

Gender Typicality of Higher Education Aspirations in Upper-Secondary Education: Intensification, Convergence or Stability

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ABSTRACT

The aim of the paper was to examine intensification, convergence, or stability in the gender typicality of girls' and boys' higher education aspirations during the time spent in upper-secondary education. The study, conducted on a sample of 13,301 pupils of four- and five-year secondary education programmes, examined the roles of the upper-secondary education programme, pupils' interests, and school success in explaining the gender typicality of their higher education aspirations. The results suggest that, although there are differences between girls and boys in the gender typicality of their educational aspirations, these differences are stable over time, whereby neither the gender intensification nor the gender convergence hypotheses were confirmed. The girls' and boys' choices become neither more, nor less gender-stereotypical, compared to the start of secondary education. The results of regression models show that the gender typicality of higher education aspirations differs with regard to vocational domain/grammar school programme: pupils in typically male programmes aspire towards typically male higher education programmes and vice versa. School success and interests have also contributed to the explanation of the gender typicality of higher education aspirations. Success in the Croatian Language and interest in linguistic and biomedical domains predict a stronger aspiration towards typically female higher education programmes,

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while success in Mathematics and the English Language, and interest in technical and ICT domains contribute to the aspiration towards typically male higher education programmes. The findings of this study suggest that, along with the influence of gendered educational interests and achievements, the differentiation of secondary education can influence gender-stereotypical educational aspirations.

Key words: higher education aspiration, gender typicality, domain interest, institutional setting, secondary school experience

INTRODUCTION

Aspirations for higher education, defined as young people's ambitions and goals linked with future educational outcomes and experiences in higher education, are among the most important determinants of educational, career and life choices and outcomes (Ristić Dedić & Jokić, 2019). Their meaning goes beyond the field of education, as these aspirations are strongly linked with the development of a person's identity and with personal well-being. Nevertheless, it would be a mistake to conclude that aspirations for higher education are the only precondition for attaining positive educational and life outcomes, for as Gutman & Ackerman (2008) emphasise, such outcomes are at the same time also a predictor and product of abilities, personal characteristics, socialisation and experience. The nature of educational aspirations changes and develops during schooling as a result of very complex interrelationships between a person's development and their educational and life environment (Gottfredson, 2002).

Empirical research and statistical data, from Croatia and internationally, point to gender typicality in aspirations for higher education and a horizontal segregation in later choices of study programmes (Alon & DiPrete, 2015; Charles & Bradley, 2009). As in the majority of developed countries (McDaniel, 2010), in Croatia more women than men enrol, attend and complete study programmes (Croatian Bureau of Statistics, 2019). According to the Eurostat (2020) data, women comprised 56.7% of the student body in Croatia during the 2017/18 academic year. In most study programmes and fields, no gender parity exists. Male or female students dominate and as such, certain study programmes comprise a gender-typical choice. Along these lines, in the year 2017 men made up the majority of those enrolled on study programmes in the field of information and communications technologies (77.7%) and engineering, manufacturing and construction (71.9%), while there were significantly more women in study programmes in the field of education (87%), health and welfare (76.3%), social sciences, journalism and information sciences (71.2%) and arts and humanities (67.6%). Similar patterns have been relatively stable for many years running (Croatian Bureau of Statistics, 2019). A persistent horizontal gender segregation – a division into typically female and typically male study programmes – can be seen in most developed countries (Barone, 2011; Charles & Bradley, 2009; Eurostat, 2020).

A theoretical framework for explaining gender differences in educational aspirations

The expectancy-value model of achievement motivation (Eccles, 2015; Eccles et al., 1983) has been chosen as the theoretical frame for this research as it problematises the gender, educational and socialisation-related perspectives of educational aspirations, and it takes into account the importance of motivation, gender-related beliefs and previous achievements in the process of shaping girls' and boys' educational aspirations. This model's main assumption is that expectations of success and subjective task values (interest, utility value and attainment value) have a direct impact on educational aspirations. Personal goals and general self-image, including the self-concept of one's abilities, also impact on expectations of success and subjective task values. Pupils' perceptions of the socializers' beliefs, behaviours and expectations, their perceptions of gender roles and stereotypes of activities, and the interpretation of previous experiences determine what kind of personal goals and self-image they will have. Finally, it is assumed that the stated pupil perceptions are shaped by the cultural milieu, beliefs and behaviours of their role models, abilities and previous achievement-related experiences.

Although gender differences in school achievement in mathematics and the natural sciences are reducing or disappearing (Updegraff et al., 1996), research studies show that girls expect to achieve less and evaluate themselves as less competent in these fields than boys (Eccles et al., 1993; Jugović, 2019). Part of the research into values attributed to mathematics and the natural sciences shows that girls consider mathematics to be less important and useful and that they are less interested in the natural sciences (Jacobs et al., 2002; Watt, 2004), while some of the research shows that there are no gender differences in interest in, and the perceived usefulness and importance of, mathematics (Eccles et al., 1993; Marušić, 2006). On the other hand, girls are more successful at reading literacy (Mullis et al., 2004; OECD, 2004), they have a stronger interest in languages at school, consider them more important and more useful, and perceive themselves as more competent at languages than boys (Jacobs et al., 2002; Marušić, 2006).

Research studies conducted both in Croatia and abroad have shown that subjective task values are the most powerful predictor of educational aspirations (Eccles et al., 1983; Jugović, 2010, 2017). The results of American research into the importance of gender beliefs in explaining educational outcomes are inconsistent (DeBacker & Nelson, 1999; Greene et al., 1999), while Croatian research has confirmed the hypothesis of a model of the negative effects of gender stereotypes on pupils' gender-atypical educational choices and school achievement (Jugović, 2010, 2017; Jugović, Baranović & Marušić, 2012). Eccles et al. (1983) state that abilities and earlier experiences with academic achievements determine motivation and educational aspirations, and they emphasise that gender differences in educational choices are often significantly greater than the differences in the

grades themselves, which Croatian research also shows (Jugović, 2017). Finally, the importance of the impact of socializers – especially the stereotypical beliefs of parents and teachers on pupils' beliefs and achievements – has been recorded in numerous studies (Retelsdorf, Schwartz & Asbrock, 2015; Tenenbaum & Leaper, 2003).

A developmental perspective on gender differences in education

In the literature, two contradictory approaches can be found to researching changes in gender differences in academic motivation, educational aspirations and achievements during childhood and adolescence. The first approach is the gender intensification theory (Hill & Lynch, 1983), according to which it is assumed that there is increased pressure on children and adolescents to conform to socially conditioned gender roles. This results in a strengthening of gender differences in motivation and educational aspirations, according to which, over time, boys would become increasingly interested in maths or physics for example, and less interested in languages and reading, while with girls the inverse trend would be expected. Contrary to the above assumption, the gender convergence hypothesis has been asserted, according to which gender differences in motivation and educational outcomes reduce with age (Fredricks & Eccles, 2002; Jacobs et al., 2002). The authors believe that gender differences decrease, on the one hand, because boys at the beginning of their schooling have unrealistically high expectations and perceptions of their own abilities that reduce over time under the influence of feedback from teachers and through social comparisons with their classmates. On the other hand, girls are believed at the beginning of their schooling to not overestimate their abilities as much as boys. Consequently, with them, the reduction in their evaluation of their own abilities is less noticeable.

A review of the few research studies into changes in gender differences linked to education has not indicated any unequivocal results (Frenzel et al., 2010; Jacobs et al., 2002; Nagy et al., 2010; Watt, 2004). Longitudinal research studies completed in the USA, Australia and Germany have investigated the development of gender differences on different aspects of pupils' motivation, such as self-concepts of their ability, expectations of success, subjective task values and perceptions of difficulty and effort in mathematics, English and sport. Not one of the mentioned research studies has dealt with changes in gender differences linked with educational aspirations or choices alone. The research studies have included pupil groups of various ages. The biggest age range was included in the research on American pupils from grade (school year) one to grade 12 (Jacobs et al., 2002), while the remaining three studies included a range of five or six years (having begun in grade five or seven).

Most findings in the described research studies show that there are no age-related gender differences in changes to academic motivation. In other words, gen-

der differences in motivation are stable over time (Frenzel et al., 2010; Nagy et al., 2010; Watt, 2004). Only in the research by Jacobs et al. (2002) has the gender convergence hypothesis been confirmed in some cases (for self-concepts of ability in mathematics and the subjective task values of sport) and gender intensification (for self-concepts of ability in English). The explanation for such a phenomenon is that this research includes the longest range of years and especially the young years when the impact of socialisation is likely strongest, while the other three research studies encompass a shorter period (five or six years) and higher years of primary or secondary school.

The role of the institutional environment in shaping educational aspirations

For this study, it is especially important to emphasise that the development of aspirations for higher education is not determined only by personal characteristics, but also by the interaction of a young person with the everyday environment in which they live. With aspirations for higher education, factors from the wider social environment also play a role, such as the current economic situation, perceptions of future needs for certain qualifications and the characteristics of the educational system in which a young person studies (Gorard, See & Davies, 2012; Jokić, 2019; Quaglia & Cobb, 1996). Gender stereotypes in aspirations appear as early as at the beginning of one's educational path, and they especially come to the fore around the transition from the primary- to secondary-education system.

On the institutional level, the differentiation in upper-secondary education programmes is strongly linked to gender differences in educational and career trajectories. An earlier choice of programme, especially the vocational education and training programmes, is more likely to lead to enrolling on a course that matches gender stereotypes and gender identity than a choice made when older. In addition, the vocational specificity of the programmes themselves, linked with gender-typical occupations, provides a stronger possibility for the construction and affirmation of pupils' gender identity, which can guide them to a gender-typical education pathways, and later also an employment career (Imdorf et al., 2014). Irrespective of the theoretical mechanism (impression management, socialisation or rational choice), the existence and prevalence of the various programmes and contents in secondary education guides pupils towards gender-typical career choices. The wider the range of vocational programmes, the greater the segregation at upper-secondary education level will be (Imdorf et al., 2015). This is especially important for boys as it has been shown that their educational trajectories are key to understanding the dynamic of gender segregation (Imdorf et al., 2014, 2015, Riegle-Crumb, King & Moore, 2016).

The Republic of Croatia's education system is characterised by a single-structure eight-year elementary education (consisting of primary and lower-secondary

education), followed by a transition into differentiated upper-secondary education that lasts from three to five years. The differentiation in upper-secondary programmes is manifested within both general academic (grammar school/gymnasium) and vocational tracks. Pupils can thus choose between five general academic programmes and around 200 vocational programmes, although their number and vocational specificity in the case of the four-year and five-year programmes is not so great (Matković, 2011). At upper-secondary level, horizontal gender segregation is visible in the proportion of girls and boys in certain vocational fields and grammar school programmes. Hence, in the year 2017/18, looking at the larger vocational fields, girls dominated in personal services (96.1%) and were overrepresented in medicine (76.3%), veterinary (73.3%), applied arts (77.0%) and economic secondary-school programmes (68.8%). Boys dominated in shipbuilding (99.1%), mechanical engineering (97.8%), electrical engineering (96.5%), and somewhat less in transport (78.0%) and construction programmes (71.1%) (MZO, 2020).

In the literature to date we have not found an analysis of the specific role of upper-secondary education programmes and their gender typicality in shaping aspirations for higher education. The abovementioned mechanisms justify posing the question of whether attendance of and time spent in a certain secondary-school environment determines the gender typicality of aspirations for higher education.

RESEARCH QUESTIONS AND HYPOTHESES

The empirical insights confirm the hypotheses of the expectancy-value model concerning the importance of academic motivation, including interest, in explaining the gendered features of educational aspirations (Eccles et al., 1983; Jugović, 2017). Yet it is less well known how educational aspirations develop among pupils, namely, whether they become more or less gender-typical toward the end of their secondary education. Empirical insights on changes in general differences in academic motivation are available (Jacobs et al., 2002; Nagy et al., 2010), but a developmental perspective on gender differences in educational aspirations remains unexplored to date. On the other hand, contemporary research into gender segregation in choice and participation in higher education (Alon & DiPrete, 2015; Barone, 2011) often focus on generational changes, and does not take into account the development of aspirations. Finally, the scarce literature on the gender dimension to vocational education and training (Imdorf et al., 2014, 2015) points to the significance of institutional arrangements for the gender typicality of careers, but does not thematise the transition to higher education.

The Republic of Croatia's secondary-education system represents an intriguing environment to study changes in the gender typicality of aspirations for higher education. As a result of the high level of differentiation in the upper-secondary programmes, it is possible to assess the contribution that attending a gender-specific upper-secondary education has on the gender typicality of aspirations for high-

er education of girls and boys. The insights gained can be generalised to other systems of education characterised by stratification and strong differentiation in secondary education programmes. The hypotheses of gender intensification and gender convergence, which are crucial for explaining developmental changes in gender differences, do not bring contextual and institutional factors to the fore. These factors could also contribute to the development of educational aspirations in higher education. This especially relates to the school environment in which aspirations are formed. Consequently, in this study we consider it important to check the role of vocational fields and grammar-school programmes on the gender typicality of the higher-education aspirations of the upper-secondary population.

This study's main research question is:

1. Does an intensification or convergence in the gender typicality of aspirations for higher education of girls and boys occur during their time spent in upper-secondary education, or does the gender typicality remain stable?

Additional research questions are:

2. Does attending a particular upper-secondary programme, and the time spent in the programme, contribute to explaining the gender typicality of higher-education aspirations?
3. Does an interest in certain educational areas and school achievement contribute to explaining the gender typicality of aspirations for higher education?

Based on the literature review, we pose the following hypotheses:

H1. With the time spent in upper-secondary education, neither intensification nor convergence in the gender typicality of girls' and boys' aspirations for higher education occurs. Instead, the gender typicality of aspirations for higher education remains stable over time.

H2.a. Attending a certain upper-secondary programme contributes to explaining the gender typicality of aspirations for higher education, in such a fashion that attending gender-typical vocational or grammar school programmes is linked with the gender typicality of aspirations for higher education.

H2.b. Time spent in a gender-typical upper-secondary education programme strengthens the gender typicality of aspirations for higher education.

H3. Interest in a certain educational area and school success contribute to explaining the gender typicality of pupils' aspirations for higher education. At the same time, grades in mathematics and interests in technical fields and information science contribute to aspirations for enrolling on typically male study programmes, while grades in Croatian and foreign languages, and interests in biomedical and healthcare field and linguistic field contribute to aspirations for enrolling on typically female study programmes.

METHODOLOGY

This article began as a result of the academic research project *An analysis of the condition and needs of upper-secondary education linked to information about higher-education choices and the procedure of enrolling on study programmes via the National Information System of Registration in Institutions of Higher Education (NISpVU)*¹ completed in the 2017/18 school year in Croatia. It features a cross-sectional research design, with responses gathered from three generations of upper-secondary pupils at one point in time. A cross-sectional research design was chosen because it is economical to implement and fits in with the intention of ensuring the research is nationally representative. It does so by including a large number of participants from all parts of the country, various upper-secondary programmes and different years of learning and teaching.

Sample

In this study, data from the quantitative part of the research in which 13,301 pupils participated, from a nationally representative sample of 59 public secondary schools that provide four-year and five-year-long upper-secondary programmes in the Republic of Croatia are analysed.² The school sample is stratified according to regions and the type of upper-secondary programmes that are organised and implemented in the school. Within each school, the sample included at least two classes in the first, third and final year of education, dependent on the number of pupils in the school and the heterogeneity of the structure of the upper-secondary programmes (for more details about methodology see Jokić & Ristić Dedić, 2019). Schools implementing exclusively vocational or exclusively grammar school programmes participated in the research, as well as mixed schools with vocational and grammar school programmes. The sample includes 16.0% of secondary schools and 14.3% of the total number of pupils in the included school years. The sample is comprised of 53.6% girls and 46.4% boys, which is almost identical to the population structure of pupils in the four-year and five-year long upper-secondary programmes. The average age of participants from the first-year upper-secondary classes was 15 years and three months, from the third-year classes it was 17 years and three months, and from the final-year classes it was 18 years and five months. The gender structure did not differ among generations of pupils. The sample included a somewhat larger number of pupils from vocational upper-secondary pro-

¹ The project was designed and carried out by academic researchers from the Institute for Social Research in Zagreb (ISRZ), in collaboration with the Agency for Science and Higher Education, as part of a project financed by the European Social Fund – Improvement of Quality Assurance and Enhancement Systems in Higher Education.

² The framework for sampling schools can be found in the dataset on secondary schools available on the following internet pages of the Ministry of Science and Education (<http://mzos.hr/dbApp/pregled.aspx?appName=SS#>) (accessed on 17 October 2018).

grammes (52.5%), in comparison with pupils from grammar school programmes (47.5%). This is in line with the population structure of pupils in the four-year and five-year upper-secondary programmes.

Participants included in the analytical procedures

This study only analyses the sub-sample of pupils in vocational fields or on grammar school programmes with a large number of participants (12,015 participants), who replied to the question “Do you want to study in the future?” (attend a higher-education programme) with “Yes” or “I don’t know”, who also replied to the question of gender, and for whom at least one aspiration for higher education was successfully coded. Due to the impossibility of generalising, replies by participants in vocational fields or on grammar school programmes represented in only one school are not included, nor are those in which less than 100 pupils expressed aspirations for higher education. As a result, the set used in analysis was reduced to 11,583 aspirations from 7,763 pupils. In the regression models, the replies of participants who did not state their grades or level of interest in the chosen areas of learning of work are excluded (442 choices). With these interventions, the number of participants included in the analyses dropped to 7,418 compared with the initially coded group, and their expressed choices dropped to 11,216 (Table 1).

Table 1. Structure of the sample of participants and their expressed aspirations from larger vocational fields or grammar-school programmes

	Total number of pupils in sample	Proportion of girls	Number of pupils who expressed at least one aspiration	Number of expressed aspirations
Electrical engineering	1,645	5.3%	863	1,090
Mechanical engineering	499	5.4%	239	296
Natural Sciences–Mathematics grammar school	1,358	42.5%	955	1,540
Chemical technology	168	49.0%	109	171
Agriculture	299	50.5%	99	121
Hospitality and tourism	876	64.0%	397	627
General grammar school	3,110	65.7%	2,152	3,496
Economics	1,772	68.8%	1,084	1,547
Languages grammar school	1,536	75.5%	973	1,607
Healthcare	752	76.1%	547	721
Total	12,015	53.5%	7418	11,216

Research procedure

The research was carried out in collaboration with school coordinators who implemented the questionnaires in their schools during lesson time. The average length of time taken for a group to fill out the questionnaire was 40 minutes. This research has respected ethical principles of research with children and young people, and the research received authorisation from the competent ministry and the approval of the Ethics Committee of the Institute for Social Research in Zagreb. The participants could withdraw from participating at any time.

Instruments and examined constructs

Aspirations for higher education for enrolling on a given study programme were assessed via the open question:

“Do you already know which study programme you would like to enrol on? Please write your answer on the line, e.g. economics, computing, nursing, law etc. You can give more than one answer”.

On the basis of a set of rules concerning the roots of the words and phrases, participants' replies were procedurally coded into educational fields according to the categories of the *UNESCO International Standard Classification of Education, Field of Education and Training (ISCED-F 2013)* (UNESCO, 2014). This internationally standardised categorisation includes 11 wide, 29 narrow and 80 detailed fields. So as to ensure consistency with the official statistics, study programmes were allocated identical codes that they were assigned by the Ministry of Science and Education and the Croatian Bureau of Statistics. When it was not possible to unambiguously identify a detailed field from the pupil's entry, it was attributed to an appropriate narrow field. Of 8,596 participants who expressed aspirations for higher education in at least one recognisable field, 3,100 of them stated two, 948 stated three, 217 stated four, 43 stated five and nine stated six aspirations. The field could not be unambiguously allocated in 145 cases (1.7%), largely because the participants stated the names of university faculties at which study programmes in many narrow fields were conducted.

The gender typicality of aspirations for higher education

On the basis of Eurostat's administrative data on the proportion of women in the student population in the Republic of Croatia in the year 2017 (Eurostat, 2020), for each narrow and detailed ISCED educational field, an indicator of proportion of women in the field was calculated – p_w (in an analogous manner to Alon & DiPrete, 2015 and, similarly, Charles & Bradley, 2009). In the year 2017, this indicator had

a range from 0.111 for detailed field 713 (Electricity and energy) to 0.978 for detailed field 112 (Training for pre-school teachers). This value is associated with the expressed aspirations for higher education of participants, so that for each identified aspiration, the indicator p_w denotes the gender typicality of the aspiration and therefore, when relating to a given pupil, it stands for an **indicator of the gender typicality of the aspiration for higher education**. A higher value indicates aspirations for a study programme in which women are more highly represented, and a lower value to aspirations for a study programme with a greater proportion of men.

School achievement

School achievement is expressed in terms of the final grade in the previous school year, in the subjects Croatian, mathematics and the pupil's first foreign language. The replies of first-year pupil participants relate to their grades in the eighth year of primary school, and the replies of participants in the third or the final year relate to grades from their previous year in secondary school. These subjects have been chosen as they make up a compulsory part of the end-of-school national exams that are the precondition for pupils' continuing their education at a higher level. In Table 2, the average grades of girls and boys and the differences between them are displayed.

Table 2. School achievement in the previous school year – average values and differences between girls and boys in the first, third and final year.

	Girls			Boys			r		
	PS8	SS2	SS3	PS8	SS2	SS3	PS8	SS2	SS3
Croatian	4.50	3.90	3.96	4.08	3.49	3.50	0.29	0.22	0.26
Mathematics	4.13	3.21	3.28	4.02	3.11	3.19	0.11	0.07	0.06
Foreign language	4.49	3.99	4.02	4.41	3.93	3.95	0.07	0.07	0.07

Key: PS8 – grade from year 8 of primary school, SS2 – grade from year 2 of secondary school, SS3 – grade from the penultimate year of secondary school. r – indicator of the size of the effect.

In all subjects and all school years the girls' average grades are higher than the boys' (with $p < .001$ for all t-tests), although the girls' advantage is somewhat stronger for Croatian. The difference between girls and boys is stable in all school years and across all subjects. In the supplementary OLS specifications, which include the interaction between sex and school year, a difference in the effect of sex with respect to school year is not established in any subjects at a level $p < .05$.

Interest in fields of learning and work

The participants were presented with a list of 11 fields of learning and work that they may have encountered in or outside of school. The contents of certain fields were explained through examples of the sciences or trades that comprise them. The deployed division of fields strove to respect the differences in experiences and participants' familiarity with the contents of various subjects and fields in a differentiated upper-secondary system of education, and represent scientific–artistic fields as they are determined at the level of higher education and science. The pupils replied with how much they were interested in each field, and they used a five-point scale (from 1 – not at all, to 5 – yes, completely). In the analysis, items were included about interests in fields with a high percentage of men, or women, in the student body (above 75% or below 25%) – these include interests in language and biomedical fields as typically female, and technical and information-sciences-related fields as typical male. The interests of girls and boys in the four educational fields in the first, third and final school year are displayed in Figure 1.

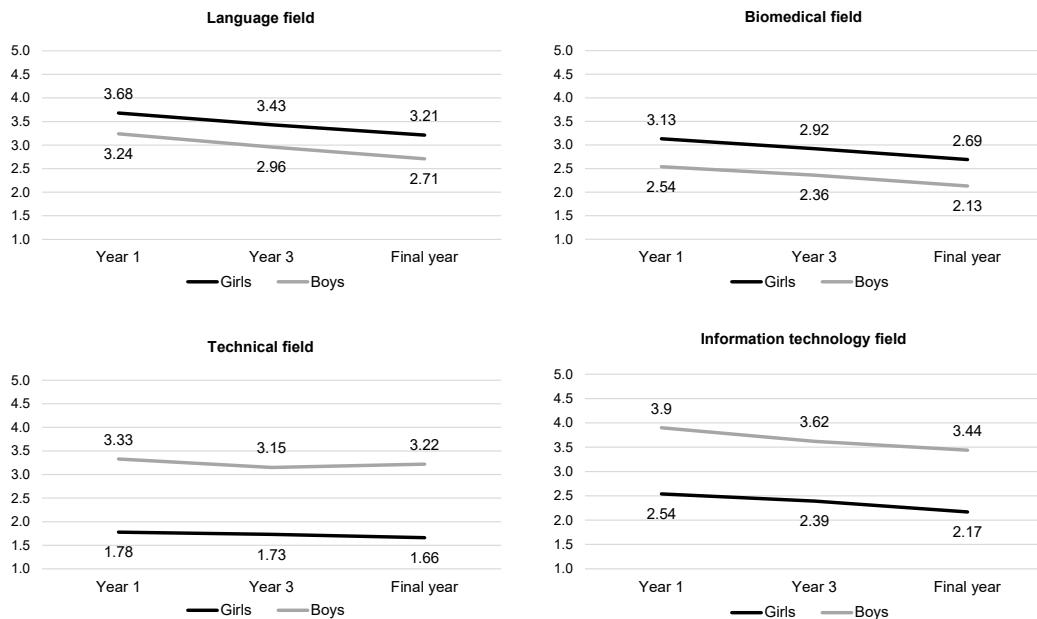


Figure 1. Interest in gender-typical fields – average values and difference between girls and boys in the first, third and final year.

The interests differ between girls and boys in all observed fields in all school years (with $p < .001$ for all t-tests), the differences pointing in the expected direction: girls have a greater interest in language and biomedical fields, and boys in technical

and information technology fields (Figure 1). In all fields apart from the technical, among boys and girls, a similar level of reduction in interest occurred in the upper-school years, while the difference between girls and boys largely remained steady. In the supplementary OLS specifications, which include the interaction between sex and school year, some gender convergence in interests was ascertained in the third year for technical ($b=-0.12$, $p<.05$) and information science ($b=-0.14$, $p<.05$) fields in the third school year, but in the fourth year, the effect disappears.

Analytical procedures

In order to answer research questions, a set of nested *fractional response* regressions are used with the *indicator of the gender typicality of the aspiration for higher education*, with (p_w) used as the criterion variable. Given that the basic unit of the analysis is the individual's aspiration for higher education, in the case when participants have expressed several aspirations, a weighting inversely proportional to the number of entered choices has been used, while the standard error is evaluated taking into account the clustering of responses within individuals.

As groups of predictors linked to certain research questions, the following have been used: (1) sex and school year and their interaction, (2) vocational field or grammar-school programme, in interaction with school year (changes during schooling) and sex (the gender-specific effect of the field on the gender typicality of aspirations), (3) grades and interest, including in its interaction with sex (the gender-specific effect of interests on the gender typicality of aspirations).

In all the regression analyses, controls have been included for the majority of places of schooling and the municipalities categorised as assisted areas (according to the index of development), given that differences have been established in them in gender norms and stereotypes (Kamenov & Galić, 2011), which can lead to a greater gender typicality of aspirations for higher education in smaller and less-developed places. Given this assumption, in the controls, the interaction effect of sex is included as the direction of the link could be different for boys and girls.³

RESULTS

The response to the research questions begins with a presentation of descriptive indicators, with educational fields of aspirations for higher education of participants are presented, with regard to the school year they are attending, and their sex. A descriptive display of the main criterion variable (the indicator of the gender typicality of aspirations for higher education) follows, with respect to sex, school year and

³ The status of municipalities as assisted areas did not prove itself to be linked with the gender typicality of higher-educational aspirations, and the size of settlement consistently showed itself to be linked with less gender typicality in aspirations.

the vocational field or grammar-school programme that the pupils are attending. These descriptive indicators provide the basis for a series of logistic regressions through which the variation in gender typicality of aspirations for higher education is explored in terms of sex, school year, upper-secondary programme, school achievement and interest, and their specific interactions.

Aspirations for higher education of upper-secondary pupils with regard to specific educational fields of study programmes, school year and sex

In Table 3, the structure of first-year, third-year and final-year pupils' aspirations for higher education are displayed and are matched up with the specific narrow educational fields of study programmes (columns 1, 2 & 3). The results point to an instability in the structure of those aspirations during upper-secondary education. Between the first and third school year, a trend of increasing aspirations is visible towards the study programmes in the fields of welfare, education, journalism and information sciences, business and administration, mathematics and statistics, engineering and engineering professions, agriculture, protection and security services, and transportation services. As well, there is a decline in aspirations for study programmes in the fields of law, informational and communication technologies, healthcare, and social and behavioural sciences (column 4). The results do not indicate a trend of increasing interest in gender-typical educational fields of study.

In addition, a systemic difference is noticeable between girls and boys in the field of the study programmes to which they aspire. This results in a different structure of aspirations for higher education for girls (column 5) and boys (column 6). Girls most often aspire to studies in the field of healthcare (28.3%) and business and administration (10.0%), and boys to studies in information and communication technology (27.8%) and engineering and the engineering professions (16.4%).

Table 3. The structure of pupils' aspirations in line with certain fields of study – a comparison with regard to school year and sex

ISCED fields of study:	Year 1	Year 3	Year 4 ^a	$\Delta 1-4$ ^b	Choice among girls	Choice among boys	Proportion of girls among those aspiring towards the field	Change in patterns of aspirations for the field: School year* sex ^c
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Welfare	0.0%	0.3%	0.6%	0.6 p.p.***	0.6%	0.0%	96%	
Education	3.7%	3.8%	6.0%	2.3 p.p.***	6.9%	1.5%	86%	.**
Languages	4.6%	5.8%	5.0%	0.4 p.p.	7.5%	2.0%	83%	.*
Biological and related sciences	2.2%	2.3%	2.0%	-0.2 p.p.	2.7%	1.4%	73%	
Veterinary sciences	0.8%	0.7%	0.5%	-0.3 p.p.	0.9%	0.3%	78%	
Law	6.7%	5.1%	3.2%	-3.5 p.p.***	6.5%	2.6%	77%	.*
Social and behavioural sciences	7.1%	7.1%	6.1%	-1.0 p.p.*	9.6%	2.8%	82%	
Journalism and information sciences	0.8%	0.6%	1.3%	0.5 p.p.**	1.4%	0.3%	85%	
Arts	3.9%	4.8%	4.7%	0.7 p.p.	5.3%	3.4%	68%	.*
Mathematics and statistics	1.2%	1.6%	2.2%	1.0 p.p.*	1.7%	1.8%	56%	.*
Business and administration	7.5%	9.7%	10.6%	3.1 p.p.***	10.0%	8.6%	61%	
Agricultural sciences	0.7%	1.1%	1.4%	0.7 p.p.*	0.7%	1.6%	35%	
Physical sciences	2.9%	2.8%	2.8%	-0.2 p.p.	2.5%	3.2%	51%	
Healthcare	22.8%	20.1%	19.3%	-3.5 p.p.**	28.3%	10.1%	79%	
Humanities (except languages)	2.2%	2.3%	2.0%	-0.2 p.p.	2.0%	2.4%	52%	.*
Personal services	3.6%	4.6%	4.5%	0.9 p.p.	3.4%	5.4%	46%	
Forestry	0.3%	0.5%	0.4%	0.1 p.p.	0.2%	0.7%	27%	.*

ISCED fields of study:	ISCED fields of study:				Choice among girls	Choice among boys	Proportion of girls among those aspiring towards the field	Change in patterns of aspirations for the field: School year* sex ^c
	Year 1	Year 3	Year 4 ^a	$\Delta 1.-4.$ ^b				
Architecture and construction	2.6%	2.1%	2.6%	0.1 p.p.	2.7%	2.1%	63%	
Security services	1.6%	2.3%	2.0%	0.5 p.p.*	1.8%	2.2%	52%	
Transportation services	1.0%	1.7%	1.7%	0.7 p.p.*	0.4%	3.0%	14%	
Information and communication technologies	17.9%	13.1%	11.3%	-6.6 p.p.***	3.2%	27.8%	13%	.*
Engineering and engineering professions	6.0%	7.6%	9.3%	3.3 p.p.***	1.3%	16.4%	9%	

Note: The fields of study are ordered according to the proportion of women in the student population.

% – percentage of pupils who choose a certain field of study.

p.p. – percentage point.

^aAlso includes a fifth school year in programmes for medical nurses/ technicians.

^bChanges in patterns of aspirations across school years for certain fields have been identified by applying a χ^2 test to the dichotomous variable of the desired field of study (the observed field compared with the remaining fields).

^cChanges in patterns of aspirations with regard to the gender across the school years have been identified by applying a χ^2 test to pupils aspiring towards each individual field.

* p<.05, ** p<.01, *** p<.001

The proportion of girls among those aspiring to a certain field (column 7) is also different: from 9% of girls among the pupils with an aspiration to study in the field of engineering, to 96% of girls among the pupils that aspire to study social work. The results point to the girls being more inclined to study in fields of study programmes in which women are overrepresented, and boys in those with a lower proportion of women. For most fields of study, the gender structure of those aspiring is very close to the real gender structure of the student body (Eurostat, 2020). Furthermore, gender differences in aspirations for higher education for a certain field are not stable during secondary school (column 8). Gender patterns of aspirations change over the school years in the fields of education, language, law, art, mathematics, humanities, forestry and information and communications technology (ICT). These patterns do not follow the gender typicality of the studies: specifically, in the upper

school years there is a convergence in representation of interest between boys and girls for certain presently gender-typical fields such as ICT and law.

The gender typicality of aspirations for higher education with regard to sex, school year and vocational field or grammar-school programme.

In Figure 2 the average value is shown of the indicator of the gender typicality of aspirations for higher education (p_w) of girls and boys in the three observed school years at secondary school.

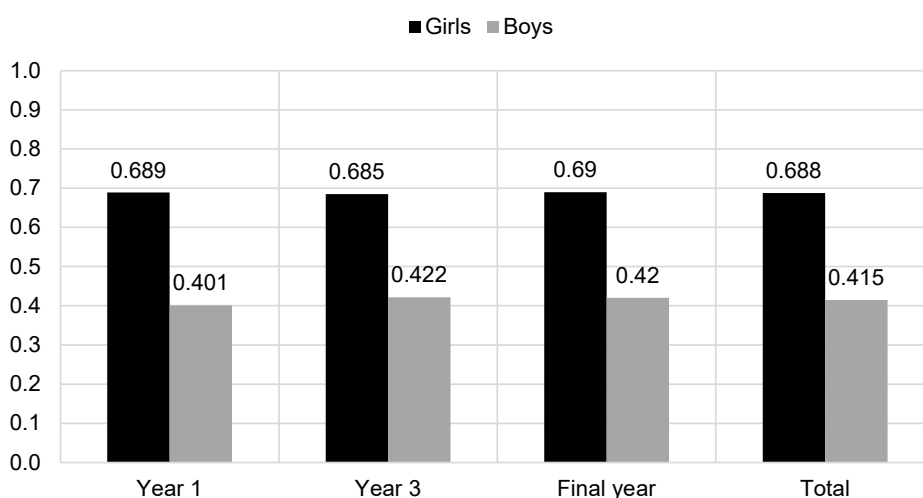


Figure 2. The average value of the gender-typicality indicator of aspirations for higher education (p_w) of girls and boys in the first, third and final year of secondary school.

In line with expectations, there is a difference between boys and girls in the gender typicality of aspirations for higher education. The average proportion of women in the programmes to which girls aspire totals 0.688, and in those to which boys aspire, 0.415 ($F=5426.5$, $p<.001$). In contrast to the variability of aspirations towards certain fields of study, the gender typicality of aspirations for higher education shows itself to be largely stable during secondary school with girls ($F=0.58$, $p>.05$), while with boys there was some variation between the school years ($F=3.52$, $p<.05$). This depiction points to the fact that throughout the years of upper-secondary education, aspirations for higher education are stable in their gender typicality: girls choose typically female studies, and boys choose typically male studies, irrespective of the school year they are attending.

Table 4 shows indicators of the gender typicality of aspirations for higher education of pupils from various vocational fields and grammar-school programmes.

Table 4. The average gender typicality of girls' and boys' aspirations for higher education, in line with the vocational fields and kinds of grammar-school programmes.

	Total	By school year				By sex of the pupil		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Year 1	Year 3	Year 4	Anova F (school year)	Girls	Boys	$\Delta M-\bar{Z}^b$
Electrical engineering	0.259	0.230	0.265	0.280	9.25***	0.448	0.248	0.200***
Mechanical engineering	0.254	0.230	0.275	0.245	1.80	0.342	0.249	0.093*
Natural Sciences– Mathematics grammar school	0.486	0.496	0.482	0.482	0.52	0.617	0.385	0.232***
Chemical technology	0.678	0.676	0.670	0.685	0.17	0.707	0.653	0.054*
Agriculture	0.578	0.556	0.572	0.601	0.62	0.652	0.517	0.136***
Hospitality and tourism	0.642	0.635	0.633	0.654	0.95	0.684	0.540	0.144***
General grammar school	0.617	0.621	0.617	0.615	0.18	0.685	0.477	0.208***
Economics	0.649	0.652	0.643	0.653	0.59	0.688	0.550	0.138***
Languages grammar school	0.676	0.684	0.675	0.670	0.79	0.715	0.544	0.171***
Healthcare	0.782	0.781	0.765	0.805	5.98**	0.795	0.736	0.058***
Total	0.572	0.567	0.573	0.576	1.30	0.691	0.412	0.279***

Note: The vocational fields listed are ordered according to the proportion of women in them, moving from lower to higher.

^a Also includes a fifth school year in programmes for nurses and medical technicians.

^b The statistical significance of the difference for each field has been ascertained by a one-way analysis of variance.

* $p < .05$, ** $p < .01$, *** $p < .001$

The results indicate strong differences between the pupils in ten different vocational fields or programmes in the average indicator of the gender typicality of aspirations for higher education p_w (Table 4, column 1, $F=618.0$, $p < .001$). Pupils from

the vocational fields and grammar-school programmes with a larger proportion of boys are oriented towards typically male study programmes (column 1), which is visible in the low values of indicator p_w in the fields of electrical engineering and machinery, and to some extent in the natural sciences–mathematics grammar schools. Conversely, pupils enrolled on upper-secondary programmes with a female majority are characterised by aspirations for higher education towards study programmes in which women dominate. This is visible in the high p_w with pupils at languages grammar schools and in vocational fields such as healthcare, chemical technology, economics and hospitality and tourism. The presented results confirm that a significant part of the gender typicality of aspirations for higher education can be explained by a compositional effect, through pupils choosing gender-typical upper-secondary programmes.

The process of schooling in the environment of a chosen vocational field as a kind of habitus, may lead over time to the strengthening of pupils' gender-typical choices (columns 2, 3 & 4). However, our data do not point to a pattern of increasing gender-typical aspirations between the first and final school year – neither in the “male” vocational fields and the natural sciences–mathematics gymnasium, nor in those that are “female”. Statistically significant differences between years in the gender typicality of aspirations have been established only in the vocational fields of electrical engineering and healthcare (column 5).

It is important to emphasise that the choice of vocational field does not explain the full gender difference in the gender typicality of aspirations for higher education. Within all of the vocational fields and grammar-school programmes, girls' aspirations were skewed towards study programmes in educational fields with a larger average percentage of women in the student population, compared with the aspirations of their male peers in the same upper-secondary programmes (column 8).

Determinants of the gender typicality of upper-secondary pupils' aspirations for higher education.

The descriptive indicators served as the basis for a series of nested fractional response regression specifications (Table 5). There was a total of six regression models that build upon one another.

Table 5. Results of the fractional response regression. Determinants of the gender typicality of aspirations for higher education (p_w) of upper-secondary pupils

	(1)	(2)	(3)	(4)	(5)	(6)
Sex and school year						
Sex: boys	-1.485*** (-8.67)	-1.085*** (-7.09)	-1.023*** (-6.60)	-1.105*** (-7.04)	-0.614*** (-4.39)	-0.552*** (-3.44)
School year	0.007 (0.83)	0.003 (0.34)	-0.005 (-0.40)	0.004 (0.47)	0.009 (1.04)	0.005 (0.60)
Boys # School year	0.024 (1.49)	0.010 (0.71)	-0.012 (-0.71)	0.008 (0.54)	0.010 (0.80)	0.017 (1.30)
Vocational field / grammar-school programme						
Electrical engineering		-1.085*** (-30.09)	-1.361*** (-18.28)	-1.020*** (-6.33)	-0.703*** (-20.33)	-0.650*** (-18.09)
Mechanical engineering		-1.160*** (-19.30)	-1.341*** (-9.84)	-1.390*** (-5.48)	-0.802*** (-14.33)	-0.765*** (-13.47)
Natural Sciences– Mathematics grammar school		-0.385*** (-11.88)	-0.375*** (-5.01)	-0.308*** (-7.16)	-0.180*** (-6.35)	-0.174*** (-6.14)
Chemical technology		0.391*** (5.86)	0.266 (1.52)	0.080 (1.03)	0.310*** (4.87)	0.294*** (4.67)
Agriculture		-0.012 (-0.16)	-0.246 (-1.25)	-0.175 (-1.45)	0.162* (2.06)	0.163* (2.03)
Hospitality and tourism		0.099* (2.52)	0.008 (0.08)	0.020 (0.44)	0.120** (3.10)	0.108** (2.78)
General grammar school (ref.)		0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Economics		0.098*** (3.67)	0.073 (1.12)	0.005 (0.16)	0.160*** (5.77)	0.145*** (5.21)
Languages grammar school		0.168*** (5.84)	0.210** (3.15)	0.124*** (4.03)	0.099*** (3.64)	0.095*** (3.49)
Healthcare		0.715*** (20.21)	0.582*** (8.02)	0.563*** (15.65)	0.556*** (14.98)	0.564*** (15.50)
Interaction between vocational field or grammar-school programme and			School year	Sex: Boys		
Electrical engineering			0.099*** (3.75)	-0.005 (-0.03)		
Mechanical engineering			0.064 (1.42)	0.312 (1.19)		
Natural Sciences– Mathematics grammar school			-0.004 (-0.15)	-0.093 (-1.40)		
Chemical technology			0.043 (0.81)	0.581*** (4.78)		
Agriculture			0.083 (1.25)	0.335* (2.21)		

	(1)	(2)	(3)	(4)	(5)	(6)
Hospitality and tourism			0.032 (0.97)	0.233** (2.67)		
General grammar school (ref.)			0.000 (.)	0.000 (.)		
Economics			0.009 (0.41)	0.285*** (4.77)		
Languages grammar school			-0.016 (-0.72)	0.125 (1.76)		
Healthcare			0.046* (2.08)	0.535*** (6.03)		
Grades						
Croatian					0.054*** (4.62)	0.051*** (4.37)
Mathematics					-0.031** (-3.29)	-0.031** (-3.28)
First foreign language					-0.029** (-2.61)	-0.026* (-2.31)
Interests in the fields						
Languages					0.058*** (7.98)	0.052*** (5.66)
Biomedical and healthcare					0.094*** (15.81)	0.064*** (9.12)
Technical					-0.191*** (-21.90)	-0.157*** (-12.28)
Information sciences					-0.100*** (-12.42)	-0.089*** (-8.48)
Boys # Languages						0.008 (0.59)
Boys # Biomedical and healthcare						0.072*** (6.03)
Boys # Technical						-0.067*** (-3.87)
Boys # Information sciences						-0.031 (-1.90)
Constant	0.474*** (4.93)	0.660*** (7.00)	0.680*** (6.95)	0.656*** (6.97)	0.787*** (7.03)	0.802*** (6.99)
Observations	11216	11216	11216	11216	11216	11216
Pseudo R ²	0.058	0.087	0.087	0.088	0.104	0.105
AIC	9550.893	9279.222	9294.514	9286.689	9114.653	9114.878
BIC	9609.494	9403.749	9484.966	9477.142	9290.455	9319.981

Note: The logit function has been used. The coefficients are expressed as the log odd ratios. The Z-values are displayed in brackets. All models have been controlled for the gender-specific effect of the size of the place of schooling and the status of assisted areas * p<.05, ** p<.01, *** p<.001.

In order to answer the first research question of how intensification, convergence or stability in the gender typicality of aspirations for higher education of girls and boys occurs during their time spent in upper-secondary education, a basic specification of logistic regression has been carried out that includes only sex, school year and their interaction i.e. **model 1**. The analysis has shown that there is a statistically significant effect only with respect to sex, in the expected direction of gender-typical choices. School year did not prove to be significant in predicting the gender typicality of aspirations for higher education, nor did the interaction between gender and school year. This finding points to there being neither an intensification nor divergence in gender differences in the gender typicality of aspirations for higher education. Rather, in line with the first hypothesis posed in this article, the gender typicality of aspirations for higher education is stable over time.

Under the second research problem, with **model 2**, the role of the context of the attended upper-secondary programme in explaining the gender typicality of aspirations for higher education is examined. Here, alongside the basic variables (gender, school year and their interaction), vocational fields and types of grammar-school programme are included in the analysis. The results show a link between vocational fields or grammar-school programmes and the gender typicality of aspirations for higher education, in a direction that matches the gender typicality of the vocational fields or grammar-school programmes themselves, therein confirming hypothesis 2a. Attending electrical or mechanical engineering schools and natural sciences–mathematics grammar schools predicts aspirations for typically male studies, while attending hospitality, economic or healthcare vocational fields and languages grammar schools contributes to aspirations for typically female studies. By including the attended vocational fields or grammar-school programmes, the gender effect is weakened, but has not disappeared, and the effect of school year and its interaction with gender remains insignificant.

Extending the above specification, regression **model 3** includes the interaction effect of the vocational fields or grammar-school programme and year of schooling on the gender typicality of aspirations for higher education. This interaction effect is found only in the vocational fields of electrical engineering, computing and healthcare. In line with hypothesis 2b, in the field of healthcare an increase in the gender typicality of aspirations for higher education occurs in the upper school years (i.e. there is an increase in the likelihood of aspirations to pursue typically female studies). Yet, contrary to expectations, in the field of electrical engineering, a decrease in the gender typicality of aspirations for higher education occurs in the upper school years (i.e. there is an increase in the likelihood of aspirations to pursue typically female studies). In other words, no systemic difference in the gender typicality of aspirations for higher education between school years was identified, irrespective of the intensity of the gender typicality of vocational fields or grammar-school programme, thus not confirming hypothesis 2b.

Model 4 has been set up to examine whether the effect of attending each of the analysed vocational fields or grammar-school programmes on the gender typicality of aspirations is different for girls and boys. This model includes the interaction effect of sex and field of upper-secondary education (building on model 2). In vocational schools with similar ratio of girls and boys (chemical technology, agriculture) and those with more girls (economy, healthcare), the interaction effect is significant indicating that boys who study in those vocational fields are more likely to aspire to study programmes in which women are more highly represented. Yet the interaction effect is insignificant in typically male vocational schools (electrical and mechanical engineering) and the grammar schools.

Under the third research problem on the contribution of interest and school achievement in explaining the gender typicality of pupils' aspirations for higher education, in the regression **model 5**, grades in Croatian, mathematics and a foreign language are included, as are interests in language, biomedical and healthcare, technical and information sciences fields. Higher achievement in the subject of Croatian contributes to the likelihood of aspirations for typically female studies, and success in mathematics and foreign languages for typically male studies. Similarly, interest in languages and biomedical fields contributes to aspirations for typically female studies, while interests in technical fields and information sciences contributes to aspirations for typically male studies. These findings almost completely confirm the third hypothesis, with one exception, which is that grades in a foreign language contribute to aspirations for typically male studies. In comparison to the specification that does not include interest and grades (Table 5, model 2) the effects of educational fields on the gender typicality of aspirations for higher education have mainly decreased in model 5, yet remain statistically significant. It is therefore likely that the contributions of vocational fields to the gender typicality of aspirations can be partly, but not completely, explained through the differences in interests and grades.

Finally, in **model 6**, the interaction effects of sex and interest are also included. The interaction effects indicate that with the boys, interest in the biomedical and technical fields are associated with the gender typicality of educational aspirations more strongly than with girls. For languages and information-science fields, the interaction between sex and interest did not prove to be significant.

The complex findings on the role of interest as are illustrated in Figure 3 that plots the gender typicality of aspirations against interest in the four selected fields. In line with the established general effect of interest in the regression model, pupils with higher levels of interest in the languages and biomedical fields demonstrate aspirations leaning towards typically female fields in higher education (a greater p_z), and those with interest in technical fields and information sciences, lean towards typically male fields of study (lower p_z). Yet in the language, and especially in the biomedical field, the difference in the gender typicality of aspirations between girls and boys is reduced at the higher interest levels, while in the technical and in-

formation sciences fields, the same difference is somewhat increased, analogously with the ascertained interaction effect of gender and interest in the multivariate regression model.

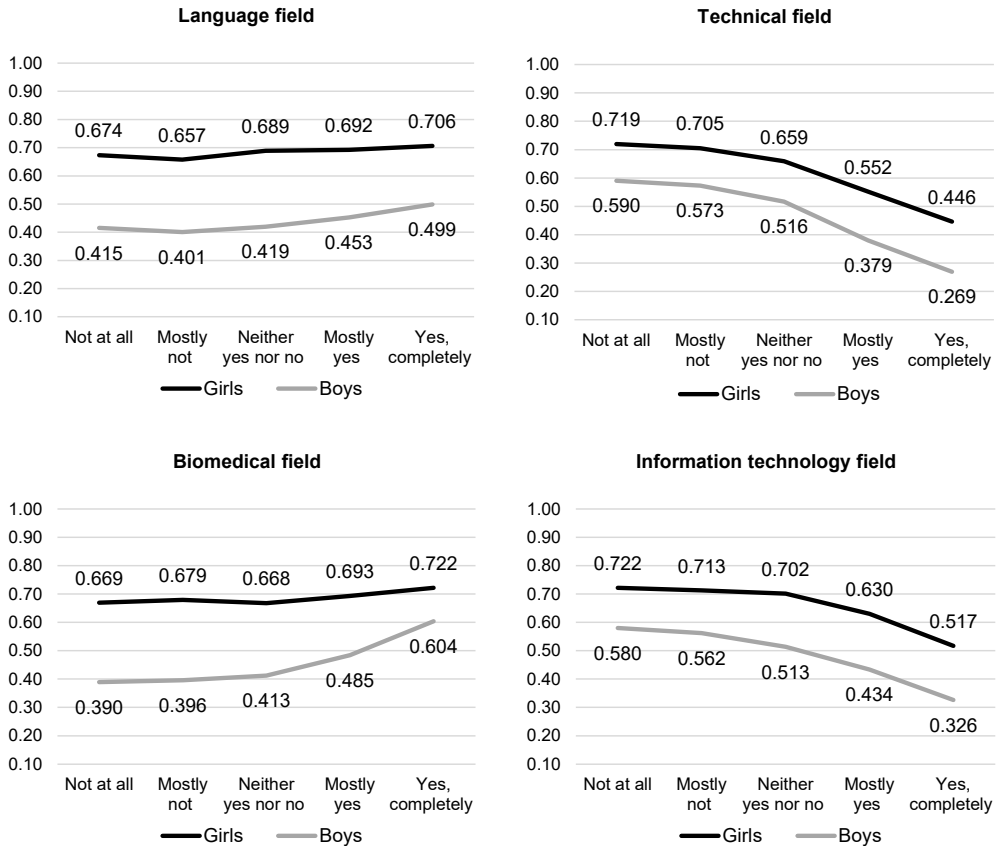


Figure 3. Gender typicality of aspirations for higher education of boys and girls with respect to the level of interest in certain fields.

DISCUSSION AND CONCLUSION

The results indicate that among girls and boys who attend secondary school, differences exist in their aspirations for higher education. While girls aspire to a greater extent to enrol on study programmes on which women are more highly represented, boys gravitate towards study programmes with greater numbers of men. This finding is in line with comparative international research findings on aspirations for higher education, and Croatian research into horizontal segregation in higher edu-

cation (Barone, 2011; Charles & Bradley, 2009; Eurostat, 2020; Jerrim & Schoon, 2014, Croatian Bureau of Statistics, 2019).

This article's main research problem, which has not been empirically verified to date in an international context, was to explore whether the gender typicality of aspirations for higher education of girls and boys increases, decreases or remains stable during the time spent in upper-secondary education. The results show that, while differences exist between girls and boys in the gender typicality of their educational aspirations, those differences are stable over time, therein disconfirming the hypothesis of gender intensification (Hill & Lynch, 1983) and that of gender convergence (Fredricks & Eccles, 2002; Jacobs et al., 2002). In other words, the choices of girls and boys over the years of their schooling become neither more nor less gender stereotypical compared with at the beginning of their upper-secondary education, irrespective of changes in their aspiration as regards particular study programmes. The research findings here regarding the stability of gender differences in aspirations for higher education could be explained in terms of the older pupil age and relatively narrow age range or educational period that this research encompasses. Indeed, a review of international research studies into changes in gender differences in academic motivation indicates that such differences are stable in research that covers older age cohorts of pupils and shorter periods (Frenzel et al., 2010; Nagy et al., 2010; Watt, 2004). An increase or decrease in gender differences over years of schooling is found in research that spans the entire age range of primary-school and upper-secondary education, and especially the young ages when the impact of socialisation is strongest (Jacobs et al., 2002). A review of Croatian research on gender differences in academic motivation confirms this. It shows that in primary school there are no gender differences in any dimensions of motivation for mathematics, while in secondary school, boys have higher expectations of success and task values in mathematics than girls (Jugović, 2019).

In attempting to explain the gender typicality of pupils' aspirations for higher education, the role of the educational field that pupils studied in upper-secondary education was also examined. The gender typicality of aspirations for higher education differs greatly with respect to vocational field or grammar-school programme, and in the expected direction: both male and female pupils on typically male school programmes aspire to enrol on typically male study programmes, and vice versa. The pupils in these schools, through their attendance, are already primed in terms of curriculum and identity on gendered fields of study. Therefore, the fields that female pupils, but especially male pupils, study explains a significant part of the gender gap in aspirations. However, this link does not become stronger with time spent in the programme, as the gender typicality of aspirations in most educational fields are at similar levels at the beginning and end of schooling. Furthermore, within any given field it is still noticeable that girls are nevertheless more inclined to choose typically female study programmes, and boys, typically male ones. At the same time, gender differences in the gender typicality of aspirations

for higher education are somewhat less pronounced in vocational fields with a large number of girls and in those with an equal number of boys and girls, and more pronounced in the vocational fields of electrical and mechanical engineering and in the grammar-school programmes. These findings point to the important influence of educational system characteristics on the gender typicality of aspirations for higher education, as also demonstrated by international research. In their research on the formation of aspirations in twelve countries, Buchmann & Dalton (2002) identified that the level of differentiation of a country's education system influences the manner in which boys' and girls' aspirations for higher education form. They believe that an open, undifferentiated education system at upper-secondary level, and the existence of a general curriculum for all pupils, conveys the ideas that a wide spectrum of educational and professional trajectories are open to all pupils, while in educational systems in which pupils are tracked early on into various educational pathways (e.g. through an earlier choice in vocational programme), educational aspirations are greatly determined by the kind of school they attend. Our findings, alongside insights from international research studies (Imdorf et al., 2014, 2015) indicate that the wide differentiation in upper-secondary education through the numerous vocational and grammar-school programmes can additionally harden gender stereotypical educational aspirations. These results have powerful implications for the Croatian education system, and demonstrate that a later transition to secondary education and/or reducing its level of differentiation (at least in the earlier school years), could weaken the gender specificity of aspirations for higher education. Within the existing institutional arrangements, given the strong gender typicality of many upper-secondary choices and the high gender typicality of aspirations for higher education throughout upper-secondary education, a timely intervention would include the themes and learning outcomes related to educational and professional career management being incorporated from the very beginning of elementary education. A focus on informing pupils about upper-secondary and higher-education options must be made available from as early as the fifth year of primary school, and an important part of such informing ought to consist of raising awareness about questions of the gender typicality of certain choices. Reducing the gender stereotyping of educational and professional choices at the level of the education system, but also the school curriculum is especially important. One means of having such an impact is through the promotion of examples of persons who do not fit the stereotype, and especially communication with former school pupils who have chosen gender non-typical choices.

Apart from structural factors, the role of individual factors such as interest and previous school achievement has been explored here, in explaining the gender typicality of aspirations for higher education. According to the expectancy-value model (Eccles, 2015), pupils' interests in educational fields and their previous academic achievement, which are often gendered (as our research has also shown), affect educational aspirations. Our results show that school achievement in Cro-

atian language contributed as expected to aspirations for typically female study programmes, and success in mathematics to aspirations for typically male study programmes. These findings are in line with longitudinal research completed with upper-secondary pupils in England and Germany (Parker et al., 2012). In the English sample, it was shown that high achievement in English (as a first language) increased the chances of selecting social sciences, humanities or biomedical studies (typically female studies), while in both samples, high achievement in mathematics increased the chances of selecting studies in physics, mathematics and engineering (typically male studies). Our research has further shown that in Croatia, a higher grade in English contributes to the selection of typically male studies, which is surprising if we take into account that similar research completed in Germany showed that higher achievement in English as a foreign language increased the chances of selecting social-sciences, humanities or biomedical study programmes over programmes in physics, mathematics or engineering (Parker et al., 2012), and also the fact that languages are considered a traditionally female field (Jacobs et al., 2002; Marušić, 2006; Watt, 2004). On the other hand, English is necessary in certain stereotypically male fields of study, such as information and communications technologies. Our analyses have further shown that interests in stereotypically female fields (languages and biomedical fields) predict a great likelihood of selecting typically female studies, while interests in stereotypically male fields (technical and information-sciences fields) predict a greater chance of selecting typically male studies. These findings are in line with the hypotheses of the expectancy-value model (Eccles et al., 1983) and the results of research that points to the importance of motivation for physics and mathematics in explaining the choice of technical study programme and motivation for languages in selecting social sciences or humanities study programmes (Chow, Eccles & Salmela-Aro, 2012; Jugović, 2010, 2017; Simpkins, Davis-Kean & Eccles, 2006). It is worth emphasising that with boys, interests played a stronger role in explaining the gender (a)typicality of aspirations than with girls, especially in the biomedical and information-sciences fields.

One limitation to the research completed lies in the nature of the data not being longitudinal, and therefore we cannot speak with certainty of developmental changes due to progress across the educational system. Instead, the analysis is based on comparing different generations of pupils. It is possible, although not likely, that the differences between school years (or their lack) cohort-based (changes in aspirations between generations), or a period effect (all pupils who attended in one specific year were exposed to something that altered their aspirations). In future research it will be important to follow the same pupils over several years, or to repeat the same research design in a later school year. This research has encompassed a limited upper-secondary period of schooling, and so in future research studies, interest should be widened to include younger ages, as early as in primary

school, so as to increase the possibility of detecting changes in gender differences in educational aspirations.

The contribution of this research lies in its demonstrating that gender differences in educational aspirations exist and that during upper-secondary education they do not decrease. This points to the importance of implementing educational policies and practices whose goal is the reduction of gender imbalances in educational and career choices, including the introduction of a gender-sensitive career guidance. Theoretical approaches such as the expectancy-value model (Eccles et al., 1983), as well as numerous other research studies, show that gender stereotyped educational aspirations form under the influence of gender differences in academic motivation and previous educational achievements, and those insights can help guide the designing of educational interventions crucial for reducing gender differences in educational aspirations. The practical implications of the findings of the research completed on the importance of interest in predicting gender-typical educational aspirations are that it is necessary to devote attention to the development of pupils' interests that are free from gender stereotypes. As gender stereotypes on school subjects begin to form, and interests become differentiated with respect to gender as early as in primary school, such educational interventions should be carried out from the very beginning of primary education.

Translated by Andrew Hodges

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Rodna tipičnost visokoškolskih obrazovnih aspiracija tijekom srednje škole: intenzifikacija, konvergencija ili stabilnost

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SAŽETAK

Cilj je rada bio ispitati dolazi li do intenzifikacije, konvergencije ili stabilnosti u rodnoj tipičnosti visokoškolskih obrazovnih aspiracija djevojaka i mladića tijekom vremena provedenoga u srednjoškolskom obrazovanju. U istraživanju na uzorku od 13 301 učenika/ca četverogodišnjih i petogodišnjih srednjoškolskih programa ispitana je i uloga srednjoškolskog programa te učeničkih interesa i školskog uspjeha u objašnjenju rodne tipičnosti njihovih visokoškolskih aspiracija. Rezultati upućuju na to da, iako postoje razlike između djevojaka i mladića u rodnoj tipičnosti obrazovnih aspiracija, te su razlike stabilne kroz vrijeme, čime nije potvrđena ni hipoteza rodne intenzifikacije, niti rodne konvergencije. Odabiri djevojaka i mladića kroz godine školovanja ne postaju ni više niti manje rodno stereotipni u odnosu na početak srednjoškolskog obrazovanja. Rezultati regresijskih modela pokazuju da se rodna tipičnost visokoškolskih aspiracija razlikuje s obzirom na strukovno područje/gimnazijski program, i to u očekivanom smjeru: učenici i učenice tipično muških programa aspiriraju tipično muškim studijima i obratno. Školski uspjeh i interesi također su pridonijeli objašnjenju rodne tipičnosti visokoškolskih aspiracija. Uspjeh iz hrvatskog jezika kao i interesi za jezično i biomedicinsko područje predviđaju snažniju aspiraciju tipično ženskim studijima, dok uspjeh iz matematike i engleskog jezika te interesi za tehničko i informatičko područje pridonose aspiraciji tipično muškom studiju. Nalazi ovog istraživanja ukazuju na to da, uz utjecaj rodno obilježenih obrazovnih interesa i postignuća, diferenciranost srednjoškolskog obrazovanja može utjecati na rodno stereotipne obrazovne aspiracije.

Ključne riječi: visokoškolska obrazovna aspiracija, rodna tipičnost, interes za područje, institucionalno okruženje, srednjoškolsko iskustvo