Women's aversion to majors that (seemingly) require systemizing skills causes gendered field of study choice.

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This version: 6. March 2023

Abstract

This article examines whether gender differences in preferences for field of study characteristics can explain gendered major choice. Specifically, this study focuses on a broad range of subject characteristics that are often simultaneously present: systemizing skills required (math intensity, reasoning style, affinity for work tasks), future job characteristics corresponding with the male breadwinner model (materialism, work–family compatibility), and characteristics invoked by behavioral preferences (risky situations and a competitive environment). To disentangle these co-occurring characteristics and minimize the influence of other factors in the decision-making process (e.g., admission likelihood), this study uses a choice experiment incorporated in the Swiss panel study TREE. In it, a representative sample of high school students choose their preferred field of study from two artificial fields with varying characteristics. The results show the largest gender differences in preferences for characteristics related to reasoning style (abstract versus creative) and affinity for work tasks (technical versus social), and smaller differences for math intensity, competitive climate, and work–family compatibility, while there are no gender differences in preferences for materialistic characteristics (salary and prestige). Unexpectedly, the gender differences are primarily caused by female students' preferences, while male students are neutral towards most characteristics.

Acknowledgments:
I thank Felix Busch, Kristin Kelley, Martina Jakob, Hannes Kröger, Alexander Libmann, and Barbara Zimmermann for their insightful comments. Further, I would like to thank the participants of the Colloquia in Bamberg, Konstanz, Munich, and Zurich, as well as the participants of various conferences in 2019 (ECSR, RC28, and the Experimental Methods in Social Stratification Research) for their valuable inputs. This research was funded by the Swiss National Science Foundation (P400PS_180683 and PZ00P1_193286).

1. Introduction

Even though the persistent gender segregation in fields of study and related occupations is one of the larger puzzles in research on gender inequality in the labor market, the reasons why “mathematics-capable women disproportionally choose non-mathematic fields” (Ceci et al. 2009: 251) remain opaque, despite better labor market prospects of these fields (e.g., higher income and lower unemployment rate, see Murphy and Oesch 2016, Reimer et al. 2008). Indeed, research has shown that when material security is high, individuals will prefer to “express” themselves and consequently will choose subjects or occupations that are consistent with their (likely gendered) interests and self-concepts (e.g., Cech 2013, Charles and Bradley 2009). This finding might also explain why gender differences in ability and value orientation generally do not explain a large part of the gender difference in field of study choice, while students’ occupational plans are a lot more informative (e.g., Barone and Assirelli 2020, Morgan et al. 2013). However, what are the specific characteristics of occupations and their related fields of study that explain these gendered interests?

Students’ career plans are strongly influenced by their (biased) perception of occupations and related fields of study, notably ideas about the average individual and the work environment in a particular field (Gottfredson 1981). While some of these characteristics accurately reflect workplace environments and required skills (e.g., the need to be good at math for studying STEM fields), other commonly associated characteristics may be less accurate (e.g., low communal goal orientation in STEM fields and occupations). Indeed, as elaborated in Cheryan (2012), perceptions of subjects are strongly influenced by popular portrayals (of members) of these fields (e.g., in movies). Therefore, it can be assumed that students' preferences for specific subjects and occupations result from both actual characteristics and stereotypical expectations.

However, examining the importance of specific subject and occupational characteristics in the field of study choice process poses distinctive problems because fields of study combine a high number of gender-stereotyped characteristics (some based on actual differences, others on stereotyped perceptions). For example, male-dominated STEM fields (science, technology, engineering, and mathematics) could be characterized as follows: the number of mathematics courses is high, analytical reasoning skills are required, and the climate is competitive; further, these subjects prepare students for jobs that often do not require the same intensity of social interaction compared to other professions (e.g., the medical field) and that – on average – offer higher salaries and lower work–family compatibility compared to other occupations (see for further elaboration on these stereotypes about STEM: Piatek-Jimenez et al. 2018; Thébaud and Charles 2018). Due to the collinearity of these gendered characteristics, we have limited knowledge about the importance of any one of these characteristics for gendered field of study choice. For example, women may not be deterred by the number of mathematics courses in STEM fields, but by their perception that these subjects prepare for jobs that are incompatible with family goals (e.g., Weisgram and Diekman 2017) or communal goals (e.g., Diekman et al. 2010). If we are to implement policies to increase the proportion of women in male-dominated subjects – STEM fields in particular – it is necessary to improve our understanding of the importance of these (perceived) characteristics in the subject choice process. Hence, this study answers two questions. First, which field of study characteristics matter for women and men's field of study choice? Second, do men and women differ in their preferences for these characteristics?

To date, little is known about the importance of field of study characteristics in gendered subject choice. Previous research used different analytical approaches to examine this question. The first approach applied laboratory experiments and focused on the influence of one specific characteristic on individuals' choices (e.g., Weisgram and Diekman 2017) without being able to specify the importance of this characteristic compared to other known factors (e.g., math-intensity of a field). The second approach compared field of study characteristics on a macro-level without being able to disentangle the importance of the often co-occurring characteristics and to examine micro-level processes leading to these subject choices (e.g., Barone 2011, Su and Rounds 2015, Xie and Shauman 1997). The third approach analyzed the influence of gender differences in student's characteristics on subject choice (e.g., their math grades), mostly without examining the role of preferences for subject characteristics in this process (e.g., Barone and Assirelli 2020, Morgan et al. 2013). The only exceptions I know of found that preferences for agentic and communal goals (Diekman et al. 2010, Simon et al. 2017), well-paying jobs (Quadlin 2020) and for artistic, social, and realistic tasks (Ochsenfeld 2016) can explain gendered field of study choice. However, these preferences were measured after students began their studies and thus may suffer from endogeneity biases. Additionally, the importance of these preferences in relation to each other is unknown because the preferences were not ranked but only rated on a scale (see Quadlin 2020 for a detailed discussion).

This article explores the question on the importance of field of study characteristics in gendered subject choice with a different methodological approach compared to previous research – a survey-based choice experiment (e.g., Street and Burgess 2007). In this experiment, a nationally representative sample of high school students choose the field of study that best matches their interests from among artificial fields with varying characteristics and without concrete names. Since these artificial subjects mix characteristics in different combinations, students' choices indicate the importance of these characteristics in relation to each other. Therefore, unlike survey questions, this method allows to measure and rank these stated preferences. Another advantage of a choice experiment is the possibility of creating an artificial choice situation that makes it possible to diminish the interference of other processes that are likely to influence students' decision-making in real life (e.g., expected probability of success), while still providing high external validity.[1] Moreover, conducting this experiment in Switzerland (in the 2nd cohort of the Swiss panel study TREE, Hupka-Brunner et al. 2021) also substantially mitigates the potential problem that previous curricular choices and anticipated constraints influence students' choice in the experiment. This is because Swiss high school curricula are highly standardized, there are virtually no university admission restrictions, and the costs of studying are low (see Section 3 for a detailed discussion).

[1] In a similar setup, Reuben and colleagues (2017) showed that there is a strong correlation between estimated pre-labor employment preferences, as expressed in a choice experiment, and the characteristics of subsequent jobs. A more general discussion about the high external validity of choice experiments can be found in Telser and Zweifel (2007) or the meta-analysis by Quaife and colleagues (2018).

In summary, this study is the first to use a methodological approach that not only allows to measure gendered preferences for (stereotyped) field of study characteristics by disentangling the co-occurring characteristics, but also, due to its experimental approach, allows to control for a wide variety of intervening processes. Therefore, it is possible to determine the causal effect of gender on subject characteristic preferences. Moreover, in contrast to previous studies, this article focuses on a larger number of characteristics: a) requirements for systemizing skills (mathematics, analytical versus creative reasoning style, affinity for technical versus social work tasks); b) future job characteristics (materialistic features and family-friendly work structures); and c) subjects characteristics associated with risk and a competitive environment.[2]

2. Theoretical background

One of the main conclusions of previous research is that a "residual unobserved taste component" (Wiswall and Zafar 2015: 793) or "gender-essentialist preferences" (Charles and Bradley 2009, Cech 2013) are the dominant explanatory factor of gender segregation in fields of study. One important reason for these gendered preferences are societal held gender roles and gender stereotypes.[3] While gender roles consist of descriptive and injunctive norms about gendered responsibilities and proper gendered behavior, gender stereotypes describe a socially embedded set of convictions about men and women's abilities and personality. Both mechanisms affect individuals' identities by influencing their (self-perceived) abilities and shaping their interests and values (e.g., Konrad et al. 2000).

This article focuses on students' preferences in three dimensions of subject characteristics: a) preferences for using systemizing skills; b) preferences for future job characteristics (materialistic features and family-friendly work structures); and c) preferences for a risky and competitive environment. On the one hand, these dimensions correspond to gender stereotypes about the "natural" abilities of women and men. For example, women are assumed to be gifted in areas related to interpersonal relationships and men are assumed to be more analytical and technical. On the other hand, these dimensions refer to gender roles about "proper" gendered behavior, such as men must take risks, be competitive, and provide for a family, while women should exhibit caring and restrained behavior.

[2] There are other field of study characteristics that could be tested, such as sense of belonging to the student body, availability of mentors and role models, proportion of female students, etc. However, because testing more than ten factors within a vignette would likely overwhelm participants (Auspurg and Hinz 2015: 18), it was necessary to limit the number of characteristics.

[3] The most recent debate on whether societal forces account for the entirety of the gender gap in STEM field preferences or whether there could also be biological causes, can be found in the European Journal of Personality (see the contributions by Ceci et al. 2021, El-Hout et al. 2021; Stewart-Williams and Halsey 2021).

A) Preference for using systemizing skills

One important reason for gender segregation in fields of study is women's lower attendance in STEM fields. A prominent explanation for this phenomenon is that women's systemizing skills, i.e., the "ability to analyze the rules underlying a system in order to predict its behavior" (Billington et al. 2007: 261) are inferior to men's. Proponents of this Empathizing-Systemizing theory argue that individuals who score higher on systemizing have higher mathematical ability (because mathematics is a rule-based system, ibid.), are more likely to be enrolled in STEM fields than in the humanities (ibid., Focquaert et al. 2007), and are more likely to work in male-segregated occupations (Wright et al. 2015). Although studies using this approach consistently find that men score higher on systemizing, their measures are based on self-assessment and are thus susceptible to being biased by internalized gender norms.

The idea of men's higher systemizing skills corresponds to the notion of two distinct cognitive processes: one in which the mind systematically applies rules to manipulate information, thereby creating knowledge in a deductive manner; and one in which the mind processes information based on associative links with similar and contiguous information, thereby creating new knowledge in an inductive manner (Sloman 1996). The first process corresponds to cognitive functions such as deliberation, explanation, and formal analysis, while the second process pertains to cognitive functions like intuition and creativity. Although both processes are essential to the functioning of the mind, gender stereotypes assume that men excel in the former and thus possess a superior ability in abstract and logical thinking, while women apply a more intuitive and holistic approach to reasoning, which corresponds to the latter (e.g., Faulkner 2000). Consequently, men's "natural" reasoning abilities are better suited for studying science subjects with their math-intensive curricula, while women's more creative reasoning style is better suited to the humanities. In addition, men's supposedly superior reasoning skills also enable them to understand how technical devices work with much less effort, while women's greater empathy predisposes them to work tasks that require social skills, which corresponds to the "working with people versus working with things" dimension (Prediger 1982) – the interest dimension with the largest gender differences (Su et al. 2009).

Since gender stereotypes assume that men's abstract reasoning skills are superior to women's, it is seen as a logical consequence that they also outperform women in mathematics. However, there is a substantive body of research showing that gender differences in mathematical skills are relatively small: neither girls nor boys differ in their numerical ability during early childhood (Kersey et al. 2018), nor do meta-analyses show large differences in mathematical ability between men and women (e.g., Hyde et al. 2008). Furthermore, previous results also do not unequivocally support the idea that men have more often exceptional cognitive ability and math skills due to the greater male variability (no difference: Ceci et al. 2014; favoring men: Wai et al. 2010). Additionally, the supposed differences are insufficient to explain male overrepresentation in STEM subjects (O'Dea et al. 2018, Hyde et al. 2008) and contradict research showing that the proportion of highly talented men and women depends on the gender equity of a country (Guiso et al. 2009). Therefore, it is likelier that gendered socialization influences men's and women's self-assessment of their mathematics skills, which is reflected in their grades. This assumption is supported by evidence showing that parents tend to misjudge their sons' mathematical skills (e.g., Herbert and Stipek 2005). Moreover, male students are overconfident in their mathematical skills (conditional on their performance) and therefore more likely to pursue STEM subjects (e.g., Correll 2001), even if it is to their disadvantage because they overestimate their skills (Penner and Willer 2019). Unsurprisingly, previous research shows that prior achievement, tested performance, and self-assessment of skills explain a small part of the gender gap in STEM fields, although the explanatory contribution is rather low (e.g., Gabay-Egozi et al. 2014, Justman and Méndez 2018, Lörz et al. 2011, Mann and DiPrete 2013, Morgan et al. 2013).

These ideas about gender differences in systemizing skills influence individuals' interests and self-concept and, in turn, their career choices. Indeed, a meta-analysis on vocational interests shows that men prefer jobs with technical and scientific tasks, while women prefer to work in jobs associated with social skills (Su et al. 2009). The gender difference was especially large in the "things versus people" dimension, with almost one standard deviation difference. Research on gender segregation in subject choice confirms the importance of this "humanistic–scientific" and "care–technical" divide, with women opting for subjects in the humanities and subjects involving aspects of care (Barone 2011), which reflects methodologically similar research showing the importance of the "things versus people" dimension in explaining gender segregation within STEM fields (Su and Rounds 2015). Indeed, stereotypes portray STEM fields and careers as technology-focused and unrelated to any communal goals (such as working with or helping people), even though these stereotypes are often wrong (e.g., Cheryan 2012). Consequently, in comparison to other factors, vocational interests related to these dimensions are pivotal in field of study choice (e.g., Ochsenfeld 2016). In a similar vein, studies have shown (e.g., Diekman et al. 2010, Simon et al. 2017) that individuals who endorse communal goals are less likely to show interest in STEM careers, which is reflected in Cech's (2013) result that women who identify with being emotional, unsystematic, and people-oriented are less likely to enter male-dominated fields.

In summary, this article focuses on three subject characteristics that are associated with systemizing skills: A) math intensity of a subject; B) required reasoning style (associative/creative versus analytical/systematic); and C) affinity for technical versus social work tasks. Because gender stereotypes assume that men have higher systemizing skills compared to women, it is expected that males have a significantly higher preference for all characteristics associated with systemizing skills (higher math intensity, an analytical reasoning style, and preparing for jobs which require affinity for technical work tasks) (Hypothesis 1).

B) Preferences for job characteristics corresponding to the male breadwinner model

Gender stereotypes assume that men are agentic (e.g., assertive, controlling, confident), while women are communal (e.g., affectionate, nurturing, kind) (e.g., Eagly and Karau 2002). Consequently, the respective social norms prescribe that men should aim for higher status roles in society and for being the breadwinner in the family. In contrast, women are expected to become the primary caregivers and should therefore choose occupations allowing them to reconcile family and career (e.g., Hakim 2002). However, it is less clear whether these general values affect preferences for future job characteristics.

Regarding men's inclination towards materialism, the evidence is mixed on whether men choose male-segregated fields because of the potential for higher earnings (positive effect: Lörz et al. 2011, Mann and DiPrete 2013, Ochsenfeld 2016, no effect: Zafar 2013). The same holds true for whether men are more likely to choose working conditions with higher prestige (for supporting evidence: Busch-Heizmann 2014, Eccles 2007; for contradicting evidence: Marini et al. 1996, Rowe and Snizek 1995). Regarding women's inclination towards family-friendly workplace characteristics, the evidence remains mixed on whether this lifestyle preference leads to gender-segregated subject choice. Beliefs about the possibility of reconciling work and family affect STEM field choice in some studies (e.g., Mann and DiPrete 2013, Weisgram and Diekman 2017), while others find no correlation (e.g., Lörz et al. 2011, Morgan et al. 2013, Ochsenfeld 2016).

In summary, this article focuses on two subject characteristics that are associated with work–family preferences: A) the preference for materialism (salary and prestige); and B) the preference for the possibility to combine work and family. Because these preferences touch on the core idea of gendered responsibilities in society and family, it is expected that men will show a significantly higher preference for subjects that prepare for occupations with above average salary and high prestige, while women will show a higher preference for subjects that prepare for occupations that allow work and family to be combined (Hypothesis 2).

C) Preference for competitive and risky environments

A diverse set of studies assembled by Croson and Gneezy (2009) shows that women have higher risk and competition aversion, which could be one reason for gender segregation in fields of study and the labor market. Evidence suggests that these differences are caused by both hormonal levels and socialization (e.g., Andersen et al. 2013, Sapienza et al. 2009) which produce gender-specific emotional responses to risky or challenging situations (nervousness and fear in women versus anger in men, Arch 1993). Additionally, there is some evidence that men tend to be overconfident in their predictions of success in laboratory experiments, conditional on actual performance, especially in male-typed tasks (e.g., Kamas and Preston 2012). As a result, women are less likely to opt for competitive situations, even if their performance does not differ from men's and even if the competition-like situation is financially more rewarding (e.g., Niederle and Vesterlund 2007). This makes women less likely to choose risky careers (e.g., Sapienza et al. 2009) and competitive high-prestige subjects and schools (e.g., Buser et al. 2014). In addition to these internal constraints, social norms expect women to behave communally rather than agentically (e.g., Eagly and Karau 2002) and to present themselves in a self-deprecating way (e.g., Miller et al. 1992). Unsurprisingly, this undermines women's odds in competitive and bargaining situations, and thus results in them avoiding competitive fields for fear of being penalized for violating these norms (e.g., Amanatullah and Morris 2010). Research on subject choice confirms that the level of competitiveness in a field discourages girls more than boys (Mann et al. 2015). However, the effect of individuals' preference for competition is mixed: while in Reuben et al. (2017), competitiveness and overconfidence do not predict subject choice, the opposite is true for the choice of mathematics in Swiss (Buser et al. 2017) and Dutch (Buser et al. 2014) high schools.

In summary, this article focuses on two subject characteristics that are associated with behavioral preferences: the preference for subject environments that encourage risk-taking and competitive behavior. Because these preferences are associated with the male gender stereotype and gender roles, it is expected that males show a significantly higher preference for subjects with a competitive climate and subjects that prepare for jobs involving a higher number of risky situations (Hypothesis 3).

3. Analytical approach

Research on field of study choice has mainly relied on observational data to measure field of study preferences. In contrast, the analyses in this article are based on a survey-based stated choice experiment (Street and Burgess 2007). This approach allows to construct artificial subjects consisting of counterfactual combinations of subject characteristics from which participants must choose. More precisely, high school students' preferences for (stereotyped) subject characteristics are measured by asking them to choose from two artificial subjects (the choice set) the one they would like to study (see Figure 1 for an example, a more detailed explanations of the different attributes and levels follows in paragraph 4). Because the levels of the subject characteristics are combined in different ways in each artificial subject, it ensures the identification of men's and women's preferences for these characteristics. For example, there are choice sets presenting subjects with above average salary and high competition, while other choice sets show the combinations of above average salary and low competition, below average salary and high competition, or below average salary and low competition. Since these artificial subjects combine different levels of sets of characteristics, it is possible to estimate the importance of these characteristics in relation to each other. This is not possible with real fields of study because the presence of subject characteristics is not independent. The results of the experiment can be interpreted as the preferences of an average student for certain characteristics, since high school students are randomly allocated to these choice sets and consequently differences between students evaluating these different choice sets are minimized.

Figure 1: Example of a choice set

I'm sure you've already thought about what you'd like to do after graduating from high school.
Below you will find two descriptions of fields of study.

Which of these subjects would you be more interested in, A or B?

	Subject A	Subject B
Characteristics of the subject:		
Mathematics is an important part of the subject	rather no	rather yes
The subject primarily requires ...	associative and creative thinking	analytical and systematic thinking
Competition among students is ...	low	high
Characteristics of the profession the subject is preparing for:		
The risk of not finding a suitable entry job within one year is ...	average	low
Important professional skills are ...	compassion and social skills	affinity for technics and technology
The monthly salary is in comparison to other subjects ...	below average	above average
The reputation of the profession in Switzerland is ...	average	high
Workloads below 60% are ...	most of the time possible	hardly possible
Which of these subjects would you be more interested in?	A ☒	B ☐

Gender segregation in fields of study result from a series of interconnected processes that are difficult to disentangle with survey data. One limitation of using survey data is that students' responses on their preferred subject characteristics may be influenced by their prior choices, as individuals tend to avoid cognitive dissonance (e.g., Izuma et al. 2010). In contrast, the artificial choice situation in an experiment is less prone to this influence since the artificial fields are not named and do not resemble actual fields of study. Another concern is contextual factors that may systematically affect individuals' choices regardless of their actual preferences. This is why an experimental design is advantageous because it reduces the influence of biased knowledge about fields and anticipated constraints (e.g., mismatch with the stereotypical student body, likelihood of admission, potential financial hardship) on students' choices. Especially anticipated constraints can pose a significant challenge to an unbiased identification of gender preferences, as women tend to make more risk-averse decisions.

Switzerland is an ideal location for this study due to its setting with minimal restrictions on field of study choice. Three points are noteworthy: First, Swiss high school students do not face entry restrictions to the different subjects,[4] as long as they successfully pass the end-of-high school exam.[5] This is because students' curricula are quite homogeneous, as they cannot

4 The only exceptions are medical fields in the German-speaking part of Switzerland and sports science at some universities. To study these subjects, students must pass an admissions exam that explicitly tests skills related to the requirements of the field of study (e.g., visual recognition of patterns in the medical field, athletic ability in sports science). However, due to Switzerland's small size, commuting to other parts of Switzerland is not prohibitive time- and money-wise, so students can enroll at another university.

5 In most cantons, less than 5 percent of high school students fail the baccalaureate exams (Eberle and Brüggenbrock 2013). Even if students fail, they are allowed a second attempt after repeating the final year of high school.

opt out of high school courses (e.g., from the advanced calculus courses) and thus should theoretically be able to study all fields.[6] Second, there are no admission restrictions to Swiss universities, as they are obliged to admit students to all undergraduate-level programs, provided they have successfully completed high school. Third, at 2% of an annual median wage,[7] the cost of studying is so low that students' subject choice should not be significantly influenced by financial considerations (in contrast to the U.S., for example, see Quadlin 2017).

As elaborated in the theory section, this article focuses on preferences for eight (stereotyped) subject characteristic that are part of the three preference dimensions systemizing skills, job characteristics, and behavioral preferences. The operationalization of the corresponding attributes and levels in the experiment is inspired to some extent by the survey experiment in Wiswall and Zafar (2018) and by the subject descriptions from the Swiss career counseling homepage (www.berufsberatung.ch), and was further refined after several rounds of cognitive pretests with Swiss high school students (see Table 1). Individuals' preference for subject characteristics associated with systemizing skills are measured as follows: A) preference for subjects in which mathematics is an important part (measurement for math intensity); B) preference for using an analytical and systematic versus an associative and creative reasoning approach (measurement for reasoning style); and C) preference for jobs requiring an affinity towards technical tasks and technology, rather than compassion and social skills (measurement for affinity towards technical versus social work tasks). Preference for job characteristics was operationalized with three attributes: A) preference for a subject promising a high future salary compared to other fields (income); B) preference for a job with high reputation (prestige); and C) preference for subjects preparing for jobs in which a level of employment below 60% is possible (work–family compatibility[8]). Finally, behavioral preferences were measured as follows: A) preference for subjects with medium or low risk of not finding a suitable entry job (risk-seeking preferences)[9]; and B) preference for subjects with low or high competition among students (competition-seeking preferences).

Most of these attributes have a one-dimensional scale (e.g., low–high), except for the attributes describing an individual's reasoning style and affinity towards technical versus social work tasks. These two characteristics are represented with a two-dimensional scale for two reasons: First, using four attributes instead of two would have resulted in overly complex choice sets. Second, gender stereotypes construct abstract versus holistic thinking and social versus technical skills as mutually exclusive attributes of the same underlying traits (e.g., Faulkner 2000) that represent important gender differences in interests (e.g., Su et al. 2009). Furthermore, for reasons of external validity, it is not possible to use the levels "low" and "high" for all one-dimensional attributes. In particular, it is not plausible that future university graduates apply for jobs with

6 Other research (e.g., Barone and Assirelli 2020) has shown that students' curricula choices have a tremendous effect on their later subject choice.

7 The tuition costs are around 1,600 CHF yearly, while the median yearly salary in Switzerland is around 78,000 CHF. Further, students can apply for non-repayable bursaries if their parents' income is below a certain threshold.

8 In Switzerland, part-time work is especially prevalent in the female-dominated service sector and very common for women with small children, with 82 percent of them working part-time (the corresponding number for men is 13 percent) (FSO 2017).

9 One might argue that this measurement of risk aversion could be influenced by the current economic situation. However, youth unemployment rate in Switzerland is has been low and rather stable over the past 20 years (between 4 and 8 percent, currently 6.9 percent) (FSO 2022a).

high unemployment risk, low prestige, and low salary, as the Swiss labor market has been suffering from a shortage of highly skilled workers for several years now (e.g., Beerli et al. 2021; Buchs and Buchmann 2017). The choice set itself contains a short introductory text, presents the two subjects (unlabeled, entitled Subject A and Subject B) with their attributes in a tabular form, and concludes with a question asking students which of the two subjects they would choose (see Figure 1, which shows an example of the choice set). The translation of the choice sets between the three survey languages (German, French, and Italian) was carried out by a professional translation service (see Table OA1 in the Online Appendix for the wording in the original survey languages).

Table 1: Choice set attributes and levels

Preference dimension	Subject characteristics (choice set attributes)	Exact phrasing	Levels of attributes
Systemizing skills	Math intensity	Mathematics is an important part of the subject	- rather no - rather yes
	Reasoning style	The subject primarily requires	- associative and creative thinking - analytical and systematic thinking
	Work task affinity	Important professional skills are	- compassion and social skills - affinity for technical tasks and technology
Breadwinner model	Salary	In comparison to other subjects, the monthly salary is	- below average - above average
	Prestige	The reputation of the profession in Switzerland is	- average - high
	Work–family compatibility	Levels of employment below 60% are	- most of the time possible - hardly possible
Behavioral preferences	Risk-seeking	The risk of not finding a suitable initial job within one year is	- average - low
	Competition-seeking	Competition among students is	- low - high

The choice experiment itself was integrated in the second wave of TREE2 (2018). TREE2 is the second cohort of the Swiss longitudinal survey TREE multi-cohort panel study (Transitions from Education to Employment, Hupka et al. 2021), which is based on a nationally representative sample of Swiss students in the last compulsory school year. This study focuses on 18-year-old students enrolled in high schools (baccalaureate schools), who are thus potentially eligible to transition to university (N = 1,734). Out of these students, 1,551 individuals participated in the experiment, with 62% of the respondents being female.[10] At the time of the survey, students' transition to university was about two years ahead of them.

The experimental design is as follows. Because a full factorial based on a design with eight dimensions and two levels consists of 256 choice sets, a selection of choice sets was obtained with an optimal orthogonal in the differences (OOD) design by using the program Ngene. A major advantage of the OOD design approach is that it forces respondents to make tradeoffs

[10] There is no apparent bias towards female participation as 59% of high school graduates were female in 2019 (FSO 2021).

among attributes in a choice set because there is minimal overlap among attribute levels in the alternatives (Street and Burgess 2007). This approach resulted in 24 choice sets (D-optimality 100%), identifying all the main effects and two-way interactions of the choice attributes (see Table OA2 in the Online Appendix for the different choice sets). The dimensions were chosen to avoid illogical cases and thus no vignette had to be excluded. Efficiency is improved by using a stratified random assignment of choice sets by respondents' gender and language region. Because the experiment was part of a large survey conducted with CASI, each respondent answered only one choice set, which was randomly allocated within blocks. All vignettes were evaluated between 55 and 73 times (female subsample: average number of ratings: 40 (range: 32–45); male subsample: average number of ratings: 24 (range: 21–28). To check whether the random treatment allocation worked, balancing tests were conducted, showing that none of the vignettes was evaluated more frequently by one gender. Similarly, other important respondent characteristics, such as parental ISEI and mathematical ability, are well balanced (see Table OA3 in the Online Appendix for means by choice sets and Wald tests).

The analytical approach consists of analyzing the survey experiment with a logit model, as the dependent variable indicates whether the student chooses alternative A or alternative B of the choice set. Because the two alternatives are always represented with opposite attribute levels in the OOD design (see Table OA2 in the Online Appendix), it is not necessary to estimate conditional logit models. The independent variables are the gender of the student and the subject characteristics of the choice set that the student was exposed to. As explained earlier, choice sets differ in the combination of subject characteristics (the independent variables) and therefore a positive (negative) effect of an independent variable means that a student is more likely (less likely) to choose an artificial subject with those specific characteristics. To examine whether women and men differ in their preferences, all independent variables describing the choice set are interacted with the gender of the student (see equation 1). The average marginal effects for all subject characteristics for both genders are plotted separately and the difference between men and women's coefficients are displayed graphically. The significance of the coefficient differences is estimated with Wald tests. Note that due to the design of the experiment, all estimated effects are conditional on the other subject characteristics. Because observations within choice sets may not be independent, random effects models are estimated. All replication material is available at the GESIS archive.

1) $$log \frac{p_{choice\ of\ field\ B\ instead\ of\ field\ A}}{1-p_{choice\ of\ field\ B\ instead\ of\ field\ A}} = \beta_0 + \beta_1 sex_i * (\beta_2 Math_j + \beta_3 Thinking_j + \beta_4 Affinity_j + \beta_5 Salary_j + \beta_6 Prestige_j + \beta_7 Parttime_j + \beta_8 Competition_j + \beta_9 Risk_j) + U_i + W_{ij}$$

with i = individuals, j = choice sets

4. Results

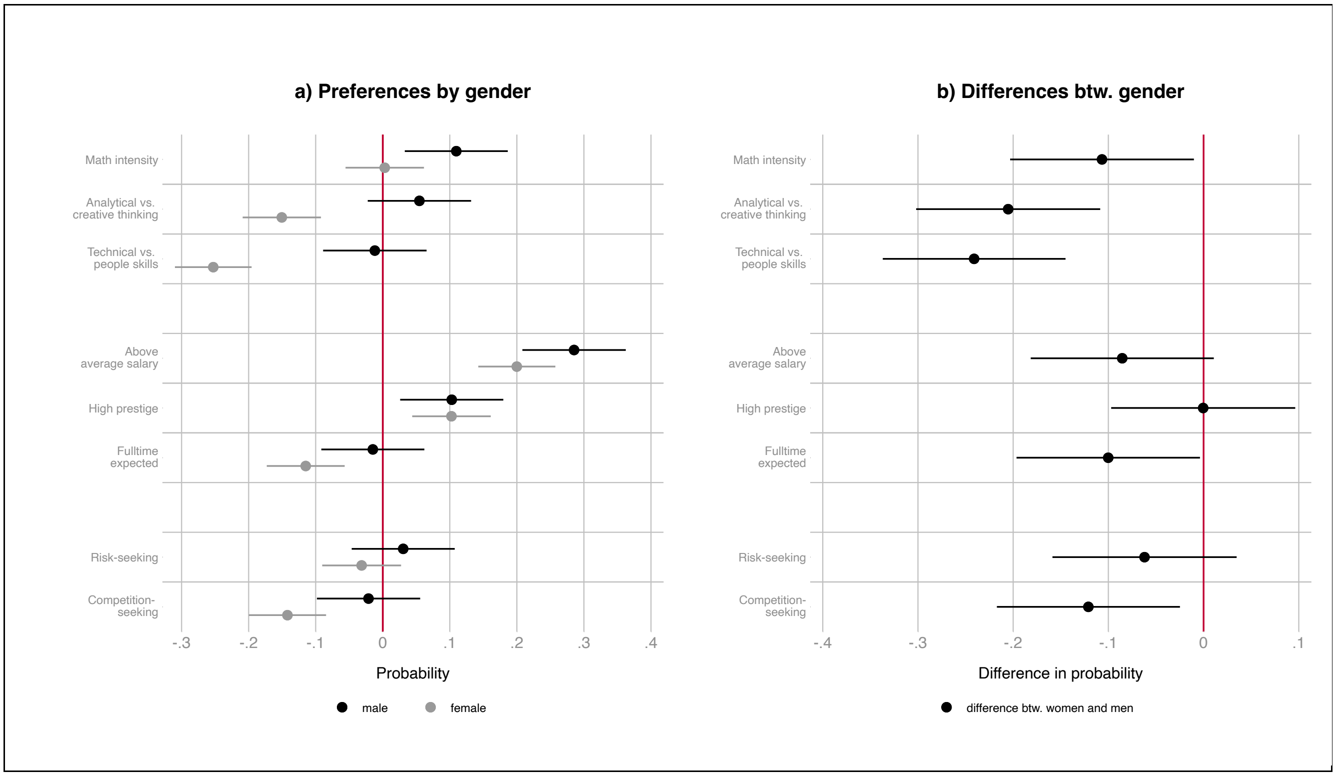
4.1. Gender differences in preferences for subject characteristics

To answer the two research questions, this article first examines which (potentially stereotypical) field of study characteristics are important in a hypothetical field of study choice situation for men and women (see Panel A in Figure 2), and second, whether these preferences differ by gender (see Panel B in Figure 2). In general, a wide variety of characteristics influence individuals' field of study choice, but that the average female and male high school student react differently to these characteristics. Most often, women prefer characteristics that adhere to gender stereotypes and gender roles, while men's choice is often not affected by field of study characteristics.

To go into detail, this section starts with the systemizing skills dimension and whether these characteristics matter more for men (Hypotheses 1). The analyses show that the average male student in the hypothetical subject choice situation is 11 percentage points ($p = 0.005$) more likely to choose a math-intensive subject compared to a non-math-intensive field. In contrast, the average female student is neutral toward this characteristic ($p = 0.92$). Regarding reasoning style, women are 15 percentage points more likely to choose the subject requiring associative reasoning (instead of analytical reasoning, $p < 0.001$), while men do not consider this subject characteristic in their choice ($p = 0.16$). Finally, gender-specific work tasks do not affect male students' choice ($p = 0.77$), while women are 25 percentage points less likely ($p < 0.001$) to choose a field of study that prepares for occupations requiring technical skills rather than a field that prepares for occupations requiring social skills. All gender differences for systemizing characteristics are significant: Affinity for gender-specific work tasks displays the largest difference between men and women (24 percentage points, $p < 0.001$), followed by thinking style preference (21 percentage points, $p < 0.001$)[11], and preference for math-intense subjects (11 percentage points, $p = 0.0303$). Summarizing, Hypothesis 1 is confirmed: The results overwhelmingly show that women dislike systemizing characteristics, whereas men are neutral toward these attributes in the experiment (except for men's clear preference for mathematics and women's neutral stance).

Figure 2: Preferences for subject characteristics by gender

[11] However, the difference between the two gender differences for preference for work tasks and reasoning style is not significant (diff. in diff. = 3.6 percentage points, $p = 0.58$).



Notes:
N = 1551. 95%-confidence interval reported. Dependent variable: Choice of "Subject B" instead of "Subject A" in experiment.
Figure A: Average marginal effect of subject characteristics by gender.
Figure B: Difference of the average marginal effects between gender.
Random-effect models. Choices are nested in vignettes.
The coefficients for the underlying logit random-effects model are reported in Table OA4 (Model 1) in the Online Appendix.
The coefficients displayed in Figure 2 are reported in Table OA5 in the Online Appendix.

In a next step, we examine the effect of job characteristics that correspond to the male breadwinner model. The analysis shows that both genders prefer fields of study that prepare for jobs with higher materialistic returns (preference for above vs. below average salary: men = 29 percentage points, $p < 0.001$; women = 20 percentage points, $p < 0.001$; preference for high vs. average prestige: men = 10 percentage points, $p = 0.009$; women = 10 percentage points, $p = 0.001$). Figure 2 also suggests that young women might anticipate potential work–family conflicts, as they show an aversion to fields that prepare for jobs requiring full-time employment (instead of jobs with part-time work opportunities, probability = 11 percentage points, $p < 0.001$), in contrast to men ($p = 0.71$). However, significant gender differences can only be found in preference for fulltime work (10 percentage points, $p = 0.042$), while there is no significant gender difference for materialistic job characteristics (difference in salary: $p = 0.08$; difference in prestige: $p = 0.99$). In summary, the results only partially support Hypothesis 2 that women and men differ in their preferences for job characteristics corresponding with the male breadwinner model. Contrary to the hypothesis, both genders show a clear preference for materialistic job characteristics. Consistent with the hypothesis, 18-year-old women already seem to anticipate potential work-family conflicts and thus prefer fields that prepare them for jobs with the possibility of part-time work.

Finally, regarding behavioral preferences, Hypothesis 3 assumed that men would show a higher preference for both risk and competition. However, neither men nor women react to subject characteristics associated with risk ($p_{men} = 0.44$; $p_{women} = 0.30$). In contrast, female respondents are 14 percentage points less likely to choose an artificial field of study in which competition among students is high (instead of low, $p < 0.001$), while men are neutral ($p = 0.59$). The gender difference in preference for competition is significant (difference = 12 percentage points, $p = 0.0137$). Therefore, the hypotheses concerning behavioral preferences is only partially supported: There is no gender difference in preference for risky job environments, while women dislike competitive features in fields of study (in contrast to men who are neutral towards this characteristic).

The question arises whether the results of the experiment reflect individuals' genuine preferences. To assess the external validity of the experiment, we examined whether the students' preferences for field characteristics in the experiment are linked to their intentions to pursue fields of study that are associated with those characteristics (the information on their plans is based on an open-ended question asked in a different part of the survey, see the Online Appendix for more details). To answer this question, we examine the following: a) whether students with materialistic values plan to study business, economics, or law (given that these fields offer the highest salaries in Switzerland, see FSO 2022b), b) whether students with preferences for systemizing characteristics plan to study STEM fields, c) whether students with a preference for compassion and social skills plan to study fields in the area of health and teaching, and d) whether students with a preference for creative and associative thinking plan to study the arts (e.g., music, theater, dancing, design). This robustness check employs the same analytical strategy as before, but with a two-way interaction between the characteristics of the choice set presented to the students and whether students mentioned any of the corresponding fields in their future study plans. The results (see Table A1, Models 1) confirm that the revealed preferences in the experiment correlate with characteristics of the fields that respondents intend to pursue in their plans: Students who prefer above average salary and high prestige in the experiment are more likely to plan studying economics or legal sciences. Individuals with study plans in STEM fields are significantly more likely to choose high math intensity, analytical thinking ability, affinity for technical tasks, and full-time employment in the experiment. Respondents with study plans in health or teaching show an aversion to competition and risk in the experiment, as well as an affinity for socio-emotional skills. Finally, students with a preference for associative and creative thinking in the experiment are more interested in artistic fields in real life.

Two additional robustness checks and one final remark close this section. First, there is always the possibility that some attribute combinations in the vignettes resemble certain fields of study or seem implausible to students, thus affecting students' choice differently. For this reason, a variable was added to the models describing the attribute combinations present, thereby effectively controlling for unobserved heterogeneity across vignettes. As can be seen in the Appendix (Table A1, Model 2), the coefficients are very similar to those from the random-effects model. Second, the question arises whether the examined field of study characteristics in the experiment are representative for male-dominated fields.

Additional analyses show that these characteristics indeed correlate with a preference for male-dominated fields (see Online Appendix Table OA7). Finally, a potential concern is that students approached the experiment as a form of "game", rather than revealing their authentic preferences. Nonetheless, this does not undermine the identification of the effects, as any gamification behavior would solely introduce additional variance, which would reduce the accuracy of the estimates, but it would not introduce any bias.

5. Discussion

Despite extensive research on the reasons for gender segregation in fields of study, it remains a conundrum why women with high mathematics ability do not pursue male-dominated subjects at the same rate as their male counterparts. One possibility that has received little attention is gendered preferences for subject characteristics. In contrast to previous research, which relied either on survey data with a small selection of questions measuring subject characteristic preferences or on laboratory experiments examining one specific subject characteristic, this article took a different approach. Specifically, this article answers this question through a survey-based choice experiment in which high school students were asked to choose between two artificial subjects, each with distinct characteristics and no actual names, to determine their field of study preferences. The focus of the experiment is on a broad range of characteristics that are often simultaneously present in fields: requirement for systemizing skills (math intensity, reasoning style, affinity for work tasks), job characteristics that the field is preparing for (materialism, work–family compatibility), and invoked behavioral preferences (the field involves risky decisions and a competitive environment). This approach has distinct advantages: it measures stated preferences, it allows disentangling the often colinear subject characteristics, it creates a ranking of the importance of these characteristics relative to each other, and it ensures that the importance of subject characteristics for field of study choice is measured without introducing biases due to other processes (e.g., incomplete information about subjects, likelihood of admission, or expected lack of fit with a subject's student body). The experiment itself was conducted with a representative sample of Swiss youths from the second cohort of the Swiss panel study TREE and thus benefits from Switzerland's favorable contextual factors, such as unrestricted access to most subjects and very low tuition fees, factors that might affect women's and men's subject choices differently.

The analyses show that beliefs about required reasoning styles and work task affinity are the main drivers of gender segregation in fields of study. While these characteristics do not affect men's choice in the experiment, they are the strongest predictor of women's choices, resulting in the largest gender differences in the experiment. This confirms previous findings on the importance of communal goals for women's STEM career choice (e.g., Cech 2014, Diekman et al. 2010, Ochsenfeld 2016, Simon et al. 2017, Su and Rounds 2015). Interestingly, the math intensity of a subject is not relevant for a women's hypothetical choice (as opposed to men's). Another unexpected result is the lack of gender differences in preferences for materialistic benefits – both men and women value high prestige and above average salary. However, unlike men, women have a high preference for subjects that prepare for jobs with a high work–family compatibility (confirming previous research, e.g., Weisgram and Diekmann 2017) and no competitive climate (see, e.g., Buser et al. 2017), although, the gender difference in these preferences is rather small compared to the large gender difference in required reasoning styles and work tasks affinity.

Overall, these results contribute to the study of gendered subject choice by connecting previous research findings based on different methodological approaches. First, the article's finding that reasoning styles and affinity towards work tasks exhibit the largest gender differences reflects Barone's (2011) finding that gender segregation in fields of study is primarily due to women and men sorting into subjects along a humanistic–scientific and a care–technical divide. Second, the results also explain why gender differences in mathematical ability and grades explain only a small part of women's lower preference for male-dominated STEM fields (e.g., Barone and Assirelli 2020, Ceci et al. 2009, Morgan et al. 2013). While the math-intensity of a subject is irrelevant for women's choice in the experiment, they avoid field of study characteristics that correlate with STEM field plans and that have strong gender stereotypical connotations – logical thinking and an affinity of technical tasks. In line with previous research (e.g., Cech 2014, Correll 2001) and without having tested this assumption, I speculate that women's actual math ability might not be sufficient to overcome their stereotyped beliefs about their systemizing ability. Future research should investigate this question in more detail.

Even though this article has provided new evidence for several open research questions, some points remain to be discussed. First, female students' decision-making process is much more influenced by the subject characteristics presented in the experiment compared to male students. Whether female students react more strongly to stereotypical expectations or whether male students' choices depend primarily on field of study characteristics that were not assessed in this experiment remains an open question and should be explored in more detail in the future. Second, the experiment only measures respondents' preferences in a hypothetical choice situation. While previous choice experiments on a similar topic have demonstrated strong external validity (Reuben et al. 2017), and our own analysis based on field of study plans supports this finding, investigating final subject choices would be a valuable addition to this analysis. Third, the experiment combined the dimension of analytical and creative reasoning style and of technical and social skills for theoretical and methodological reasons. Due to the importance of these factors in the results, it would be valuable to differentiate between these preferences and investigate whether women genuinely prefer social work tasks and creative thinking, or whether they simply have an aversion to technical work tasks and analytical thinking. Finally, it must be stressed that the experiment focused on the influence of field of study characteristics on field of study choice. Therefore, this article does not inform on the influence of other likely reasons for field of study choice such as parental preferences for specific subjects or peer effects in field of study choice.

The results of this study have two important policy implications. First, the experiment revealed that job characteristics play a role in the choice of field of study. Therefore, higher financial rewards in female-dominated occupations might attract more men, while STEM occupations might attract more women if they offer jobs with a good work-life balance. Second, the experiment showed that the largest gender differences in subject preferences emerge in the stereotypical notions of required thinking skills and affinity for work tasks. Therefore, it is necessary to change the common perception that associates certain subject characteristics exclusively with male- or female-dominated subjects, as already suggested by Cheryan (2012). For example, male-dominated engineering also requires creative thinking and social skills (i.e., developing new products as part of a team), while female-dominated psychology also requires analytical thinking and technical skills (i.e., setting up and analyzing eye-tracking experiments). Thus, an easy to implement recommendation is that universities not only continue to provide role models and advertise male- and female-dominated subjects as gender-inclusive, but also specifically could try to reframe the content of their subjects, thereby encouraging equally qualified women to choose currently male-dominated subjects (and vice-versa).

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Appendix

Table A1: Robustness checks.
Dependent variable: Choice of field "B" in the choice experiment.

Type of robustness check:	**(1) Does the experiment measure real-life preferences?**				**(2) Check for unobserved heterogeneity between vignettes**	
Field of study plans include:	Business, Economics, law	STEM	Health and Teaching	Art (e.g., music, theater, visual art)		
Mentioned being interested	-1.280*	-2.072***	0.646+	3.149***	Sex (1 = female)	2.185***
in studying specific field	(0.512)	(0.392)	(0.387)	(0.821)		(0.000)
High math intensity	0.135	-0.253+	0.210	0.267*	High math intensity	0.616+
	(0.131)	(0.152)	(0.142)	(0.125)		(0.077)
Analytical reasoning style	-0.355**	-0.608***	-0.373**	-0.144	Analytical reasoning style	-0.0253
	(0.131)	(0.153)	(0.142)	(0.126)		(0.937)
Affinity for techn. tasks	-0.795***	-1.339***	-0.631***	-0.826***	Affinity for techn. tasks	0.177
	(0.131)	(0.158)	(0.143)	(0.126)		(0.521)
Above average salary	0.834***	1.176***	0.933***	1.143***	Above average salary	1.224***
	(0.132)	(0.157)	(0.144)	(0.126)		(0.000)
High prestige	0.248+	0.509***	0.297*	0.366**	High prestige	0.680*
	(0.131)	(0.155)	(0.143)	(0.126)		(0.012)
Full-time job	-0.275*	-0.541***	-0.282*	-0.205	Full-time job	-0.158
	(0.131)	(0.156)	(0.143)	(0.126)		(0.556)
High risk	-0.0542	-0.0995	0.104	-0.123	High risk	-0.149
	(0.131)	(0.152)	(0.142)	(0.125)		(0.593)
High competition	-0.541***	-0.697***	-0.337*	-0.421***	High competition	0.107
	(0.131)	(0.155)	(0.143)	(0.126)		(0.745)
High math intensity	0.141	1.344***	-0.231	-1.652**	High math intensity	-0.487*
* field was mentioned	(0.348)	(0.264)	(0.268)	(0.550)	* female	(0.034)
Analyt. reasoning	0.0883	0.914***	0.143	-2.607***	Analyt. reasoning	-0.942***
* field was mentioned	(0.353)	(0.264)	(0.268)	(0.576)	* female	(0.000)
Affinity tech. tasks	-0.285	1.482***	-0.642*	-0.0634	Affinity tech. tasks	-1.136***
* field was mentioned	(0.368)	(0.267)	(0.272)	(0.561)	* female	(0.000)
Above average salary	1.429***	-0.226	0.369	-1.089+	Above average salary	-0.281
* field was mentioned	(0.374)	(0.267)	(0.271)	(0.581)	* female	(0.225)
High prestige	0.955**	-0.281	0.213	-0.0874	High prestige	0.0366
* field was mentioned	(0.371)	(0.265)	(0.271)	(0.560)	* female	(0.875)
Full-time job	-0.116	0.610*	0.0308	-0.783	Full-time job	-0.469*
* field was mentioned	(0.361)	(0.266)	(0.270)	(0.569)	* female	(0.043)
High risk	-0.0956	-0.0502	-0.675*	0.901	High risk	-0.362
* field was mentioned	(0.347)	(0.264)	(0.268)	(0.595)	* female	(0.116)
High competition	0.113	0.474+	-0.559*	-0.828	High competition	-0.633**
* field was mentioned	(0.363)	(0.264)	(0.271)	(0.566)	* female	(0.006)
Constant	0.364+	0.851***	-0.0265	-0.0983	Constant	1.459***
	(0.190)	(0.217)	(0.206)	(0.183)		(0.001)
N	1285	1285	1285	1285	*N*	1551
rho	< 0.001	< 0.001	< 0.001	< 0.001	*rho*	< 0.001

Notes:
Model 2: Coefficients for vignettes not shown. The full model is reported in Table OA4 (Model 2) in the Online Appendix.

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Online Appendix for the article

Women's aversion to majors that (seemingly) require systemizing skills causes gendered field of study choice.

by Benita Combet[1]

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1. Additional information on the choice experiment

Table OA1: Phrasing of the experiment in the different languages

English		**German**	
I'm sure you've already thought about what you'd like to do after graduating from high school. Below you will find two descriptions of fields of study. Which of these subjects would you be more interested in, A or B?		*Bestimmt hast du dir schon Gedanken gemacht, was du nach dem Abschluss des Gymnasiums machen möchtest. Nachfolgend findest du zwei Beschreibungen von möglichen Studienfächern. Welches dieser Studienfächer würde dich mehr interessieren, Studienfach A oder Studienfach B?*	
Characteristics of the subject		**Merkmale des Studienfachs**	
Mathematics is an important part of the subject	- rather no - rather yes	Mathematik ist ein wichtiger Bestandteil des Studiums	- eher nein - eher ja
The subject primarily requires ...	- associative and creative thinking - analytical and systematic thinking	Das Studium erfordert in erster Linie ...	- assoziatives und kreatives Denken - analytisches und systematisches Denken
Competition among students is ...	- low - high	Das Konkurrenzdenken zwischen den Studierenden ist ...	- niedrig - hoch
Characteristics of the profession the subject is preparing for		**Charakteristika des Jobs, auf den das Studium vorbereitet**	
The risk of not finding a suitable entry job within one year is ...	- average - low	Das Risiko, innerhalb eines Jahres keinen zum Studium passenden Einstiegsjob zu finden, ist ...	- durchschnittlich - niedrig
Important professional skills are ...	- compassion and social skills - affinity for technical tasks and technology	Wichtige Fähigkeiten sind ...	- Einfühlungsvermögen und Sozialkompetenz - Flair für Technik und Technologie
The monthly salary is in comparison to other subjects ...	- below average - above average	Der monatliche Lohn ist im Vergleich zu anderen Studienfächern ...	- unterdurchschnittlich - überdurchschnittlich
The reputation of the profession in Switzerland is ...	- average - high	Das Ansehen des Jobs in der Schweiz ist ...	- durchschnittlich - hoch
Workloads below 60% are ...	- most of the time possible - hardly possible	Arbeitspensen unter 60% sind möglich ...	- kaum - meistens

French		**Italian**	
Vous avez certainement déjà réfléchi à ce que vous souhaitez faire après avoir terminé le gymnase. Ci-dessous, vous trouverez deux descriptions de matières d'études possibles. Laquelle des deux matières vous interesserait davantage, A ou B ?		*Lei avrà sicuramente già pensato a quello che desidera fare dopo aver concluso il liceo. Qui sotto troverà due descrizioni di possibili materie di studio. Quale delle due materie la interesserebbe di più, la A o la B?*	
Caractéristiques de la matière:		**Caratteristiche della materia:**	
Les mathématiques forment une partie importante de la matière	- plutôt non - plutôt oui	La matematica occupa una parte importante della materia	- piuttosto no - piuttosto sì
La matière demande en première ligne …	- De penser par association et un esprit créatif - Une pensée analytique et systématique	La materia richiede soprattutto ...	- Di pensare per associazione e uno spirito creativo - Un pensiero analitico e sistematico
L'esprit de competition entre les étudiant(e)s est …	- faible - fort	Lo spirito di competizione tra gli studenti è ...	- debole - forte
Caractéristiques du métier auquel les études préparent :		**Caratteristiche della professione preparata dagli studi**	
La probabilité de trouver en l'espace d'un an un premier emploi qui correspond aux études est …	- haut - dans la moyenne	La probabilità di trovare un primo lavoro che corrisponda agli studi entro il primo anno è ...	- elevato - nella media
Des facultés importantes dans le métier sont …	- l'empathie et les compétences relationnelles - une affinité pour la technique et la technologie	Delle capacità importanti nella professione sono ...	- l'empatia e le competenze relazionali - un'affinità per la tecnica e la tecnologia
En comparaison avec d'autres matières, le salaire mensuel, une fois en emploi, est …	- inférieur à la moyenne - supérieur à la moyenne	In confronto ad altre materie il salario mensile, una volta impiegato, è ...	- inferiore alla media - superiore alla media
Le prestige du métier en Suisse est …	- dans la moyenne - élevé	Il prestigio della profession in Svizzera è ...	- nella media - elevato
Des postes jusqu'à 60% sont …	- à peine possibles - possibles la plupart du temps	Dei posti fino al 60% sono ...	- difficilmente possibili - possibili la maggior parte del tempo

Table OA2: Choice sets in the experiment

Choice set	Mathematics		Reasoning style		Competition		Risk		Affinity work tasks		Salary		Prestige		Part-time	
	A	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
1	1	0	1	0	0	1	1	0	0	1	0	1	1	0	0	1
2	1	0	0	1	1	0	0	1	0	1	0	1	1	0	1	0
3	0	1	1	0	0	1	1	0	0	1	0	1	0	1	1	0
4	1	0	0	1	1	0	1	0	1	0	0	1	0	1	0	1
5	0	1	0	1	0	1	0	1	1	0	0	1	1	0	1	0
6	0	1	1	0	1	0	0	1	1	0	0	1	0	1	0	1
7	0	1	1	0	1	0	0	1	0	1	1	0	1	0	0	1
8	0	1	0	1	1	0	1	0	0	1	1	0	0	1	1	0
9	1	0	0	1	0	1	0	1	0	1	1	0	0	1	0	1
10	1	0	1	0	0	1	0	1	1	0	1	0	0	1	1	0
11	0	1	0	1	0	1	1	0	1	0	1	0	1	0	0	1
12	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
13	0	1	0	1	1	0	0	1	1	0	1	0	0	1	1	0
14	0	1	1	0	0	1	1	0	1	0	1	0	0	1	0	1
15	1	0	0	1	1	0	0	1	1	0	1	0	1	0	0	1
16	0	1	1	0	0	1	0	1	0	1	1	0	1	0	1	0
17	1	0	1	0	1	0	1	0	0	1	1	0	0	1	0	1
18	1	0	0	1	0	1	1	0	0	1	1	0	1	0	1	0
19	1	0	0	1	0	1	1	0	1	0	0	1	0	1	1	0
20	1	0	1	0	0	1	0	1	1	0	0	1	1	0	0	1
21	0	1	1	0	1	0	1	0	1	0	0	1	1	0	1	0
22	0	1	0	1	1	0	1	0	0	1	0	1	1	0	0	1
23	1	0	1	0	1	0	0	1	0	1	0	1	0	1	1	0
24	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Mathematics: 1 = rather yes, 0 = rather no
Reasoning style: 1 = analytical and systematic thinking, 0 = associative and creative thinking
Competition: 1 = high, 0 = low
Risk: 1 = average, 0 = low
Affinity for work tasks: 1 = flair for technology and engineering, 0 = compassion and social skills
Salary: 1 = above average, 0 = below average
Prestige: 1 = high, 0 = average
Part-time = 1 = hardly possible, 0 = most of the time

Table OA3: Balancing tests

Choice set	Overall		Mean of					
			ISEI parents		Degree of gender-segregated study plans		Mathematical self-concept	
Gender	M	F	M	F	M	F	M	F
1	22	38	66	65	39	60	0.8	0.2
2	25	42	71	69	44	57	0.5	0.1
3	22	45	63	68	51	56	0.2	0.1
4	25	38	66	62	44	62	0.3	0.0
5	26	42	72	64	38	60	0.7	0.2
6	26	39	66	68	43	59	0.7	-0.3
7	26	45	64	64	43	60	0.6	0.0
8	23	41	65	68	42	59	0.3	0.0
9	24	43	65	59	41	60	0.4	0.2
10	26	44	67	66	43	58	0.8	0.1
11	24	40	69	69	38	60	0.3	-0.1
12	26	41	71	65	43	55	0.6	-0.1
13	19	40	72	61	51	59	0.4	0.0
14	25	40	59	66	40	56	0.4	-0.1
15	23	44	70	64	45	64	0.8	-0.4
16	24	41	66	64	47	64	0.3	0.2
17	29	40	68	69	36	60	0.5	-0.1
18	23	38	67	65	41	62	1.0	-0.1
19	28	45	67	66	41	58	0.4	-0.2
20	26	38	72	65	45	60	0.2	0.2
21	23	37	64	66	44	59	0.1	-0.1
22	21	38	62	68	48	60	0.4	0.1
23	24	37	72	64	46	65	0.4	0.1
24	23	32	71	66	46	60	0.0	0.1
Wald test of equality btw. coefficients within columns								
Prob. > F	1.00		0.65	0.78	0.85	0.54	0.42	0.53

2. Additional information on the main analyses

Table OA4: Base model and extended model for robustness check on unobserved heterogeneity. Dependent variable: Choice of field "B" in the choice experiment.

	(1) Logit coefficients from the underlying model from Figure 2	(2) Check for unobserved heterogeneity between vignettes
Sex (1 = female)	2.124*** (0.339)	2.185*** (0.000)
High math intensity	0.489** (0.177)	0.616+ (0.077)
Analytical reasoning style	0.245 (0.176)	-0.0253 (0.937)
Affinity for techn. tasks	-0.0529 (0.177)	0.177 (0.521)
Above average salary	1.211*** (0.177)	1.224*** (0.000)
High prestige	0.459** (0.177)	0.680* (0.012)
Full-time job	-0.0663 (0.176)	-0.158 (0.556)
High risk	0.137 (0.176)	-0.149 (0.593)
High competition	-0.0951 (0.176)	0.107 (0.745)
High math intensity * female	-0.475* (0.226)	-0.487* (0.034)
Analyt. reasoning * female	-0.949*** (0.227)	-0.942*** (0.000)
Affinity tech. tasks * female	-1.120*** (0.229)	-1.136*** (0.000)
Above average salary * female	-0.268 (0.229)	-0.281 (0.225)
High prestige * female	0.0266 (0.228)	0.0366 (0.875)
Full-time job * female	-0.480* (0.228)	-0.469* (0.043)
High risk * female	-0.286 (0.226)	-0.362 (0.116)
High competition * female	-0.581* (0.228)	-0.633** (0.006)
Vignette 2 (Ref. Vign. 1)		0.868 (0.131)
Vignette 3		-0.376 (0.569)
Vignette 4		0.729 (0.238)
Vignette 5		1.034* (0.020)
Vignette 6		-0.0925 (0.847)
Vignette 7		0.260 (0.599)
Vignette 8		0.0224 (0.960)
Vignette 9		-0.360 (0.456)
Vignette 10		0.502 (0.323)
Vignette 11		-0.0320 (0.951)
Vignette 12		-0.0592 (0.896)

Vignette 13		0.353
		(0.540)
Vignette 14		-0.0519
		(0.937)
Vignette 15		1.082
		(0.137)
Vignette 16		0.182
		(0.803)
Constant	-1.211***	1.459***
	(0.271)	(0.001)
N	1551	1551
rho	< 0.001	< 0.001

Notes:
Model 1: Underlying logit model of AME coefficients reported in Figure 2.
Model 2: Vignettes 17 to 24 were dropped due to too much collinearity (which is an essential part of the OOD choice design)

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table OA5: Average Marginal Effect Coefficients from Figure 2

	Men	Women	Difference
High math intensity	0.110**	0.00297	-0.107*
	[0.033,0.186]	[-0.055,0.061]	[-0.203,-0.010]
Analytical reasoning style	0.0547	-0.151***	-0.205***
	[-0.022,0.132]	[-0.209,-0.092]	[-0.302,-0.109]
Affinity for techn. tasks	-0.0118	-0.253***	-0.241***
	[-0.089,0.065]	[-0.310,-0.196]	[-0.337,-0.145]
Above average salary	0.285***	0.200***	-0.0854+
	[0.208,0.362]	[0.142,0.257]	[-0.182,0.011]
High prestige	0.103**	0.103***	-0.000382
	[0.026,0.180]	[0.044,0.161]	[-0.097,0.096]
Full-time job	-0.0148	-0.115***	-0.100*
	[-0.092,0.062]	[-0.173,-0.057]	[-0.196,-0.004]
High risk	0.0305	-0.0315	-0.0620
	[-0.046,0.107]	[-0.090,0.027]	[-0.159,0.035]
High competition	-0.0212	-0.142***	-0.121*
	[-0.098,0.056]	[-0.200,-0.085]	[-0.217,-0.025]

Notes:
Confidence intervals in brackets
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

3. Robustness checks

Table OA6: Mentioned field of study plans

	Examples for fields of study	Overall number of respondents mentioning this field as one out of five[1]	Gender segregation in these fields (based on official statistics, unweighted)[2]	Pairwise correlation between sex (1=female) and field of study type
Language science	German literature English literature	56 (4.3% of all obs.) ♂ = 12 (2.4%) ♀ = 44 (5.4%)	27.5% male	-0.07 (p = 0.01)
Humanities	Philosophy, history, anthropology	59 (4.5%) ♂ = 19 (3.8%) ♀ = 40 (4.9%)	35.6% male	-0.02 (p = 0.037)
Social science	Political science, psychology, sociology	217 (16.5%) ♂ = 39 (7.9%) ♀ = 178 (21.7%)	29.5% male	-0.18 (p < 0.001)
Economics and law	Economics, business, law	245 (15.0%) ♂ = 126 (20.6%) ♀ = 119 (11.6%)	56.1% male	0.12 (p < 0.001)
STEM	Mathematics, IT, biology	420 (31.8%) ♂ = 228 (45.9%) ♀ = 192 (23.4%)	68.8% male	0.23 (p < 0.001)
Health science	Medicine, nursing	314 (23.8%) ♂ = 79 (15.0%) ♀ = 235 (28.6%)	32.6% male	-0.14 (p < 0.001)
Arts	Music, Design, Performance arts	115 (8.7%) ♂ = 37 (7.4%) ♀ = 78 (9.5%)	42.6% male	-0.04 (p = 0.203)
Teaching	Teaching on various levels	106 (8.0%) ♂ = 12 (4.0%) ♀ = 44 (10.5%)	25.0% male	-0.11 (p < 0.001)

[1] Numbers do not sum up to 100% because individuals were allowed to name several subjects.
[2]Average proportion of men in fields from years 2010-2017. Source: Federal Statistical Office FSO, Studierende und Abschlüsse der Hochschulen, 29.03.2018.

137 (8.4%) of the students did not know what they want to study at this point in time. 152 (9.3%) of the students did not answer the question. 20 (1.2%) of the students' answers were not clear enough to be coded. Only 3 individuals mentioned more than 5 fields.

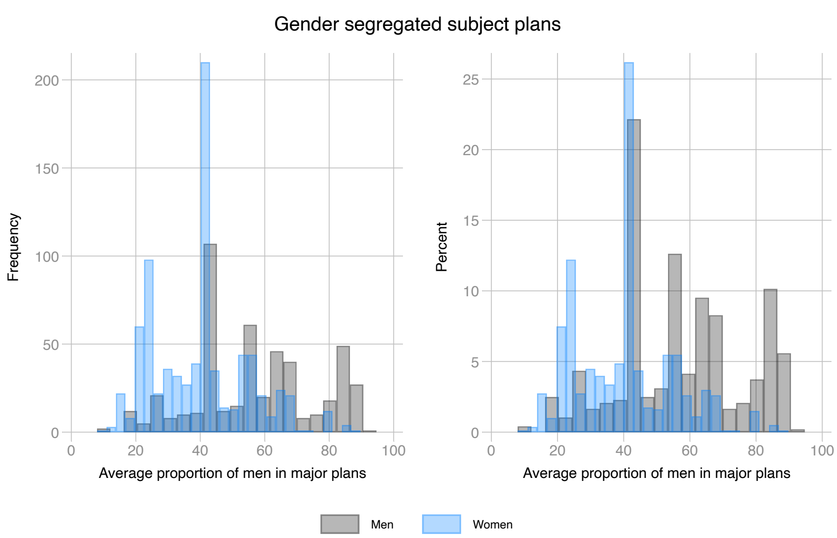
The exact coding approach is available upon request.

Do characteristics chosen in the experiment translate to a general preference for male-dominated fields?

The extent to which respondents' field of study plans are segregated by gender is measured by taking the average of the proportion of men for each of the fields mentioned in their plans by respondents. More specifically, I added for each field mentioned in students' field of study plans the information about the average proportion of men in each field over the years 2010-2017 (the experiment was conducted in 2018), based on official numbers from the Swiss Federal Statistical Office (see also Table OA6). Because students could indicate multiple fields, I averaged the proportion of men across these fields to obtain a final number on the degree of gender segregated field of study plans.

As expected, men report field of study plans in which, on average, 57 percent of students are male, while this proportion is only 40 percent for women (see Figure OA1 below). To examine whether preferences for systemizing characteristics correlate with male-dominated subject plans, I calculate a two-way interaction between respondents' gendered plans and the characteristics of the choice set respondents encountered. Furthermore, because preferences for male-dominated field of study plans correlate highly with the gender of individuals (pairwise correlation = -0.438, $p < 0.001$), I calculate separate models for male and female students to control for individuals' gender (which is equivalent to a three-way-interaction). The results confirm that preferences for specific characteristics in the experiment correlate with preferences for gendered field of study plans, although in some cases only for one gender (see Table OA6). Specifically, I find a positive correlation between individuals' plans to study fields with a higher proportion of men and a higher preference for high math intensity, analytical reasoning style (only for women), affinity for technical work tasks, above average salary (only for women), high prestige (only for women), and for fields that prepare for full-time employment (only for men) in the experiment.

Figure OA1: Histogram of male-dominated field of study plans



Note: The high number of cases in bin 40 is due to the fact that many people indicated law and medicine as potential fields of study, and that both of these two fields have an average male share of 43 percent.

Table OA7: Effect of preference for male-dominated fields on preferences in experiment
Dependent variable: Choice of field "B" in the choice experiment

Sample:	Men	Women
Proportion of men in participant's study plans	-0.0498**	-0.0828***
	(0.017)	(0.017)
High math intensity	-2.137**	-1.255*
	(0.684)	(0.498)
Analytical reasoning style	-0.355	-1.885***
	(0.684)	(0.498)
Affinity for techn. tasks	-3.071***	-2.191***
	(0.693)	(0.505)
Above average salary	2.305***	-0.504
	(0.686)	(0.509)
High prestige	1.461*	-0.440
	(0.677)	(0.497)
Full-time job	-1.134+	-0.915+
	(0.673)	(0.506)
High risk	0.330	-0.184
	(0.683)	(0.498)
High competition	-0.726	-1.273*
	(0.672)	(0.507)
High math intensity	0.0463***	0.0308**
* proportion	(0.012)	(0.012)
Analyt. reasoning	0.00809	0.0284*
* proportion	(0.011)	(0.012)
Affinity tech. tasks	0.0541***	0.0200+
* proportion	(0.012)	(0.012)
Above average salary	-0.0151	0.0361**
* proportion	(0.011)	(0.012)
High prestige	-0.0168	0.0199+
* proportion	(0.011)	(0.012)
Full-time job	0.0193+	0.0114
* proportion	(0.011)	(0.012)
High risk	-0.00705	-0.000170
* proportion	(0.011)	(0.012)
High competition	0.0113	0.0119
* proportion	(0.011)	(0.012)
Constant	1.562	4.420***
	(0.982)	(0.756)
N	483	802
rho	< 0.001	< 0.001

Notes:
Proportion of men in students' field of study plans ranges theoretically from 0 (no men) to 100 percent. The average proportion of men in participants' plans is 46.62% (std. = 18.44; min. = 8.00; max. = 94.66). The number of individuals is lower because of missing values in field of study plans (e.g., in case students did not have any concrete plans yet).

Logit coefficients reported
Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001