

Horizontal and Vertical Segregation in Education by Gender in the Hungarian-Romanian-Ukrainian Border Region (Partium)

HAJNALKA FÉNYES¹

*University of Debrecen, Department of Sociology and Social Policy,
Hungary*

Abstract

Although women have reached the state of equality in education, horizontal and vertical segregation still put them in a disadvantaged situation. According to horizontal segregation, women study at distinct areas which the labor market does not appreciate considerably, and according to vertical segregation, their presence on the highest levels of education (PhD training, university staff and researcher position) is lower, which is also the source of lower incomes. This study uses the data of the “Regional University” research in order to examine the various aspects of horizontal and vertical segregation present by gender in higher education. In addition, we will examine the social background of males and females at “feminine” and “masculine” faculties, and at university and college faculties.

Keywords: Gender Differences, Horizontal and Vertical Segregation in Higher Education, Hungarian-Romanian-Ukrainian Border Region (Partium)

The aim of this paper is to examine some aspects of horizontal and vertical segregation in education by gender in the Hungarian-Romanian-Ukrainian Border Region (Partium), relying on the database of “Regional University” research.

The phenomena of horizontal and vertical segregations can be traced on the labor market, as well (according to horizontal segregation, professions tend to become “feminine” and “masculine”, and according to vertical segregation, women do not take/get leader positions), but the background to these may be the fact that segregation already appears in the phase of training. Specializing in a certain field is different at women and men, and even in education we can find typically feminine (e.g. teacher training) and masculine (engineer, informatics, physicist training) areas.

It is important to emphasize that segregation eventually affects the getting on in life for women in a negative way, as girls study at departments of lower prestige, and train to be employed in professions that are less recognized, and in these professions they can expect lower salaries. (Jacobs, 1996)

The causes of segregation: theoretical background

The reasons for horizontal and vertical segregation may be found in the divergent socialization processes. Parents and teachers have different expectations from boys and girls and these

¹ Postal Address: 4032 Debrecen, Egyetem tér 1, Hungary, Email Address: fenyesh@freemail.hu

predictions turn out to come true as a kind of self-fulfilling prophecy. Girls are expected to have better reading skills, whereas boys are expected to be better at mathematics. When a girl excels in mathematics, the teachers explain it with her diligence, but when this happens to a boy, they emphasize good abilities. This causes certain professions to become massively feminine later on. Boys accredit their success to their abilities, and failures to external causes, while girls see success as an unexpected result, and accredit failure to internal causes. It is due to their lower self-esteem as well, that girls do not take higher-prestige jobs. (Kovács, 2007) Social psychologists found the reason for students' segregation by majors in personality congruence; sex-type socialization leads women and men to favor sex-appropriate majors. (Jacobs, 1995)

Kohn (1963) emphasizes that parent-child relationships are a product of differences in parental values (depending on the social class of parents). Values form a bridge between social structure and behaviour. Based on this theory, there could be different parent values and parent-child relationships concerning different genders. The different socialization processes may come from different values of parent concerning boys and girls.

The divergent processes of training are not only created by the differences in socialization, but could be based on different cognitive abilities. Girls are characterized by stronger verbal skills, logical memory and certain kinds of creativity. Boys, however, tend to be better at analytical, arithmetic and mathematical skills, and they perform better in the branches of creativity that require analytic thinking. All these skills can be used for various purposes, but none of them are better than the others in intellectual accomplishments; only the direction of intellectual accomplishment is different. (Sas, 1984)

Other researchers found the reason for segregation in the students' career awareness of girls (they are aware of horizontal segregation on the labor market by gender, and that is why they choose "female-appropriate" majors). (Jacobs, 1996)

College itself can affect segregation. It is important to investigate the influence of college on the choice of major, because about the half of the students changes their major during the studies. In the 1960s and 1970s during college experience students' majors become less segregated by gender, but in the 1980s there was only minor change in segregation during the college years (Jacobs, 1995). Concerning the sex role reinforcement hypothesis, the college will intensify sex-role attitudes and behaviors during the studies and that is why segregation tends to increase. But this hypothesis was not proved, according to Jacobs' (1986) finding. Concerning liberalization hypothesis, college will reduce sex-role stereotyping, and this predicts a decline in sex-segregation during the college years. Based on the data of Jacobs the direction of the change of segregation is consistent with this hypothesis, but the reduction in sex segregation is not the result of changes in attitudes. Finally concerning external trends hypothesis, the change in segregation is a response to social trends in the non-college environment, and colleges themselves are influenced by social trends. Jacobs shows that external influences affect most the changes in segregation during the years of studies. (Jacobs, 1986)

Jacobs formulated - based on the previous results - the social control theory concerning the segregation in education by gender. There are lifelong influences; social pressures and constraints that both women and men face with (during the early socialization, during the college years and on the job) which reproduce sex segregation. Discrimination concerning hiring decisions is only an example of these constraints. Changes in social environment, social climate, social and economic incentives, social norms and sex role models can affect segregation. Rapid social changes or more stable periods can contribute to changes in segregation differently. The trends in large society, affects the trends of segregation by gender in school and in workplace. Sex segregation remains susceptible to social influences during the whole life. (Jacobs, 1995)

Economists find that females prefer those fields of education, which prepare for professions with high rewards early in life, and a low earnings trajectory. The reason for this, that women want to maximize earnings during the period, they are most likely to work. But the data show, that female's initial earnings are lower, and they exhibit slower earnings growth than do males, so

this economic explanation is not supported. (Jacobs, 1996)

Researchers (Bradley, 2000; Charles & Bradley, 2002) examined vertical and horizontal segregation simultaneously in higher education, in various countries. They created a segregation index for each country, and examined the effect of three macro features on the progress of segregation. The first one was the prevalence of the idea of gender equality by countries (and also, its opposite, i.e. the identification with traditional gender roles). The second factor was the character of the educational system (structural divergences among the countries: the prevalence of non-university tertiary level trainings, the prevalence of university training, the rate of women in these trainings). The third factor is the level of female employment by countries. According to their results, the idea of gender equality affected the rate of women in elite training positively. Also, where the non-university tertiary level trainings were more incident, the number of women in the non-elite sector was greater. They also demonstrated that by the prevalence of the norm of gender equality, women are in majority at certain departments of higher education (horizontal segregation is stronger). Besides these, where the non-university tertiary level trainings were more frequent, horizontal segregation was stronger, as well. Their last result was that vertical and horizontal segregation were in positive correlation by countries, even after the exclusion of other factors, yet, the prevalence of the ideas of gender equality affected vertical inequalities in a stronger manner compared to horizontal ones.

Jacobs (1999) examined the connections between vertical and horizontal segregation. He found that the rate of women in elite schools is lower than that of men, and this difference has not changed much in time (in the 1970s the difference decreased, but since the 1980s it has been stationary.)² According to the results, the background to this phenomenon is that there are fewer women preparing for engineering careers, and that the training institutions for these careers are elite schools, while there are more women present in the teacher training and part time education - whose training institutions are considered low-status schools. Using multi-variable methods in his analysis, the author demonstrated that after the inclusion of the two explanatory factors (engineer vs. teacher's degree and part-time vs. full-time training), the effect of gender on choosing an elite school is not significant any more.

It is an interesting phenomenon, that sex segregation in higher education declined by 40% between 1960 and 1990, while segregation on the labor market declined apprx. by 20%. So the trends in the higher education do not necessary change the trends on the labor market. (Jacobs, 1995)

The cause of occupational segregation by gender could be as well the personal preferences and/or sex-role socialization, but it can be also a result of the "tastes" of employers. Discrimination contributes to maintain sex segregation in paid work (Blau, 1984). There are institutional barriers to sex integration in the labor market, as well. Women face with barriers to job training, barriers to entry-level positions and with structural barriers, and because of these barriers women will not choose sex-atypical jobs (Roos & Reskin, 1984).

The other economic explanation of segregation on the labor market makes use of human capital model. Concerning this model, segregation in workplace is the cause of voluntary choices of women. Women choose jobs, where there is less conflict between work and domestic obligations. Familial roles influence women's occupational choices and outcomes. The model estimates that the investment of women work-related human capital is lower, which may cause wage differences and segregation on the labor market. The other prediction is that women's expected time out of the labor force (labor force withdrawals) can affect the career choices (women with discontinuous work careers will be more likely to choose "female" jobs). But these predictions were not supported by the data of Corcoran et al. (1984). Furthermore they found, that there is a considerable mobility between "male" and "female" job types, as well, which is also in contrary to the predictions of the above mentioned model. Taking everything into consideration they state

2 The examination regarded those schools as elite institutions, where test results proved to be higher than the average, the entrance rates are lower and, ultimately, where the rate of graduates is lower, as well.

that human capital model is not able to explain job segregation. (Corcoran et al., 1984)

Both human capital theory and status attainment theory (formulated by Blau and Duncan in 1967) state that women's own behaviour is the cause of sex segregation on the labor market. The human capital model emphasizes the educational credentials and interrupted work histories of women, concerning status attainment theory the cause of segregation is women's own values, behaviour, aspiration, attitudes and sex-role expectation. But Strouber (1984) emphasizes that the cause of segregation is the labor market behaviour of men. The behaviour of men - both employers and workers - is governed by their desire to maintain their patriarchal privilege. Patriarchy is "a set of personal, social and economic relationships that enable men to have power over women and the services they provide" (Strober, 1984, p. 147). Male employers set wages and working conditions, male employers allow male workers to decide which jobs will be theirs. Women will get what is left for them. But Mason (1984) shows that elements of this theory are empirically unsupported. Mason states, that more theories are needed and there is not only one general theory which can explain segregation on the labor market.

The further reason for segregation (in education and on the labor market, as well) could be sex-role socialization (in family, school and the mass media), which had been already mentioned. The source of segregation not only located to workplace, the effect of early socialization is important, as well. There are sex differences in occupational preferences, knowledge and skills, which can be in connection with the socialization process. (Marini & Brinton, 1984) But Wolf (1984) emphasizes that there are differences in women's behaviour before they enter the labor market, and later, when they face the economic realities, so the different socialization is not the only reason for job segregation.

As we have seen, there are several explanations concerning segregation by gender in education, and on the labor market. In this paper we will not examine these effects just we explore what kind of segregation is present in higher education in the "Partium" region. Furthermore, we want to investigate only some aspects of horizontal and vertical segregation, relying on the database.

Horizontal segregation by genders in education

In developed countries, horizontal segregation in higher education is approximately constant in time, in spite of the fact that the number of women in higher education has gradually risen. This is in accordance with labor market trends. There, employment segregation hardly changes, in spite of the fact that, on the whole, the employment of women has risen. (Bradley, 2000) Segregation in education decreased a bit between 1960 and 1980 but has stagnated since then. (Jacobs, 1996). The rate of females is high in teacher training, medical expert training and at psychology departments, and the rate of males is high in engineering, physicist and informatics areas. (Freeman, 2004, Bae et al., 2000)

In the USA, in the 1990s, the type of the higher education of males and females differed in appr. 30%. In the 1960s, women's rate was higher than 70% in the fields of education, fine arts, nursing, history and housekeeping, and in the 1990s their rate was above 50% even in science (mostly in the fields of chemistry and biology, but not in physics). But in engineer training, their rate was only 14% (Jacobs, 1996).

Fewer women tend to prepare for becoming physicists, engineers and information specialists. However, according to Spelke, men used to be in majority in law schools and economics training, as well, yet today we can trace a dominant presence of women in these trainings, which indicates that the choice of majors can still change. There is no biological ground for the alternative choice of profession at girls (Spelke, 2005). The background for women to be present in modest numbers in engineering and scientific professions can be the diverse career orientations, parental effects, psychological barriers, the lack of social support and the small number of positions in scientific professions (Jacobs, 1996). We can also detect that horizontal segregation by gender is greater

among low-status students (Bourdieu & Passeron, 1977).

It is an interesting question to ask, what effects parental models may have on the choice of majors that are not gender-typical. According to Dryler's results, in case the parents had gender-atypical education (profession), their children tend to choose such atypical programs in the final years of secondary education – but this is characteristic of boys mostly (we cannot trace such correlation at girls.) Furthermore, higher educational qualification brings about a greater acceptance of gender equality, and thus students coming from better social backgrounds will choose atypical educational processes in greater numbers. (Dryler, 1998)

The career orientation of girls, however, remained traditional, both in developing and developed countries. The choice for traditionally feminine careers is present at a higher rate at girls even in the countries (Scandinavian countries, Holland) where the “gender-neutral” education modernizing efforts are predominant. In secondary education, girls tend to choose health care and professions which are related to housekeeping and family care at a higher rate, while boys choose industrial and agricultural professions. In higher education, the specializations that were previously dominated by women (teacher training, arts) become more feminine gradually. However, there is a majority of women in law schools, music and visual arts and medical majors today, as well. (Koncz, 1996)

Horizontal segregation is detectable in the vocational training of skilled workers, as well. In the fields of office work, finance, accounting, health care and social work there is almost an exclusive female majority studying, but their rate is also above 60% in the field of trade. Their rate, however, is only 25% in the fields of industry, agriculture and transport. (Hrubos, 1996) In secondary education providing GCSE certificate, we can trace the majority of girls in general high schools, and in the case of vocational high schools, we can see an unequal distribution among the trainings of the professions mentioned above. (Hrubos, 1996)

In Hungary, women have caught up with men in education; moreover, they have surpassed them, but have specialized in different educational fields. On the tertiary level, men tend to have qualifications in science, engineering and agrarian fields, while women typically have qualifications in arts, social science and teacher training. Women have an overall majority in higher education, but they are less oriented towards science and mathematics in secondary schools, and therefore only few of them will acquire degrees in such fields. We can also point that, compared to men; fewer women pursue an academic career. (Keller - Mártonfi, 2006, Oktatási körkép, 2005)

In Hungary and on tertiary level, we can find fewer women at technical universities and colleges, foundational colleges, universities of physical education, military colleges, colleges of defense and police academies, but at the same time we can trace that girls are in majority even at university faculties of higher prestige (e.g. law, medical, economics), and that their presence rate is around 60% at universities of arts and science. Their majority in teacher-, primary school teacher- and kindergarten teacher training is still above 70%. In the field of engineering, however, we can still see a really low number of women. It is worth noting that in 2005, the rate of women in the field of mathematics and statistics reached 40% and that this rate will probably increase in the future. (Palasik, 2006)

Since the mid-70s, the rate of female students has been increasing at the Budapest Technical University (not considering some slight fluctuations). However, even in 2004, this rate is merely 23,2% (Palasik, 2006). At women choosing engineering, we can see that parents – especially mothers – had degrees in engineering. Therefore, family traditions have an important role in the choices of career in the case of female students that study further in such fields. The husbands of women having an engineering career usually have the same orientation in their professions. The number of female lecturers is continually increasing in technical university training, and we can find more women in higher positions, as well. (Rajkó, 2002)

In Hungary, segregation by educational branches is present, but this was noticeable before, as well (Tornyai 2008, Hrubos 2001a, 2001c). Nevertheless, in the 1990s, the rate of women increased in the fields of engineering, science, law, agriculture and veterinary medicine, and

slightly decreased in teacher- , primary school teacher- and kindergarten teacher training and in Arts. Therefore, horizontal segregation decreased in time. (Hrubos, 2001b)

Table 1: *The distribution of full-time university and college students by gender and by educational areas (%) 1990, 2004*

Educational areas	men		women	
	1990	2004	1990	2004
Engineering	84.3	76.7	15.7	23.3
Informatics	NA	86.6	NA	13.4
Agricultural	68.4	49.0	31.6	51.0
Medical	40.3	31.4	59.7	68.6
Economic	41.0	37.2	59.0	62.8
Law and social administrative	46.2	39.3	53.8	60.7
Arts	30.0	28.6	70.0	71.4
Science	58.6	49.0	41.4	51.0
Special needs education	8.6	2.5	91.4	97.5
Physical education	55.9	59.0	44.1	41.0
Primary school teacher and kindergarten teacher training	9	10.4	91.0	89.6
Music and visual arts	46.2	43.3	53.8	56.7
Social	NA	21.9	NA	78.1
Law enforcement	79.0	68.3	21.0	31.7
Military	100	82.8	0	17.2
Religious	79.4	52.1	20.6	47.9
Altogether	51.2	45.8	48.8	54.2

Source: Bukodi et al. 2005 (edited)

The same can be seen in Table 1., but here we can compare 1990 and 2004 data concerning horizontal segregation (Hrubos (2001b) only examined the tendencies in 1990s). During this period, the horizontal segregation in higher education decreased to a slight extent, as well. The rate of women increased in technical, agricultural, law enforcement, military and religious specializations, therefore we can see the inflow of women into fields that were previously dominated by men. Parallel to this, their rate has decreased to a slight degree in primary school teacher training and kindergarten teacher training, but medical, economic, law and social administrative fields are continually being feminized. (In physical education the girls are in minority, and their rate decreased by 3% during the examined period, so concerning this data, the horizontal segregation increased a bit.)

Table 2: *The distribution of full-time university doctoral (PhD) trainees and master trainees (DLA) by gender and by the field of training. 2004 (%)*

Field of training	Men	Women
Teacher training, education	47.3	52.7
Music and visual arts	42.9	57.1
Arts	39.6	60.4
Social science	49.2	50.8
Economy and management	47.4	52.6
Law	56.7	43.3
Science	59.6	40.4
Informatics	90.9	9.1
Engineering	72.6	27.4
Agriculture and veterinary medicine	51.4	48.6
Medicine and social care	49.5	50.5
Services	37.4	62.6
Altogether	54.2	45.8

Source: Bukodi et al. 2005 (edited)

As we can see it based on Table 2, there is horizontal segregation present in PhD and DLA trainings. According to our data, female trainees are in majority in the fields of arts, music and visual arts and services, but in minority in the fields of law, science, informatics and engineering (in these latter two their rate is only 9-27%).

According to the data of Hrubos, it is traceable that in the 1990s the rate of women increased in PhD training, in programs of arts, economics and agrarian studies. (Hrubos, 2001c). This concludes that the “feminization” of arts and economist trainings has continued, yet as the rate of women has increased in agrarian training, this has decreased horizontal segregation.

Horizontal segregation is noticeable in higher education among staff members, as well; there are feminine and masculine branches of science. The smallest number of female lecturers at the Szegedi Tudomány Egyetem (University of Szeged) was at faculties of Law (27%) and Science (22%) in the millennium. It is noticeable, however, that women are present at a relatively high rate at the college faculties of Agriculture and Food Industry. Teacher training was the only field where the percentage of female lecturers was above 50% (51.4%). At the faculties of Medicine and Arts, their rate was 40%. (Kissné, 2005)

Horizontal segregation is present among female researchers and developers, as well. Compared to the 43-45% found in medical and educational fields, their rate is only 20% in the engineering field. Among MTA doctors (doctors of Hungarian Academy of Science) and C.Sc.'s doctors (PhD's) women represent themselves in the lowest numbers in engineering, and are represented in greatest numbers in the fields of social sciences. Also, their rate is relatively high in the field of medical science. (Haraszthy & Hrubos, 2002).

Vertical segregation by gender in education

The phenomenon of vertical segregation by gender is present in even three forms in education. Firstly, getting higher and higher at the educational levels, we can see the rate of women decreasing (although, nowadays appr. 50% of full-time PhD trainees are women in Hungary). Secondly, the rate of females in elite higher education institutions is lower, and their rate is higher in evening classes and part-time trainings that represent a lower prestige. Also, until the 1990s, Hungarian women studied at colleges at a higher rate than at universities. The third sign of vertical segregation

is that the rate of women decreases in higher education among staff members and researchers by leaping higher on the ladder of positions.

In developed countries, girls are in majority in higher education. In PhD training the gender rates are equal, but among tertiary level staff members, men are in majority, and by climbing up the ladder of positions, the rate of women gradually decreases. Besides these, elite schools have fewer girls, but evening classes and part-time training courses have more (Jacobs, 1996, 1999).

On secondary level, we have man-majority in vocational schools in Hungary, while in vocational high schools the rate of boys and girls is somewhat the same. General high schools have girl-majority, but it is boys who have greater chance to enter high-prestige institutions. In the 1990s, vertical segregation by gender was still noticeable in the sense that, compared to the average, boys succeeded to enter state universities at a higher rate than girls, while state colleges and part-time trainings accepted girls at a higher rate. (Liskó, 2003)

In the 1990s in Hungary, female and male students entered tertiary level institutions of various status at different rate, thus vertical segregation was present (Hrubos, 2001a). Nevertheless, it was detectable that while the rate of women in higher education was continuously rising, their inflow into university level programs was stronger than into colleges, therefore, vertical segregation in time decreased (Hrubos, 2001b).

The rate of women among teachers' decreases by getting higher and higher at the levels of education. Both in developing and developed countries, the "feminization" of the teaching career is typical. However, there are still fewer female university staff members, although their rate indicates an increasing trend. In the 1990s, their number was smaller especially among associate professors and professors. (Koncz, 1996)

According to Tornyi's chart, the distribution of men and women on the academic ladder in the late 1990s in the EU states, and between 2001 and 2005 in Hungary typically shows a "gap" diagram (see Tornyi, 2008, 2009). Among university students there were more women, among PhD students the gender rates were equal, among instructors and assistant professors the rate of women was smaller (30-40%), and finally, among associate professors and professors they were in significant minority. (Tornyi, 2008, 2009) We can feature this phenomenon as a "female educational pyramid", as well. (Kissné, 2002, 2005, Koncz, 1985)

Table 3: *University and college teachers by position, 2007*

Position	Rate of women (%)
Professor	8.3
Associate professor	26.0
Assistant professor	28.1
Instructor	24.1

Source: Nők és férfiak Magyarországon, 2007

According to data from 2007 (Table 3.), however, the rate of women is similar on the bottom three levels of the academic ladder (but still significantly lower than that of men), and their rate drops drastically only on the level of professors. It can also be regarded as an interesting phenomenon that the rate of women among assistant professors and instructors dropped under 30% compared to Tornyi's data from 2005, while their rate in PhD training shows increasing tendency. While in 2001 the rate of women in full-time PhD training in Hungary was 42.4%, according to data from 2007, their rate today is 50% already (Nők és férfiak Magyarországon 2007). At the University of Debrecen they are in even greater percentage, but it is due to the lack of engineering PhD training in the region. Within the PhD training of the University of Debrecen, Tornyi (2006) and Fináncz (2009) also dealt with the subject of the special situation of women. Nevertheless, the fact that the rate of women is already 26% among associate professors

predicts that presumably more women will get to the top of the academic ladder (professorship) in the following years.

It is most remarkable that in Hungary there are 70 rectors in the presidential seats of state and private institutions on tertiary level, yet only seven of them are women. It is also noteworthy that these women are leaders of lower-prestige universities. (*Női rektorok Európában*, 2008)

Between the two world wars in Hungary, the “Magyar Tudóslexikon” (Lexicon of Hungarian Scientists) listed only 10 women, and it is interesting that these female scientists excelled mostly in “masculine sciences” (mathematician, architect, physicist, biophysicist, chemist, philosopher). The rate of women among tertiary level staff members was insignificant at that time. For instance, between 1921 and 1945 only 23 women worked on instructor level or higher. (Kissné, 2002)

In the 1970s, 22% of researchers were women. This rate in 1980 was already 27%. Woman researchers were born to fathers with higher education at a greater rate than men, and the number of children is traditionally smaller at well educated women. In the 1990s the rate of women in the field of research and development was around 28% - within this rate, they were present in the fields of social sciences in 40%, 34% in medicine and 23% in engineering. The rate of women holding an academic degree was 18.3% in 1997. (Faragó, 2000)

Table 4: *The rate of women among researchers and developers 1980-2007*

Year	The rate of women (%)
1980	27.0
1990	28.1
2000	34.2
2003	35.1
2007	33.5

Source: “Nők és férfiak Magyarországon, 2007”

According to the data of Table 4, the number of female researchers in Hungary increased drastically in the 1990s, but since then it has stayed on the same level, and thus their overall rate is around one third. (This has been proved by other analyses as well; see e.g. Tornyi, 2009, Haraszthy & Hrubos, 2002). Nowadays, 34% of researchers are women; however, they have positions of lower prestige and lower salaries (*Női rektorok Európában*, 2008).

Women lag behind in academic training and research, and by getting higher and higher at the academic ladder the number of women gradually declines and only few of the women of our time tend to choose an academic career. One of the reasons lies in the traditional division of labor and in the classical mother-wife role model represented by women (i.e. the task of women is bringing up children, doing housework, and that the woman submits herself to the professional advancement of the man). The further factor that hinders the advancement of women is the masculine character of power (men get leader positions, even though their female colleagues have the same qualifications and competence). Besides these, there are certain internal barriers, as well: women have lower self-esteem and tend to accept traditional gender roles. They submit career to family, and they are prone to avoid conflicts. At last, financial factors count, as well (the underdevelopment of the infrastructure helping household-family tasks). (Kissné, 2002, 2005, Tornyi, 2009)

The rate of women was between 8 and 15% (these rates fluctuate in time) in the 1990s among MTA (Hungarian Academy of Science) doctors. This rate was around 25-30% among C.Sc.’s (Haraszthy & Hrubos, 2002). In 2005, only 3.5% of full-time or part-time MTA members were women (11 in figures). Later, their number rose up to 18 but their rate was still only 5.5%. (*Női rektorok Európában*, 2008) Therefore, considering academic and scientific qualifications, women lag behind. There are also differences per certain scientific areas: while in arts and social

sciences the rate of women acquiring an academic degree is high, their rate in the fields of science and engineering is low (Bolyán, 2001, Kissné, 2002). By the end of the 1990s, only 20% of the qualified researchers were women (Haraszthy & Hrubos, 2002).

Considering all, women face three forms of segregation in academic life: their significant presence can only be found in some areas, they are less likely to get higher positions at work, and ultimately that they work in less advantageous employment forms (contract job, short-term job contracts, part-time employment). For this reason, their salaries are lower, as well. (Haraszthy & Hrubos, 2002)

The hypotheses and results of the empirical examinations

In the empirical part of the study we will examine the manifestations of horizontal and vertical segregation by gender in higher education. We will estimate the prestige of the “feminine” and “masculine” faculties, and examine the rate of females studying at university and college faculties. In addition, we will examine the social background of male and female students at “masculine” and “feminine” and at university and college faculties.

Concerning our first hypothesis – which applies to horizontal segregation, and is based on the data related to the whole of Hungary and other developed countries, see above – male students will be in majority in trainings such as science and engineering in the “Partium” region, as well, while at other faculties (especially at departments (faculties) of humanities, teacher and primary teacher training) females will be in majority. However, during the period between the two world wars (Bíró & Nagy, 2007), 46.3% of humanities majors, and 46.4% of science majors were women at the faculties of Arts (where the science departments were represented as well). This means that there was no clear-cut dividing line between scientific areas by gender – therefore, our data can also provide us with surprising results. It was notable that, before the Second World War, the number of men studying at the departments of Greek, Physics and Latin was above the average, there was barely any difference between the rates of genders at the departments of Hungarian, General Science, History, Geography and Mathematics, and that the rate of women was above average at the departments of French, German, English, Chemistry and Italian at faculties of Arts. (Bíró & Nagy, 2007)

Concerning our second hypothesis we suppose that the prestige of “masculine and feminine” faculties will be different, the girls will study at less prestigious faculties. We do not have the data on the prestige of faculties, so we have to estimate it. We will take former examinations dealing with the population’s judgment of intellectual professions as a basis to be able to determine the prestige of “masculine” and “feminine” faculties and the professions related to them (Szabó, 1997, Marián, 1997). We are aware of the fact, that the prestige of professions is culturally and nationally determined, as well. The following results could be true only for Hungarian part of the “Partium” region. (We do not have data for the other parts of the region, concerning the prestige of professions.) The social recognition of the professions and the appreciation of them in Hungary showed significant divergences. While appreciation of teaching career and “helping” professions is high within the population, according to the social recognition and income top list, it is the law, information specialist, managerial and politician careers that are on the top. According to the opinion of the population, lawyers, doctors, economists and mechanical engineers earn the most, and it is hard to make a living by being a teacher, kindergarten teacher or a librarian. Professions like lawyers, clergymen, journalists, economists and mechanical engineers are considered to be overpaid jobs (based on the gap between social and financial recognition), while teachers and kindergarten teachers are considered underpaid.

In another study (Fónai, 2009), the students participating in the University of Debrecen

Talent Care Program evaluated the prestige of the faculties of University of Debrecen.³ According to the opinion of the students, the faculties of Medicine, Law, Economics and Engineering topped the prestige list. In the case of well established university faculties (Arts and Science), however, we can detect loss of prestige. The students did not put agricultural training in the first part of the list, and the faculty of Health was placed at the end of the list, as well.

Considering vertical segregation, according to our hypothesis (based on the data concerning the whole of Hungary), females will study at lower-prestige college faculties at higher rates than at universities in the “Partium” region and fewer females will plan PhD studies compared to male students.

Concerning our previous results (Fényes & Pusztai, 2006, Fényes, 2009), in the “Partium” region at universities and colleges the social background of boys was better than that of girls, so we can state that social mobility in education was lower in the case of boys. (Here the so called “male disadvantage hypothesis” was supported.) The boys only attempt to study further if they have more advantageous cultural and financial background. In this paper we will examine the presence of this hypothesis depending on the type of faculty (we will examine the social background of students at “feminine” or “masculine” faculties, and at college or university faculties respectively). According to our present hypothesis, as the prestige of “feminine” and college faculties is somewhat lower, males coming from more disadvantageous backgrounds are also enrolled. Yet, at the “masculine” and university faculties, it is clear that only males with better social backgrounds are represented.⁴

In the analysis, we used two databases of the “Regional University” research (supervisor: Kozma Tamás): the first one is the sample of first-year college and university students (N=1587, in the following to be marked as ISCED51), and the second is the sample of fourth-year college and university students (N=940, in the following to be marked as ISCED54). Both samples are regional; the students of the higher education institutions of Hajdú-Bihar and Szabolcs-Szatmár-Bereg County, and students from two higher education institutions in the “Partium” region beyond the Eastern Hungarian border are represented in it. The data collection took place between 2003 and 2005. The sample is representative concerning the faculties of examined universities and colleges, and the students have been chosen randomly at each faculty. We are aware of the fact that our results cannot necessarily be generalized for the whole of Hungary, although the sampling procedures and the sample sizes meet the methodological requirements. (We will discuss the effect of the regional feature of the sample later, in the summary.)

Firstly, we will examine horizontal segregation among first-year university and college students. For this, we created a “woman rate index” (WRI)⁵. WRI is calculated in the following way: the rate of women by faculty was divided by their average rate at all faculties (67.44%). WRI takes the value of one in the case of the average of female enrollment, it is greater than one if the rate of girls is above their average value, and it is smaller than one, if the rate is under this average.

3 The students determined the prestige of majors based on their demand, incidence, hardness and the future wages by answering the open question, “Why do you list it here?”

4 Within the faculties of Arts during the period between the two world wars, there was but very little difference between feminine, masculine and unisex majors regarding the social background of students and the settlement type of their place of birth, but it was demonstrable that jew students were overrepresented at feminine departments (mostly because of the high rate of jew girls, although jew boys were also overrepresented at these departments). It was also clear that the educational background of the parents of female students was higher in the case of feminine majors, which is in conflict with the assumption that graduating at masculine departments requires of women greater effort and a better family background. (Bíró Nagy 2007)

5 The index is similar to the representative value of Bíró & Nagy (2007), but we examine gender rates by faculties and not by majors within the faculty of Arts. The reason for this lies in the fact that although we obtain data by majors, as well, the sample was not representative in this respect, and the small sample sizes would have caused problems during the analysis of the results.

Table 5: *The rate of men and women by faculties in a regional sample (ISCED51) DE: University of Debrecen*

Faculty		Men	Women	Woman rate index (WRI)
DE Faculty of Agricultural Science	N	36	65	
	%	35.64	64.36	0.95
DE Faculty of Arts	N	29	175	
	%	14.22	85.78	1.27
DE Faculty of Science	N	55	55	
	%	50.00	50.00	0.74
DE Faculty of Economics	N	36	54	
	%	40.00	60.00	0.89
DE Faculty of Medicine	N	16	34	
	%	32.00	68.00	1.01
DE Faculty of Engineering	N	108	37	
	%	74.48	25.52	0.38
DE Faculty of Child and Adult Education (in Hajdúböszörmény)	N	2	95	
	%	2.06	97.94	1.45
Faculty of Health (at Nyíregyháza College)	N	13	41	
	%	24.07	75.93	1.13
DE Faculty of Law	N	36	86	
	%	29.51	70.49	1.05
Partiumi Keresztény Egyetem (PKE) (Partium Christian University)	N	60	112	
	%	34.88	65.12	0.96
II. Rákóczi Ferenc Kárpátaljai Magyar Főiskola (Sub-Carpathian Hungarian College)	N	53	68	
	%	43.80	56.20	0.83
Nyíregyházi Tanárképző Főiskola (Teacher Training College in Nyíregyháza)	N	23	88	
	%	20.72	79.28	1.18
Kölcsey Ferenc Református Tanítóképző Főiskola (KFRTF) (Reformed Teacher Training College)	N	13	84	
	%	13.40	86.60	1.28
ALTOGETHER	N	480	994	
	%	32.56	67.44	

In this present table, the Chi-square statistics are significant on the $p < 0.001$ level.

It is traceable that, in accordance with our hypothesis, men are only in majority at the DE (University of Debrecen) College Faculty of Engineering, and in addition, their rate corresponds with the rate of women at the DE Faculty of Science. At the other faculties (institutions), women are in majority and if we consider the two colleges/universities beyond the border (Partiumi Keresztény Egyetem, II. Rákóczi Ferenc Kárpátaljai Magyar Főiskola), the rates are similar there to those in Hungary. We can also note that women are in majority not only at lower-prestige college faculties but at some high-prestige university faculties, as well.

Based on the woman rate index (WRI), we will continue to distinguish “masculine” departments (where the rate of women is under the average) from “feminine” (where the

rate of women is above the average) and “unisex” ones (where the rate of women is around average.)

Table 6: “Feminine”, “Masculine” and Unisex faculties. Cumulative table based on the woman rate index (WRI). (ISCED51)

“Feminine” faculties (WRI: above 1.05)	“Masculine” faculties (WRI: under 0.95)	Unisex faculties (WRI: 0.95-1.05)
DE Faculty of Child and Adult Education in Hajdúböszörmény (1.45)	DE-Engineering (0.38)	DE-Agricultural Sciences
KFRTF (1.28)	DE-Faculty of Science (0.74)	PKE
DE-Faculty of Arts (1.27)	Sub-Carpathian College (0.83)	DE-Law
Nyíregyháza. teacher training (1.18)	DE-Economics (0.89)	DE-Medical
Nyíregyháza. health (1.13)		

The rate of women in the institutions in bold letters is 50% or lower.

As it can be seen, with the exception of DE Faculty of Arts, the “feminine” faculties are college faculties (which are lower prestige than university faculties), and generally they provide training for “helping” professions (kindergarten teacher, social pedagogy jobs, career in healthcare) whose social and financial recognition is low in Hungary (see before). What may also lie in the background of the feminization of the teaching career is that compared to other professions, the rate of fixed work time is lower (the number of teaching days is smaller), and protected office-holder status is typically granted, and thus girls are attracted to teaching career despite the lower salary.

Among unisex faculties we can already find trainings (law, medicine) that prepare for high-prestige careers (relying on public poll and on students’ opinion results in Hungary, see before), although considering the starting salaries, these two professions are not among the most recognized professions, either (later the salaries rise remarkably). Here, we can find the Partium Christian University (PKE), as well. This university has a mixed profile – it has faculties of arts, economics and music and visual arts, and students can study tourism, philosophy, fine arts, religion, social work, sociology, English, Romanian, advertising and management. Female students prepare for the higher-prestige economic career under their average rate. Besides this, among “masculine” faculties we can find the Sub-Carpathian College, and as we expected, the DE Faculty of Science and the Faculty of Engineering College, where the rate of girls is indeed 50% or lower.

Let us now see the differences of cultural and financial background at women and men studying at “feminine”, “masculine” and “unisex” faculties. Our research question is whether the *male-disadvantage hypothesis* (i.e. that the social mobility of male students in higher education is smaller) is present at these three groups of faculties. According to our hypothesis, as the prestige of “feminine” faculties is lower, the *male-disadvantage hypothesis* will not be present, and therefore males with less advantageous backgrounds can get enrolled. At the “masculine” and “unisex” faculties, however, males are only present if they have a better cultural and financial background than girls do.

The following tables (7 and 9) are summarizing tables based on the cross tabulation runs and “compare means” runs of the SPSS program (the detailed data are not presented here, there were 78 runs, 14 significant relations, and 65 not significant relations). We made cross tabulations for example at “feminine” faculties concerning the education of father by

gender (the result was not significant, so the education of father did not differ by gender at “feminine” faculties). The further variables examined by gender at different faculties can be seen in the table 7. In the case of the number of siblings, number of people living in the same household and possession of durable consumer goods, we made “compare means” runs for example when we compared the average number of sibling by gender (the difference was not significant at “feminine” faculties, and at other faculties, as well).

Table 7: *The social background of students at “feminine”, “masculine” and unisex faculties – by gender (ISCED51)*

Background variables	“Feminine” faculties N=615	“Masculine” faculties N=506	“Unisex” faculties N=466
Cultural capital of parents			
Education of the father	NS	NS	NS
Education of the mother	NS	NS	NS
Whether the father reads regularly	NS	NS	NS
Whether the mother reads regularly	The mothers of males read more	NS	NS
Whether the father reads belles-lettres	NS	NS	NS
Whether the mother reads belles-lettres	NS	NS	NS
Economic capital			
Number of siblings	NS	NS	NS
Number of people living in the same household	NS	NS	NS
Possession of durable consumer goods	NS	Better for male students	Better for male students
Whether they live better than 10 years before	NS	NS	NS
Any financial problems	NS	NS	NS
Type of settlement of the place of residence	NS	Better for male students	NS

The table is based on the cross tabulation runs and “compare means” runs of the SPSS program. NS marks non-significant relations by gender according to the Chi-square test or ANOVA test (the tests were significant, if $p < 0.05$).

It is clear that, contrary to our hypothesis, the male-disadvantage hypothesis (the lower social mobility of male students) is present regardless the gender distribution of the faculties, and the background of females is not more auspicious at any of the indexes, than that of males'. (It is also clear that, as a consequence of the smaller sizes caused by the broken data, there are but few significantly divergent indexes by gender.)

At “feminine” faculties, the cultural background of males is more advantageous, and at “masculine” and “unisex” faculties their financial background is better. At “feminine” faculties, the mothers of male students read more compared to the mothers of female students, but there is no difference regarding financial background by gender. This means that, the male students who are in significant minority at “feminine” faculties, were presumably encouraged to choose such “girlish”, “feminine” majors and faculties by mothers who read regularly.

At “masculine” and “unisex” faculties, however, male students have better financial background (considering the possession of durable consumer goods), and at “masculine” faculties the type of settlement of the place of residence of male students is more advantageous, as well. Nevertheless, there is no difference between the cultural background of males and females. Male students (who are not in majority in all cases, but are represented in their

average rate or above) studying at “unisex” and “masculine” faculties attempt to study further only with a better financial background and more auspicious type of settlement. Meanwhile, female students – who represent themselves at a relatively low rate at these faculties – study here despite their less auspicious financial background.

Therefore, it seems that the prestige of the faculties and their “feminine or masculine” feature do not influence considerably the difference between the social background of males and female. The *male-disadvantage hypothesis*, thus, (i.e. males having lower social mobility) is demonstrable at all three faculty types, and the only difference is that either their cultural or their financial background is more auspicious.

Let us now see one form of *vertical segregation*, i.e. what the rate of males and females is at university and college faculties.

Table 8: *The rate of males and females at university and college faculties (%) (ISCED51)*

	University faculties	College faculties
Male	31.6%	33.9%
Female	68.4%	66.1%
N	849 (100%)	625 (100%)

The Chi-square statistic is not significant.

It is notable that, contrary to our hypothesis, males and females study at university and college faculties at somewhat the same rate in the region.⁶ Nevertheless, we need to note that vertical segregation is present in the training after all – in the sense that males have PhD plans at greater rates than girls do (see Fényes, 2009).

Although we have shown that the rate of male and female students tends to be similar at college and university faculties, we are now able to examine what the difference of the social backgrounds of male and female students is like in lower prestige college training and in higher prestige university training. According to our hypothesis, the *male-disadvantage hypothesis* will not be present in college training (the social mobility of female students will not be more advantageous here), and males coming from a disadvantageous social background will rather appear in college training than in university training.

⁶ The rate of girls is even a bit higher at university faculties than at college faculties, although the difference is not significant. It may be due to the fact that there was no Technical University in Debrecen, only an engineering college faculty, and thus there are more male students at colleges than there would really be if there was a Technical University.

Table 9: *The differences between the social background of male and female students at university and college faculties*

Background variables	ISCED51 University students	ISCED51 College students	ISCED54 University students	ISCED54 College students
Cultural capital of parents				
Education of the father	Better for male students	Better for male students	NS	NS
Education of the mother	NS	Better for male students	NS	NS
Whether the father reads regularly	NS	The fathers of males read more	NS	NS
Whether the mother reads regularly	NS	NS	NS	NS
Whether the father reads belles-lettres	NS	NS	No data av.	No data av.
Whether the mother reads belles-lettres	NS	NS	No data av.	No data av.
Economic capital				
Number of siblings	NS	NS	NS	NS
Number of people living in the same household	NS	NS	No data av.	No data av.
Possession of durable consumer goods	Better for male students	NS	NS	Better for male students
Whether they live better than 10 years before	NS	NS	Male students more likely do	Male students more likely do
Any financial problems	NS	NS	NS	Less likely for male students
Type of settlement of the place of residence	Better for male students	NS	NS	NS

The table is based on the cross tabulation runs and “compare means” runs of the SPSS program. NS marks non-significant relations by gender according to the Chi-square test or ANOVA test (the tests were significant, if $p < 0,05$).

According to the merged data of the university and college faculties, the *male-disadvantage hypothesis* was overall present in our ISCED51 database (see Fényes & Pusztai, 2006). Both the cultural and financial background of male students was better, but according to the broken data, among college students it is the cultural background of males that is better (the parents with higher qualifications and regular reading habits encouraged their sons to apply to college training), and among university students, the education of father, the financial background (possession of durable consumer goods) and the type of settlement of the place of residence of males that is more auspicious.

The *male-disadvantage hypothesis* was only verified in relation to the financial background at the merged data in the ISCED54 database (see Fényes, 2006). According to the broken data by institution type, however, the financial background of male students at universities is not any better – only in one index (whether they live better than 10 years before) – while the financial background of male students at colleges is better than that of females, according to various indexes (possession of durable consumer goods, whether they live better than 10 years before, any financial problems). With respect to the cultural background and the settlement, there is no significant difference between male and female students according to the results (in accordance with the former, merged results). Thus, as opposed to our hypothesis, the financial aspects counted more at

the further studies of males on college level than at the further studies of males on university level.

Altogether, as opposed to our hypothesis (in both databases), *male-disadvantage hypothesis* is present among college students, as well. Therefore, beside the case of male students at university, the social background of college male students is also a bit more advantageous – males here were also less mobile than girls.

Summary

The phenomenon of horizontal and vertical segregation by gender has not disappeared in education, in spite of the fact that nowadays there is woman-majority in higher education, and that they are in advantageous situation in several aspects on other levels of education, as well. The further “feminization” of certain faculties (departments) continues, while the rate of women is also gradually rising in certain training fields that are typically dominated by men. Although horizontal segregation slightly declines in training, it still puts female students into a disadvantageous situation; the choosing of “feminine” professions sets back their getting on on the labor market later on, and the recognition of professions dominated by women remains considerably low compared to fields dominated by men.

According to vertical segregation, the rate of women declines on the higher levels of education (mostly in PhD training and among tertiary level staff members). Besides these, it appears to be characteristic that women are represented at a higher rate in the field of education and research in lower positions and in low-prestige jobs, and therefore, their salary is also less.

The causes of segregation in education – based on the literature - could be the different occupational preferences, knowledge and skills (girls’ better verbal skills, boys’ mathematical skills), the divergent socialization processes by gender (in family, school and mass media), the career awareness of girls (they are aware of horizontal segregation on the labor market by gender), lifelong social constrains that both women and men face with (social control theory), the theory of patriarchal systems: male employers and workers have choice to decide which job to take, and women get what is left for them, and finally the predictions of the human capital model: women want to choose jobs, which are not in conflict with their domestic obligations.

In our empirical research, we examined some aspects of horizontal and vertical segregation in a regional sample, and we do not examine the reasons for segregation. We distinguished between “feminine” and “masculine” faculties (where the rate of women was above or under the average), and we pointed out that, in the examined region the prestige of feminized faculties is lower than where the rate of men is average or above the average (based on our estimation concerning the whole of Hungary). Nevertheless, by examining vertical segregation, and contrary to our hypothesis, the presumption that women represent themselves at college faculties of lower prestige at a higher rate than at university faculties was not demonstrable. What we may find in the background of this result is that the examined region (Hajdú-Bihar and Szabolcs-Szatmár-Bereg County in Hungary, and parts of Transylvania and Sub-Carpathia) does not have a Technical University, only an engineering college faculty, and thus more males study at colleges than they would if there were a Technical University. However, according to the literature (Hrubos, 2001b) it is also detectable that there was a massive inflow of women into university training (rather than into college training) in the 1990s; therefore it can occur that it is not even typical in general for women to be present at universities at a lower rate than at college faculties.⁷

By examining the social background of students, we can state that whether we take the “feminine” and “masculine” faculties, or university and college training, the male-disadvantage

⁷ We note that during the time of sampling (on which we relied on in our empirical examination), the new type of training (bologna) was not yet introduced on a grand scale in Hungary. Thus, the examination of the rate of female and male students in the bachelor training and in the master's training may be the subject to further examinations.

hypothesis⁸ was present in the region, i.e. the social mobility of males in higher education is lower than that of females, regardless of the type of the faculties. Contrary to our hypothesis, males at “feminine” faculties of low-prestige and in college training attempted to study further, only if they had a more auspicious social background.

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⁸ The lower social mobility of male students in higher education was demonstrated by international and other Hungarian examinations, as well (for details see Fényes 2009, Fényes Pusztai 2006).

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