

Intergenerational transmission of gender segregation: How parents' occupational field affects gender differences in field of study choices

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The study explores how parents' occupational field affects gender differences in educational fields. On the one hand, the theory of direct transfer predicts that adolescents enter fields similar to those of their parents because of intergenerational transmission of occupation-specific resources and that adolescents are more likely to draw upon the resources provided by the higher-status parent. On the other hand, the theory of sex-role learning predicts that boys and girls are more likely to choose more gender-stereotypical fields of study because they learn 'appropriate' gender-role behaviour from their parents' occupational field and that boys are more likely to learn this behaviour from their father and girls from their mother. We use longitudinal data collected from adolescents and their parents in the Netherlands ($N = 2,497$) and tested our hypotheses using multiple-group structural equation modelling and multinomial regression analyses. In line with sex-role learning, results show that especially mothers who are employed in a more feminine occupational field influence their daughters to enter a more feminine field of study (health, biology, agriculture and veterinary) and their sons to enter a more masculine field of study (science and technology). Mothers' occupational field therefore not only influences girls' field of study, but also boys'. This study highlights the role of horizontal characteristics when examining which field of study adolescents enter. Contrary to the stratification literature, which primarily focuses on fathers, this study concludes that mothers play a more important role in gender differences in fields of study.

Keywords: parents' occupational field; field of study; gender differences

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Introduction

Boys and girls are still segregated into different occupational fields, partly owing to persistent gender differences in fields of study. Boys are more likely to enter gender-stereotypical masculine fields of study such as engineering and mathematics, whereas girls are more likely to enter gender-stereotypical feminine fields such as the humanities and arts (OECD, 2009: table A3.6). Although there are many factors that can influence gender differences in fields of study (Xie *et al.*, 2015), family of origin seems to be especially important (Buchmann & Hannum, 2001). To explain gender differences in fields of study, previous research looked at the influence of parents' social class and educational background, which are vertical characteristics because they focus on differences in *level* (Davies & Guppy, 1997; Van de Werfhorst *et al.*, 2000, 2003). Only a few studies highlight the importance of linking horizontal positions (i.e. parents' occupational field) with adolescents' field of study choice (Dryler, 1998; Van de Werfhorst & Luijkx, 2010). The present study aims to explain how parents' horizontal characteristics influence boys and girls to enter masculine (male-dominated) or feminine (female-dominated) fields of study after secondary education.

This article makes an important contribution to the existing literature by contrasting two explanations for how parents might influence their children's field of study. Although it seems plausible that adolescents enter fields similar to those of their parents, the different ways in which children learn from their parents generate different expectations as to what fields of study boys and girls enter. The first explanation is based on *direct transfer* and entails that adolescents enter a similar field of study as their parents' occupational field because parents transfer occupational field-specific resources (e.g. skills, knowledge and aspirations) to their children (Jonsson *et al.*, 2009). Studies show that there is intergenerational resemblance between a father's occupational field and both his son's and his daughter's field of study (Van de Werfhorst *et al.*, 2001; Van de Werfhorst & Luijkx, 2010). However, only a few studies have looked at the effect of mother's occupation in addition to father's on their children's field of study, with mixed results. There is some support for direct transfer (Dryler, 1998), but other studies show that the relationship between parents' occupational field and an adolescent's field of study is not so straightforward (Leppel *et al.*, 2001; Støren & Arnesen, 2007).

The second explanation is based on *sex-role learning* and entails that boys and girls learn 'appropriate' male and female gender-role behaviour by watching their parents' behaviour. In this explanation, mother's and father's behaviour functions as an example of what adolescents consider appropriate gender-role behaviour. The few studies that test how sex-role learning affects boys' and girls' educational decisions found support for this explanation for boys, but not for girls (Dryler, 1998; Støren & Arnesen, 2007).

Including both mothers and fathers and boys and girls in the underlying study allows us to explore whether direct transfer or sex-role learning is more important for the intergenerational transmission of horizontal characteristics. Furthermore, it enables us to study how parental influence might differ for boys and girls, as well as which parent has a greater influence on the field of study choice.

We use longitudinal data that we collected from adolescents and their parents in the Netherlands in 2010/2011 and 2011/2012, when the adolescents were 15 and 16 years of age. The adolescents were surveyed again in 2014 and 2015 after completing secondary education, at the age of 18 and 19, respectively.

Theory

Direct transfer

Adolescents are more likely to choose a field of study that resembles their parents' occupational field owing to the intergenerational transmission of occupation-specific skills, cultural capital, social networks, but also occupation-specific aspirations and beliefs (Van de Werfhorst *et al.*, 2000, 2001; Jonsson *et al.*, 2009; Van de Werfhorst & Luijkx, 2010). For example, the children of a carpenter '... may be especially likely to become carpenters because they are exposed to carpentry skills at home, socialized in ways that render them especially appreciative of carpentry as a vocation, and embedded in social networks that provide them with information about how to become carpenters and how to secure jobs in carpentry' (Jonsson *et al.*, 2009: 983). Parents transfer these occupational resources to their children, who actively draw upon these resources. This increases the likelihood that children choose a similar field of study to their parents' occupational field (e.g. more likely to choose carpentry than medicine). The intergenerational transfer of these occupation-specific resources happens regardless of how gendered this occupation is. This implies that direct transfer leads to gendered fields of study only insofar as mother or father is employed in a gender-stereotypical occupation. In other words, boys or girls only enrol in a more masculine or feminine field of study if their parents are employed in a more masculine or feminine occupation. Direct transfer does not lead to a specific expectation regarding which resources (mother's or father's) are more important. Unless both parents have the same occupation, an adolescent can only enrol in one field of study similar to one parent. The underlying premise is that one adolescent uses the mother's occupational resources and enrolls in a similar field of study as the mother's occupational field whereas another uses the father's occupational resources and ends up in a similar field of study as the father's occupational field. Averaged over the whole population, the masculinity (or femininity) of an adolescent's field of study will therefore be somewhere in between that of their parents. Based on the theory of direct transfer, we therefore hypothesise that *mothers who are employed in a more feminine (masculine) occupation will influence boys and girls to enrol in a more feminine (masculine) field of study (H1a)* and *fathers who are employed in a more feminine (masculine) occupation will influence boys and girls to enrol in a more feminine (masculine) field of study (H1b)*.

Occupational status effects

From a rational choice perspective, it is likely that direct transfer depends on which parent has the highest status (Hetherington, 1965; Korupp *et al.*, 2002; England, 2010). If we assume that adolescents aspire to a social class as good as, or better than, that of their family, and that adolescents want to avoid downward mobility, boys and

girls will be likely to use the occupational resources of the occupational field of the parent with the highest status. Research indicates that—on average—men and women do not differ in their occupational status (Treiman & Terrell, 1975; Magnusson, 2009), which implies that either the mother or the father could be the higher-status parent. If the higher-status parent has a gender-stereotypical occupation, and adolescents enrol in a similar field, this will result in a more feminine or masculine field of study, respectively. This also implies that if the higher-status parent is of the opposite sex and has a gender-stereotypical occupation, then boys and girls will enrol in less gender-stereotypical educational fields. In sum, if adolescents enrol in the occupation of the higher-status parent, we expect that *the parent with the higher-status occupation who is employed in a more feminine (masculine) occupation will influence both boys and girls to enrol in a more feminine (masculine) field of study, whereas the parent with the lower status occupation will have a weaker effect on the femininity (masculinity) of boys' and girls' field of study (H2).*

Research has shown that adolescents from a higher social class are more likely to choose a more prestigious field of study (e.g. medicine and law; Van de Werfhorst *et al.*, 2003), but we know of only one study that has evaluated the consequences of parents' occupational status in combination with parents' occupational field for adolescents' field of study. Dryler (1998; Sweden) studied track choices of 16-year-old students in upper secondary education and found support for direct transfer, but only weak support for the parent with the higher-status occupation being more important.

Sex-role learning

Gender-role socialisation implies that children learn gender-specific norms, values and aspirations from their social environment. From early childhood onward, children develop beliefs and expectations that are associated with each sex group, known as gender roles or sex roles. The family is one of the most important sources of gender-role socialisation (Glass *et al.*, 1986; Hitlin, 2006). Parents socialise their children by conveying ideas about what is appropriate behaviour for their sex category, either because their behaviour functions as an example of what is gender-stereotypical male or female behaviour (cognitive development theory; Kohlberg, 1966) or because they actively encourage behaviour that complies with these gender expectations (social learning theory; Bandura, 1977).

Mothers and fathers can function as 'appropriate' gender-role models if their occupation is appropriate for their sex category. Adolescents then learn traditional gender roles by observing their parents. Consequently, if adolescents conform to these observed gender roles, mothers and fathers who are employed in more gender-stereotypical occupations influence their children to enrol in more gender-stereotypical fields of study. Note that this gives rise to expectations that differ to some extent from those based on direct transfer theory. For instance, if a mother has a gender-stereotypical (female-dominated) occupation (e.g. nurse), her daughters are more likely to enter a more feminine field of study according to both theoretical mechanisms. For boys, however, the expectations differ. Sex-role learning predicts that having a mother in a more gender-stereotypical occupation makes it more likely that the sons will enrol in a more masculine field of study, since they have observed that feminine

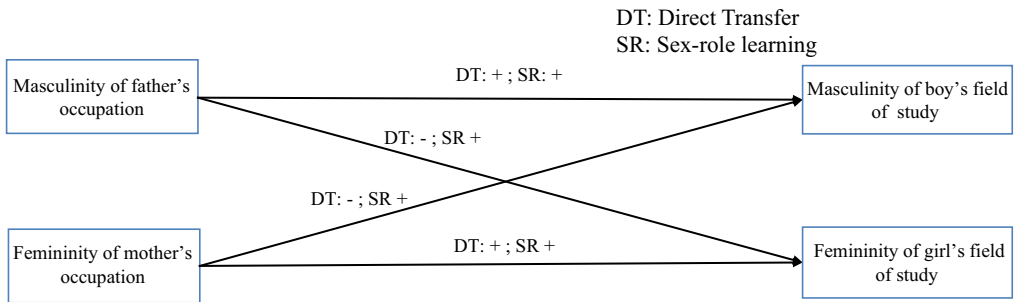


Figure 1. Expectations of the effect of parents' occupation on masculinity of boy's field of study and femininity of girl's field of study derived from the theory of direct transfer and sex-role learning [Colour figure can be viewed at wileyonlinelibrary.com]

occupations are appropriate for women (girls) only. Direct transfer theory, on the other hand, predicts that sons of nurses will enrol in a more feminine field of study themselves as well. Similarly, if a father has a gender-stereotypical occupation (e.g. plumber), then both mechanisms would predict that the sons will enter more masculine fields of study. For the daughters of plumbers, however, sex-role learning predicts a more feminine field of study, whereas direct transfer predicts that they will enrol in a more masculine field of study. In sum, based on sex-role learning, we expect that *mothers who are employed in a more feminine occupation will influence boys to enrol in more masculine fields of study and girls to enrol in more feminine fields of study (H3a)*. We expect that *fathers who are employed in a more masculine occupation will influence boys to enrol in more masculine fields of study and girls to enrol in more feminine fields of study (H3b)*. Figure 1 illustrates our expectations concerning the effects of parents' occupational field based on direct transfer and sex-role learning.

Previous research shows mixed results with respect to sex-role learning. Dryler (1998) found no support for sex-role learning. Polavieja and Platt (2014), who studied the effect of parents' occupational field on children's occupational aspirations, found strong support for sex-role learning. Both Støren and Arnesen (2007) and Leppel *et al.* (2001) found mixed evidence of both sex-role learning and direct transfer. However, two results stand out that support sex-role learning. Støren and Arnesen (2007; Norway) used retrospective data to examine choices in upper secondary education and found that boys enter more gender-stereotypical fields when their mother has a gender-stereotypical occupation (i.e. health, social care, child care or teaching). Leppel *et al.*'s (2001; post-secondary students, USA) results suggest that mothers in non-stereotypical occupational fields influence boys to enter non-stereotypical fields as well.

Same-sex effects

Gender socialisation theories suggest that adolescents specifically copy the parent of the same sex (same-sex influence), either because children are encouraged to do so (social learning theory) or because adolescents actively choose to copy the parent of the same sex (cognitive development theory). Girls are expected to learn appropriate gender-role behaviour from their mother and boys from their father. If parents' occupations indeed function as an example of what is 'appropriate' gender-role behaviour,

then girls will choose a more feminine field of study only if their mother has a more feminine occupation. Similarly, boys will only be affected by the masculinity of their father's occupation. In sum, if boys and girls copy the parent of the same sex, we expect that *mothers who are employed in a more feminine occupational field will influence their daughter to enrol in a more feminine field of study, whereas fathers will not (H4a)* and *fathers who are employed in a more masculine occupational field will influence their sons to enrol in a more masculine field of study, whereas mothers will not (H4b)*.

Research that focuses on gender differences in horizontal education did not provide much support for same-sex influences. Dryler (1998) and Støren and Arnesen (2007) found same-sex influence only for boys. Leppel *et al.* (2001) even found that opposite-sex influences were more important. Having a father in a gender-stereotypical occupational field (professional or executive occupation) had a larger effect on girls than having a mother working in the same masculine field, whereas the opposite holds for boys.

Method

Dutch educational system and field of study

In the Netherlands, secondary education begins at the age of 12 and is compulsory until obtaining the 'starting qualification' at upper secondary level (age 17 or 18). After primary education (age 12), students can enter one of three possible levels of secondary education, depending on grades and test results. The majority of students enter VMBO, or the vocational track. This is a four-year vocational programme, after which pupils continue in senior secondary vocational education and training (MBO). The other two levels both provide access to higher education. HAVO, or the general track, is a five-year programme preparing students for universities of applied science that offer bachelor degrees. VWO, or the academic track, is a six-year programme which prepares pupils for a 'research' university.

Students in the vocational, general or academic track enter a field of study at different time points. In order to finish compulsory education and get the 'starting qualification', students who completed the vocational track are required to continue in senior secondary vocational education and training (MBO) for at least two years. These students enter a field of study when entering senior secondary vocational education and training (age 16). Students who have finished the general track (age 17) and the academic track (age 18) have completed compulsory education, and only students who continue their education choose a field of study.

Data

We use wave 1 (2010/2011) and wave 2 (2011/2012) of data collected in the Netherlands as part of the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU) to measure our independent variables. The general focus of the CILS4EU is to explore the structural, cultural and social integration of immigrant and non-immigrant children in four European countries (Kalter *et al.*, 2014, 2015, 2016a,b). These two waves were collected when the students were in their third year of secondary education (wave 1; age 14–15) and when they were in their fourth year

of secondary education (wave 2; age 15–16). We included respondents who participated in wave 1 as well as newcomers who entered the panel in wave 2.¹ Our independent variables are thus measured in either the first *or* the second wave. Since our independent variables (e.g. parents' occupation) are relatively stable over time, and both wave 1 and wave 2 were conducted before the students chose their field of study, we use both waves to increase the sample size.

We additionally use wave 4 (2014) and wave 5 (2015), which are part of the continuation of this project in the Netherlands: Children of Immigrants Longitudinal Survey in the Netherlands (CILSNL; Jaspers & Van Tubergen, 2014, 2015). Because the age at which students enter a field of study is different depending on the secondary educational track they follow, using wave 4 (age 17–18) and wave 5 (age 18–19) allows us to measure the field of study for students of all levels of secondary education. The field of study is thus measured in either wave 4 *or* wave 5.²

The sample was selected based on a sample design that was stratified according to educational level and percentage of non-western immigrants in a school. Schools were selected with probability proportional to their size, using the number of pupils at the relevant educational level. Additionally, schools with non-western immigrant children were oversampled. In order to correct for possible selection bias and to enhance the validity of our results, we weight our analytical sample based on national statistics from Statistics Netherlands (CBS), using the numbers of pupils with a western and non-western background in the third and fourth year of secondary education in the vocational, general or academic track in the Netherlands in 2010/2011. The initial response rate of schools was 34.9%. To increase the school response rate, a replacement strategy was used in which non-responding schools were replaced with other similar schools (response rate after replacement: 91.7%).

In waves 1 and 2, respondents filled in a self-completion questionnaire in their class at school (student participation rate = 91.1%). Additionally, adolescents were given a questionnaire for one of their parents to fill in at home. To increase parents' participation rate, parents received an abbreviated questionnaire in the third reminder and were contacted by phone if necessary to ask them to participate by completing the shorter version (parents' participation rate: wave 1, 74.4%; wave 2, 50.3%). In waves 4 and 5, a mixed-mode approach was used. In wave 4, approximately 70% completed an electronic questionnaire, 10% filled in a print questionnaire and 20% responded by telephone. In wave 5, approximately 84% completed an electronic questionnaire, 1% filled in a print questionnaire and 14% responded by telephone.

In total, 5,768 respondents participated in wave 1 *or* wave 2. Of these respondents, we included adolescents who chose a field of study after secondary education and who lived with two opposite-sex parents (wave 4, 1,652; wave 5, 845). In total, 2,497 respondents and 2,153 parents ($n = 330$ short questionnaires; $n = 1,823$ long questionnaires) are included in our analyses.

Measures

Dependent variable. *Gender-stereotypical field of study* signifies masculinity in boys' field of study and femininity in girls' field of study. Students were asked to describe their current studies. The answers were coded into fields of study based on the 3-digit

International Standard Classification of Education Scale (ISCED97; UNESCO, 2006). We used separate classification schemes for senior secondary vocational education and training (MBO) and higher vocational education (HBO) and university from CBS. Both schemes contain the 3-digit ISCED-field codes for all fields of study. To indicate how gender-stereotypical fields of study are, we extracted the percentage of female or male students enrolled in the relevant field of study in the Netherlands in 2013/2014 or 2014/2015, depending on the year in which adolescents chose their field of study (Statistics Netherlands, 2014/2015). A higher score thus indicates a more gender-stereotypical field of study for both boys and girls. In our data, the senior secondary vocational education and training field with the highest percentage of female students is hair and beauty services (97.55%), and the field with the lowest percentage of female students is electricity and energy (0.64%). For higher vocational education and university, the field with the highest percentage of female students is educational science (92.04%), and the field with the lowest percentage of female students is electronics and automation (3.85%).

Independent variables. *Femininity of mother's occupation* and *masculinity of father's occupation* are two variables that reflect how gender-stereotypical the occupational fields of parents are. Parents were asked about their current or, if they were currently unemployed, their most recent occupation and their main activities in this occupation, as well as the occupation of their partner (if present). The occupations were coded according to the International Standard Classification of Occupations 2008 (ISCO08). Missing values were replaced with information provided by the adolescents, who also answered questions about their parents' main occupation. However, adolescents reported this information specifically for their biological parents. We therefore only replaced missing values when respondents indicated that they lived with their biological mother and/or father ($n = 713$).³ In our analyses, we include two control variables called *occupation mother reported by student* and *occupation father reported by student*, indicating whether the parent's occupation did not (0) or did (1) originate from the student questionnaire. We excluded fathers ($n = 5$) and mothers ($n = 33$) in our analyses who indicated that they had never worked.

To indicate the masculinity/femininity of a job, we calculated the percentage of women working in that job in the Netherlands using pooled data from the European Labour Force data (EU-LFS). The EU-LFS is a large household sample survey carried out by national statistics institutes (in the Netherlands, CBS), providing quarterly results on labour participation of people aged 15 and over. We obtained the annual average of quarterly data covering 2011 to 2015.⁴ The occupations of the persons in the data were coded according to the 3-digit ISCO08 coding and we pooled these years in order to have enough observations within one occupational category. This resulted in a dataset containing 40,850,663 observations. On average there were 281,729 observations per ISCO08 occupation. In our analyses, 'Production managers in agriculture, forestry and fisheries' is the least popular ($n = 518$) and 'Shop salespersons' the most popular ($n = 2,306,301$). In percentages, 'Building finishers and related trades workers' have the fewest women (0.87%) and 'Secretaries (general)' the most (93.39%).

To operationalise *father's status higher than mother's*, we recoded ISCO08 codes into the standard International Socio-Economic Index (ISEI) of occupational status scores using conversion tools (Ganzeboom & Treiman, 2014). Subsequently, we divided the father's ISEI score by the sum of the mother's and father's ISEI scores and subtracted 0.5.⁵ The variable of father's status higher than mother's then ranges from -0.4 to 0.4 , with positive values meaning that the father has a higher occupational status than the mother, negative values meaning that the mother has a higher status than the father, and 0 meaning that the mother and father are in an occupation that is equal in status.

Controls. We controlled for *parents' highest educational level* because a higher educational level can lead to less gender-stereotypical fields of study for both boys and girls (Dryler, 1998; Støren & Arnesen, 2007). Parents were asked what their and their partner's highest level of education was. This resulted in a scale indicating whether the mother or father had no education (0), primary education (1), secondary education (2), vocational education and training (3), higher vocational education (4) or university (5). We replaced missing values with information provided by the adolescents, who indicated whether their mother (father) had completed primary education, secondary education or university. We only replaced parents' missing values if respondents indicated that they lived with their biological parents ($n = 414$).

We controlled for *non-western immigrant background*. This variable indicates whether one of an adolescent's parents were (1) or were not (0) born outside western countries.⁶

Vocational track, general track and academic track are three dummies that indicate whether an adolescent in secondary education is in the vocational track (1) or not (0), in the general track (1) or not (0), or in the academic track (1) or not (0). In our analyses, the vocational track will be the reference category. These variables are included to capture differences in what fields of study adolescents enter between levels of secondary education. Table 1 shows the descriptive statistics of all variables.

Analyses

To examine gender differences in fields of study, we use multiple-group structural equation modelling in STATA. Since our data are hierarchically structured (students are nested in classes), standard errors were adjusted by clustering on class level at T1 ($N_{classes} = 247$) to take into account the non-independence of our data.⁷ In all analyses, we compared boys and girls. An advantage of structural equation modelling is that it allows us to use full information maximum likelihood estimation (FIML) to account for missing data at random. This method uses all observed variables in the model to estimate the means and covariances of item non-response. It outperforms listwise deletion (as used by ordinary linear regression) and other substitution methods (Enders & Bandalos, 2001; Graham, 2009). FIML relies on data missing at random (MAR), and research has found that this method resulted in unbiased parameter estimates, even in some cases that violated this assumption (e.g. Enders & Bandalos, 2001; Graham, 2009; Larsen, 2011).

Table 1. Descriptive statistics of variables for all respondents ($N = 2,497$) and boys ($n = 1,051$) and girls ($n = 1,446$) separately

| | Mean (SD) | | | Min | Max | <i>n</i> |
|---|------------------|------------------|------------------|-------|-------|----------|
| | Total | Boys | Girls | Total | Total | Total |
| <i>Dependent variable</i> | | | | | | |
| Gender-stereotypical field of study | 66.98 (23.22) | 68.07 (23.22) | 66.20 (23.19) | 0.90 | 99.36 | 2,497 |
| <i>Independent variables</i> | | | | | | |
| Femininity of mother's occupation | 67.20 (22.11) | 67.52 (21.88) | 66.96 (22.28) | 0.87 | 98.01 | 2,332 |
| Masculinity of father's occupation | 68.60 (24.93) | 67.31 (25.22) | 69.56 (24.67) | 1.99 | 99.13 | 2,286 |
| Father's status higher than mother's | 0.02 (0.13) | 0.02 (0.13) | 0.02 (0.13) | -0.37 | 0.36 | 2,207 |
| <i>Controls</i> | | | | | | |
| Mother's occupation reported by student | 0.18 | 0.18 | 0.19 | 0 | 1 | 2,497 |
| Father's occupation reported by student | 0.19 | 0.20 | 0.19 | 0 | 1 | 2,497 |
| Highest educational level of parents | 3.21 (1.10) | 3.28 (1.09) | 3.16 (1.10) | 0 | 5 | 2,489 |
| Non-western immigrant background | 0.17 | 0.16 | 0.18 | 0 | 1 | 2,497 |
| Vocational track | 0.53 | 0.54 | 0.53 | 0 | 1 | 2,497 |
| General track | 0.29 | 0.28 | 0.29 | 0 | 1 | 2,497 |
| Academic track | 0.18 | 0.18 | 0.19 | 0 | 1 | 2,497 |

Source: Wave 1 and 2 of Children of Immigrants Longitudinal Survey in Four European Countries and wave 4 and 5 of Children of Immigrants Longitudinal Survey in the Netherlands, own calculations.

Table 2 shows the results that allow us to evaluate hypotheses 1 to 4 concerning direct transfer and sex-role learning. We start with the simplest model, in which parents' characteristics are constrained to be equal across groups (model 1). Subsequently, we freely estimate the effects of mother's and father's occupation on boys' and girls' field of study, to see whether parents affect boys and girls differently (model 2). Lastly, we add interaction effects to test our hypothesis concerning the influence of the parent with the highest occupational status (model 3). In models 1 and 2, we constrain the effect of the variable father's status higher than mother's and the interaction effects to 0 to ensure that model 1 is nested in models 2 and 3.

In all models estimated, we constrained the control variables to be equal for boys and girls as freeing parameters did not significantly improve the model fit.

To show whether mother's and father's occupation might be more relevant for some groups than for others, we ran all models in Table 2 again per level of secondary education of the respondent, parental educational background and non-western immigrant status. The results are shown in Appendix A.

Results

Model 1 in Table 2 tests our hypotheses concerning sex-role learning. In line with hypothesis H3a, this model shows that mothers with a more feminine occupation lead

Table 2. Unstandardized coefficients and standard errors of multiple-group analyses of predictors of masculine field of study choice for boys and feminine field of study choice for girls ($N = 2,497$)

| | Model 1 | | Model 2 | | Model 3 | |
|--|--------------------|--------------------|--------------------|--------------------|---------------------|--------------------|
| | Boys | Girls | Boys | Girls | Boys | Girls |
| | B (SE) | B (SE) | B (SE) | B (SE) | B (SE) | B (SE) |
| <i>Independent variables</i> | | | | | | |
| Femininity of mother's occupation | 0.06** (0.02) | 0.05 (0.04) | 0.08** (0.03) | 0.04 (0.04) | 0.08** (0.03) | |
| Masculinity of father's occupation | -0.01 (0.02) | 0.04 (0.03) | -0.04 (0.02) | 0.05 (0.03) | -0.04 (0.02) | |
| Father's status higher than mother's | | | | 9.80 (28.42) | 39.99* (19.92) | |
| Femininity of mother's occupation × father's status higher than mother's | | | | 0.25 (0.29) | -0.25 (0.24) | |
| Masculinity of father's occupation × father's status higher than mother's | | | | -0.33 (0.23) | -0.40 (0.24) | |
| <i>Controls</i> | | | | | | |
| Mother's occupation reported by student | -0.53 (1.27) | | -0.56 (1.26) | | -0.45 (1.27) | |
| Father's occupation reported by student | -0.26 (1.25) | | -0.12 (1.23) | | -0.10 (1.25) | |
| Highest educational level of parents | -1.12** (0.39) | | -1.13** (0.39) | | -1.10** (0.39) | |
| Non-western immigrant background | -4.47** (1.38) | | -4.55** (1.38) | | -4.53*** (1.36) | |
| General track | -4.99*** (1.05) | | -4.91*** (1.03) | | -4.84*** (1.02) | |
| Academic track | -6.46*** (1.60) | | -6.42*** (1.60) | | -6.41*** (1.645) | |
| Constant | 71.19*** (2.47) | 69.40*** (2.52) | 69.36*** (3.25) | 71.00*** (2.78) | 69.10*** (3.27) | 70.16*** (2.84) |

Source: Wave 1 and 2 of Children of Immigrants Longitudinal Survey in Four European Countries and wave 4 and 5 of Children of Immigrants Longitudinal Survey, own calculations. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

to adolescents choosing a more gender-stereotypical field of study. This effect is relatively small. A 10% increase in the share of women in the mother's occupation is associated with a 0.6% increase in the share of own-gender students in the adolescent's field of study. The masculinity of the father's occupation (H3b) does not affect which field of study adolescents enter.

Model 2 tests whether the femininity of mother's occupation and the masculinity of father's occupation have a different effect on boys and girls. The effect of mother's occupation is significant for girls, but not for boys. However, these effects are also not significantly different for boys and girls ($b = 0.05$ vs. $b = 0.08$, Wald z -score = 0.41, $p = 0.52$). This supports the theory of sex-role learning with respect to the influence of mothers (H3a): mothers influence boys to choose more masculine fields of study

and girls to choose more feminine fields of study. The masculinity of the father's occupation has no influence on boys' or girls' field of study, refuting our hypotheses concerning both the direct transfer effect (H1b) and (again) sex-role learning (H3b).

Although models 2 and 3 show support for a mother–daughter same-sex effect (H4a), we already concluded that the effect of mother's feminine occupation on daughter's field of study is not significantly different from the effect of mother's occupation on son's field of study. Additionally, no father–son same-sex effect was found (H4b). Therefore, our data do not support the hypotheses concerning same-sex influence (H4a & H4b).

Model 3 includes interactions between the femininity of the mother's occupation as well as the masculinity of the father's occupation and the variable father's status higher than mother's for boys and girls separately. This model tests whether especially the parent with the highest status employed in a more feminine (masculine) occupation results in boys and girls choosing a more feminine (masculine) field of study (H2). We find that when the father has a higher status than the mother, girls are more likely to choose a more feminine field of study. However, the interaction terms are not significant, meaning our data do not show the predicted occupational status effects (H2).

All models in Table 2 reveal that a higher educated parent leads boys and girls to less gender-stereotypical fields of study. Moreover, adolescents in the general and academic tracks enter less gender-stereotypical fields of study than those in the vocational track. Lastly, students with a non-western immigrant background enter less gender-stereotypical fields of study than students with a western background.

Horizontal and vertical characteristics

Table 2 shows that the femininity of the mother's occupational field leads to gender differences in fields of study. However, horizontal characteristics are often intertwined with vertical characteristics (characteristics that relate to differences in level; Jonsson *et al.*, 2009). An example of how horizontal and vertical characteristics might be related is that if an adolescent enters a field of study similar to that of his/her mother's or father's occupation, then the educational field is likely to lead the adolescent to a similar occupation as the parent and thus also to a similar occupational status. Intergenerational transmission of occupational field is then automatically also intergenerational transmission of status. We therefore checked how the mother's and father's vertical and horizontal characteristics relate to which field of study boys and girls enter.

We ran all analyses in Table 2 again, including the mother's and father's occupational status or the highest occupational status within a couple, *in addition to* or *instead of* the mother's and father's occupational field. We conclude that the effect of the mother's occupational field remained significant and more important than parents' vertical characteristics. None of the occupational status variables has a significant effect on an adolescent's field of study. Only when controls were excluded did occupational status variables, mainly father's occupational status and highest parents' occupational status, lead boys and girls to less gender-stereotypical fields of study. The status variables, however, lose their significance when parents' highest education is included and/or when we control for differences in adolescents' level of secondary

education. This means that horizontal characteristics and vertical characteristics are intertwined, in which education plays a key role in at least two ways. First, parents who are employed in a higher-status occupation are more likely to have a higher education ($r = 0.53, p < 0.001$) and, as we see in Table 2, adolescents who have parents with a higher educational background are less likely to enter gender-stereotypical fields of study. Second, adolescents with parents who are employed in a higher-status occupation are more likely to end up in higher levels of secondary education ($F(2, 2,457) = 107.78, p < 0.001$), which also leads boys and girls to less gender-stereotypical fields of study. Nevertheless, irrespective of occupational status, the effect of mother's occupational field on adolescents' field of study is robust.

To further explore how horizontal characteristics are intertwined with vertical characteristics, all analyses in Table 2 were run again separately per level of secondary education and for adolescents with higher-educated parents and adolescents with average/lower-educated parents. The results are shown in Appendix A.

From Appendix A we conclude that the femininity of the mother's occupation is important for adolescents in the general track, for adolescents from lower/average-educated families and for adolescents from non-western immigrant backgrounds. Mothers from all these groups who are occupied in a more feminine occupation lead both boys and girls to more gender-stereotypical fields of study. Father's occupational field seems more important for adolescents who are enrolled in higher levels of secondary education and for adolescents from higher-educated families. For adolescents in the general track, father's masculine occupational field leads boys and girls to *less* gender-stereotypical fields of study, whereas for adolescents from the academic track and higher-educated background, father's masculine occupational field leads boys to *more* gender-stereotypical fields of study. Fathers of adolescents from higher-educated backgrounds lead girls to *less* gender-stereotypical fields of study. There is some evidence that father's masculine occupation leads boys to more masculine fields of study, whereas mother's feminine occupation leads girls to more feminine fields of study.

Fields of study

In order to get more insight into the specific fields boys and girls enter, we additionally performed multinomial regression analyses in which the dependent variable contains the categories: Education, humanities, arts and social sciences (including social services and excluding economics as a social science); Business and law (including economics); Science and engineering (including mathematics, computing, manufacturing and construction); Health, biology, agriculture and veterinary (including life sciences); and Services (e.g. security services and personal services). Based on the percentage of women in fields of study in 2014/2015 derived from Statistics Netherlands (at all educational tracks; Statistics Netherlands, 2014/2015),⁸ health, biology, agriculture and veterinary can be categorised as the most feminine category (73% women), followed by education, humanities, arts and social sciences (68% women). Services (46% women) and business and law (41% women) can be considered gender-neutral given that they attract similar numbers of boys and girls, and science and engineering can be considered the most masculine category (14% women). Multiple

Table 3. Results of multinomial logistic regression models that test the effect of femininity of mother's occupation and masculinity of father's occupation on choosing a field of study ($N = 2,497$)

| | Model 1 | | | | | Model 2 | | | | |
|--|-----------------|-------------------|--------------------|--------------------|--|-----------------|-------------------|-------------------|--------------------|--|
| | EHAS | BL | SE | S | | EHAS | BL | SE | S | |
| <i>Independent variables</i> | | | | | | | | | | |
| Femininity of mother's occupation | -0.00 (0.00) | -0.01* (0.00) | -0.00 (0.00) | -0.01* (0.00) | | -0.00 (0.00) | -0.01* (0.00) | -0.01** (0.01) | -0.01** (0.00) | |
| Femininity of mother's occupation × boy | | | | | | 0.01 (0.01) | 0.01 (0.01) | 0.02** (0.01) | 0.01* (0.01) | |
| Masculinity of father's occupation | -0.00 (0.00) | -0.00 (0.00) | 0.00 (0.00) | -0.00 (0.00) | | -0.00 (0.00) | -0.00 (0.00) | 0.00 (0.00) | -0.00 (0.00) | |
| Masculinity of father's occupation × boy | | | | | | 0.00 (0.01) | -0.00 (0.01) | 0.00 (0.01) | 0.00 (0.01) | |
| <i>Controls</i> | | | | | | | | | | |
| Boy | -0.17 (0.15) | 1.26*** (0.14) | 2.74*** (0.16) | 1.30*** (0.15) | | -0.77 (0.63) | 0.77 (0.66) | 1.28 (0.67) | 0.10 (0.61) | |
| Occupation mother reported by student | -0.11 (0.18) | 0.13 (0.21) | 0.04 (0.19) | 0.07 (0.18) | | -0.11 (0.18) | 0.13 (0.20) | 0.05 (0.19) | 0.08 (0.18) | |
| Occupation father reported by student | 0.12 (0.18) | 0.02 (0.20) | -0.01 (0.20) | 0.00 (0.18) | | 0.11 (0.18) | 0.01 (0.20) | -0.02 (0.20) | -0.00 (0.18) | |
| Highest educational level parents | 0.07 (0.06) | -0.04 (0.06) | -0.00 (0.07) | 0.04 (0.07) | | 0.07 (0.06) | -0.04 (0.06) | -0.00 (0.07) | 0.05 (0.07) | |
| Non-western immigrant background | -0.08 (0.18) | 0.79*** (0.17) | 0.07 (0.23) | -0.03 (0.20) | | -0.08 (0.18) | 0.79*** (0.17) | 0.07 (0.23) | -0.04 (0.20) | |
| General track | 0.21 (0.14) | 0.25 (0.19) | -0.05 (0.15) | -0.46** (0.15) | | 0.20 (0.14) | 0.25 (0.19) | -0.05 (0.15) | -0.46** (0.15) | |
| Academic track | 0.00 (0.17) | 0.15 (0.21) | -0.06 (0.22) | -1.71*** (0.24) | | -0.00 (0.17) | 0.14 (0.21) | -0.07 (0.22) | -1.71*** (0.24) | |
| Constant | 0.40 (0.44) | 0.41 (0.39) | -1.41*** (0.42) | 0.17 (0.45) | | 0.54 (0.51) | 0.46 (0.48) | -0.66 (0.57) | 0.57 (0.52) | |

Source: Wave 1 and 2 of Children of Immigrants Longitudinal Survey in four European Countries and wave 4 and 5 of Children of Immigrants Longitudinal Survey, own calculations, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

EHAS = Education, humanities, arts, and social sciences; BL = Business and law; SE = Science and engineering; S = Services. Reference category = Health, biology, agriculture, and veterinary.

imputation was used to account for missing data. We replicated models 1 and 2 from Table 2 (model 3 was excluded, because this model contains too many parameters compared with the number of respondents in our analyses). Table 3 shows the results of the multinomial regression analyses in terms of log-odds.

Model 1 in Table 3 shows that, compared with choosing the most feminine field of health, biology, agriculture and veterinary, adolescents are less likely to enter business and law as well as services when mothers are employed in a more feminine occupational field. Although model 2 shows that, for business and law, this effect is only significant for girls, the difference between boys and girls was not significant (Wald z -score = 3.68, $p = 0.06$). Mothers thus decrease the likelihood of choosing business and law for boys *and* girls. For services, model 2 shows that the femininity of the mother's occupation increases the likelihood that boys enrol in services, but decreases the likelihood that girls enrol in these fields. These effects are significantly different for boys and girls (Wald z -score = 8.43, $p < 0.01$). Moreover, model 2 shows that the more feminine the mother's occupation is, the less likely it is that girls choose science, engineering and services, but the more likely it is that boys choose these fields, all compared with their likelihood of choosing health, biology, agriculture and veterinary. These effects are significantly different for boys and girls (Wald z -score = 9.12, $p < 0.01$).

These effects are generally in line with the theory of sex-role learning as well as our earlier conclusions in Table 2. Although the effect of mother's occupational field is not large, we find support for hypothesis H3a: when mothers are employed in more feminine occupations, boys are more likely to enrol in more masculine fields of study (science and engineering) than in more feminine fields of study (health, biology, agriculture and veterinary). At the same time, mother's feminine occupation makes it more likely that girls enrol in more feminine fields (health, biology, agriculture and veterinary) and less likely that they enrol in more masculine fields (science and engineering). For business and law, which can be categorised as gender-neutral, mothers influence boys and girls in the same way. We find no same-sex effects, as mothers with gender-stereotypical occupations influence both boys and girls (H4a) and, just like Table 2, Table 3 does not show any significant effect of masculinity of father's occupation.

Table 3 additionally shows that gender differences in fields of study remain after taking the characteristics of parents' occupation and control variables into account. Compared with health, biology, agriculture and veterinary, boys are more likely than girls to enter science and engineering, business and law, and services. Adolescents with a non-western immigrant background are more likely than adolescents with a western background to enter business and law. Compared with choosing health, biology, agriculture and veterinary, students in the general or academic track are less likely than students in the vocational track to enter services.

Conclusion and discussion

In this article we examined the effect of parents' occupation on adolescents' field of study and contrasted two explanations. On the one hand, the theory of direct transfer states that parents transfer occupation-specific resources to their children, who actively draw upon these resources. Direct transfer happens irrespective of the parent'

sex, but adolescents are more likely to draw upon the resources provided by the higher-status parent. On the other hand, sex-role learning implies that boys and girls learn 'appropriate' gender-role behaviour from their parents and that boys are more likely to learn this from their father and girls from their mother. We used longitudinal data collected from adolescents and their parents in the Netherlands to test our hypotheses.

Our results largely support the theory of sex-role learning. Mothers who are employed in a feminine occupation influence their sons and daughters to enrol in more gender-stereotypical fields of study. In accordance with the theory of sex-role learning, this suggests that the mother's behaviour exemplifies appropriate behaviour for the adolescents' sex category. Consequently, if mothers are employed in a more feminine occupation, boys will choose a more masculine field of study and girls a more feminine field of study. More specifically, as analyses of specific fields of study showed, boys are more likely to enter science and engineering and less likely to choose fields such as health, biology, agriculture and veterinary, whereas for girls we find the opposite. This is in line with previous studies, which concluded that mothers in a non-traditional occupational field result in adolescents choosing non-traditional fields (Leppel *et al.*, 2001; Støren & Arnesen, 2007; Polavieja & Platt, 2014). However, whereas these studies find this effect only for girls (Polavieja & Platt, 2014) or boys (Leppel *et al.*, 2001; Støren & Arnesen, 2007), we conclude that the mother's occupation affects both boys' and girls' field of study.

Contrary to the theory of sex-role learning, we find no evidence that it is more likely for boys to learn gender-role behaviour from their father and for girls to learn gender-role behaviour from their mother. Mother's occupation has a similar influence on boys and girls, and father's occupation has little effect on which field of study adolescents enter. Although the effect of mother's occupation is relatively small, it does imply that if more mothers were employed in more masculine occupations, then more boys and girls would enter gender atypical fields. We conclude that whereas previous research focused mainly on father's occupation (Van de Werfhorst *et al.*, 2001; Van de Werfhorst & Luijkx, 2010), our results highlight the importance of mother's occupation for adolescents' field of study.

Our study shows that horizontal characteristics (parents' occupational field) are intertwined with vertical characteristics (level of secondary education and parents' highest education). Overall, the femininity of the mother's occupation contributes to gender-stereotypical field of study choices for boys and girls from lower and average-educated backgrounds, whereas the masculinity of the father's occupation matters for adolescents in higher education and from higher-educated backgrounds. Although mothers seem to reinforce gender-role behaviour for both boys and girls, interestingly, fathers reinforce traditional gender-role behaviour for boys (sex-role learning and/or direct transfer), but reduce traditional gender-role behaviour for girls (direct transfer). This seems to indicate that when the stakes are higher (for higher-educated parents and children), children are more likely to profit from the resources of their father. This may be the case because even higher-educated mothers in the Netherlands are more likely to work part-time than fathers. When the stakes are lower, mothers socialise their children into appropriate gender roles. The overall effect of the mother is more visible in our study, because fathers' effects are sometimes opposite,

depending on the gender of the child and their track, and may thus cancel each other out. These results are in line with other studies, showing that mechanisms which lead to gender segregation in fields of study can work differently for different levels of secondary education (Imdorf *et al.*, 2015) and for boys and girls from different social backgrounds (Van de Werfhorst *et al.*, 2003). We encourage future research to further explore this intersectionality and study how parents' occupational fields affect gender differences in fields of study for adolescents from different education levels and social backgrounds.

Although parents can be important for the fields of study their children enrol in, their influence—as measured here—does not explain gender differences in field of study choices. After taking parents' influence into account, boys were still more likely to enrol in science, engineering, services, business and law than in health, biology, agriculture and veterinary, whereas for girls this was the opposite. In order to evaluate why boys and girls enter different fields of study, future research could explore more subtle forms of parental socialisation and the role of other socialisation agents, such as peers, teachers and siblings (e.g. Sáinz *et al.*, 2011; Kiuru *et al.*, 2012; Anelli & Peri, 2014; Van der Vleuten, 2018). This field would benefit from research that studies the relative contribution of different socialisation practices and agents to gender differences in the fields of study that adolescents enter.

One interesting finding and topic for future research is that adolescents with a non-western immigrant background choose less masculine fields of study than their western peers. More specifically, they are more likely to enter the rather gender-neutral field of business and law. It could be that adolescents from non-western ethnic minorities choose more lucrative fields to compensate for the relatively low socioeconomic status of their family of origin. We also find that the mother's occupational field is particularly important for adolescents with a non-western immigrant background. Women from these groups are less likely to have a paid job in the Netherlands. So if they do work, they may exert a larger influence on their sons and/or daughters. The mother's 'non-traditional' behaviour would then induce more non-traditional (gender atypical) educational fields. We encourage future research to explore how parental influence generates gender differences in fields of study for adolescents from different immigrant backgrounds.

This study was conducted in the Netherlands, which is an interesting context for examining gender differences in fields of study because horizontal educational choices are made at various educational levels (secondary and tertiary level). However, in order to better understand how parents influence the fields their children enter, it would be beneficial to replicate our study in countries with a different educational system, in which horizontal educational choices are made at a later time point or at a specific educational level (e.g. choice of major in tertiary education in the USA), as well as in countries where gender segregation in the labour market is less pronounced (Bettio & Verashchagina, 2009). Moreover, many women, and mothers, in the Netherlands work part-time. Women who work part-time are more often employed in female-dominated occupations (OECD, 2009). The effect of a mother's occupation may therefore not really stem from her occupational field, but more from the general socialisation effect that comes from spending time with her child. Unfortunately, we were not able to take into account parents' employment hours, but in order

to disentangle these effects, future research could compare mothers with many or few (or no) working hours. Similarly, the effect of mother's occupational field could also be a result of the fact that daughters learned from their mother's feminine occupation that it is 'appropriate' for women to work in part-time (and thus feminine) jobs, and sons learned that it is 'appropriate' for men to work in full-time (and thus masculine) jobs. In order to disentangle these effects, future research could compare the effect of mother's occupation in countries with differing levels of part-time employment.

Overall, this article highlights the role of horizontal characteristics when examining which field of study adolescents enter and concludes that we need to look beyond the role of the father and additionally include mothers in explanatory analyses. Mothers—not fathers—seem to socialise their children into gender-specific fields of study.

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NOTES

- ¹ In the second wave, additional students and parents who were not part of the sampling frame entered the survey because (some) students changed class from wave 1 to wave 2 and whole classes were asked to participate in wave 2 ($n = 596$).
- ² Students from the vocational track entered a field of study in wave 3. However, because field of study was not asked in wave 3, we use information on their field of study from wave 4. This means that field of study for the vocational track is not measured directly after secondary education, but one year later.
- ³ This number is quite high because parents who filled in the short questionnaire did not answer questions about their partner's occupation.
- ⁴ We use the data from 2011 onwards because this is the year that the LFS-EU went from the ISCO88 to the ISCO08 coding.
- ⁵ In the theory section, we argued that the higher-status parent could be either the mother or the father. In line with this notion, about half of the women in our data have a higher occupational status than their male partner.
- ⁶ In line with the CILS4EU sample frame as well as the general definition of the CBS, western societies are defined as Europe (excluding Turkey), North America, Oceania, Indonesia and Japan. Non-western immigrants are people from Turkey, Morocco, Surinam, Dutch Antilles and Aruba, Africa, Asia (excluding Indonesia and Japan) and Latin-America.
- ⁷ All respondents who only participated in wave 2 were given a separate class identifier ($n = 596$).
- ⁸ The numbers for secondary vocational education are not available online. We requested them from Statistics Netherlands. They are available upon request from the authors.

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Appendix A

In all analyses in Table 2 (main text), there are substantial differences between respondents in different tracks of secondary education (vocational track, general track and academic track) as well as for adolescents from higher-educated (lower-educated) parents. To see how horizontal characteristics (parents' occupational field and adolescents' field of study) are intertwined with vertical characteristics (secondary school track and parents' highest education), we ran all analyses displayed in Table 2 again separately per track of secondary education (Table A.1) and for adolescents with a higher-educated background (highest education of parents is higher vocational education or university) and adolescents with an average/lower-educated background (highest education of parents is no education, primary education or secondary education; lower or secondary vocational education (Table A.2)). Additionally, because

Table A.1. By track of secondary education: Unstandardised coefficients and standard errors of multiple-group analyses of predictors of masculine field of study choice for boys and feminine field of study choice for girls

| | Model 1 | | Model 2 | | Model 3 | |
|---|--------------------|--------------------|---|--------------------|--------------------|--------------------|
| | Boys | Girls | Boys | Girls | Boys | Girls |
| | B (SE) | B (SE) | B (SE) | B (SE) | B (SE) | B (SE) |
| <i>Independent variables</i> | | | | | | |
| Femininity of mother's occupation | 0.05 (0.03) | | Vocational track (<i>n</i> = 1320) 0.07 (0.07) | 0.05 (0.04) | 0.06 (0.07) | 0.05 (0.05) |
| Masculinity of father's occupation | 0.01 (0.03) | | 0.04 (0.04) | -0.02 (0.03) | 0.04 (0.04) | -0.01 (0.04) |
| Father's status higher than mother's | | | | | -11.55 (41.61) | 33.51 (28.13) |
| Femininity of mother's occupation × Father's status higher than mother's | | | | | 0.50 (0.44) | -0.12 (0.34) |
| Masculinity of father's occupation × Father's status higher than mother's | | | | | -0.38 (0.35) | -0.34 (0.30) |
| Constant | 71.87*** (3.65) | 71.29*** (3.67) | 68.78*** (5.73) | 73.48*** (4.41) | 68.93*** (5.65) | 72.70*** (4.70) |
| Femininity of mother's occupation | 0.08** (0.03) | | General track (<i>n</i> = 717) 0.01 (0.06) | 0.13* (0.05) | -0.02 (0.05) | 0.16** (0.05) |
| Masculinity of father's occupation | -0.07** (0.02) | | -0.02 (0.06) | -0.10** (0.03) | -0.01 (0.07) | -0.11*** (0.03) |
| Father's status higher than mother's | | | | | 8.10 (28.83) | 26.38 (31.47) |
| Femininity of mother's occupation × Father's status higher than mother's | | | | | 0.24 (0.29) | -0.33 (0.37) |
| Masculinity of father's occupation × Father's status higher than mother's | | | | | -0.12 (0.38) | -0.33 (0.34) |

Table A.1. (Continued)

| | Model 1 | | Model 2 | | Model 3 | |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | Boys | Girls | Boys | Girls | Boys | Girls |
| Constant | 67.03*** (3.55) | 64.61*** (3.76) | 69.61*** (6.15) | 64.12*** (6.07) | 69.39*** (6.17) | 63.28*** (5.78) |
| Femininity of mother's occupation | 0.06 (0.04) | | 0.08 (0.05) | 0.05 (0.06) | 0.07 (0.07) | 0.05 (0.06) |
| Masculinity of father's occupation | 0.07 (0.04) | | 0.20* (0.08) | -0.02 (0.04) | 0.20* (0.08) | -0.01 (0.04) |
| Father's status higher than mother's | | | | | 64.62 (83.30) | 122.19* (61.16) |
| Femininity of mother's occupation × Father's status higher than mother's | | | | | -0.49 (0.85) | -0.86 (0.54) |
| Masculinity of father's occupation × Father's status higher than mother's | | | | | -0.33 (0.50) | -0.94 (0.60) |
| Constant | 59.35*** (5.06) | 55.25*** (4.97) | 49.89*** (7.67) | 61.90*** (5.70) | 49.63*** (8.19) | 60.91*** (5.36) |

Source: Wave 1 and wave 2 of Children of Immigrants Longitudinal Survey in Four European Countries and wave 4 and wave 5 of Children of Immigrants Longitudinal Survey in the Netherlands, own calculations. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A.2. By parents' highest education: Unstandardised coefficients and standard errors of multiple-group analyses of predictors of masculine field of study choice for boys and feminine field of study choice for girls

| | Model 1 | | Model 2 | | Model 3 | |
|--|----------|----------|------------------------------------|----------|----------|----------|
| | Boys | Girls | Boys | Girls | Boys | Girls |
| | B | B | B | B | B | B |
| | (SE) | (SE) | (SE) | (SE) | (SE) | (SE) |
| <i>Independent variables</i> | | | | | | |
| Femininity of mother's occupation | 0.06* | | 0.02 | 0.08* | 0.02 | 0.09* |
| | (0.03) | | (0.04) | (0.03) | (0.04) | (0.04) |
| Masculinity of father's occupation | 0.00 | | 0.01 | -0.01 | 0.01 | -0.01 |
| | (0.02) | | (0.04) | (0.03) | (0.04) | (0.03) |
| Father's status higher than mother's | | | | | -19.24 | 36.84 |
| | | | | | (40.90) | (27.06) |
| Femininity of mother's occupation | | | | | 0.46 | -0.30 |
| × Father's status higher than mother's | | | | | (0.40) | (0.31) |
| Masculinity of father's occupation | | | | | -0.24 | -0.28 |
| × Father's status higher than mother's | | | | | (0.31) | (0.26) |
| Constant | 66.63*** | 64.39*** | 71.22*** | 66.46*** | 71.03*** | 65.62*** |
| | (3.99) | (3.86) | (4.44) | (3.16) | (4.42) | (3.26) |
| | | | Higher-educated parents (n = 1032) | | | |
| Femininity of mother's occupation | 0.07 | | 0.08 | 0.06 | 0.06 | 0.07 |
| | (0.04) | | (0.06) | (0.04) | (0.06) | (0.05) |
| Masculinity of father's occupation | -0.02 | | 0.07 | -0.09** | 0.09* | -0.09** |
| | (0.03) | | (0.04) | (0.03) | (0.05) | (0.03) |
| Father's status higher than mother's | | | | | 49.03 | 60.39 |
| | | | | | (35.64) | (32.97) |
| Femininity of mother's occupation | | | | | -0.11 | -0.21 |
| × Father's status higher than mother's | | | | | (0.37) | (0.34) |
| Masculinity of father's occupation | | | | | -0.37 | -0.76* |
| × Father's status higher than mother's | | | | | (0.30) | (0.34) |
| Constant | 75.23*** | 73.79*** | 58.31*** | 68.33*** | 57.75*** | 67.92*** |
| | (6.71) | (6.71) | (4.38) | (3.54) | (4.27) | (3.55) |

Source: Wave 1 and wave 2 of Children of Immigrants Longitudinal Survey in Four European Countries and wave 4 and wave 5 of Children of Immigrants Longitudinal Survey in the Netherlands, own calculations. *p < 0.05; **p < 0.01; ***p < 0.001.

Table A.3. By immigrant background: Unstandardised coefficients and standard errors of multiple-group analyses of predictors of masculine field of study choice for boys and feminine field of study choice for girls

| | Model 1 | | Model 2 | | Model 3 | |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | Boys | Girls | Boys | Girls | Boys | Girls |
| | B (SE) | B (SE) | B (SE) | B (SE) | B (SE) | B (SE) |
| <i>Independent variables</i> | | | | | | |
| Femininity of mother's occupation | 0.04 (0.02) | | 0.02 (0.04) | 0.05 (0.03) | 0.02 (0.04) | 0.06* (0.03) |
| Masculinity of father's occupation | 0.01 (0.02) | | 0.06 (0.03) | -0.04 (0.02) | 0.07 (0.03) | -0.03 (0.03) |
| Father's higher occupational status | | | | | 14.25 (31.08) | 42.32 (22.16) |
| Femininity of mother's occupation × Father's status higher than mother's | | | | | 0.19 (0.29) | -0.19 (0.25) |
| Masculinity of father's occupation × Father's status higher than mother's | | | | | -0.36 (0.25) | -0.50 (0.26) |
| Constant | 73.42*** (2.82) | 71.23*** (2.85) | 70.91*** (3.51) | 73.49*** (3.24) | 70.50*** (3.53) | 72.52*** (3.27) |
| Western background (<i>n</i> = 2075) | | | | | | |
| Femininity of mother's occupation | 0.22*** (0.05) | | 0.26*** (0.08) | 0.21*** (0.06) | 0.23** (0.09) | 0.22*** (0.07) |
| Masculinity of father's occupation | -0.07 (0.04) | | -0.11 (0.07) | -0.04 (0.05) | -0.10 (0.07) | -0.05 (0.05) |
| Father's status higher than mother's | | | | | -93.24 (83.58) | 22.13 (49.25) |
| Femininity of mother's occupation × Father's status higher than mother's | | | | | 1.18 (0.72) | -0.44 (0.56) |
| Masculinity of father's occupation × Father's status higher than mother's | | | | | 0.25 (0.73) | 0.07 (0.40) |
| Constant | 54.61*** (5.76) | 55.37*** (5.74) | 55.23*** (8.42) | 54.80*** (6.15) | 54.91*** (8.29) | 54.95*** (6.27) |
| Non-western background (<i>n</i> = 422) | | | | | | |

Source: Wave 1 and wave 2 of Children of Immigrants Longitudinal Survey in Four European Countries and wave 4 and wave 5 of Children of Immigrants Longitudinal Survey in the Netherlands, own calculations. **p* < 0.05; ***p* < 0.01; ****p* < 0.001.

the original sample contained an oversampling of respondents with a non-western immigrant background, we ran all analyses separately for respondents who have a western and non-western background (Table A.3). All analyses in Tables A.1, A.2 and A.3 include control variables, but we only show the effects of the variables we hypothesised on (mother's occupational field and father's occupational field).

Table A.1 shows no significant effects of parents' occupational field for both boys and girls in the vocational track. The results for the general track show that mothers who are employed in a more feminine occupation lead boys and girls to more gender-stereotypical fields of study and that fathers who are employed in a more masculine occupation lead boys and girls to less gender-stereotypical fields of study. Although it seems that girls are affected more by their mother and father, Wald tests show that the effects of mother's occupation (Wald z -score = 1.87, p = 0.17) and father's occupation (Wald z -score = 0.91, p = 0.34) are not statistically different for boys and girls in model 2. Boys from the academic track enrol in more gender-stereotypical fields of study if their father has a more masculine occupation (model 2). This effect is significantly different for boys and girls (Wald z -score = 4.20, p < 0.05). This model thus shows a same-sex effect.

Table A.2 shows the results separately for adolescents from lower/average-educated backgrounds and higher-educated backgrounds. Model 1 in Table A.2 shows that the mother's occupation leads boys and girls to more gender-stereotypical fields of study if they have lower/average-educated parents, but not if they are from higher-educated backgrounds. These effects are not different for boys and girls. Models 2 and 3 show that the father's masculine occupation leads girls from higher-educated parents to less gender-stereotypical fields of study, but boys to more gender-stereotypical fields of study. The effect of father's masculine occupational field is significantly different for boys and girls (model 2: Wald z -score = 7.96, p < 0.01).

Table A.3 shows the results for people with a western background and people with a non-western immigrant background. Model 1 shows that the femininity of the mother's occupation is important for adolescents with a non-western immigrant background. A 10% increase in the share of women in the mother's occupation is associated with around a 2% increase in the share of own-gender students in the adolescent's occupational field. This effect is not different for boys and girls (model 2: Wald z -score = 0.33, p = 0.57). Father's occupational field does not seem to affect the adolescent's field of study for both adolescents with a western and a non-western background.