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# Why do young people make atypical gender-related study choices? An analysis of French master's graduates

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## Abstract

Despite laws and educational reforms in favour of gender equality, in France both training courses and professions remain highly gendered. The educational system and the labour market continue to conform to stereotypes, and both girls and boys continue to base their educational choices on what society assigns their genders as areas of competence. However, about 10% of master's graduates make atypical study choices, in the sense that they chose an orientation standardly chosen by the opposite gender. This paper proposes an empirical analysis of these 'atypical' students. Our results show that these individuals do not have specific profiles, either in terms of schooling background or social origin. By estimating a logistic regression, we highlight the importance of the expected returns and of the professional project in the atypical study choice. We also underline that although the unconventional choice allows a more rapid integration on the labour market and appears as a cost-effective solution for girls, it does not erase the wage inequalities between men and women.

**Keywords:** Educational return, Gender-related study choice, Labour market integration

**JEL classification:** C25, I24, J24

“Schools, secondary schools, colleges and higher education are responsible for transmitting knowledge and working methods. They help promote co-education and equality between men and women, particularly with regard to orientation [...]”<sup>1</sup>

Article L121-1 of the French Educational Code

Despite important social developments, and in particular the legal obligation regarding co-education which has been in place since the 1970s, training and vocational guidance in France remains gender stereotyped; gender appears as a social construction (Baudelot & Establet, 2007). As early as primary school, girls perform better than boys, and they differ in their first choices of courses: at the end of junior school, girls generally opt for general and technical rather than for professional studies (French Department for Education, 2015). And within the general and technical courses, they choose sciences less often than boys, this difference being even more pronounced in higher education where women make up 75% of students reading humanities. In their study on 36 western countries (including France), Baudelot and Establet (2001) showed that only 3 out of 17 fields present sometimes higher numbers of girls, sometimes higher numbers of boys (14 fields always present the same gender superiority) and come to the conclusion that “countries that would guide boys to humanities and girls towards the training of engineers have yet to be invented” (p. 109).

Yet in March 2000 the European Council set out the Lisbon Strategy, which aimed to make the European Union “the most competitive and the most dynamic knowledge economy worldwide” by 2010. With this in mind, one of the Lisbon objectives was to reduce gender inequality in scientific areas, especially in scientific studies, and to increase enrolment in science courses by around 15%. To this end, many laws were adopted to favour gender equality (Orientation law 2005;<sup>2</sup> Interministerial decrees from 2006 to 2011;<sup>3</sup> Missions for parity). Simultaneously, in France there was an increasing willingness to support women in scientific research, with many associations created to this end (L’Oréal-Unesco, Women and Maths, Women and Sciences, Women Engineers).

However, despite the volume of rules aimed at supporting gender equality, the girls’ conquest of higher education since the 1960s has played out unequally within the various training courses and establishments (Marry, 2004), so much so that although the majority of training schemes and occupations tend to be open to both genders, many courses and professions remain largely gender segregated (Duru-Bellat, 2004a; Baudelot & Establet, 2006). One often-cited example is that of midwives: in 2009 in France, out of 17,000 midwives only 850 were men. However, far from appearing as erroneous career moves, the

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<sup>1</sup> “Les écoles, les collèges, les lycées et les établissements d’enseignement supérieur sont chargés de transmettre et de faire acquérir connaissances et méthodes de travail. Ils contribuent à favoriser la mixité et l’égalité entre les hommes et les femmes, notamment en matière d’orientation [...]” Article L121-1 du Code de l’éducation.

<sup>2</sup> The term ‘coeducation’ was officially registered in law.

<sup>3</sup> Gender equality became an essential objective in many departments (Education, Women’s rights, Labour, Higher education and research, Environment, academic success).

atypical gendered-related study choice (i.e., choice of a course mainly chosen by the opposite gender), especially in French higher education, appears more and more like a plausible professional project that, under certain conditions, may even be more profitable on the labour market; girls who have opted for a ‘male’ orientation can end up in better positions than their colleagues who have chosen a traditional orientation (Couppie & Epiphane, 2002). Many factors are cited in the literature as explaining study choice (Hoxby, 2003); in the particular context of gendered study choice, these factors can be grouped into three classes—the micro level, macro level, and institutional level (Yazilitas et al. 2013)—and considered together.

From this point of view, the objective of this empirical analysis is to study atypical training choices among master’s graduates. What are the personal features of students who make such training choices? What are the factors explaining this type of choice? Going beyond an analysis in terms of schooling background and personal characteristics, we will also discuss these study choices through an analysis of three particular factors, relying on the three classes proposed by Yazilitas (2013). Among the various factors of study choice, we assume that gendered study choices may be explained by higher educative returns, by a better integration on the labour market, or by a specific professional project that breaks with societal stereotypes.

The paper is organized as follows: in the first part we describe the factors explaining study choice according to gender (1.1) and set out their impact on academic sectors and the labour market (1.2). The second part presents the database used (2.1) and some descriptive statistics (2.2, 2.3). In the last part, we analyse gendered study choice according to three particular factors: educative return (3.1), professional project, and integration on the labour market (3.2); then (3.3) we estimate a logistic model explaining the atypical study choice.

## **1. Factors of study choice and gender-related behaviour**

Although it is not really a long-term action plan, we often talk about the ‘strategy’ of students when we analyse school choice. This concept has given rise to an extensive economic literature on the factors influencing students’ behaviour (Hoxby, 2003), as well as a sociological literature linking orientation strategies to social inequalities (Boudon, 1973; Duru-Bellat, 2003).

We first sketch the various factors influencing study choice, with an emphasis on gender differences. Then, by reference to survey work on gendered study choice, we focus on certain specific factors.

## 1.1. Factors of study choice

Throughout their school careers, individuals and families face orientation choices such that they must consider various alternatives where the risk of failure, the cost of studies, and anticipation of the future are essential elements (Boudon, 1973).

First, the individual must perceive a socio-economic advantage in order to pursue studies. Indeed, according to the theory of human capital (Schultz, 1961; Becker, 1964; Mincer, 1958, 1974), education is an investment which enables an increase in the productivity of those who profit from it and thus implies an increase in their remuneration. Thus, an individual who decides to invest in education expects a certain return on this investment (Wolter, 2000; Botelho & Costa-Pinto, 2004). Faced with a rational choice problem, i.e., comparing the present cost with the anticipated future profits of the investment in education, the student makes a choice based on the available information. However, the literature suggests that in making this choice, men and women do not reason in the same way, and do not adopt the same behaviour as regards making a rational choice: specifically, girls' expectations are adaptive, whereas those of boys are static (Demeulemeester, 1994). On this basis, and assuming that students are aware of the returns of higher education, Botelho and Costa-Pinto (2004) showed that men tend to overestimate those returns. Gabay-Egozi & al. (2014) explained that a higher number of girls choose humanities study because girls attribute lower utility and greater risks to science, technology, engineering, and mathematics (henceforth STEM-fields).

Secondly, individuals arbitrate between the various options on a cost/benefit basis. A higher enrolment cost will have a negative impact on individuals from modest backgrounds, but will also be a brake to choices of short training courses because the educational investment then could be seen as not profitable (Kane, 1995; Rouse, 1998). Men and women do not adopt the same behaviour faced with risk: generally speaking, men adopt riskier behaviours (Page et al. 2007; Halek & Eisenhauer 2001), and this may come from a difference in level of aspiration. Indeed, Page et al. (2007) showed that the influence of aspiration level on educational choices is higher for men: indeed, men seem to have a higher level of aspiration. This is consistent with the results of Gneezy, Niederle and Rustichini (2003), who show that the higher the level of competition in the environment, the fewer women are present and the less powerful they tend to be. According to Buser et al. (2017), this competitiveness partially explains why girls are less likely to choose math studies. Cattaneo et al. (2017) showed that the labour market competitiveness is also a significant factor of university choices.

Lastly, the desire to obtain a diploma can also explain choices of orientation. An individual will pursue studies and obtain a diploma because it represents a positive signal on the labour market at the time of recruitment (Spence, 1973). Another aspect concerns

employment (Stallman et al., 1993), both the associated expected wage and also the social status that an individual can attain via a given profession. The choice of certain sectors thus depends on the social prestige conferred by society on the relevant profession (Fershtman & Weiss, 1993), but also on the situation on the labor market (Freeman, 1971; Diebolt, 2001). In his model of ‘glutting’, Diebolt (2001) considered that there are two essential factors in study choice: the expected wage, and the situation on the labor market in terms of available jobs. Diebolt and Jaoul-Grammare (2016) confirmed these results in an experimental analysis, but also underlined the presence of gendered behaviour: they showed that while girls appear more sensitive to gain, boys have a preference for risk.

As mentioned above, according to Yazilitas et al. (2013), in their survey on gendered study choice, all these factors can be grouped into three different frameworks: micro-level, macro-level, and institutional factors. The micro level refers to psychological factors influencing students’ choice, such as self-efficacy beliefs, expectations of success, subjective task value and role models (parents, teachers, peers). The macro level essentially refers to societal factors and to the differential socialization of men and women. Lastly, institutional factors focus on the educational system, whereby gendered study choices are linked to the degree of differentiation in education, to the degree of freedom of study choice, and to schooling evaluations. Thus, Yazilitas et al. show that any one framework alone cannot offer a convincing explanation of gendered study choice, but propose that an understanding of the connections between the three frameworks offers a better understanding of the phenomenon.

From this point of view, among the various factors of study choice, we go beyond schooling variables to focus on expected higher educative returns, on better integration on the labour market, and on specific professional projects which break with societal stereotypes. Each of these three factors refers to one of the three levels identified by Yazilitas (2013): an expected higher educative return links with microeconomic behaviour; better labour market integration for people who make an unconventional study choice is linked to the macroeconomic level; and a specific professional project breaking with stereotypes is linked to the institutional approach.

## **1.2. Gender-related study choice and ‘gender-selecting’ of academic courses**

French girls’ enrolment has been shooting up since the 1960s, and by the 1970s had caught up with male enrolment rates. Yet despite their increasing numbers, their better results throughout the schooling process (fewer repeated years, better results at baccalaureate), and a higher rate of access to higher education, girls find more difficulties integrating on the labour market. Baudelot and Establet (2001) thus raise the question of whether the relative success of girls is conditioned by an orientation towards less prestigious courses and a greater difficulty in ‘selling’ their educational capital on the labour market. Indeed, although social

transformations have allowed girls to succeed within the educational system, other social attitudes have changed much more slowly, resulting in an ongoing rigidity of the labour market.

The choice of orientation certainly continues to conform to stereotypes (Duru-Bellat, 2004; MENESR, 2012; Ramaci et al., 2017). Adults and especially parents and teachers adopt gender-differentiated behaviour regarding children (Bellotti, 1974; Baudelot & Establet, 2007), so much so that both girls and boys still make their educational choices based on what society assigns them as areas of competence: thus, among those with an excellent level in mathematics, only 5 out of 10 girls vs. 7 out of 10 boys will choose a scientific sector of study (MENESR, 2013). According to Blanchard et al. (2016), girls don't exclude themselves from scientific areas: they are excluded. The authors argue that girls exhibit self-censorship behaviour because during their schooling teachers convince them that the sciences are a male affair. They join here Legewie and DiPrete (2014) who underlined the effect of high school context on gender gap. Thus, according to Duru-Bellat (2004, p. 70), "orientation inequalities shape inequality of achievement between men and women," so "the bulk of the differences in careers is played by differences in orientation." Indeed, even though women are more likely to obtain the baccalaureate (89% versus 85% for males; RERS, 2013), they are less likely to access selective training (42% in CPGE-post-secondary preparatory school, and 27% in engineering schools; RERS, 2015).

Despite a greater openness to co-education in various academic courses (Haby Law, 1975), and the wider evolution of social attitudes, some French academic areas still remain the preserve of a single sex (Table 1). The share of students according to gender in the French academic sector underlines that in effect there are gender-based academic specialties.

Table 1. Distribution of girls in the academic sectors of higher education

Sector	% girls	Speciality
Chemistry	45.7%	Mixed
Law, Economics and Management	59.6%	Mixed
Humanities	72.4%	Female
Mathematics, Physics	26.6%	Male
Mechanics, Electronics, Engineering	15.9%	Male
Health studies	71.5%	Female
Biology	53.9%	Mixed
Sports	32.4%	Male

Source: Génération 2004

In France, the so-called 'masculine' specialties are those specialties that have less than a third of girls. Conversely, the 'feminine' specialties are those with more than two-thirds girls. Between these two thresholds, specialties are considered 'mixed' (Coupié & Epiphane, 2002). The most 'masculine' specialties are Mathematics & Physics, and Mechanics & Electronics & Engineering; the most feminized sectors are Humanities and Health sectors.

From an overview of the French academic sectors, 14 specializations can be said to be ‘masculine’, 16 ‘feminine’, and 20 can be described as ‘mixed’ (Appendix 1).

Using the dominance criterion proposed by Hakim (1993),<sup>4</sup> in addition to academic courses, it is also possible to identify masculine and feminine occupations on the French labour market (Table 2).<sup>5</sup> This segregation is due to the gendered stereotypes associated with some occupations (meticulousness, attention, interpersonal relationships for women; strength and authority for men), which are little changed over the last thirty years (Chappert, 2009, p. 9).

Table 2. The five most masculine and feminine occupations in France in 2011

		% of women
Feminine occupations	Home-help	97.7
	Secretary	97.6
	Domestic employee	94.3
	Nursing auxiliary	90.4
	Nurse and midwife	87.7
Masculine occupations	Construction worker (structural works)	2.1
	Construction worker (finishing works)	2.1
	Skilled worker in construction industry	7.9
	Maintenance skilled worker	8.9
	Driver	10.5

Source: DARES 2013

In the following section we compare study choice with occupation in order to determine if it is only the study choice which is unconventional, or whether the professional project or occupation on the labour market is too.

## 2. Data and descriptive analysis

### 2.1. French higher education system and database

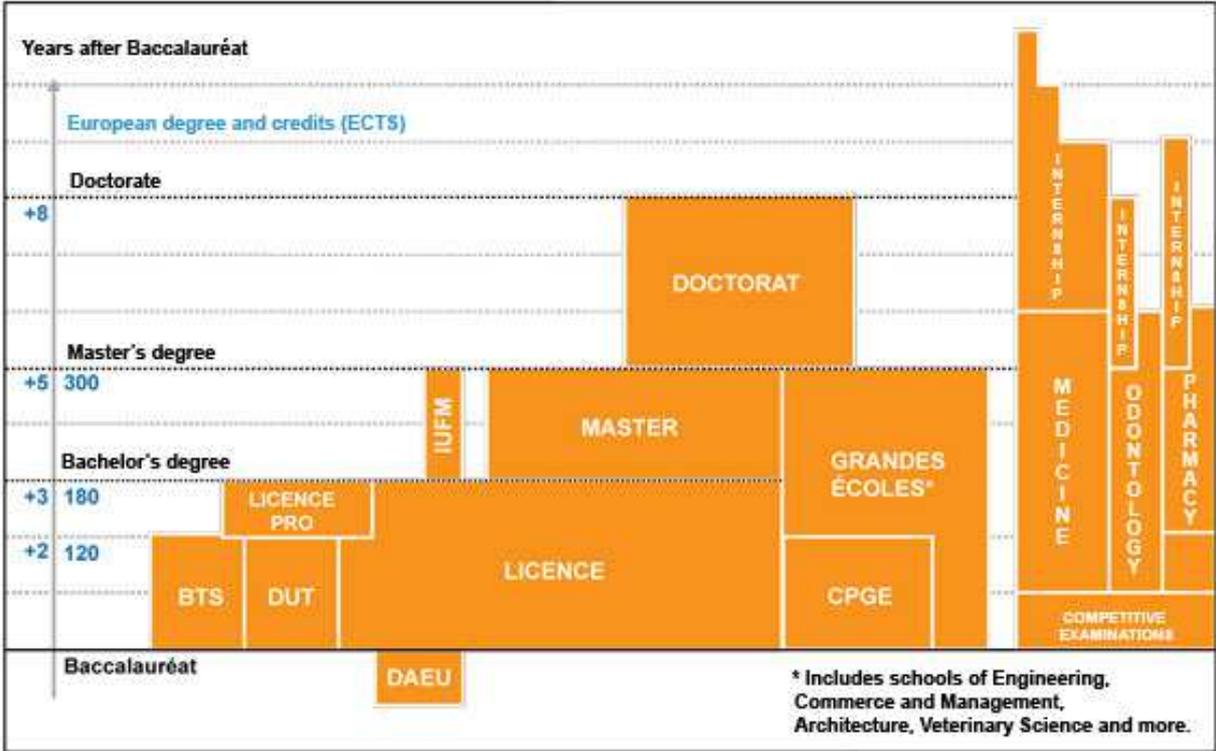
The French higher education system is characterized by a dual system: universities and ‘elite schools’ (Figure 1). Universities are scientific, cultural and professional public institutions and offer a good standard of education in all disciplines at a relatively modest

<sup>4</sup> Based on the share of women in each occupation, so-called feminine occupations are those occupations in which the share of women is 15 percentage points higher than the average share of women for all occupations. So-called masculine occupations are those in which the share of women is 15 percentage points lower than the average share of women for all occupations. If the share of women is between these thresholds, the occupation is considered as mixed (Hakim, 1993).

<sup>5</sup> A more detailed table is available in the work of the DARES (2013).

annual cost. The qualifications awarded are harmonized with those of other European countries (LMD system). They also include internal institutions and schools (IUT) which offer technical and short-term training (2 or 3 years), where the selection procedure for admission is rather strict. Major public institutions and elite schools ('les grandes écoles') offer five-year courses including two years of initial preparation in preparatory classes ('Classes Préparatoires aux Grandes Ecoles', CPGE). They are famous for their competitive selection entry exams. Indeed, even though these latter institutions only count for 4% of all students, it is common to speak of there being two higher education systems, which are ordered hierarchically. As well as these options, depending on the university there are also health studies (medicine, pharmacy, odontology) where admittance is based on highly competitive exams, and, depending on the high school there are also technical schools (BTS) awarding 2-year diplomas.

Figure 1. The French Higher education system



Source : [www.education.gouv.fr](http://www.education.gouv.fr)

For our analysis we used the Génération 2004 database provided by the CEREQ. The CEREQ is a French public establishment which depends on the Ministry of National Education, the Ministry of Economy, Industry and Employment and the Ministry of Labour, Social Relations, Family, Solidarity and Towns. It gives advice on educational policies and is expert in the production of statistical series at the regional and national levels, as well as quantitative research on education, insertion and employment.

Among the statistics produced by the CEREQ there are publications called ‘Génération’. These are longitudinal investigations of the first years of working life; the first in the series, ‘Génération 92’, focused on the first three years on the labour market of a sample of 27,000 young people, representing the cohort who left the education system in 1992. In 2007, 65,000 young people who left the educational system in 2004 answered the survey ‘Génération 04’. These publications contain indicators on schooling and labour market insertion.

Our analysis here focuses on all master’s graduates (M1 + M2) within the higher education cohort of 2004. We chose this level of training in order to avoid the schooling redirections often observed in the early years of higher education: we can assume that at the master’s level the choice of study is stabilized. The sample covers 4,714 individuals. We focus especially on people who chose the academic sector, in order to assess their choice according to their gender and the gender-based academic specialities. For present purposes, we will indulge in the following misuse of language: we use the term ‘atypical’ individuals to refer to those who opted for an unconventional study choice according to their gender, in which respect we refer to the classification established previously (Table 1). Among 4,714 individuals in master’s programs, 453 can be described as atypical.

To analyse the study choice we select variables describing schooling background (baccalaureate, time to baccalaureate, distinction, and orientation), personal characteristics (gender, parents’ occupation), and integration on the labour market (wage, career-path, and contract). We also consider the professional project of the individual at the time of entry into higher education. Indeed, the existence of a life project is an important factor especially in gender-related study choices, and is more important among young girls; unlike boys, girls seek to match their professional and life projects, which often leads to “compromise choices” (Duru-Bellat, 2004, p. 71) in which they select less valued professions offering work conditions more compatible with family life. Thus, boys are generally directed towards occupations as managers (executives) whereas girls generally opt for middle-ranking jobs (Vouillot, 2012). While this understanding of ‘male’ or ‘female’ occupations is very prominent among young people,<sup>6</sup> there are many who would approve of someone making an atypical choice (Bosse & Guégnard, 2007),<sup>7</sup> but not many who would make such a choice themselves (49% women and 22% men).

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<sup>6</sup> 49% (45% women and 54% men) think there are ‘masculine’ occupations and 40% (34% women and 50% men) think there are ‘feminine’ occupations (Bosse & Guégnard, 2007, p. 43)

<sup>7</sup> 91% (97% women and 84% men) approve of women choosing a ‘masculine’ occupation; 83% (89% women and 76% men) approve of men choosing a ‘feminine’ occupation (Bosse & Guégnard, 2007, p. 45).

## 2.2. Atypical study choice and schooling background

While enrolment by gender is roughly balanced at master's level, we note that nearly two thirds of atypical individuals are boys (Table 3).

Concerning schooling, distributions by baccalaureates and by distinction are similar whether we consider all master's students or only atypical individuals. If we look at the time to the baccalaureate, atypical individuals have more often repeated a year than the master's group as a whole (33% vs. 28%). The main difference concerns the orientation after the baccalaureate, which appears less diverse for atypical individuals than for master's students as a whole. Fewer choose short studies, post-secondary preparatory schools, or even business schools, tending to favour university (59.6% versus 45.1%). Finally, with regard to the social origins of students, individuals with a non-traditional choice more often come from a low social background. We agree here with the results of Lemarchant and Tudoux (2008), which showed that while the orientation is unconventional, the individual characteristics of these young people are normal, and statistically they look just like any other individuals.

The distribution by gender highlights presents a clear profile. First of all, the particularity of the type of baccalaureate depends on the sample itself: indeed, 'atypical' girls chose 'male' studies, generally located within the exact sciences, so it is to be expected that they display a high share of scientific baccalaureates (92%). With regard to schooling background, boys who made a conventional choice appear to have better results than those who opted for an atypical choice (61% against 49% have a distinction); we observe the opposite effect for girls: atypical girls have better results than conventional ones (54.6% against 47% have a distinction). They are also more likely (13.7%) to be in advance (i.e. to have skipped a year due to high performance).

If we look at the orientation chosen after the baccalaureate, we see that atypical boys opt more often for university (69.4% against 29.6%) while atypical girls show more diversified study choices (only 40% at university): they are more often to be found in short courses (21% vs. 10% for boys) or in post-secondary preparatory school (29% vs. 12% for boys). This emphasizes the elitist profile of atypical girls who are to be found in more selective courses than boys. While the training domain (exact sciences) can partially explain this schooling profile, it also raises a question: in order to study in a sector that does not match their gender, are girls obliged to display a significantly better curriculum result than boys?

Finally, in terms of social origin, while there is little difference between conventional and atypical individuals (regardless of gender), we note that atypical girls tend to come from more modest social backgrounds than atypical boys (Table 3 and 4).

Table 3. Distribution of individuals according to schooling background and social origin

		Master	Atypical individuals
Atypical choice	No	91.6	-
	Yes	8.4	-
Gender	Female	50.5	33.5
	Male	49.5	66.5
Baccalaureate	Socio-Economic (ES)	22.9	22.9
	Literary (L)	15.2	14.9
	Scientific (S)	49.8	54.3
	Others	12.1	7.9
Distinction	No	51.5	55.9
	Yes	48.5	44.1
Time at the baccalaureate	Advance	7.2	8.6
	Delay	28.2	33.0
	Normal	64.6	58.4
Orientation after the baccalaureate	BTS or IUT <sup>8</sup>	20.9	13.7
	CPGE (Post-secondary preparatory school)	22.0	17.4
	Business School and engineering school	5.0	1.7
	Health schools	0.4	0.4
	Medical studies	3.0	4.3
	University	45.1	59.6
	Other	3.6	3.0
Father's occupation	Executive	41.4	44.2
	Non-executive	58.6	55.8
Mother's occupation	Executive	25.7	27.9
	Non-executive	74.3	72.1

Table 4. Distribution of individuals according to gender and study choice

		Men		Women	
		Classic choice	Atypical choice	Classic choice	Atypical choice
Baccalaureate	Socio-Economic (ES)	16.2	32.7	29.1	3.4
	Literary (L)	4.0	22.2	25.6	0.5
	Scientific (S)	64.3	35.1	35.7	92.2
	Others	15.5	10.0	9.7	3.9
Distinction	No	49.1	61.1	53.0	45.4
	Yes	50.9	38.9	47.0	54.6
Time at the baccalaureate	Advance	6.5	6.1	7.7	13.7
	Delay	30.9	40.9	24.8	17.4
	Normal	62.6	53.0	67.5	68.9
Orientation after the baccalaureate	BTS or IUT <sup>9</sup>	28.5	9.9	15.2	21.2
	CPGE (Post-secondary preparatory school)	28.8	11.7	16.4	28.7
	Business School and	7.6	0.9	3.2	3.2

<sup>8</sup> Diplomas awarded after 2-year technical studies. They are called 'short courses'. The first depends on university, the second depends on secondary school.

<sup>9</sup> Diplomas awarded after 2-year technical studies. They are called 'short courses'. The first depends on university, the second depends on secondary school.

	engineering school				
	Health schools	0.1	0.3	0.7	0.5
	Medical studies	1.8	3.7	3.8	5.5
	University	29.6	69.4	56.8	40.2
	Other	3.5	4.1	3.9	0.7
Father's occupation	Executive	43.2	46.7	39.4	38.2
	Non-executive	56.8	53.3	60.6	61.8
Mother's occupation	Executive	26.8	30.1	24.3	22.9
	Non-executive	73.2	69.9	75.7	77.1

So, it appears that the various factors have a differentiated impact according to gender.

Concentrating on atypical individuals, we note that the distribution of girls in the male sectors reveals significant differences (Table 5). While they amount to more than 52% in the 'Science and industrial technologies' sector, they are just 3% in 'Electronics' and 3.8% in 'Civil engineering'.<sup>10</sup> Concerning schooling background, 56% of these girls have followed a pure academic pathway (Licence/Master), 20% have a mixed curriculum IUT/University, and only 4% have a mixed curriculum BTS/University; this is not very surprising insofar as they are mainly to be found in scientific fields which offer several types of training (IUT, BTS, University)

Table 5. Distribution of the atypical girls within the male sectors

Sectors	%
Mathematics	14.6
Physics	5.4
Mechanics, mechanical engineering	5.6
Civil engineering	3.8
Computer sciences	14.2
Electronics	3.0
Sciences and industrial technologies	52.9
Culture and regional languages	0.5
Total	100%

Among atypical boys, 40% chose the sector of 'Legal sciences'; after that comes 'Arts' and 'Information science' and 'Communication' (Table 6). 67% of them have a pure academic pathway, 5% a mixed curriculum BTS/University. This proportion is the same for mixed curriculum DUT/University. Unlike girls, boys who opted for an unconventional choice are found mainly in the humanities, which offer less alternative training than university.

<sup>10</sup> We do not take into account the stream 'Culture and regional languages' in which only one girl is enrolled.

Table 6. Distribution of atypical boys in 'female' sectors

Sector	%
City planning / Land settlement	4.4
Arts	8.6
French as Foreign Language	3.2
Applied Foreign Languages	3.0
Foreign Languages and literatures	6.2
Old Languages and Literatures	0.8
French Languages and Literature	1.4
Medicine	3.7
Pharmacy	3.3
Psychology	4.2
Science of information and communication	7.3
Educational Sciences	2.8
Legal Sciences	40.5
Political Sciences	5.2
Language Sciences	0.7
Sociology, demography	4.7
Total	100%

### 2.3. Atypical choice and professional project

Individuals were asked if they had formulated a precise professional project at the time of their baccalaureate and, if yes, what it was. The share of individuals with a professional project at entry into higher education is slightly higher for atypical individuals than for all master's students (38.8% vs 35.2%). Thus, the atypical choice seems to be a long-run project, especially for atypical boys (Table 7).

Table 7. Professional project and individual choice according to gender

		Master's graduates			Atypical individuals		
		All	Girls	Boys	All	Girls	Boys
Professional Project	Yes	35.2	34.8	35.6	38.8	34.9	40.7
	No	64.8	65.2	64.4	61.2	65.1	59.3

Among atypical individuals who had a specific professional project at the time of entry into higher education (Table 7), for 32.3% the unconventional choice appears to be a specific professional project directed at an atypical occupation, since they chose their study according to their project. This is even clearer for girls: 41.3% of atypical girls make an atypical study choice matching an atypical professional project (Table 7). We also note that for 57.4% of atypical girls, only the study choice is atypical, not the professional project. This share is higher for atypical boys: 66.9% of them make an atypical study choice whereas they do not have an atypical professional project.

Table 8. Professional project and study choice for atypical individuals (%)

	Girls	Boys	All
Atypical professional project matching with atypical study choice	41.3	28.4	32.3
Atypical professional project not matching with atypical study choice	1.3	4.6	3.6
No atypical professional project	57.4	66.9	64.1
Total	100	100	100

So, the atypical choice appears to be a long-run project, especially for girls, but for many people and especially for boys, the atypical study choice does not result from an atypical professional project. So it may be that beyond a real atypical life project, the non-conventional study choice appears as more profitable than the traditional choice. In the next part we try to answer this question, by calculating educative returns and analysing labour market integration.

### 3. Atypical choices, educative returns, and professional integration

#### 3.1. The atypical study choice: A profitable orientation?

In order to determine if an orientation is profitable, we generally calculate the educative returns. With this in mind, we estimate returns for individuals who make an unconventional study choice, referring to Mincer's model of schooling (1974).

We estimate the linear equation  $\ln Y_i = a + bS_i + \varepsilon$ , where for an individual  $i$ ,  $Y_i$  is the wage,  $S_i$  is the schooling duration since entry into primary schooling and  $\varepsilon$  a residual term. With this specification,  $b$  represents the average educative returns of  $S_i$  years of schooling.  $S_i$  is determined according to the number of years of schooling since entry into primary schooling (repeat years excluded). Our estimations show that the atypical choice is more profitable than the classical choice, especially for girls (Table 9). Indeed, for girls the most profitable academic sector is 'Mechanics and electronics'.

Table 9. Educative returns according to the gender and the academic sector (2004)

Academic sector	Women	Men
Chemistry	0.042	0.054
Law, Economics and Management	0.09	0.092
Humanities	0.07	0.074
Mathematics, Physics	0.06	0.074
Mechanics, Electronics, Engineering	0.096*	0.085
Health studies	0.081	0.069
Biology	0.067	0.062
Sports	0.079	0.052

\* Read as: the average rate of returns of schooling for girls in mechanics equals 9.6%, that is to say that one additional schooling year increases the logarithm of the wage by about 9.6%.

This profitability is also observed on the labour market (Table 10): the most profitable sectors for girls are ‘Energy’ and ‘Manufacture of motor vehicles’, which are traditionally masculine sectors (INSEE, 2016). For men, the most profitable sectors are mixed.

Table 10. Educative returns according to gender and economic business sector

Business Sector	Women	Men
Financial and insurance activities	0.126	0.144
Real estate activities	0.075	0.167
Administration	0.078	0.069
Agriculture, forestry and fishing	NS	0.089
Wholesale	0.118	0.122
Construction	0.117	0.116
Education, human health and social work activities	0.044	0.076
Energy	0.182	0.118
Manufacture of food products	0.104	0.114
Manufacture of motor vehicles	0.131	0.146
Manufacture of consumer goods	0.131	0.085
Manufacture of capital goods	0.102	0.12
Manufacture of intermediate goods	0.123	0.112
Administrative and support service activities	0.097	0.099
Other service activities	0.086	0.081
Transports	0.089	0.105

The estimation of the educative returns reveals that the atypical study choice is profitable on the labour market.

In the next part, we compare the professional integrations of individuals with classical and atypical study choices, by reference to their first job.

### 3.2. Atypical choice and professional integration

According to the integration variables, there are some differences between the set of all master's students and those individuals who opted for an unusual orientation (Table 11). Atypical individuals do not experience a better integration on the labour market than the set of all master's students. If we look at the gender distribution, we can see that girls who made an unconventional choice fit into the labour market more quickly than those who opted for a more traditional choice, but the situation is reversed for boys.

Table 11. Distribution of individuals according to integration variables

Labour market integration	Master	Atypical individuals	Women		Men	
			Classic choice	Atypical choice	Classic choice	Atypical choice
Delayed integration / Training	24.6	21.2	26.1	17.4	23.7	23.2
Quick integration	65.7	65.5	63.3	69.3	68.3	63.5
Unstable employment or unemployment	9.7	13.3	10.5	13.3	8.0	13.3

In order to investigate the labour market integration, we use *wages* and variables concerning *professional position* (type of employment, contract type, full-time). Among 453 atypical individuals, 360 were employed at the time of the survey and among them 227 were boys and 133 girls.

The gender distribution (Table 12) shows that the atypical choice more frequently guarantees a permanent contract for girls (57.6% versus 52% for conventional choices), whereas for boys where the classic choice seems to be a better guarantee of stability (66.6% for classical choice vs 54.9% for atypical choice). This is confirmed by reference to worktime: atypical girls are less often part-time workers than classical ones, whereas the reverse phenomenon appears for men.

In terms of wages, atypical girls displayed a higher average and median wage than girls who made a conventional choice. However, we underline that the unconventional choice appears cost-effective in terms of insertion and wages only for girls, who are gaining entry onto the labour market with a better position than girls in the traditional sectors (Table 13).

Table 12. Distribution of individuals according to the gender, the type of choice and the variables characterizing the first job

Variables	Modalities	Women		Men	
		Atypical choice	Classic choice	Atypical choice	Classic choice
Contract	Fixed-term contract	35.1	36.7	33.5	23.4
	Permanent contract and civil servant	57.6	52	54.9	66.6
	Temporary work, Temp, Stand in	5.1	5.4	2.6	6.6
	Professionalization Contract and others	0.6	3.8	4.1	2.1
	Social contracts and subsidised jobs	1.8	2.1	4.8	1.3
Worktime	Part time	6.2	16	13.3	5
	Full time	93.8	84	86.7	95
Wage	Lowest	490	84	182	182
	Highest	4200	5000	7200	4550
	Median	1650	1354.2	1450	1700
	Average	1635.8	1400.9	1619.5	1725.9
	Standard deviation (n-1)	442.6	521	822	537.6

Table 13. Comparison of individuals in terms of wages and insertion according to gender and type of choice

	Girls who have chosen a 'male' orientation in comparison to...		Boys who have chosen a 'female' orientation in comparison to...	
	Girls who have chosen a 'female' orientation	Boys who have chosen a 'male' orientation	Boys who have chosen a 'male' orientation	Girls who have chosen a 'female' orientation
Insertion	+	+	-	+
Wage	+	-	-	+

Read as: Girls having made a choice of 'male' studies have better job-market integration than girls who chose 'female' sectors. They also have higher wages.

Finally, when we compare the planned project with the effective project, we note that 72.3% of girls carried out their professional projects (Table 14), of whom 58.8% had an atypical project. The shares are lower for boys: 60.7% of them carried out their professional projects, of whom 44.4% had an atypical project.

Table 14. Professional project and final occupation

	Women	Men
Professional project carried out	72.3	60.7
<i>of whom atypical project</i>	58.8	44.4

### 3.3. What are the factors explaining the atypical study choice?

As we have previously noted, the different variables have differentiated impacts according to gender. So, finally, we analyse the choice of study by estimating a logistic regression for each gender.

Here we try to explain the atypical study choice according to personal variables (social origin, gender) and schooling background (time to baccalaureate, type of baccalaureate, distinction). Social origin has three modalities: modest (neither parent is an executive), intermediate (only one of the two parents is executive), highest (both parents are executive). We also focus on three factors of study choice in order to try to understand the atypical choice: the existence of a professional project at the entry in higher education, the expected return of the academic sector, and labour market integration. For this last variable, we consider only two modalities: quick integration or not.

The estimation (Table 15) shows that expected returns and the existence of a professional project have a positive and significant impact for both girls and boys. The existence of a professional project at the time of entry into higher education multiplies the propensity to make an atypical study choice by 1.39 (boys) and 1.47 (girls).

The impact of schooling background varies a lot between girls and boys: a girl who possesses a scientific baccalaureate is 9.5 times more likely to make an atypical study choice than a girl who possesses another baccalaureate. Literary and economics baccalaureates have a negative impact on the probability to make an atypical study choice (respectively 14.5 and 4 times less). Meanwhile, these two baccalaureates have a significant positive impact on boys' atypical study choice (8 and 2.8 times more), whereas a boy who possesses a scientific baccalaureate has a lower chance of making an atypical study choice. Gaining a distinction also has a differentiated impact: it is non-significant for boys, whereas a distinction multiplies the girls' propensity to make an atypical study choice by 1.67. The time spent on the baccalaureate is also more profitable for girls than for boys: to be in advance multiplies the propensity to make an atypical study choice by 2.5 (girls) and (1.4). These results emphasize that girls are obliged to display significantly better curriculum outcomes than boys in order to successfully adopt an orientation which does not match with their gender.

Concerning social origin, we observe a differentiated impact according to gender: 'modest background' girls are 1.3 times *more* likely to make an atypical study choice, whereas 'modest background' boys are 1.5 times *less* likely to make such choice. So, the atypical study choice may be a more profitable option for girls with a modest social background.

Finally, a rapid expected integration on the labour market increases the girls' probability of making an atypical study choice by 1.14, whereas it is not significant for boys.

Table 15. Logistic regression explaining atypical study choice

Source	Girls		Boys	
	Value	Odds ratio	Value	Odds ratio
Constant	-11.11	-	-2.54	-
Expected returns	89.70	-	6.73	-
Baccalaureate - Socio-Economic (ES)	-1.39	0.25***	1.04	2.84***
Baccalaureate - Literary (L)	-2.65	0.07***	2.08	8.03***
Baccalaureate - Scientific (S)	2.26	9.56***	-0.16	0.86***
Baccalaureate - Others	0.00	Ref.	0.00	
Distinction - No	-0.52	0.60***	0.05	NS
Distinction - Yes	0.00	Ref.	0.00	
Time at baccalaureate - Advance	0.93	2.53***	0.34	1.41***
Time at baccalaureate - Delay	0.02	NS	0.37	1.45***
Time at baccalaureate - Normal	0.00	Ref.	0.00	
Social origin - Modest	0.26	1.30***	-0.39	0.67***
Social origin - Highest	0.08	NS	0.08	NS
Social origin - Intermediate	0.00	Ref.	0.00	
Professional project at entry in higher education - Yes	0.33	1.39***	0.39	1.47***
Professional project at entry in higher education - No	0.00	Ref.	0.00	
Quick labour market integration - No	-0.13	0.88***	0.06	NS
Quick labour market integration - Yes	0.00	Ref.	0.00	

Significance at 1% (\*\*\*), 5% (\*\*); NS: no significant

## Conclusion

Among all the master's graduates who left higher education in 2004, 9% made an atypical study choice, one third of these being girls and two thirds boys. With respect to the set of all master's students, these individuals do not have specific profiles either in terms of schooling background or social origin. We thus confirm results obtained for other levels of training (Lemarchant & Tudoux, 2008).

The first result of this paper is that the various factors on the atypical study choice have a differentiated impact according to gender. First, girls seem to be obliged to display significantly better curriculum outcomes than boys if they want to make an atypical study choice.

Beyond schooling factors, we then underline the importance of the expected returns and of the existence of a clear professional project on the atypical study choice. Usually, this non-traditional choice is a long-run project which has existed since baccalaureate. Girls who thus display a professional project clearly oriented towards a traditionally 'male' profession seem to be more successful: there are higher numbers of girls who had a 'male' professional

project at the end of high school and who chose their orientation accordingly, than boys who wish to have a ‘feminine’ occupation.

We also find that girls more quickly find lasting employment than boys, and that the girls’ planned project more often matches their effective project.

Finally, while the unconventional choice appears as a cost-effective solution for girls, it does not erase the wage inequalities between men and women: within the ‘male’ sectors, girls have more easy access to lasting employment, and boys can more easily get a lasting job within the ‘feminine’ fields. However, despite their higher positions, girls who have chosen the ‘male’ sectors have overall *lower* wages than men who have chosen the same sector; on the other hand, boys who have chosen ‘female’ sectors have *higher* wages than girls who have chosen these same sectors. To fight against these disparities, one possible solution is the establishment of quotas in masculine and feminine occupations as well as in the corresponding training sectors: but this does appear to be something that would be difficult to implement (Chappert, 2009).

In further research with a more recent database, our work invites an analysis of the evolution of these inequalities both in higher education and on the labour market.

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Appendix 1 – Gender-selecting academic sector (Génération 2004, all academic levels)

Sector	% of girls	Type of speciality
Medicine	0.75	Female
Pharmacy	0.69	Female
Sciences of language – Linguistics	0.89	Female
Old Languages and Literatures	0.81	Female
French Languages and Literatures	0.87	Female
General Literatures	0.77	Female
French, Foreign Language	0.71	Female
Foreign Languages and Literatures	0.75	Female
Applied Foreign Languages	0.73	Female
Archaeology, Ethnology, Prehistory, Anthropology	0.69	Female
Religious Sciences	0.92	Female
Psychology, Cognitive Sciences	0.88	Female
Sociology, Demography	0.74	Female
Educational Sciences	0.89	Female
General Training to become engineer	1.00	Female
Languages, humanities	0.76	Female
Mathematics	0.26	Male
Physics	0.27	Male
Sports	0.32	Male
Mechanics, mechanical engineering	0.08	Male
Civil engineering	0.15	Male
Computer sciences	0.14	Male
Electronics	0.06	Male
Sciences and industrial technologies	0.21	Male
Mathematics and computer sciences	0.13	Male
Physics and chemistry	0.07	Male
Political sciences-multidisciplinary	0.00	Male
Economics and management	0.18	Male
Sciences and applications	0.15	Male
Sciences-multidisciplinary	0.29	Male
Chemistry	0.46	Mixed
Applied mathematics to social sciences	0.39	Mixed
Earth and universe sciences	0.41	Mixed
Biology and health	0.56	Mixed
Odontology	0.44	Mixed
Materials engineering	0.40	Mixed
Arts	0.61	Mixed
Culture and regional languages	0.65	Mixed
Philosophy, Epistemology	0.43	Mixed
History	0.49	Mixed
Geography	0.40	Mixed
City planning / Land settlement	0.52	Mixed
Science of information and communication	0.60	Mixed
Legal Sciences	0.64	Mixed
Political Sciences	0.64	Mixed
Economics	0.50	Mixed
Management	0.59	Mixed
Administration and economics	0.59	Mixed
Languages-multidisciplinary	0.34	Mixed
Natural sciences-multidisciplinary	0.63	Mixed