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Severiens, S.; ten Dam, G.

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# Leaving College: A Gender Comparison in Male and Female-Dominated Programs

Sabine Severiens · Geert ten Dam

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**Abstract** Women, on average, outnumber men and are more successful in higher education. A literature overview showed that these differences may be explained by gender differences in learner characteristics, by external factors and by institutional factors. This study aims to explain gender differences in higher education in more detail by focusing on one of the recent research findings in this area: the role of the numerical representation of men and women in course programs. What are gender differences in study success in male and female-dominated course programs, and what are gender differences in reasons for leaving these programs? The research questions were answered by analyzing Dutch census data and conducting a survey on students that have left college. Results showed that gender differences in retention scores and reasons for leaving were indeed related to the numerical representation of women and men in course programs. Leaving female-dominated programs seemed to be a different matter from leaving male-dominated programs.

**Keywords** Gender differences · Study success · Retention · Drop-out · Reasons for leaving

## Introduction

In recent years, a number of researchers have called attention to the fact that, from the 1990s onwards, men have begun to perform less well in higher education compared to women (Evers and Mancuso 2006; Jorgensen et al. 2009; OECD 2008). The OECD report ‘Higher Education to 2030’ (2008) shows that this is a trend in most OECD countries. It is noteworthy that the widening gap is more the result of increasing participation rates among women than the result of decreasing participation rates among men. Aside from Austria,

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S. Severiens (✉)  
Risbo, Erasmus University Rotterdam, PO Box 1738, 3000 DR Rotterdam, The Netherlands  
e-mail: severiens@risbo.eur.nl

G. ten Dam  
Department of Child Development and Education, Faculty of Social and Behavioural Sciences,  
University of Amsterdam, Amsterdam, The Netherlands

Canada and the United Kingdom, in all other OECD countries the numbers of men entering higher education have grown. The growth of women's participation, however, has been stronger. Moreover, women study at a faster pace (Van Langen et al. 2008, p. 12), and the percentage of female graduates has started to exceed that of their male counterparts (OECD 2008). Conversely, the attrition rates of men are higher, especially in the average performing group (Jorgensen et al. 2009). However, these observations are not true for each and every course program. Academic performance has been found to be similar for males and females, except for situations in which females represent a minority in a course; in those courses women often perform less well and drop out more often than men (Ozga and Sukhnanan 1997; Beekhoven et al. 2003; OECD 2008). Furthermore, the OECD noted that the higher rates of female students and graduates were mainly attributable to the feminine fields (OECD 2008). Beekhoven et al. (2003) found that women make more progress in courses with higher proportions of women.

The above observations show that women, on average, outnumber men and are more successful in higher education. The question is why this is the case: what has happened in the last 15 years that has motivated women to enter education at higher levels than men, and why do men decide to leave college more often than women? A second question refers to the observed variation according to the numerical representation of women and men. Why would women perform less well in male-dominated programs? And why would men perform less well in programs dominated by women? The model presented by Nora et al. (1996) is used to describe previous research and answer these questions. They distinguish between four blocks of study success predictors, based on Pascarella's more general model on student retention: (1) background characteristics, (2) institutional related factors, (3) external factors and (4) cognitive abilities and achievement. The first and fourth block of predictors are often combined into learner characteristics such as motivation, aspiration and cognitive abilities, skills and achievement. The second group of predictors pertains to institutional factors such as climate and quality of teaching, while the third group focuses on external factors such as the job market situation and job opportunities. Gender differences in study careers, including gender imbalances in participation rates, may be explained by differences in learner characteristics, by institutional factors and/or by external factors. In the next section, we present an overview of recent research on factors related to gender differences in graduation and drop-out rates in each of these three groups.

The present study intends to advance our understanding of gender differences in higher education by (1) examining reasons for leaving, referring back to the explanatory factors in the literature overview; and (2) further exploring the variation according to numerical representation of women and men in course programs.

## Literature Overview

### Learner Characteristics

In terms of preparing for higher education, women seem to be at an increasing advantage. At the age of 16, women are catching up in mathematics and the gap in English is widening in their favor (OECD 2008). The PISA studies show that girls (aged 15) outperform boys in reading (OECD 2009). In some countries the gender gap has widened greatly, in no country has it narrowed. In France, Sweden and Romania, the decline in reading performance among boys is the main reason for the widening gap. Even though girls are catching up, in mathematics, boys on average still outperform girls. Some of the OECD countries still display large

differences (although not as large as the gender differences in reading skills): these are Belgium, Chile, the United Kingdom, the United States, Colombia and Liechtenstein (see e.g., O’Shea et al. 2010). In science, boys and girls perform about the same. Only six countries show a statistically significant gender difference in favor of males (United Kingdom, Luxemburg, Denmark, the Netherlands, Mexico and Switzerland) and two countries show an advantage for females (Turkey and Greece). The remaining countries show no differences.

While this may explain why women have entered in higher numbers, it does not explain why more men have left higher education. It also does not explain why women would be less successful in male-dominated course programs or, conversely, why men would be less successful in female-dominated course programs. The research that attempts to explain gender differences in higher education on the basis of differences in cognitive skills generally concludes that these differences are either very small or even non-existent (see e.g., Evers and Mancuso 2006).

Gender differences in educational careers do seem to emerge when factors other than cognitive learner characteristics are involved. For example, Sommers (2001) shows that boys more often have discipline problems and are more likely to attend special education. Girls, on the other hand, are more likely to pay attention in class, work with others, organize and keep track of homework and seek help from others. Evers and Mancuso (2006) relate their findings to differences in socialization patterns. They conclude that the education system rewards characteristics more typically found in girls, such as obedience, concentration and self-control. Jorgensen et al. (2009) arrives at a similar conclusion on the basis of research using the Student Readiness Inventory. Males score lower on academic discipline and communication skills. They also score lower on motivation. In their review study, Woodfield et al. (2006) state that the most frequent explanation for gender differences refers to differences in learner identity: women work harder and more consistently. Trueman and Hartley (1996) add to this conclusion by explaining gender differences in academic performance as a result of women’s better time management skills. Finally, gender differences in higher education are related to goals. Grebennikov and Skaines (2009) argue on the basis of their literature review that women find academic goals more important than men and they place a greater value on higher education, mainly because women need to better prepare themselves in order to have the same chances on the job market. The OECD report (2008) also shows that girls seem to have higher aspirations than boys.

The relative importance of non-cognitive factors is reported by Jacob (2002). On the basis of an analysis of longitudinal data (the NELS study), he concludes that women’s higher returns from college and greater non-cognitive skills account for nearly 90% of the gap between women and men.

In conclusion, gender differences in educational careers may be explained, in part, by differences in non-cognitive learner characteristics, such as discipline, motivation, time management skills and goals. We do not consider these learner characteristics as stable individual factors, but the result of an interaction between individual, external and institutional factors. This also means that studies on external or institutional characteristics may show that these gender differences in non-cognitive learner characteristics vary according to numerical representation. In the next section, we describe the external factors that encourage women to stay in college and complete their education at higher rates than men.

## External Factors

One of the relevant external factors when attempting to explain gender differences in higher education concerns family responsibilities. The OECD (2008) stated, for example,

that opportunities for women to combine family life with professional life have increased in recent years. This explains why women have started to enroll more often, as they expect high returns from a college degree and the possibility of combining work and family responsibilities. Care responsibilities during college also seem to affect gender differences during college. Using a national database (from the US), Leppel (2002) found that, based on competing demands for their time, women's priorities influence their academic performance in a different way from men's priorities. For instance, while having children had a negative impact on men's persistence in academia, it had a positive impact on women's academic persistence. Leppel explains this finding by women's reliance on their husbands to provide for them and their children which gives them an opportunity to continue studying. From a similar point of view men may feel more pressure to earn a living and thus find it more difficult to meet the demands of work and education simultaneously.

Aside from family responsibilities, opportunities in the job market may also explain the difference between women and men with respect to study careers. On the one hand, comparing men and women with degrees in tertiary education, the economic benefits are still higher for men than women. Women with tertiary degrees earn only 71% of what men with tertiary degrees earn (OECD 2010). This percentage varies somewhat between countries. In the age group 39–44, in the Netherlands this percentage is 79%, in the US it is 68%. In Italy, women obtain the lowest score: they make only 52% of what men make, and in Korea, relatively speaking women earn the most (84% of what men earn). On the other hand, the economic benefits for men without tertiary education seem to be better than for women without tertiary degrees. Like Jacob (2002), Evers and Mancuso (2006) propose that a university degree yields higher returns for women than men based on their observation that opportunities for well-paid jobs without a tertiary education are better for men than for women. As a result, the opportunity cost of attending university is higher for males than for females. Moreover, the financial returns for women seem to have risen in recent decades, although there is no evidence of declining returns for men. However, the fact that returns for completing a degree have increased more for women in the past few decades could explain the difference in participation rates in higher education (DiPrete and Buchmann 2006).

The state of the economy in different sectors also influences the study careers pursued by men and women in different ways. Low unemployment rates and high salaries in traditional male job areas which do not require higher education may serve as an incentive for men to leave higher education or not to enter it at all. For example, high wages in real estate, finance and insurance are linked to a higher proportion of females in college, whereas high wages in services are linked to a higher proportion of men in college. In a similar vein, Mastekaasa (2005) shows an effect based on the field of work. Men are more likely to drop out of their studies in applied fields, probably due to attractive opportunities in the non-academic job market. Jacob (2002) presents a similar argument in describing a rise of women in traditional "white collar" male occupations, an increase that is not detected in the blue collar occupations. He concludes that young men with high school diplomas have a better chance of finding a well-paid blue collar job than young women with high school diplomas. This explains why some men leave college early (or do not enroll at all), while women enter and graduate at higher rates.

In conclusion, the different impact of family responsibilities, the structure of the job market and the state of the economy all seem to impact the percentages of women and men enrolling in and graduating from higher education. These explanations for the relatively high male attrition rates, however, do not explain the variation according to numerical representation. In other words, previous research does not indicate external factors that explain why women would leave traditional male areas more often.

## Institutional Factors

A number of studies have examined institutional factors that may explain differences between women and men in higher education. For example, Macan et al. (1990) ascribe achievement differences to the type of assessment and field under study. With respect to assessment, Lumsden and Scott (1987) suggest that women outperform men in course work, whereas men perform better in exams. A more recent study by Woodfield et al. (2005) confirms the result for coursework (women perform better than men), but not the result for exams (men perform as well as women).

With respect to the field, it appears that females perform better in social fields while male students do better in technical fields (Macan et al. 1990). Given the overrepresentation of women in social fields and men in technical fields, it is difficult (if not impossible) to ascribe observed differences to the field itself or to this overrepresentation.

Aside from assessment and field, the quality of interaction between students and between students and staff also appears to be relevant in predicting gender differences in study success. Nora et al. (1996) found that the interaction of students with peers and close personal relationships were linked to persistence to a similar extent for both males and females. Jorgensen et al. (2009) showed that males seem to feel less connected with and involved in the college community than their female counterparts. According to Jorgensen, “males may be viewing other elements of their lives as more important than school related tasks, leading them to devote less time to their studies and to become less involved in the college community compared to female students.” Kim and Sax (2009) also found that women are generally more satisfied with faculty interaction, while at the same time course-related interaction seems to have a stronger effect on degree aspiration among men. Nora et al. (1996) found that the most significant positive effect on female students staying in college came from mentoring experiences in the form of non-classroom interaction with faculty. They also found that none of the factors in the model were significant in the group of men alone or showed a remarkably stronger relationship in the group of men. It can be concluded that interaction with faculty as well as peers seems equally important for men and women, but it seems that men are less satisfied with this interaction than women. This relative lack of good quality interaction with peers and staff may cause men to feel less connected and lead them to drop out more often.

Smith (2003) took another approach to explaining gender differences resulting from institutional factors. She uses the concept of a “gendered” curriculum that favors women. In the past decades, curricula have generally developed towards using “narrative practices” (e.g. presenting assignments in a context). According to the gender stereotype, using these narrative practices would help girls more than boys. However, Smith also notes that empirical research does not offer any evidence for such a difference.

From a similar perspective, another explanation refers to the feminization of the teaching profession (see also Smith 2003). Bettinger and Long (2005) and Dee (2005) examined the effects of same sex teachers on performance. Both studies concluded that same sex teachers have a positive effect. However, even though there are far more female than male teachers in primary education, there are more male than female teachers in secondary and higher education (Veendrick et al. 2004). Having teachers of the same gender cannot therefore explain why more men leave college in general. It may, however, explain why men leave female-dominated course programs more often, assuming that the share of female staff is relatively high in these programs.

In conclusion, one of the reasons why men perform less well in higher education may be that they are less satisfied with their teachers and the curriculum and that they do not feel at

home in the institution in the way that women do. The relative numbers of men and women in the course programs (or field) may be related to these processes of involvement and satisfaction. In their directions for future research, both Mastekaasa (2005) and Woodfield et al. (2006) recommend an examination of this effect.

## Research Questions

In the present study, we took up the recommendation of Mastekaasa (2005) and Woodfield et al. (2006). Firstly, the drop-out rates in course programs in which females are over-represented were examined in comparison to course programs in which men are over-represented. Secondly, the reasons for leaving college were examined in these two groups of programs. Do men in “male-dominated programs” have different reasons for leaving compared to men in “female-dominated course programs”? In a previous study (Meeuwisse et al. 2010), gender turned out to be one of the significant factors in reasons for leaving. In the present study, we investigated gender differences in more detail, that is, in relation to variation according to numerical representation.

## Methods

In order to answer the research questions, two research activities were carried out: an analysis of census data and a survey of leavers. We describe these two activities in the following sections.

### Analysis of Census Data

Dutch census data on higher education is available on the StatLine website maintained by Statistics Netherlands ([www.statline.nl](http://www.statline.nl)). It contains information on study success from 1995 onwards. Available indicators for study success are (1) graduation rates after a set number of years and (2) drop-out rates after a set number of years. The database also contains information on the number of male and female first-year students in all available course programs.

The first step in analyzing this data was to design two groups consisting of course programs with at least 75% of either male or female first-year students. The second step was to calculate the average drop-out rates of women and men in these two course program groups. We chose this indicator for study success, given the fact that the first years in higher education are the most crucial years. When students “survive” this first period, chances are high that they will complete their degree (see e.g., Harvey et al. 2006).

### Survey: Respondents and Procedure

The Information Group, the Dutch organization that administers student enrollment for all universities in the Netherlands, drew a sample of 10,000 leavers from the most recent five cohorts of students (between 2000 and 2006<sup>1</sup>). Leavers were defined as students that enrolled in year  $t$ , did not re-enroll in year  $t + 1$  and did not obtain a degree in  $t + 1$ . The leavers were sent a letter to their home address by the Information Group inviting them to

<sup>1</sup> These were the most recent cohorts at the time of the data collection in 2007.

**Table 1** Background information on the leavers that participated in the study

	<i>N</i>	%
Male	500	49.1
Female	517	50.9
Males in male-dominated programs	407	64.2
Females in male-dominated programs	227	35.8
Males in female-dominated programs	92	24.1
Females in female-dominated programs	290	75.9
Total	1,017	100.0

participate. To stimulate response, a number of gift cards were awarded to the participants that agreed to participate in this “lottery”.

1,017 leavers who had studied full-time and had withdrawn voluntarily participated by completing an online or a paper and pencil version of a questionnaire on reasons for leaving higher education.

Because the response rate was low at 10%, the representation of women and men, ethnic minority and majority students and each of the disciplines was tested against the distribution in the national database. Due to an overrepresentation of female participants, ethnic minority participants<sup>2</sup> and participants who left teacher education, a weighting procedure was applied based on the national database. Background information on the leavers is provided in Table 1.

In terms of the international descriptors as used by the OECD, our study included leavers from the ISCED-5B programs only. As opposed to the ISCED-5A programs that focus on theory and research, ISCED-5B programs are typically shorter and focus on practical, technical or occupational skills for direct entry into the labor market, although some theoretical foundations may be covered in the respective programs.

### Survey: Measures

The respondents were presented with 45 items representing seven reasons for leaving higher vocational education. Table 2 shows the psychometric properties of the questionnaire (for an extensive description of the scale construction process, see Meeuwisse et al. 2010).

Learner characteristics (cognitive skills and non-cognitive skills) were measured by the skills and content scales. Aside from the fact that, in general, cognitive skills do not seem to explain gender differences in study success, we do not know whether this is true in female and male-dominated course programs. The cognitive skills scale addressed math and language skills, study load and connection to the former program. Non-cognitive skills combined motivation, the extent to which students thought the course material was interesting and the extent to which they thought their study choice was appropriate. We labeled this scale “content”, as this more adequately reflects the meaning of these three items.

<sup>2</sup> The distinction between majority and minority participants was made on the basis of the definition of Statistics Netherlands (CBS). According to CBS, an individual belongs to a non-Western ethnic minority group if at least one of the parents was born outside a Western country. Most minority participants were born in, or had parents born in, Suriname, Turkey, the Netherlands Antilles or Morocco.

**Table 2** Reasons for leaving (scale name, description, items, reliability and descriptive values)

Reasons for leaving	Items	Cronbach's alpha (number of items)	Mean (1–5) (SD)
Home situation	Lack of support from my parents for my education	0.87 ( <i>n</i> = 8)	1.45 (0.71)
	Lack of support from my friends for my education		
	My parents were negative about my study choice		
	Stress because of financial problems during my study		
	I could not combine my study with my care responsibilities		
	I could not combine my study with my job		
	I had no social life anymore		
Job opportunities	Poor career perspectives	0.87 ( <i>n</i> = 6)	1.65 (0.92)
	Low salary in future job		
	Little chance of finding a job after graduation		
	Uninteresting future jobs		
	Little versatility in future job		
	Low status in future job		
Quality of education	Poor support	0.89 ( <i>n</i> = 5)	2.77 (1.27)
	Poor quality of teachers		
	Poor educational system		
	Poor organization		
	Poor quality in general		
Cognitive skills	Lack of competence	0.78 ( <i>n</i> = 6)	1.70 (0.82)
	Lack of math skills		
	High study load		
	Poorly prepared from previous schooling		
	Lack of writing skills		
	Lack of verbal skills		
Culture	Negative culture at school	0.81 ( <i>n</i> = 6)	1.79 (0.82)
	Being different from other students		
	Prejudice in the institute		
	Lack of support from peers		
	Lack of support from somebody at the institute		
	I had to adapt too much		
Content of education	Wrong study choice	0.75 ( <i>n</i> = 3)	3.03 (1.32)
	Uninteresting courses		
	Too little motivation		
Finances	I found a job	– ( <i>n</i> = 2) <sup>a</sup>	1.29 (0.77)
	I did not need this degree anymore because of financial reasons		

<sup>a</sup> Cronbach's alpha was not calculated because there are only two items in this scale

External factors were measured by the job opportunities, finances and home situation scales. The job opportunities scale measured whether students left because they perceived that the degree would not help them acquire a high status profession or a good salary. Home situation also seemed to be important in explaining gender differences. This scale pertains to family responsibilities, combining work and studying, and support from family and friends.

Institutional factors were measured by the quality of education and culture scales. The quality of education scale inquired into satisfaction regarding the quality of support, teachers, the educational system and the organization. The culture scale measured the extent to which students left because they felt different and had to adapt too much, because they experienced prejudice, because they were not supported by their peers, and because they basically thought the culture was negative.

Respondents were asked to rate the reasons on a 5-point Likert scale ranging from 1 (*no reason at all for withdrawing*) to 5 (*a very important reason for withdrawing*).

The general results of this study are reported in Meeuwisse et al. (2010). The present study focused on gender differences in reasons for leaving in male and female-dominated fields.

### Survey: Analyses

Multivariate analysis of variance was used to examine differences between women and men, differences according to male or female-dominated course programs and the possible interaction effect between these two independent variables. Average scores on the scales that measured the seven reasons for leaving were included as dependent variables. To decide whether or not to include GPA in secondary school and level of secondary education<sup>3</sup> as covariates, differences between men and women on these two variables were calculated first. The results showed that there were no differences: men and women did not differ in terms of secondary GPA, nor did they differ in terms of level of secondary education. It was therefore decided not to include these two covariates.

## Results

### The Census Data

Figure 1 presents the results of the analysis of the census data and shows the attrition rates of women and men in the “feminine” and “masculine” fields.

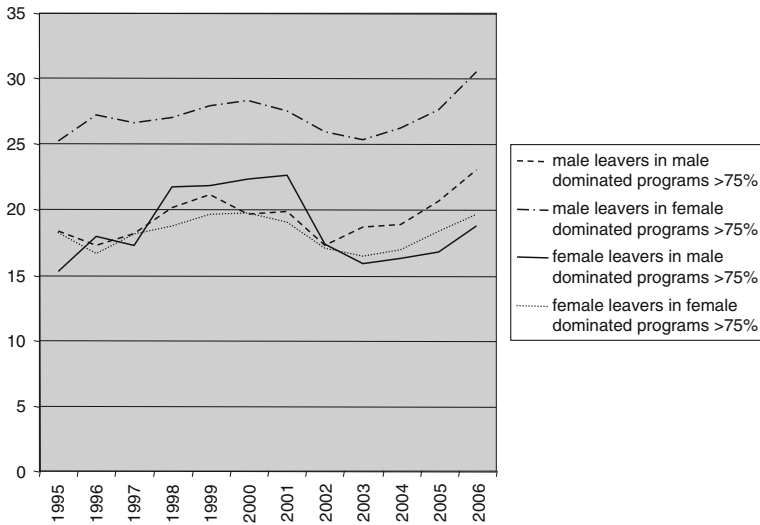
The percentage of male leavers was highest in programs where women made up more than 75% of the students. The remaining three groups were more similar in leaving rates. In other words, the problem with respect to general low retention rates of male students was greater in female-dominated fields than the male-dominated fields. This finding seems to suggest that part of the explanation for relatively high attrition rates among men lies in characteristics of the fields or course programs in female-dominated programs, or the pull and push factors in these particular fields.

### The Survey

Do men in “male-dominated programs” have different reasons for leaving from men in “female-related course programs”? Table 3 shows the results of the multivariate test that was conducted to answer this question. Both independent factors (gender and course program) and their interaction effect were statistically significant. Men and women not

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<sup>3</sup> In the Netherlands, secondary education that qualifies for higher education consists of three possible levels: (1) senior vocational schools (MBO), (2) general secondary education (HAVO) both qualifying for the vocational track in higher education, and (3) general secondary education (VWO) qualifying for the academic track in higher education.



**Fig. 1** Attrition rates within 2 years of studying (in percentages) of cohorts (1995–2006) of men and women in male and female-dominated course programs (>75%) (source CBS, further analysis Risbo/Erasmus University Rotterdam)

**Table 3** Multivariate analysis of variance: differences according to gender and male or female-dominated programs in reasons for withdrawing from higher vocational education

Effect	<i>F</i>	Hypothesis df	Error df	<i>p</i>	Partial $\eta^2$
Gender	13.733**	7,000	776,000	0.000	0.110
Male/female-dominated program	9.730**	7,000	776,000	0.000	0.081
Gender*male/female-dominated program	7.057**	7,000	776,000	0.000	0.060

\* *p* < .05; \*\* *p* < .01

only differed in terms of their reasons for leaving college, but the reasons for leaving were also different in course programs dominated by men compared to programs dominated by women. Finally, gender differences in reasons for leaving varied according to course program. Table 4 shows the between effects and Table 5 shows the average scores on the reasons for leaving (the dependent variables) in each of the relevant groups (the independent variables). We will describe each of the effects separately.

*Gender Differences*

For both men and women, the main reasons for leaving were the content of education and/or the quality of the course program. Table 5 shows averages higher than 2.5 on 5-point scales for these two reasons. Aside from “content of education” (reflecting non-cognitive learner characteristics such as motivation and interest), all reasons showed gender differences. Men left more often because of their home situation, poor job opportunities, the quality of the program, insufficient abilities, a negative culture and finances. The eta-squares show that the largest differences related to finances and culture. It is notable that none of the reasons for leaving seemed more important for women.

**Table 4** Tests of between-subjects effects

Factor	Dependent variable	df	<i>F</i>	<i>p</i>	Partial $\eta^2$
Gender	Home situation	1	32.516**	0.000	0.040
	Job opportunities	1	8.863**	0.003	0.011
	Quality of education	1	4.527*	0.034	0.006
	Cognitive skills	1	9.288**	0.002	0.012
	Culture	1	43.113**	0.000	0.052
	Content of education	1	1.939	0.164	0.002
	Finances	1	60.272**	0.000	0.072
Male/female-dominated programs	Home situation	1	26.596**	0.000	0.033
	Job opportunities	1	9.495**	0.002	0.012
	Quality of education	1	0.128	0.721	0.000
	Cognitive skills	1	0.171	0.679	0.000
	Culture	1	17.527**	0.000	0.022
	Content of education	1	1.426	0.233	0.002
	Finances	1	21.312**	0.000	0.027
Gender*Male/female-dominated programs	Home situation	1	32.503**	0.000	0.040
	Job opportunities	1	12.792**	0.000	0.016
	Quality of education	1	2.751	0.098	0.004
	Cognitive skills	1	3.771	0.053	0.005
	Culture	1	20.808**	0.000	0.026
	Content of education	1	7.692**	0.006	0.010
	Finances	1	18.064**	0.000	0.023

Home situation:  $R^2 = .057$ , job opportunities:  $R^2 = .021$ , quality of education:  $R^2 = .009$ , cognitive skills:  $R^2 = .017$ , culture:  $R^2 = .055$ , content of education:  $R^2 = .013$ , finances:  $R^2 = .070$

\*  $p < .05$ ; \*\*  $p < .01$

### *Male and Female-Dominated Programs*

In programs in which women outnumber men, students left more often because of their home situation, poor job opportunities, the program culture and finances. No differences were found in the most reported reasons (content and quality). In other words, students who left nursing or education programs left just as often because they were disappointed in the content and quality of the program as students who left engineering or science programs. It was the “less frequent” reasons that showed differences that accounted for gender variation.

Again, it is striking that none of the reasons were more important in programs in which men outnumber women. The eta-squares show that home situation, culture and finances exhibited the largest differences.

### *Interaction Effect*

Aside from the main effect of gender as well as the main effect of course program, there was also a significant interaction effect. This effect appeared in four reasons for leaving college. Men in female-dominated course programs seemed to suffer more often from problems in their home situation, such as a lack of support or the need to combine work

**Table 5** Means scores and standard deviations in each of the relevant groups for each of the reasons for leaving

	Men (means, SD)			Women (means, SD)			Total (means, SD)		
	Male-dominated programs (N = 372)	Female-dominated programs (N = 46)	Total (N = 418)	Male-dominated programs (N = 262)	Female-dominated programs (N = 142)	Total (N = 386)	Male-dominated programs (N = 598)	Female-dominated programs (N = 188)	Total (N = 786)
Home situation	1.43 (0.72)	2.15 (0.98)	1.51 (0.78)	1.43 (0.63)	1.40 (0.63)	1.42 (0.63)	1.43 (0.69)	1.58 (0.80)	1.47 (0.72)
Job opportunities	1.59 (0.90)	2.17 (1.00)	1.66 (0.93)	1.64 (0.96)	1.60 (0.87)	1.63 (0.92)	1.61 (0.92)	1.74 (0.93)	1.64 (0.92)
Quality of education	2.91 (1.24)	3.06 (1.20)	2.92 (1.24)	2.85 (1.24)	2.61 (1.30)	2.76 (1.27)	2.89 (1.24)	2.72 (1.29)	2.85 (1.25)
Not capable	1.77 (0.89)	1.89 (0.72)	1.79 (0.87)	1.69 (0.81)	1.50 (0.63)	1.62 (0.75)	1.74 (0.86)	1.60 (0.67)	1.71 (0.82)
Culture	1.86 (0.87)	2.56 (1.05)	1.93 (0.92)	1.69 (0.80)	1.66 (0.84)	1.68 (0.82)	1.79 (0.85)	1.88 (0.97)	1.82 (0.88)
Content of education	3.03 (1.36)	3.22 (1.04)	3.05 (1.33)	3.20 (1.26)	2.70 (1.37)	3.01 (1.33)	3.09 (1.33)	2.83 (1.32)	3.03 (1.33)
Finances	1.39 (0.86)	2.02 (1.15)	1.46 (0.91)	1.14 (0.47)	1.17 (0.65)	1.15 (0.55)	1.30 (0.75)	1.38 (0.88)	1.31 (0.78)

and education. They also left more often because they thought that the program led to poor opportunities in the job market. They did not feel as much at home in the culture of their institute and they more often felt they were different from the other students. Finally, a relatively large number of these men left because they had found a job that seemed to make an HE degree in a female-dominated field superfluous.

For women in female-dominated course programs, disappointment with respect to study content was less often a reason for leaving. In other words, a relatively small number of female students left these programs because the content was disappointing or because they felt uninterested and unmotivated. Women in male-dominated programs, on the other hand, left relatively often due to disappointing content and lack of motivation.

Judging the eta-squares, the largest differences with respect to the reasons related to the home situation, culture, finances and job opportunities. The eta-squares are at least 0.01, which means they can be interpreted as small, so these four reasons seem to be the most sensitive to gender differences.

It is possible to draw a more detailed picture by looking at the underlying items in each of these scales which show which of the aspects were the most sensitive to gender (see Table 6). With respect to the “home situation”, three items seemed to be especially

**Table 6** Eta’s squared for each of the items in the four relevant scales in the female-dominated disciplines

	$\eta^2$
Home situation	
Lack of support from my parents for my education	0.045
Lack of support from my friends for my education	0.031
My parents were negative about my study choice	0.114
Stress because of financial problems during my study	0.021
Stress because of problems at home during my study	0.038
I could not combine my study with my care responsibilities	0.021
I could not combine my study with my job	0.022
I had no social life anymore	0.021
Job opportunities	
Poor career perspectives	0.019
Little chance of finding a job after graduation	0.005
Uninteresting future jobs	0.012
Little versatility in future job	0.002
Low salary in future job	0.040
Low status in future job	0.023
Finances	
I found a job	0.089
I did not need this degree anymore because of financial reasons	0.060
Culture	
Negative culture at school	0.108
Prejudice in the institute	0.044
Lack of support from peers	0.035
Lack of support from somebody at the institute	0.000
Being different than other students	0.023
I had to adapt too much	0.017

sensitive to gender differences. The first two pertain to a lack of support from parents: for male students in female-dominated fields, the negative attitude of parents towards their son's study choice and their lack of support were more often a reason for leaving. The third item refers to general stress at home: this stress also seemed to be more specific in the reasons for male students leaving (as opposed to female students) in female-dominated fields.

With respect to "job opportunities", two items showed differences. Low salary of the future job and low status of the future job seemed to be the most gender-sensitive items. Both items in the "finances" scale were important in terms of gender: men in female-dominated fields more often stated that they left their HE program because they had found a job and a degree was no longer important financially.

Looking at the items in the "culture" scale, men and women in female-dominated fields seemed to differ the most in terms of a general negative culture. Men more often perceived incidences of prejudice and they more often suffered from a lack of peer support.

## Conclusions

Women, on average, outnumber men and are more successful in the bachelor years of higher education. The present study asked why men decide to leave college more often than women. We focused on the role that numerical representation plays in course programs. Do gender differences in attrition rates differ in course programs in which men outnumber women and vice versa? And do women have different reasons for leaving these male and female-dominated programs? The first research question was answered by conducting an analysis of Dutch census data. The analysis showed that the relatively low male retention scores seemed to be especially low in the female-dominated course programs. One might conclude that the problem of men in higher education is a problem that mainly surfaces in the course programs that are dominated by female students. This finding relates to the OECD observation that the higher rates of female students and graduates are mainly attributable to the feminine fields (OECD 2008). It also relates to the finding of Beekhoven et al. (2003) that women make more progress in courses with higher proportions of women. Our study showed that this was true for attrition as well. It would be interesting to find out to what extent international census data would corroborate the Dutch gender differences in attrition rates that we found in female and male-dominated course programs.

The second research question was answered by a survey of leavers. Based on the model of Nora et al. (1996), the literature points to three groups of factors for explaining gender differences in study success.

The first group of factors concerns learner characteristics such as motivation, aspiration and cognitive abilities, skills and achievement. Previous research has shown that it is not so much the cognitive learner characteristics that explain gender differences in study success, but it is the non-cognitive characteristics such as discipline, motivation, time management skills and goals that are important (Trueman and Hartley 1996; Grebennikov and Skaines 2009; Sommers 2001; Evers and Mancuso 2006; Jorgensen et al. 2009). On average, women more often show the motivation, discipline skills and time management skills that are important for performing well in higher education.

Our study did not confirm the expectation of there being no cognitive skill differences between female and male leavers, as we did observe these differences, at least in the perception of students. In general, men left more often because they characterized their

own cognitive skills level as too low to complete the program. This gender difference, however, did not appear in female-dominated programs. Men in these programs did not see their level of skills as a reason for leaving more often. Our study also failed to find evidence that men leave more often because of non-cognitive learner characteristics. Male and female leavers attributed their reason for leaving to a lack of motivation and interest to a similar extent. When we considered the male and female-dominated programs, an unexpected and interesting result was observed. In the male-dominated programs, women left more often because of a lack of motivation and interest than they did in the female-dominated programs. Apparently, women who choose a subject that is not traditionally a women's subject more often point to their low level of interest and motivation as well as a wrong choice of study to explain why they left. Unfortunately, our data did not allow us to distinguish between different traditional male fields, such as sciences, mathematics and engineering.

A second group of explanatory factors are external factors: family responsibilities, the structure of the job market as well as the state of the economy seem to all impact the percentages of women and men who enroll in and graduate from higher education (Leppel 2002; Jacob 2002; DiPrete and Buchmann 2006; Mastekaasa 2005). If the job market in traditional male segments is good, men are less inclined to enter or finish their degrees. Furthermore, returns for women seem to depend more on a degree compared to men, which encourages more women to finish their programs. Our study confirmed the expectation that men more often leave because of poor job opportunities and financial reasons. This appeared to be especially true for men in female-dominated course programs. On the one hand, they left more often because of the perceived low status of the profession that the program leads to and, on the other hand, they left more often because they found employment elsewhere.

The home situation also revealed gender differences, but not in the expected direction. Women did not leave more often because of family responsibilities. This may, however, be an effect of our selection of respondents: they were all full-time students. It is not unthinkable that women with family responsibilities study part-time more often. In this regard, the design of our study only allowed a conclusion to be drawn for full-time students: there seemed to be no gender differences in reasons for leaving that had to do with combining study and care responsibilities. The home situation did, however, result in gender differences, but in a different way. Men left more often in female-dominated programs because of the lack of support they received from their parents. The survey results clearly show that parents were relatively negative about their son's choice of a course program that is dominated by women and they more often did not support his education. This lack of parental support may make it easier for men to leave and switch to another program or to start working.

A third group of factors concerns institutional aspects such as the study climate and quality of teaching. On average, men seem less satisfied about their programs and do not feel at home in the institution in the same way women do (Macan et al. 1990; Woodfield et al. 2005). Nora et al. (1996) also describe how this relative lack of good quality interaction with peers and staff may cause men to feel less connected and to drop out more often. Both Mastekaasa (2005) and Woodfield et al. (2006) suggest that the relative numbers of men and women in the course program (or field) may be related to these processes of involvement and satisfaction.

Our study confirmed the expectation that men leave more often due to a perceived negative culture. This was true in all course programs, but especially so in female-dominated course programs. In this regard, Mastekaasa (2005) and Woodfield et al. (2006) seem

right in their suggestion that the numerical distribution of men and women in course programs (or fields) may be related to these processes of involvement and satisfaction. Again, we have to note that we do not know whether this is true for all female-dominated fields: there may be a difference between, for example, teacher education and health programs. In female-dominated programs, men seem more often to have to overcome prejudice and to adapt—or hide—some of their interests in order to fit in with the other students in their course programs. Our findings with regard to men in female-dominated programs seem to be similar to the findings in research on the position of students from ethnic minority backgrounds. Tinto shows, for example, that levels of social integration are generally lower for students in minority positions (Tinto 1997). Nora and Cabrera (1996) describe a number of studies that show that ethnic minority students relatively often have to deal with off-putting interactions with peers and teachers. On the basis of our current study, we would not want to conclude that being in a minority position is always detrimental to study success. It would, however, be interesting to further explore various minority positions in comparison to each other. For example, how do women from ethnic majority as well as from ethnic minority backgrounds fare in engineering departments?

A second institutional factor was satisfaction with the program. Different aspects concerning the quality of education were measured. Respondents were asked whether the quality of the support, the teacher, the system and the organization made them decide to leave the program. For many respondents, this was the case: a poor quality program was one of the two most important reasons for leaving. Men, however, did not leave more often because of this reason than women. In other words, both male and female leavers were critical of the organization.

## Recommendations

A limitation of our study is that the findings are based on a self-reporting method. We focused on students' perceptions as to why they left and, as such, it is their perspective that is central. Because teachers may think differently about why students leave than the students themselves, it would be interesting to include the teachers' perspectives in a study on why students leave college. Such a design could also shed some light on our unexpected finding that men left more often due to insufficient cognitive skills. As this contradicts the general observation in previous research (i.e. no differences in cognitive skills), it would be interesting to design a study which examines the difference in the perception of skills and, for example, the teachers' perceptions of these skills.

Perhaps the most important question that we left unanswered concerns the role of the field itself versus the mere overrepresentation of women or men in that particular field. Our design did not allow us to disentangle these two explanations. An alternative design could be to examine gender differences in study success in a variety of female-dominated programs. If men, for example, leave nursing programs for different reasons than education programs, this is an effect related to the field. Another interesting alternative design would be to compare relatively successful programs to unsuccessful programs within the same field. Such a design would indicate possibilities for change. For example, the culture in a relatively successful nursing program (in the sense that there are low male drop-out rates) may be different from the culture in an unsuccessful nursing program where men leave more often than women. Such findings may be useful with respect to retention policy that focuses on male students in female-dominated programs. In general, we would recommend more research on how to move towards a culture that is more diverse in nature. The recent

OECD publication on diversity in teacher training institutes provides examples of developing programs that are more diverse in their nature (Burns and Shadoina-Gersing 2010). Such curriculum policy enhances the attractiveness of courses to different groups of students.

In our study we focused on each of the separate reasons for leaving college. But the decision to leave a course program often does not depend upon one single factor, however important that factor may be. It involves a combination of different factors, ranging from the status of a specific course to financial reasons to the culture of the program. The final decision to leave college is only taken after a ‘saturation point’ has been reached. If this is indeed the case, and further research would be needed to establish such a conclusion, then the solution should also not be sought in one direction. For both men and women, the decision to leave college is a many-headed monster that should be approached accordingly.

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