

# **INFLUENCE OF GENDER STEREOTYPES ON CAREER CHOICE**

**A CROSS-SECTIONAL STUDY ON CATALAN ADOLESCENTS**

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- ECC 14 -

Universitat Pompeu Fabra, 2017/2018

## **Abstract**

This thesis provides empirical evidence on how gender stereotypes affect Catalan students' career choice. In contrast with the existing literature we create a variable that isolates the effect of gender stereotypes and we measure its significance through regression analysis. Controls for other determinants of career choice are taken into account. We find that although women appear to be more stereotyped than men, gender stereotypes only play a significant role in men's career choice decision.

Key words: Gender stereotypes, career choice, SCCT framework.

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## **1. Executive Summary**

This thesis analyses whether gender stereotypes play a significant role in the career choice decision of Catalan students. Although this question has been raised by many other researchers, almost none of the existing papers measure gender stereotypes directly. Thus, in this paper we create a new variable that isolates the effect of gender stereotypes on career choice so we can measure them directly.

In order to do so, we use a regression analysis with the variable of interest being “gender stereotypes” and a set of control variables. The control variables are selected by looking into the other determinants of career choice according to the Social Cognitive Career framework (Lent et al., 1994) that are correlated to both gender stereotypes and our outcome variable. Data for regression analysis is collected in five different Catalan high schools through a survey conducted among 338 students.

The remainder of this thesis is structured as follows. In section 2 we introduce the topic, motivation and the main objectives of the paper. Section 3 briefly reviews several studies in the field and explains the framework we use for our analysis. Section 4 describes the methodology we use and in Section 5 we explain how data was collected and the main characteristics of our dataset. Section 6 presents the analysis and results of the study and tests the fitness of the model we use. Section 7 concludes.

## **2. Introduction**

### **2.1. Motivation**

Our society is claiming for a change, a radical transformation to an egalitarian world, where women lead their own lives and professional careers, where we have equal promotion opportunities and labor rights as men do, so that our work can be seriously taken.

The well-known gender pay gap has been tried to be explained by several different reasons such as more women working in part-time jobs relative to men, choosing low-paid occupations and spending greater time out of the workforce, thus, impacting career progression and opportunities, in addition to wage discrimination.

Regulations that prohibit gender wage discrimination are just the first steps. What will be harder and conclusive is breaking the gender stereotypes chains which pigeonholes female in house and family caring chores.

### **2.2. Objectives**

Our paper aims to determine three main points: (1) whether gender stereotypes in Catalan adolescents are statistically significant for career choice; (2) if they are significant, how important they are; and (3) whether students without such stereotypes would do a less gender-differentiated choice.

Thanks to the literature review we will set up a career choice model, based on the Social Cognitive Career Theory proposed by Lent et al. (1994), and a framework to determine different factors that influence the decision on what to study.

Through a field experiment, we will determine to which extent catalan adolescents are gender-stereotyped and this influences their career choice.

Finally, using statistics tools, we will focus on estimating the effect gender stereotypes on career choice as well as the observable differences between both genders on which intrinsic and external factors are the main drivers for their career choice. We also will test the fitness of the model.

### 3. Literature Review

In this section we present the theoretical framework behind our study and we explain several concepts that will be used in the remaining of the paper. First, we review the existing literature on the natural segregation of men and women into different bachelor programs in Spain. Then, we present the Social Cognitive Career Theory framework (SCCT), which is the prominent approach to career choice decisions in the recent literature. Finally, we explain what gender stereotypes are and how they can be measured, as well as the main findings on how they influence career choice.

#### 3.1. Horizontal segregation in Spain

In 1996-1997 there was a significant larger proportion of women in majors related to their traditional social roles such as teaching, psychology, chemistry, medicine, philology and humanities. This pre labour market differences led to gender segregation even before any other type of discrimination could take place. However, those differences were not attributable to lower academic performance of women in high school, but to self-efficacy expectations, vocational maturity, gender roles and stereotypes (Mosteiro García, 1997). The Spanish Ministry of Education Statistics report that in 2017, there were more than twenty women for each man enrolled in an Early Childhood Education degree in Spain<sup>1</sup>. It is no coincidence that, at the same time, five times more women than men, studied a degree in nursing, social work or education in general. On the other side, for degrees in informatics, engineering or sports, the number of men is nearly ten times higher. This paper analyses whether gender stereotypes are still one of the explanatory variables for this segregation.

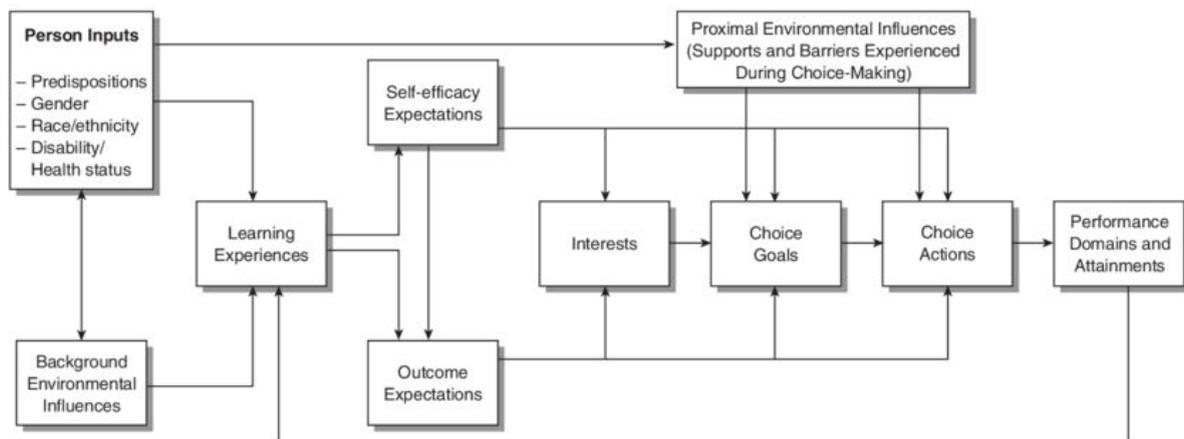
#### 3.2. SCCT framework

A relatively new approach to students' career choice is the one proposed by Lent et al. (1994), known as the Social Cognitive Career Theory framework (SCCT). The theory explains career choice by incorporating personal input variables (gender, race...), together with social influences, academic background, abilities (self-perspective) and future job position expectations. The different variables interact to determine personal interest (Interest model). Based on the interest model, the theory also develops a framework for career choice and career performance.

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<sup>1</sup> Data extract from S.G. de Coordinación y Seguimiento Universitario. Ministerio de Educación, Cultura y Deporte. Statistics of Spanish students for the 2016/17 academic year.

Hence, the SCCT model tries to explain three different things about career development: (1) how basic academic interests develop; (2) how educational choices are made; and (3) how education and career success is achieved by the individual. The three building blocks of this theory are self-efficacy beliefs, outcome expectations and goals. Self-efficacy beliefs refer to the capabilities and the confidence one individual has when performing a certain task. Outcome expectations are what people think they will achieve when performing a certain job and those expectations refer not only to economic gains, but also to social and self approval among other things. In the follow graph, we can see how all these factors interact when choosing a career track.



**Figure 1.** A simplified view of how career-related interests and choices develop over time, according to SCCT<sup>2</sup>

As we already pointed out, the Interest model is the foundation of career choice. This model is the result of the interaction between self-efficacy beliefs and outcome expectations. It assumes that if one individual can perform well in a field and can obtain a positive outcome out of his performance, he will develop an interest for the field. Once the person is interested in a particular activity or branch of knowledge he will develop specific career goals related to that field.

The Interest model is the baseline of the Choice model because if a person sets specific goals regarding his career he will undertake actions in order to achieve those goals. Nevertheless, choices are not only influenced by interests but also by environmental variables such as the level of support an individual has from his family and friends, the educational and economic barriers and the opportunities one is given. Thus, an important component of the Choice model are the external factors that determine career choices. Those factors, specifically

<sup>2</sup> SOURCE: Lent, R. W., Brown, S. D., & Hackett, G. (2002). Social cognitive career theory. Career choice and development, 4, 255-311.

gender stereotypes, are the ones we will focus on this paper in order to determine how important they are for student's career choices.

The last step of the SCCT framework is the Performance model, which tries to measure the level of success or achievement of one's goals and how persistent one is in front of difficulties. The Performance model is influenced by both the ability and motivation of the individual. These two factors are in turn determined by the self-efficacy beliefs, the outcome expectations and the goals one person sets for himself.

### **3.3. Influence of gender stereotypes on career choice**

Once we have explained the framework behind our study we can explain what gender stereotypes are and review the existing literature on the influence of gender stereotypes on career choice.

*"A gender stereotype is a generalised view or preconception about attributes or characteristics that are or ought to be possessed by, or the roles that are or should be performed by, men and women. Gender stereotyping is the practice of ascribing to an individual man or woman specific attributes, characteristics or roles by reason only of her or his membership in the social group of men or women."* (Cusack, 2013, p.17)

A common approach to measure gender stereotypes is the Implicit Association Test (GRT-36) designed by Fernandez et al. (2011). This survey is a collection of 36 questions that takes into account not only the answers of the respondent, but also her or his response time. Combining the information provided by the answers and their response time, it is possible to determine how much stereotyped a person is. The details of this test are discussed in the next section, when explaining our survey design.

The existing literature finds a significant influence of gender stereotypes in students' career choice decisions. Even before entering university, high school students already have a gender-stereotyped perception of bachelors and careers that should be pursued by men and women (Heredia, 2007). Hence, both Nicolao (2014) and Ramaci et al. (2017) find that men are interested in more realistic professions such as science and business, while women are interested in social and artistic tracks like teaching or nursing. In spite of this, girls might consider male and female-dominated jobs, while boys only consider male-dominated jobs (Shapiro et al., 2012). This is consistent with the evidence found by van der Vleuten et al. (2016) that gender expectations are stricter for boys than for girls and that the more traditional the

gender ideology of a boy the higher the probability of entering a traditional occupation, although this is not the case for girls.

The SCCT framework emphasises the role of self-efficacy and competence beliefs in students' career choice decisions. Thus, if boys perceive themselves as mathematically competent or overestimate their abilities and girls do not, then it is likely that more boys will pursue a math, science or technological related career than girls. So cultural gender beliefs could be biasing the competence belief of boys and girls, which in turn leads to more boys enrolling in STEM majors not because they are better at math related subjects, but because they think they are (Correl, 2001). Van der Vleuten et al. (2016) present evidence in a similar direction: they find that boys competence beliefs are not affected by gender stereotypes, while girls are.

Finally, the Choice model of the SCCT framework also takes into account the influence of environmental variables other than personal interests. Heredia (2007) and van der Vleuten et al. (2016) find that boys are more influenced by future earnings, power and influence a job has associated than girls, who are more concerned in helping others. Moreover, father's profession is also a determinant variable in career choice for boys (Ramaci et al., 2017).

In conclusion, the Spanish university system exhibits horizontal gender segregation. According to the SCCT framework this segregation is partly explained by gender stereotypes, which influence the interest, self-efficacy and competence beliefs of boys and girls and thus, their professional careers. Consequently, releasing the society from those stereotypes would reduce gender segregation among professional careers and to a larger extent, closing the pay gap.

## 4. Methodology

In the previous section we described the framework of our study and the conclusions of several papers on how gender stereotypes influence career choice. This section aims to explain the method we used to collect data and the model to analyze it in order to estimate the importance of gender stereotypes for Catalan students when choosing a career track. Section 4.1 describes how the survey is designed and section 4.2 the models used to analyse the data.

### 4.1. Survey design

Data collection for our study was done through an online survey created using Qualtrics, an online survey software. The survey<sup>3</sup> consists of two different parts: the first one tries to measure how much stereotyped a person is, and the second part is a collection of personal and demographic questions.

In order to measure how stereotyped a person is, we use the Implicit Association Test (GRT-36) developed by Fernandez et al. (2011). This test is a set of 36 questions describing different daily activities. For each question the respondent can choose whether the activity should be carried out by a man, a woman or it does not matter who performs it. Moreover, we also measure the time devoted to answer each question. Hence, in order to estimate the level of stereotyping we take into account those two dimensions: the choice and the response time.

On the other hand, Fernandez et al. (2011) distinguish between different types of questions: some of them are activities carried out in the domestic sphere and others in the workplace. The Implicit Association Test provides the “right” or stereotyped answer to each one of them. So for each category - domestic or work sphere - we have tasks that should be carried out by a man, by a woman and tasks that are neutral (it does not matter who carries them out) according to a gender stereotyped view. A person will be more stereotyped if he or she chooses the socially accepted or “right” answer to each question. Even more, by measuring the response time we know that a stereotyped person will devote more time to answer a neutral question, in contrast to a non-stereotyped one, who sees all questions neutral and has on average, the same response time for all type of questions. Our test also has four control questions to make sure the respondent is paying attention to the survey.

The second part of the survey is a set of personal questions that tries to measure the interests and environmental constraints of career choice, as well as some demographic

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<sup>3</sup> See in Appendix 9.4 the survey structure and questions.

questions such as age, sex, school, father's and mother's nationality and profession, siblings and religion.

The set of questions that tries to measure high school students' interests in different subjects and the external constraints they face when choosing a bachelor program are a collection of questions from Indra-Caro et al. (2017), Indra-Caro et al. (2016) and Chen et al. (2013). Some of the questions are variations of the ones proposed in those papers, some are directly taken from them and other are self-made questions following the guidelines proposed in those studies.

#### **4.2. Econometric framework**

Two types of econometric analysis are performed: regression analysis and path analysis.

##### ***Regression analysis***

The analysis of the data is conducted performing a regression analysis of the form:  $Y = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_i * W_i$ .

The dependent variable (Y) is a continuous variable that takes values from negative infinity to positive infinity. Negative values correspond to female-dominated bachelors (each value equals the women/men ratio of a given bachelor) and positive values correspond to male-dominated bachelors (each value corresponds to the men/women ratio of a given degree).

The two main independent variables ( $X_1$  and  $X_2$ ) measure how stereotyped men and women are respectively. Both are dummy variables that take a value equal to 1 if the individual shows stereotyped preferences and 0 if he or she does not. A person is considered to be stereotyped if he or she has a D score that takes a value larger than zero. The D score, in turn, is constructed according to the procedure described in the paper by Fernandez et al. (2011). In order to construct the D score we take the time a given individual spends in each question and we take the difference between the average response time for non-stereotyped responses and the average response time for stereotyped responses. We divide this value by the standard deviation of his or her response time.

Finally, we include a set of control variables into the regression that determine career choice. Although Lent et al. (1994) argue that there are a large number of career choice determinants - which we indeed measure in our survey - we only include those that are correlated with our variable of interest (gender stereotypes) in order to avoid omitted variable bias. It should be clear that we are not trying to estimate the importance of each determinant of

career choice as other authors have already done; our only concern is the effect of gender stereotypes in career choice.

Thereby, we include fourteen variables that are correlated to both gender stereotypes and career choice. A first set of controls are factors influencing career choice like future earnings, if plenty of friends are entering that major, the social acceptance of the bachelor program, the work-life balance, how easy the major is, and whether the person knows someone studying in the same field. A second set of controls refer to expectations: satisfaction of the job and how easy it is to find one. We also include an environmental variable: whether the parents like the degree. Finally, we include a set of variables regarding ability, interest and tastes aggregated into five categories (humanities, science, social science, technology and design). The value of each category is determined taking the average of all the scores that correspond to a subject in that category whenever that question is correlated with gender stereotypes.

### ***Path analysis***

The results of this regression are not valid if the SCCT framework (Lent et al, 1994) does not fit our dataset. Hence, we also conduct a path analysis in order to see how the different variables we measure interact and whether the path diagram is similar to the one depicted in the SCCT framework.

The following table shows the variables used in the analysis as well as how they are grouped:

Group	Variables name	Description
<i>Person Input</i>	<b>Gender</b>	Woman=2, Man=1
	<b>Religion</b>	Religious=1, Not religious=0
	<b>StypedM/StypedW</b>	1 if a man is stereotyped and a woman is stereotyped respectively, 0 otherwise.
<i>Background environmental influences</i>	<b>influencia_avg</b>	Takes the average of the questions on the survey regarding influence. Positive values means positive influence on the career chosen
<i>Expectation Outcomes</i>	<b>expectations_avg</b>	Takes into account outcomes from studying the degree chosen such as salary, degree of satisfaction...

<i>Interest</i>	<b>preferencia_X</b>	It takes into account the preferences over 5 major fields of study: <ul style="list-style-type: none"> <li>• Hum:humanities</li> <li>• Soc: Social science</li> <li>• Sci: Science</li> <li>• Tech: technology</li> <li>• Des: design</li> </ul>
<i>Supports and Barriers experiences</i>	<b>entorn_avg</b>	Takes into account if social environment dislikes the study choosen.
	<b>factors_X</b> (decomposes into two variables to capture the different effect for women and men)	Degree of importance of: <ul style="list-style-type: none"> <li>• Factor_6: "Study chosen is social acceptable".</li> <li>• Factor_7: "Working-life balance".</li> <li>• Factor_12: "More people of my gender is studying my same degree".</li> </ul>

**Table 1:** Variables used for path analysis. Self-made table.

The set of variables are grouped into different blocks. The first one measures expectations variables that are, in turn, determined by person input variables (religion and gender) and background environmental variables (external influences). The second one is composed of interest variables, while the third one includes variables that determine the support and barriers in the decision process, which are also partially explained by person input variables. In each one of these blocks the variables are interrelated, but they are not related to variables of other blocks so that we can measure the impact each block has on decision of a given degree. Apart from those blocks there are our two variables of interest - *stypedM* and *stypedW* - that are not related to any other variable.

In conclusion, in order to answer the questions we raised in the introduction of this paper we designed a survey that was conducted to high school students. The results of this survey are analysed using an OLS regression that tries to estimate the effect of gender stereotypes on career choice while controlling for other variables that correlate not only with the outcome, but also with how much stereotyped a person is.

## 5. Data and Sample

In the previous section we have described the survey and the econometric framework we use for our analysis. The aim of this section is to explain how we collected the data and to describe the main demographic characteristics of our dataset.

### 5.1. Pre-test

The survey was answered by 338 students from 5 different catalan high-schools, mostly aged between 16 and 18.

A pre-test was done in order to test whether the questionnaire we had designed and its implementation had any flaws. Thereby, a first set of 125 students attending Altafulla's high school answered the survey. The sample was balanced in terms of gender with almost a 50-50 split between males and females (see Table 1 below), but it was unbalanced regarding the number of students surveyed in each course.

Gender/Year	2n ESO	4t ESO	1r BAT	2n BAT	Total
Female	23	15	8	16	62
Male	22	16	11	14	63
Total	45	31	19	30	125

**Table 2:** Number of students who did the pre-test by gender and course they are enrolled. Self-made table.

During the pre-test we noticed that students younger than 15-16 years old had difficulties in understanding some of the questions and that their career was not something they had thought about. Moreover, the grading of some questions was confusing for them and due to the extension of the survey some students were distracted. Hence, the final questionnaire was designed for students aging between 16 and 18. The grading system of the questions was simplified, and several control questions were introduced in order to assess the validity of the answers given by an individual.

### 5.2. Final test and sample

The modified survey was conducted over a new sample of students from four other high schools and the sample was restricted to students aging between 16 and 18 who were in the two final years of high school (i.e. preparatory school for entering university). Provided that we had introduced control questions in order to obtain reliable answers to the questionnaire, when

we first analysed the dataset we eliminated the observations that failed to answer correctly those control questions. The final dataset is composed of 128 observations out of the 338 we initially had. The average respondent is a non-practicant catholic, with one sibling and Spanish parents.

Prior to analyse the data, in order to obtain answers for our research questions, we checked for any unbalances the dataset could have. The first point to highlight, is that the remaining observations for analysis are unbalanced in terms of gender: there are 40 male answers, 88 female answers and 4 respondents that do not specify his or her gender (there is an option to do that). Apart from this, if we look into religious beliefs, number of siblings and number of answers for each grade we do not find significant different answers for males and females (Table 2).

To sum up, the survey we designed was conducted to 338 students aging between 16 and 18 from five catalan high schools. From those 338 answers, 127 correspond to a pre-test that allowed us to introduce several improvements to the questionnaire. The final dataset is composed of 128 valid observations and the average respondent is a female, non practican catholic, with one sibling and Spanish parents. The sample is unbalanced in terms of gender, but conditional on gender it is balanced for religious beliefs, number of siblings and grade.

## 6. Results and Discussion

Up until this point have described the methods we use for analysis, as well as the main demographic characteristics of our dataset. In this section we present the main results of our study. We first conduct a preliminary study of the data at our disposal in order to determine if there are any differences across gender (assuming none of them are stereotyped), we then introduce a new variable (i.e. gender stereotypes) that tries to account for the observed differences. In subsection 6.3 we develop a model to measure the importance and significance of this new variable. Finally, in subsection 6.4 we study how the different variables interact with each other in order to yield a career choice and we test the fitness of our data into the SCCT framework.

### 6.1. Preliminary study

The objective of this preliminary study is to determine whether it exist any significant difference over sex, assuming both genders are not stereotyped.

Results are presented separately for Men (`sexe==1`) and Women (`sexe==2`). Table 3 includes only variables with mean significantly different for men and women at a 95% confidence level.

Variable	Mean Women	Mean Men	Variable	Mean Women	Mean Men
<code>gustos_4</code>	4.34	3.42	<code>interes_5</code>	3.38	2.13
<code>gustos_7</code>	4.23	3.16	<code>interes_7</code>	3.39	2.29
<code>gustos_13</code>	4.02	2.74	<code>interes_13</code>	3.06	2.05
<code>gustos_15</code>	4.41	3.08	<code>interes_15</code>	4.05	2.39
<code>gustos_16</code>	3.88	2.66	<code>interes_16</code>	3.02	1.84
<code>gustos_23</code>	3.07	2.26	<code>entorn_2</code>	2.22	1.50

**Table 3:** Variables for which difference in means are significantly different from zero at a 95% confidence level. Self-made table.

Women appear to have higher preferences (`gustos_X`) over subjects on the field of humanities: “Audiovisual culture” (`gustos_4`), “Design” (`gustos_7`), “Greek” (`gustos_13`), “History of art” (`gustos_15`), “latin” (`gustos_16`) and “Spanish literature” (`gustos_23`).

Related to preferences, women appear to have greater interest (interes\_X) on the field of humanities too: “Artistic drawing” (interes\_5), “Design” (interes\_7), “Greek” (interes\_13), “History of art” (interes\_15), “latin” (interes\_16).

Variable entorn\_2 refers to the statement: “My father does not like the career I have chosen” with higher values meaning higher degree of agreement with the sentence. Women appear to be more agree with the statement.

As described in section 5.Data and Sample, the dataset is unbalanced in terms of sex. Thus, lower observations of men might create too big confidence intervals. In order to better understand potential factors explaining differences in females and males career choice, we have reduced the confidence interval for the comparison in means by sex. Table 4 shows variables with mean significantly different for man and woman at a 90% confidence level, not appearing in table 3.

Variable	Mean Women	Mean Men	Variable	Mean Women	Mean Men
expectations_6	3.64	2.47	gustos_22	3.28	2.66
entorn_7	2.41	1.74	interes_27	4.67	3.97
gustos_5	3.95	2.97			

**Table 4:** Variables for which difference in means are significantly different from zero at a 90% confidence level. Self-made table.

Variable expectations\_6 refers to the statement: “I think it will be harder to find job opportunities in the field I have chosen due to my gender” with higher values meaning higher degree of agreement with the sentence. Women appear to be more agree with the statement.

Variable entorn\_7 refers to the statement: “I am worried about the possibility of being discriminated in job if working in the field I will study” with higher values meaning higher degree of agreement with the sentence. Women appear to be more agree with the statement.

Women appear to have higher preferences (gustos\_X) over subjects on the field of humanities: “Artistic drawing” (gustos\_5) and “Catalan literature” (gustos\_22).

Women appear to have more interest on topics related to social issues and social awareness (interes\_27).

We have also grouped subjects into 5 main fields: Humanities, Social Science, Science, Technology and Design<sup>4</sup>. Through comparison of means, we have also concluded that women have stronger preferences and interest over Humanities and Design while both sex report similar abilities to all the fields (see tables 12-14 annex 9.2).

We have also observed some interesting differences in response by gender, although they are not statistically significant.

Contrary to the conclusions of Correl (2001) and Van de Vleuten (2016), we have not observed significant differences over self-reported ability. Men tend to report higher ability on Science. Both sex report similar abilities on Social Science. Women report slightly higher ability on Technology and Design. Finally, women report higher ability on Humanities. All at a non statistically significant level.

Women appear to be more affected by social influence (entorn\_X). Women are especially influenced by parents (both father and mother) compared to men. Woman also show higher concern about the fact that her gender is underrepresented in the field she chooses and the possibility to be discriminated. Mirroring on adults working in the same field of study (entorn\_5) is the only social influence factor affecting men more.

Regarding social support/barriers, women appear to be more aligned with the statement related to people considering her good at the field of study chosen (influencia\_1 - influencia\_5). While men tend to be more agree with the statements related to parents doing the same job as the field of study. (influencia\_6 and influencia\_7). Thus, it seems that woman rely more on her own abilities while man rely more on specific information about the career and future opportunity jobs.

With respect to work-life balance, women take more into account having time to spend with family, friends and hobbies while men are more work focused. Both gender show identical results regarding statements consil\_5 and consil\_6, that refer to the easiness to find a job and the greater importance of one's career over partner's career.

As regards to factors influencing career choice, women are mainly influenced by interest on one field over others (factors\_1). Men are highly influenced by extra curricular and environmental aspects such as earnings perspective, trends, family and social acceptance. It is

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<sup>4</sup> See Appendix 9.1. Grouping of subjects.

important to highlight that men show greater preference for jobs performed by people of the same gender. Both gender show similar concern over grades and preferences.

Relative to constraints binding career choice, we have found that minimum grade is influencing women more. This might be due to the fact that women are trying to enter a more demanded career or that, on average, they have lower grades. The last is rejected when comparing self-reported PAU grades by gender.

In contrast with the previous analysis on factors influencing career choice, women are more agree with expectations regarding high earnings while men are more agree with expectations regarding satisfaction with job. This evidence might be caused by the fact that women value interest more than earnings but they assume that, in general, their choice will give them enough earnings. While men value extra-curricular facts more and those factors give them higher satisfaction with their jobs.

Based on the preliminary analysis we could conclude that women have higher preferences and interest over topics on humanities and social awareness. Thus, the greater presence of women on careers of this field might be caused by differences in tastes. In the following section we will try to determine if this differences in tastes are generated by gender stereotyped factors. We have also observed that career choice on women is based on interest on the field of study while men take into account other factors when choosing their studies.

## 6.2. Analysis of gender

The existing literature and most of the papers reviewed in section 3.3 that focus on gender and labor market do not measure gender stereotypes directly, instead they focus on correlations between variables and at most try to capture gender stereotypes effect by all unexplained factors or residuals. One of the main improvements of our study is the introduction of a specific variable that directly captures individuals' gender stereotyped mindset.

Based on our findings on the previous subsection, we introduce gender stereotyped variable as a potential explanatory variable for different career choice.

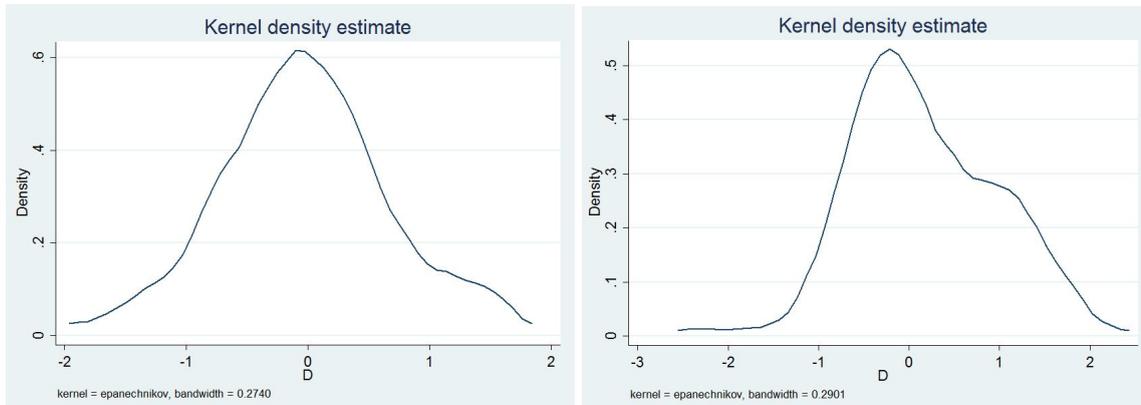
	Men	Women
Mean Stereotype Score	-0.03	0.17

**Table 5:** Mean values of D score for men and women. Self-made table.

As explained by Fernandez et al. (2011) in their paper on measuring gender stereotypes, the higher the D score the greater is the association between activities and stereotyped

responses. Although differences are not significant at a 95% confidence level, women appear to be more stereotyped than men.

We are interested not only in the mean value of stereotyped measure by gender, but also in the distribution of stereotyped individuals. The two following graphs show the density of stereotyped measurement for both man and woman:



**Graph 1:** Density function of D for men

**Graph 2:** Density function of D for women

We can observe that the graph for women is more skewed to the right. Hence, more women are stereotyped.

We have conducted a difference in means test to test for significant differences in responses for stereotyped and not stereotyped individuals. We have considered stereotyped individuals those with a D score greater than zero and non-stereotyped individuals otherwise.

The following tables show the variables with statistically significant differences. The results are grouped by gender.

	Stereotyped Women	Non-stereotyped Women
factors_12*	1.24	1.69
consil_5*	4.26	3.67

**Table 6:** Variables with significant differences for stereotyped and non-stereotyped women. Self-made table.

	Stereotyped Men	Non-stereotyped Men
Habilitat_22**	3.60	2.61
Gustos_22*	3.10	2.17
Gustos_26*	4.25	3.33

**Table 7:** Variables with significant differences for stereotyped and non-stereotyped men. Self-made table.  
Notes: \*Significant at a 90% confidence level. \*\*Significant at a 95% confidence level.

Regarding differences between stereotyped and non-stereotyped women, we find that it is more important for non-stereotyped women to have people of the same gender working with them. Stereotyped women also consider that is easier for them to find a job with their career choice.

Stereotyped men have preferences and report higher ability on Catalan literature and History than non-stereotyped man.

We have also generated a dependent variable from the variable “grau” which refers to the study chosen by each individual. This new variable is build from the ratio men to women or women to men in the university degree selected. The variable takes values from negative infinite to positive infinite. Value of 1 represents parity among gender. Values greater than one show greater presence of male while values lower than one represent greater presence of women. This ratios are taken from the Spanish Ministry of Education<sup>5</sup>.

	Stereotyped	Non-stereotyped
Woman	-1.23	-1.65
Man	1.87	0.97

**Table 8:** Mean of “grau” variable by sex and stereotype. Self-made table.

The results shows that stereotyped Men tend to choose a degree with a higher ratio Men to Women. However, contrary to basic intuition, stereotyped Women tend to choose a degree with also higher ratio Men to Women.

### 6.3. Regression analysis

In order to test formally the causal effect of gender stereotypes on career choice, we have developed an econometric model (explained in section 4.2).

<sup>5</sup> Data extract from S.G. de Coordinación y Seguimiento Universitario. Ministerio de Educación, Cultura y Deporte. Statistics of Spanish students for the 2016/17 academic year.

The model consists of an OLS regression to determine the effect of gender stereotypes, controlling for several variables correlated with both the dependent variable and one of the independent variables. The regression takes the following form:

$$Y = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_i * W_i$$

Y: <b>ratio men/women or women/men</b> taking continuous values from negative infinity to positive infinity
X <sub>1</sub> : <b>men stereotyped</b> taking value equal to 1 if the individual is an stereotyped man or zero otherwise.
X <sub>2</sub> : <b>women stereotyped</b> taking value equal to 1 if the individual is an stereotyped woman or zero otherwise.
W <sub>i</sub> : set of control variable correlated with both Y and X1 or X2

**Table 9:** Description of the variables used for regression. Self-made table.

This simple model assumes that a non-stereotyped individual, either man or woman, would choose a career with the same ratio. In order to obtain unbiased estimators of X1 and X2, we also include Control variables correlated with the dependent variable and the independent variable. We plot a table of correlation to select Control Variables. Selection criterion is based on keeping those variables correlated at least at 0.1 with both Y and Xi. The following variables are used as control variables: factors\_3,4,6,7,9,10,13 ; expectations\_4,5; entorn\_2; habilitat\_3,10,20; interes\_5,7,10,13,15,16,19,27; gustos\_2,7,13,22. Appendix 9.3 contains the correlations between the selected variables with the outcome and the variables of interest.

We have aggregate this variables into different groups:

- Variables factors are not aggregate but we eliminate factors\_13 as it refers to “Others”.
- Habilidadat\_x, interes\_x and gustos\_x all refer to opinion over a set of subjects in school. We have aggregate them into 5 main fields: humanities, science, social science, technology and design following the same structure as in the previous section. Only 3 of this areas have control variables.

After regressing variable grau on the two explanatory variables and the set of control variables, we obtain the following results:

**Table 10:** Determinants of career choice

stypedM	2.779** (0.89)
stypedW	0.152 (0.68)
factors_3	1.602** (0.374)
factors_4	1.904** (0.608)
factors_6	-0.585* (0.35)
factors_7	-1.165** (0.396)
factors_9	-0.797* (0.439)
factors_10	0.059 (0.334)
expectations_4	0.221 (0.467)
expectations_5	0.069 (0.232)
entorn_2	-0.016 (0.237)
subject_hum	0.18 (0.276)
subject_sci	0.513* (0.293)
subject_des	-0.527** (0.24)
constant	-3.9 (3.041)

Notes: \*Significant at a 90% confidence level. \*\*Significant at a 95% confidence level.

The results of the regression evidence that gender stereotypes play a significant role in men's career choice decision, although this is not the case for women.

This result might seem to contradict the previous result that women are more stereotyped than men, but in fact it does not. The regression does not look in to how much stereotyped a person is, but rather how his or her stereotypes affect the decision of career choice. By controlling for relevant environmental factors, expectations, abilities, interests and tastes we isolate the part of gender stereotypes that fully drives career choice. Hence, we find that despite being highly stereotyped those gender stereotypes do not influence women's career choice (environmental variables and personal interests do). Whereas for men gender stereotypes have a direct impact on career choice.

#### 6.4. Path analysis

Data fit of the SCCT model was also studied. We measured several parameters in order to choose the path diagram that best fits the data. Measures used are: chi-squared test of significance, Root mean squared error of approximation (RMSEA), Comparative fit index (CFI), Tucker-Lewis index (TLI), and Standardized root mean squared residual (SRMR). The estimations of this measures are shown in the following table:

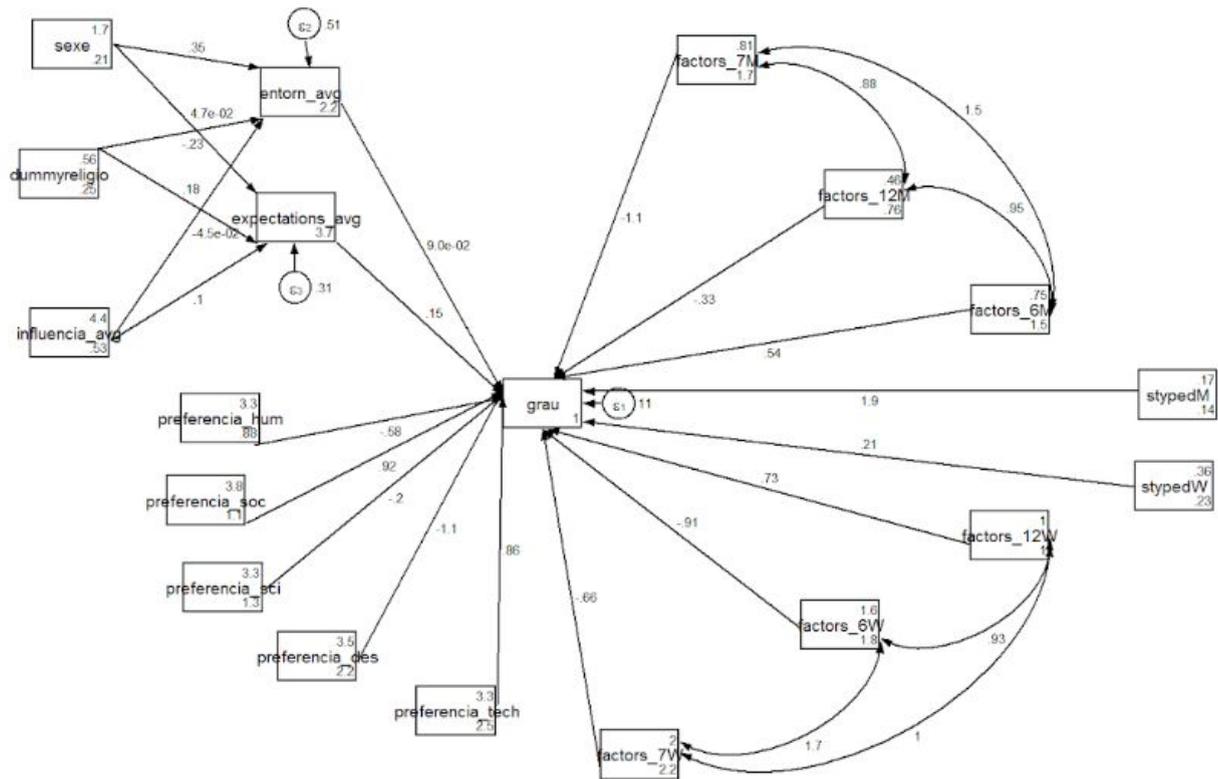
	Value
p>chi2	0.21
RMSEA	0.04
CFI	0.861
TLI	0.772
SRMR	0.044

**Table 11:** Measurement of fitness

Hoyle (1995) and Hooper et al. (2008) suggest values at least 0.9 or above for CFI and TLI to consider our model to be correctly fitting the data. They also propose a cut-off of 0.05 for RMSEA and SRMR. Finally, chi2 should not be significant.

According to the postestimation values, our model fits the data relatively well. CFI and TLI are close to 0.9. The authors also highlight the fact that this measures might not be suitable for samples lower than 150 observations. Our dataset contains 128 observations. Thus, we might not rely completely on these results. Moreover, RMSEA and SRMR are below 0.05. Finally, p-value of chi2 is well-above the minimum significance level of 0.05.

The selection criterion for the variables to include in the model is based in the SCCT conceptual diagram proposed by Lent et al. (2002), as explained in section 4. We estimated the path shown in Figure 2 following the directions of the SCCT model. Several remarkable aspects were found.



**Figure 2:** Path analysis of the SCCT model for our dataset. Self-made figure with Stata.

Our analysis resulted in several statistically significant causal relationship between different variables. Dummy religion is significant at a 90% confidence level causing entorn\_avg to be lower and expectations\_avg to be higher. Entorn\_avg measures negative impact of social environment on studies chosen. Thus, religious people perceive more positive feedback on their choices. There could be two possible explanations to this fact: either religious people tend to be more tolerant and support individual interest or a religious individual tends to choose a study degree taking already into account the degree of conformity of her community. Dummy religion is also significant for expectations\_avg meaning that a religious individual has higher expectations on future outcomes.

Gender is also statistically significant for explaining differences in entorn\_avg. Woman perceive more negative feedback on their choices. A potential explanation to this fact is that woman are more prone to choose degrees male dominant which might be difficult to accept for their families.

Preferences over a field also play a role. They are significant for technology, social science and design fields. Preferences over social science and technology increases the chances to choose a male dominated degree while preferences over design increases probability of choosing a female dominated degree. Gender is highly correlated with preference only for humanities and design. Hence, high significance and positive impact on “grau” of preferences over technology while not being correlated with gender means that both man and woman have the same interest on technology. Moreover, this interest leads to choosing degrees with higher ratio of man (correlated with degrees on the field of technology, thus, some aspects must be preventing woman to enroll on technology studies.

Factor\_6 is statistically significant for women and has a negative impact, meaning that women more concerned about others opinion tends to choose a degree with higher proportion of women. This might reflect the fact that, although the individual is not stereotyped, she finally chooses a female-role study due to environmental factors. This finding is supported by the empirical evidence finding that being a stereotyped woman does not imply higher probability of choosing a female-role degree (stypedW is not statistically significant). In the other hand, stereotyped man tend to choose a male-role degree, at a statistically significant level. These findings are aligned with the conclusions from Shapiro et al. (2012).

In conclusion, women have higher preferences and interest in the field of humanities, social issues and awareness. They are affected by social influence, especially that of parents, and are concerned for being underrepresented or discriminated in the field of their studies. Although they are more influenced by gender stereotypes than men their career choice is not significantly influenced by those. On the other hand, men are more work-focused than women and take into account their earnings perspective, family and social acceptance when choosing a job. Gender stereotypes play a significant role in their career choice. In this section we also have proven that the variables of our dataset interact in a similar way as the one depicted by Lent et al. (1994) in the SCCT framework. Hence, the underlying theory of our study further validates our results.

## 7. Conclusions

In light of the weakness of the existing literature in yielding a reliable measure of how gender stereotypes influence career choice, in this paper we have tried to shed light into this question. By conducting a survey over a sample of 338 Catalan students we have been able to create a variable that measures the impact of gender stereotypes of catalan adolescents on their career choice. We are quite confident that such variable isolates the effect of gender stereotypes because we have controlled for any other determinants of career choice contemplated in the work of Lent et al. (1994) that correlate with gender stereotypes and our outcome variable.

The results of our analysis suggest that although women are more stereotyped than men, gender stereotypes only play a significant role in men's career choice. Hence, stereotyped men tend to choose a major with a larger ratio men to women, while stereotyped women also tend to choose a major with a larger ratio men to women.

In the other hand, regardless of being stereotyped or not, women are more binded by social judgement. Thus, women tend to choose a more socially accepted degree.

Regarding intrinsic motivations of career choice, we find that women exhibit a higher preference and interest in the field of humanities, topics related to social issues and awareness. We do not find statistically significant differences in reported abilities across gender. If we look into external factors that influence career choice we find that women are affected by social influence (especially that of parents), underrepresentation and discrimination in a given job or major. They also state that minimum grade is a constraint when choosing a bachelor program, not because they have lower grades than men but because they tend to choose high-demanded degrees. The only social influence for men is whether they know any adults working in that field or not. We also find that women value more work-life balance, while men are more work focused.

Thus, factors that influence career choice for women are their interest in the field and how people sees them in terms of abilities, while men are affected by future earnings perspective, family and social acceptance as well as the jobs people of their same gender perform. A path analysis confirms that the SCCT model fits our dataset quite well.

All in all, if we come back to the research questions stated in subsection 2.2 of this paper we can conclude that gender stereotypes are indeed a statistically significant variable that drives career choice for men, but not for women. Even more, they are a quite important driver of career choice for men so that students without such stereotypes enter less

gender-differentiated majors. However, this is just the opposite for women as the less stereotyped they are, the more gender-differentiated choice they produce.

Thereby, any policy directed to eradicate gender stereotyping from early ages can have a huge impact not only on career choice, but also on labour market horizontal segregation. Teachers and parents are at the core of this transformation, but governments and authorities might have an important role too. Promoting gender-neutral schools like the ones in place in Sweden might be the first step to eradicate those stereotypes among the youngest generations.

As all research, our study has some limitations. One of them is short number of observations and the specificity of the geographical, cultural and economic context of those observations (all observations used in the final analysis come from Lestonnac de Barcelona High School). Observations were homogeneous in terms of nationality and religion as well. Thus, external validity of the study should be considered.

We suggest to extend the study to larger and more diverse samples to capture the effect of demographic variables. Moreover, other econometric models could be used, such as discrete choice models.

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## 9. Appendix

### 9.1. Grouping of subjects

<b>Subject group</b>	<b>Subjects included</b>
Humanities	Music (1), Greek (13), Art history (15), Latin (16), Spanish literature (23), English (24), Philosophy (25)
Social Sciences	Business economics (8), Geography (12), History (26)
Science	Biology (2), Science of the earth and environment (3), Electronics (9), Chemistry (20)
Technology	Technical drawing (6), Electronics (9)
Design	Audiovisual culture (4), Artistic drawing (5), Design (7)

## 9.2. Comparisons of means

**Table 12:** Comparison of means in terms of abilities

<b>Variable</b>	<b>Mean men</b>	<b>Mean women</b>
habilitat_hum	3.921* (0.16)	4.245* (0.076)
habilitat_soc	4.57* (0.15)	4.54* (0.112)
habilitat_sci	3.75* (0.192)	3.49* (0.127)
habilitat_tech	4.26* (0.239)	4.39* (0.171)
habilitat_des	4.895* (0.228)	5.008* (0.135)

Note: \*Significant at a 95% confidence level.

**Table 13:** Comparison of means in terms of interest

<b>Variable</b>	<b>Mean men</b>	<b>Mean women</b>
interes_hum	2.613* (0.146)	3.344* (0.102)
interes_soc	3.474* (0.154)	3.807* (0.127)
interes_sci	3.072* (0.187)	3.216* (0.133)
interes_tech	3.026* (0.244)	3.045* (0.2)
interes_des	2.509* (0.223)	3.519* (0.179)

Note: \*Significant at a 95% confidence level.

**Table 14:** Comparison of means in terms of tastes

<b>Variable</b>	<b>Mean men</b>	<b>Mean women</b>
gustos_hum	2.879* (0.174)	3.717* (0.103)
gustos_soc	3.79* (0.181)	4* (0.128)
gustos_sci	3.368* (0.194)	3.454* (0.136)
gustos_tech	3.592* (0.244)	3.608* (0.196)
gustos_des	3.184* (0.255)	4.174* (0.167)

Note: \*Significant at a 95% confidence level.

### 9.3. Control variables

<b>Control Variable</b>	<b>Y</b>	<b>X1</b>	<b>X2</b>
factors_3	0.3360	-0.0324	-0.1760
factors_4	0.1922	-0.0316	-0.1160
factors_6	-0.1120	-0.0180	-0.1285
factors_7	-0.2173	0.0207	-0.1300
factors_9	-0.1412	-0.0387	-0.1089
factors_10	0.1489	0.1518	-0.1727
expectations_4	0.1108	0.1611	-0.1370
expectations_5	0.1009	-0.1149	-0.0912
entorn_2	-0.1434	-0.1646	0.1726
subjects_hum	-0.1693	-0.2038	0.1281
subjects_sci	0.1876	0.1061	-0.1254
subjects_des	-0.2120	-0.1377	0.0883

#### **9.4. Survey**

Due to the extension of the survey we cannot directly reproduce it in this appendix. The exact questions and format can be examined in the following link:  
[https://pompeufabraeec.eu.qualtrics.com/jfe/form/SV\\_6Pxs5TbnM1Bocex](https://pompeufabraeec.eu.qualtrics.com/jfe/form/SV_6Pxs5TbnM1Bocex)