

University of Economics, Prague  
**Faculty of Economics and Public  
Administration**

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**GENDER STUDIES AT  
UNIVERSITY OF ECONOMICS, PRAGUE**

*Bachelor thesis*

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### **Declaration of Authorship**

The author hereby declares that she compiled this thesis independently and that all sources have been included in the list of literature.

Vendula Naglová  
25.8.2010, Prague

*“Ignorance is natural and nature never lies.”* Carl Jung

## **ABSTRAKT**

Cílem této práce je odpovědět na otázku, zda za nedostatkem žen v ekonomice stojí diskriminace žen v daném oboru, nebo zda je úspěšnost absolvování ekonomických kurzů závislá na osobnostním typu studenta. V práci je využita teorie MBTI indikátoru osobnostního typu, který je považován za jeden z nejpřesnějších pro dané účely. V práci je testováno několik hypotéz souvisejících právě s osobnostním typem a pohlavím nejenom studentů, ale i vyučujících. Nepodařilo se zcela potvrdit všechny testované hypotézy, byl ovšem prokázán vztah mezi výslednou známkou a pohlavím studenta a některými osobnostními typy. Práce také poodhalila vliv dalších proměnných (specifických pro zkušební řád VŠE) na výslednou známku.

### **Klíčová slova**

Gender problematika, MBTI, VŠE

### **JEL klasifikace**

A22, I22, J16

## **ABSTRACT**

The main aim of this thesis was answering the question, if lack of women in the economics is caused by discrimination or if personality type affects successful passing of advance economic courses. Myers-Briggs Personality Type Indicator (MBTI) was used for purposes of this thesis as the most convenient personality type indicator. This thesis tested several hypotheses resulting from expected correlation between personality type, gender (both for students and teachers) and final results. Paper showed correlation between gender and final result and also between some personality types and grade. Paper also disclosed interesting correlations between final grade and other variables unique for testing system at the University of Economics, Prague

### **Key words**

Gender, MBTI, UEP

### **JEL Classification**

A22, I22, J16

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## Introduction

Gender issues occupy newspapers and television practically every day. It is almost impossible to run away. Gender organizations do maximum for making labour market and living conditions equal for both genders – manuals for proper language, quotas in public sector or gender friendly travelling in public transportation. Now, it can seem to be smiling to talk about female head-hunter as “headhuntryně” but all these recommendations will be sooner or later reality of our lives. What is the reason for existing gender organizations? Why is it necessary to care women and to help them on the way of their lives? Is reality so bad that women can not break through their own way?

Women had clearly given social role almost until 19<sup>th</sup> century. The first feminist – Mary Wollstonecraft published her revolutionary (for that time) papers in the second half of 18<sup>th</sup> century. The first known feminist organization founded 1866 is National Union of Suffrage Societies<sup>1</sup>. Their activities were sainted by John Stuart Mill who recommended giving women the same political rights as men have. Political rights represented equality to men. However, as time went forward, women’s requirements also grown and with growing requirements grown many gender organizations specialized for various fields of everyday life. One of the fields where gender organizations are trying to operate is schooling system and consequential professional life.

Girls at primary schools act as better students than boys in general and therefore, we could expect this trend in secondary and also in tertiary education. Nevertheless, universities represent specific type of education and in that case, it is convenient to focus on this issue more precisely. Going to university symbolizes a big step for every student. Living on his own, own responsibility for his behaviour and study results and student life with all its advantages and disadvantages give an enormous power into student’s hands. With a little of exaggeration, we can say that the university is a new beginning with ability to erase all divergences between students. This gives a chance to factors influencing study results to come out and separate students between good and bad students. And that is the moment when social scientists come with their theories which they are trying to prove. This paper will not be different and in the light of gender studies will try to find a model proving correlation with gender, personal type and study results.

Papers with these issues have been already published and therefore, this paper is the application of assumptions given in previous papers (Borg and Shapiro, 1996) modified for our schooling environment. Modification of models was done sensitively and author was trying to comprehend all variables that may affect final results. According to papers we were resulting from and specificity of University of Economics, we have built some hypotheses we were trying to prove in this thesis – e.g. correlation between personality type and final grade or better results in case of matching professors personality type.

Testing method had to be adapted for the purpose of short questionnaire students do not mind to fill in. Paper had found out – as we expected - some interesting correlations between student’s final results and gender. Also correlation between personality types was detected – female SP’s have better grades and male NF’s perform worse than their female

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<sup>1</sup> <http://www.spartacus.schoolnet.co.uk/Wnuwss.htm>; downloaded 25.8.2010

colleagues. Interesting correlation was detected in variables which have been added to model due to specificity of University of Economics, Prague – e.g. students attending particular course more than once reach better results. Unless we have proved some of our hypotheses, coefficient of determination was very low in all cases. This may be caused by simplification of MBTI or omission of variable IQ which may be useful but its value knows only a few students.

This paper has following structure: firstly, reader will be familiarized with issue of women in the economics (1), Myers-Briggs Personality Type Indicator (2) and critiques of its using (3); than paper continues with a general model (4) which is trying to prove our five hypotheses. For proving these hypotheses, we had to collect data (5). Last part of this work is dedicated to proving our assumptions in following models: Model 1 (6) and Model 2 (7).



# 1. Women and the Economics

Women are trying to catch up men in every field. In the past one hundred years when women had a chance to study at universities, vote in elections and to improve their skills, they have reached at least the same level in many fields. The catching up process is escorted by many feminist movements, councils for equal opportunities for women etc. Number of women at universities raised and after those hundred, share of women has reached the same level. The only exceptions of women dominancy at universities are technical and scientific fields of study. These fields of study are in the long-term unpopular for women. We can compare this statement with table below which shows data for last academic year.

Table 1: Total number of university students in the academic year 2008/2009

Fields of study	Students		New enrolees in 2008		Graduates in 2008	
	women	men	women	men	women	men
<b>Total</b>	<b>203 263</b>	<b>166 356</b>	<b>46 398</b>	<b>35 822</b>	<b>41 631</b>	<b>31 522</b>
<b>Natural sciences</b>	11 964	16 162	2 563	3 387	2 425	2 897
<b>Technology</b>	21 628	62 349	5 043	13 977	4 841	13 110
<b>Agriculture, forestry and veterinary medicine</b>	7 996	5 876	1 937	1 434	1 680	1 124
<b>Health services, medicine and pharmacy</b>	19 277	7 495	3 997	1 172	3 393	851
<b>Humanities and social science</b>	39 727	20 652	9 148	4 181	6 951	3 194
<b>Economic sciences</b>	55 460	35 922	13 751	8 110	12 445	6 485
<b>Law and legal science</b>	8 852	7 317	1 759	1 206	1 327	1 066
<b>Pedagogy, tutorship and social care</b>	37 512	10 105	7 317	1 765	7 779	2 250
<b>Culture and art</b>	5 457	3 600	947	649	955	612

Source: [www.czso.cz](http://www.czso.cz), own arrangement

To make a general picture of situation at schooling system in the Czech Republic, we can use also Table 2 (Appendix) which summarizes numbers from table above to table picturing shares of female and male students in those fields of study. Shares of women at some fields of study did not show any bigger surprise – on the one hand, technical and scientific fields are domain for male students, on the other hand, pedagogy is under crushing dominance of women. This may represent a typical distribution of social roles – male hunters (men are trying to hunt also the imaginary animals – scientific breakthroughs) and female fire keepers (women satisfying needs as teachers, tutors).

But deeper look inside can show some interesting trends – share of women graduating in fields of study with male domination is greater than share of newly enrolled women students<sup>2</sup>. What is the reason of this greater share of graduate women students? One of the reasons could be the fact that women who finally decide to study technical and scientific field decide to finish their studies with university degree. This could be the difference between them and their male colleagues who go to the technical universities just because of lower admission requirements. This may affect final share of graduating students because some male students may give up their studies during the first three years because admission requirements often do not reflect a difficulty of the university. As we mentioned earlier, only

<sup>2</sup> We can observe inverse trend in the fields of study with female dominance.

technical and natural sciences fields of study are domain of male students. What is the situation in the economics?

Unless women are trying to reach the same level as men have as we mentioned before, there still exist some fields of study – and normal life – where men have complete dominance<sup>3</sup>. The economics is one of the disciplines where men have dominance over women and the economics is considered to be a men discipline. Not many women are capable to compare their abilities with men. This statement reflects in the fact that the last Nobel Prize went to the first woman - Elinor Ostrom - who has been awarded "for her analysis of economic governance, especially the commons"<sup>4</sup>. However, how it could be so complete dominance of men? We have a great chance to compare this assumption with data gained by Czech Statistical Office. Table 1 represents total numbers of female and male university students. We can see the enormous number of women in economic field of study. These numbers do not correspond with our assumption about low number of women in the economics. However, CZSO (Czech Statistical Office) puts together many heterogeneous fields (e.g. management, marketing, accounting, etc.) under title "economic sciences" and this may be the reason for slightly different data we expected. For more precise insight into this problem, we have to focus on schools or faculties specialized on the economics. For this purpose, we will use data related with the biggest business school in the Czech Republic – University of Economics, Prague.

In the table below, we can see numbers of students who were attending Faculty of Economics and Public Administration at University of Economics, Prague<sup>5</sup>:

Table 3: Total number of students at Faculty of Economics and Public Administration, UEP between academic years 2004/05 – 2008/09

		Academic year				
	Gender	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009
Students	Women	1406	x	1329	1397	1373
	Men	985	x	906	1135	1271
New enrolees	Women	287	x	227	271	208
	Men	186	x	138	320	285
Graduates in previous year	Women	202	x	145	255	369
	Men	123	x	89	108	204

Source: www.czso.cz, own arrangement

These numbers could be inexplicit and therefore it is very useful to make graphs showing shares of women and men at Faculty of Economics and Public Administration at UEP<sup>6</sup>. Graphs (Graph 1, 2; Appendix) show a significant trend in both cases – number of female students enrolling, studying and graduating at our faculty is still falling down. Together with this fact goes the second graph that shows share of male students at our faculty. This share is getting higher every year. Unless there are not available data for this academic year, we can expect progressive trend.

<sup>3</sup> This place would be perfect to mention famous jokes about female minors that declare tough effort of women to be on the same level.

<sup>4</sup> [http://nobelprize.org/nobel\\_prizes/economics/laureates/2009/ostrom.html](http://nobelprize.org/nobel_prizes/economics/laureates/2009/ostrom.html), downloaded 21.7.2010

<sup>5</sup> Data for the academic year 2005/2006 are not available. This causes the gap in data in both graphs.

<sup>6</sup> University of Economics, Prague

Even if we demonstrated progressive trend in newly enrolled male students and diminishing trend for their female colleagues, this still does not explain why there is so huge difference between PhD students gender. Faculty of Economics and Public Administration is no exception with 17 male PhD students compared to two female PhD students on Department of Economics<sup>7</sup>. There are many variables influencing share of women and men in economics. All these variables are keys for various theories. Some theories (Hedges and Friedman, 1993) are trying to declare low number of women in the mathematics (which could be subsidized for economics for our purposes) by different variance of both genders. Male students are not often better students than female students but they reach a greater variance in their final results. This may affect a low distribution of women in technical professions. Hedges and Friedman came up in their paper with interesting conclusion:

*“These ratios are often large enough to have important implications. For example, if a high degree of mathematical ability (e.g., ability in the top 5% of the overall population) is necessary to excel in the mathematical or physical sciences, at best half as many females as males apparently have such skill. When ability in the top 0.1% is required, only one sixth as many females as males evidently qualify. Thus, special efforts to recruit women who have the ability to excel may be required if the goal of greater representation of women in the top echelons of mathematical and physical sciences is to be achieved.”*

However, this theory sounds as interesting field to further testing under the Czech schooling conditions and it would be possible to prove it with data we gained. Main part of this thesis is focused on theory based on personality type and its influence on final grades.

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<sup>7</sup> [http://keke.vse.cz/KekE/WCMS\\_KEKE.nsf/pages/DoktorandiKeke.html](http://keke.vse.cz/KekE/WCMS_KEKE.nsf/pages/DoktorandiKeke.html), downloaded 24.8.2010

## 2. Personality type

MBTI – Myers-Briggs Personality Type Indicator is one of the most widely accepted personality type model used in analysis. It was created from the introversion/extroversion indication and Jung functional typology<sup>8</sup>. Every MBTI personality type consists from four letters and each represents one of these four categories: introvert (I) x extrovert (E), sensing (S) x intuition (N), thinking (T) x feeling (F) and judging (J) x perceiving (P). In box below, see detailed description of each category for easier understanding of this topic:

Table 4: Typology of human behaviour used in MBTI

Where a person focuses his or her attention	<b>Extraversion (E)</b>	<b>(I) Introversion</b>
	People who prefer Extraversion tend to focus on the outer world of people and things	People who prefer Introversion tend to focus on the inner world of ideas and impressions
The way a person gathers information	<b>Sensing (S)</b>	<b>(N) Intuition</b>
	People who prefer Sensing tend to focus on the present and on concrete information gained from their senses	People who prefer Intuition tend to focus on the future, with a view toward patterns and possibilities
The way a person makes decisions	<b>Thinking (T)</b>	<b>(F) Feeling</b>
	People who prefer Thinking tend to base their decisions primarily on logic and on objective analysis of cause and effect	People who prefer Feeling tend to base their decisions primarily on values and on subjective evaluation of persons-centred concerns
How a person deals with the outer world	<b>Judging (J)</b>	<b>(P) Perceiving</b>
	People who prefer Judging tend to like a planned and organized approach to life and prefer to have things settled	People who prefer Perceiving tend to like a flexible and spontaneous approach to life and prefer to keep their options open

Source: redpillpolitics.files.wordpress.com, downloaded 13.7.10, own arrangement

The easiest method how to find our personal type is to choose one option from each category and the result is one of the 16 possible personality types. Each type (Boyle, 1995) is said to define a specific set of behavioural tendencies, reflecting differences in attitudes, orientation and decision-making styles. MBTI indicator works as a hierarchy of all its cognitive functions. This represents a huge progress compared to Jung's theory which focuses only for dominant cognitive function even if men very rarely decide one-sidedly. Therefore, we can assume that MBTI indicator corresponds much more to reality. The indicator matches approximately 30 – 35 % of our complex personality. It could seem to be a very small number but comparing to other indicators used in measuring personality types is still MBTI the best.

The MBTI indicator (Myers, 1962) should be viewed as “affording hypotheses for further testing rather than infallible expectations of all behaviours”. The MBTI standard (Boyle, 1995) norm results from the Form G, which contains from 126 questions. Form G was constructed from 166-item Form F, which was shortened in an experimental part. As it was said in previous papers (Coan, 1978), only the first 95 questions are necessary to fill the form and to know the personality type. Other items are in the test just to extend testing time. We have used a very simple test of MBTI in this thesis. We have asked students and teachers to answer four questions representing each part of MBTI type indicator. This method was

<sup>8</sup> Jung functional typology includes two categories – thinking (T) x feeling (F) and sensing (S) x intuition (N)

used due to famous student's laziness and ignorance of helping other students with their bachelor thesis questionnaires. It would be very tuff to test all combinations of MBTI. Therefore, this paper used method that was - in addition - used in papers we are resulting from. There exist a few personality types more convenient to study at universities. These MBTI (Keirsey, Bates; 1984) are four: SP, SJ, NF and NT. All these four personality types have some special signs that may affect its influence on final grade. Table below shows descriptions of all these "chosen" personality types:

Table 5: Learning Styles and the Four Temperaments

<b>Dionysian (SP)</b>
SP students prefer physical involvement in the learning process and want to be able to try things themselves through a hands-on experience. They also learn best when they are entertained, so they enjoy multimedia presentations such as videos and computer simulations. SPs tend to be competitive and often respond well to group projects, particularly if the groups are involved in some sort of contest, such as a stock market game. SPs require a great deal of variety in the learning environment, and if this is lacking, they may become disruptive. A standard lecture format with Socratic questioning is deadly boring to an SP student, as is most traditional paperwork such as workbooks and end-of-the-chapter questions. The subjects that SP students prefer are music, drama, art, crafts, and mechanics.
<b>Promethean (NT)</b>
NTs tend to be independent learners and are often self-sufficient in the classroom. Unlike SJs, NT students want to choose their own research paper topics and they would even like to have some control over the subject matter of the course. NTs are most comfortable with a logical, didactic presentation of the material and need few, if any, examples to follow up a theoretical presentation. In fact, they may become impatient if the professor seems to belabor a point with too much explanation. Often NTs become intrigued by some aspect of the course and investigate that area on their own. This can be to the detriment of their grade in the course if it causes them to neglect other aspects of the course. NTs are often loners in class, especially if they are also introverted. They are often intellectual snobs and may suffer fools badly. Because they prefer to have discussions with the professor rather than with other students, they do not interact well in group discussions or group assignments.
<b>Epimethean (SJ)</b>
The learning style of an SJ student is almost made-to-order for a traditional lecture-based classroom. SJs like and need structure in the learning environment so they prefer a sequential presentation of the material in increments that make sense to them. SJs do best when they have well-defined tasks assigned to them and clear directions. They do not like long-term independent projects and may prefer to have a paper topic assigned to them rather than have to choose their own. SJs may become uncomfortable in classroom discussions unless they are carefully controlled by the teacher. SJs prefer to study facts and procedures and are often at a loss when an assignment requires them to improvise or be creative. SJs gravitate toward university business and professional classes and often choose practical professions such as accounting and teaching.
<b>Apollonian (NF)</b>
NF students enjoy a democratically run classroom with plenty of interaction with other students and the professor. NFs enjoy group projects as long as the group works cooperatively rather than competitively. Very competitive environments are counter-productive for NF students because they tend to be hypersensitive to hostility and conflict. NFs learn best through class discussion and case studies because they like instruction to relate to people. Because of the ease with which NF students express themselves, they do better in classes that require papers and essays rather than more objective means of evaluation. In addition, because NFs value personal recognition, a handwritten note of approval on a paper or test is often a stronger motivator than a good grade.

Source: D. Keirsey and M. Bates. 1984. Please understand me: Character and temperament types. 5th ed. Del Mar, Calif.: Prometheus Nemesis.

### 3. Critique of using MBTI tests

This part will be therefore focused on critiques of this testing method. However, MBTI is so spread and worldwide used method that critiques are only a few and not significant.

One of various critiques was tended to nonlinear relation between personality type and various criteria. This nonlinearity is detectable only with large samples and therefore this critique did not touch our model.

*“The relation between the EI scale and the mean standardized grade point average (GPA) shows a small break at the midpoint (Myers & McCaulley, 1985, p. 158). This effect is, however, small (.25 standard deviation) and is detectable only with large samples (e.g., N= 5,000).”* Pittinger, 1993

Other issues are connected with using MBTI in testing personality types in job advising or at schooling system. The method is used in both fields due to its universality and ability to show peoples abilities and to help them find their disabilities. MBTI also helps to improve our skills by knowing our personality type. But any test cannot be precise and tell us everything about our personality. In this case, results from this type of testing have to be handled carefully and they not recommended being overrated. This may be the reason why the MBTI should be used thoughtfully and only with respect.

## 4. A General Model

This thesis would like to test and - maybe - to prove results from two previous researches, which were focused on correlation between personality type, student gender and final grade reached in particular course.

The first research (Borg, Shapiro; 1996) was dealing with hypothesis that “economics is one of those subjects that students either love or hate, and, more often than not, the emotion expressed for it is the latter. However, as economists, we must have responded to it with love rather than hate“. This assumption must turn out well only in advanced economic courses. Why? All students go to economic schools due to some personal reasons – they are interested in mathematics, money, banking system or they just do not know what else study. These negative effects show itself mainly in basic economic courses where many students, who are not interested in economics properly, fail. On the other hand, many students fail also in advanced courses. What makes the difference between successful students and losers? Laziness could be the factor influencing student’s success but we can not cooperate with this assumption in major. What makes us successful economist or just those who “studied once at UEP”?

Borg and Shapiro came with theory that the personality type is the indicator influencing our success or failure in passing exams. They used Myers – Briggs Personality Type Indicator to prove their hypothesis. Research was done at University of North Florida with 119 macroeconomic students and proved some significant correlation between personality types: NT and NF have worse grades than students with SJ type and being an introvert has a very positive effect on good grades from economics.

Next research (Borg, Stranahan; 2002) is going further. This paper is trying to prove correlation between genders (or race) and personality type on good grades. Again, it deals with MBTI and Keirsey – Bates personality types and with its combinations with gender. This research came with some results significant for this thesis – all SJs performed better but only male SJs had significantly higher course grades.

As it was mentioned earlier, both papers came with interesting conclusions, which we would like to prove in this thesis. The background at University of Economics is slightly different to other universities and maybe it might play role in results. UEP is one of the largest universities (and the largest business school) and therefore students can choose from various teachers and various subjects that give them a “power” to get a bachelor degree with less harm. However, some courses are required for all students of particular specialization and especially these courses are interesting field for our research. One professor mainly taught these courses and therefore his teaching and testing methods are “standardized” and students can fully exploit their abilities to pass the exam. Students can also lose - in case of failing the exam - their spare credits. This could pose a huge disadvantage for their studying in the next academic year. This fact may be another type of motivation for passing the exam therefore we have to cover this variable to our model.

We will cover both previous researches with our models in following parts of this thesis:

### **Model 1: Gender vs. Personality type**

Unless female students make still more than a half of all students of economics, trend from past few years show that share of newly enrolled women is getting lower. The reason of this trend could be still increasing difficulty of economic courses. This could represent a mental barrier which can influence women judgement. According to this assumption, economy students are men or “strong” women who do not care about finality of economic courses. But what makes the difference between a strong woman and a man? What is the essence which dipoles all students between those two famous groups – winners and losers? This magical essence could be MBTI. We can create from these conclusions a few hypotheses:

Hypothesis 1: Women get better results in economic courses.

Hypothesis 2: Some personality types are “born” to be successful in economics.

Hypothesis 3: “Chosen” personality types correlated with gender should have positive effect on study results.

### **Model 2: Professor as an influence on student’s final grades**

This model is partially correlated with previous model. Students who decide to continue in their academic carrier have to be “special”. However, what makes them special? Community of teachers cannot be different from the community of students. Unless only enthusiastic economists become teachers, we can still see some differences. Since preliminary schools, we have met many teachers who were more or less inspiring for us. In addition, what is the thing determining whether they will - or they will not - be good and inspiring teachers to us? Personality type could play this role very well. Type of person can decide on our sympathies to the professor or on his ability for teaching. Moreover, this will be task of this model.

As a bonus hypothesis what I would like to personally prove is a theory about similarity of teacher and student gender and its correlation to better study results.

According to previous assumptions, in this part of thesis, we are going to prove these two hypotheses:

Hypothesis 4: Students with similar personality type get better results.

### **BONUS**

Hypothesis 5: Students with similar gender with their professors get better results.



## 5. Data

To collect required data to prove our theories we had to make a questionnaire corresponding with previous researches we result from. Questionnaire was modified for purposes of this thesis. It consists from 10 questions which ask for information needed for this particular research. Previous research (Borg, Stranahan, 2002) used some variables seemed useless for this thesis – research was looking for correlation between study results and race. This correlation is pointless in our university or (if you like) tertiary schooling system (it could be interesting to test some correlation between study results and nationality – due to enormous number of Slovak and other eastern students but it is not part of this thesis)<sup>9</sup>.

Questionnaire was sent to all students enrolling courses 5EN200 – History of Economic Thought, 5EN253 – Macroeconomics and 5EN302 – Public Economics. Students were asked to answer all questions in questionnaire. However, as it always happens, there are some unfilled or partly filled questionnaires. This happened only in few cases in every course dataset and therefore we decided to leave out these subjects from this research. Totally, we have gained 334 observations that were included into model. All these observations were separated to variables that could affect our endogenous variable – grade.

From basic statistics (Table 7; Appendix), we can see that women were more represented from all respondents – 179 against 155 male respondents. This number is not final due to some students (it was approximately a half of students who attended courses 5EN200 and 5EN302) who did not respond this questionnaire. Segmentation to courses gives us interesting view on each basic statistic. As we can see, the hardest is to pass course 5EN200, where is average number of times student attended this course 1.79 against 1.5 times in course 5EN 253, respectively 1.12 in 5EN203. This variable may could affect final grade which is highest again in the course 5EN200 (2.92) against 2.88 in 5EN253 and 2.48 in 5EN302.

The variables used in this thesis have a following meaning:

Woman	=	dummy variable, 1 refers to woman, 0 to man
Year	=	year when student is attending the course; n=1,2,3,4
Times	=	number expressing how many times students attending particular course <sup>10</sup>
I	=	dummy variable, 1 refers to introvert, 0 to extrovert (E)
N	=	dummy variable, 1 refers to intuition, 0 to sensing (S)
NF <sup>11</sup>	=	dummy variable, 1 refers to combination of NT personality type, 0 to other types
NT	=	dummy variable, 1 refers to combination of NF personality type, 0 to other types
T	=	dummy variable, 1 refers to thinking, 0 to feeling (F)
SJ	=	dummy variable, 1 refers to combination of SJ personality type, 0 to other types
SP	=	dummy variable, 1 refers to combination of SP personality type, 0 to other types
P	=	dummy variable, 1 refers to perceiving, 0 to judging (P)
Gym	=	dummy variable, 1 refers to students who graduated at gymnasium

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<sup>9</sup> It would be also interesting to cover a variable IQ that may have some effect on final grade. This variable was not included into our model because students are not very often familiar with its value.

<sup>10</sup> Variable TIMES is specific for UEP due to its mentioned spare credits system. For using in general Czech schooling system, it could be replaced for variable representing a number of doing a final exam.

<sup>11</sup> Similarly, dummy variables WNF, WNT, WSJ and WSP refer to women with appropriate personality type with 1, 0 refers to women with other personality types.

Age	=	student's age
Grade	=	a grade student received from the course
Matchsex	=	dummy variable, 1 refers to students whose gender is identical with teachers
TeachMatch	=	dummy variable, 1 refers to students whose MBTI is identical with teachers

## 6. Model 1: Gender vs. Personality Type

We will use a method of the ordinary least squares in this work to prove our hypotheses. We can express this model by following:

$$GRADE = f(\text{Age, Woman, TIMES, GYM, YEAR, MBTI variables, MBTI interaction variables})$$

### Hypothesis 1: Women get better results in economic courses.

This hypothesis is based on assumptions we have mentioned in previous part of this thesis. We have used some variables seemed to be relevant for proving the hypothesis. Our model is following:

$$GRADE = \beta_0 + \beta_1 * Woman + \beta_2 * TIMES + \beta_3 * Year + \beta_4 * Age + \beta_5 * GYM + \varepsilon,$$

where

$GRADE^{12}$  = dependant variable

$\varepsilon$  = standard error

Results from testing this hypothesis are published at table below:

Model with Gender: observations 1-334			
Dependent variable: Grade			
	<i>Coefficient</i>	<i>p-value</i>	
const	1,18507	0,31895	
GYM	-0,0205959	0,85042	
Age	0,0837223	0,16063	
Year	-0,199382	0,05159	*
TIMES	0,135811	0,03235	**
Woman	0,178472	0,07153	*
$R^2 = 0.0287$			
$R^2_{adj} = 0.0139$			

\*Significant at the .10 level; \*\*significant at the .05 level; \*\*\*significant at the .01 level

According to results, equation for this hypothesis will be following<sup>13</sup>:

$$GRADE = 1,19 + 0,18 * Woman + 0,14 * TIMES - 0,2 * Year + 0,08 * Age - 0,02 * GYM$$

Firstly, we were trying to prove our hypothesis that women finally deciding to study economics, these women are stronger and they are determined to get good grades. This model confirmed our assumption – women reach better grades than their male schoolmates do (if a respondent is a woman, she receives for 18% better grade than her male colleague). Unless our assumption was confirmed, this open a space for further researches focused on lack of PhD students at UEP under condition of women's better results in economic courses. However, other results came up from this output – negative correlation between Year and GRADE shows that students from senior years get worse grades than their younger friends get. This could be directly in contrast to other variable covered in this model – TIMES.

<sup>12</sup> GRADE will be given as a dependant variable in all models we are using in this thesis.

<sup>13</sup> Coefficients were rounded up to two decimal places in all equations.

Students who were attending particular course for the second (or third time) get better results than those who attended course for the first time. From this finding could arise one conclusion – if you have to do the course again, do it as soon as possible.

As we can see, coefficient of determination is very low – model explains only 2.9 percents of data. This situation could be caused by many factors, which are not included in our model, and because we are testing social data, where “results and miracles are not guaranteed”.

## **Hypothesis 2: Some personality types are “born” to be successful in economics.**

This hypothesis results from MBTI and Keirsey–Bates personality types. Both types have been proved as a personality types which gains significantly better results in studying and also in teaching. As we have mentioned MBTI and Keirsey–Bates personality types, we have to predict this hypothesis with two models:

$$\text{GRADE} = \beta_0 + \beta_1 * \text{Woman} + \beta_2 * \text{TIMES} + \beta_3 * \text{Year} + \beta_4 * \text{Age} + \beta_5 * \text{GYM} + \beta_6 * \text{I} + \beta_7 * \text{N} + \beta_8 * \text{F} + \beta_9 * \text{P} + \varepsilon$$

$$\text{GRADE} = \beta_0 + \beta_1 * \text{Woman} + \beta_2 * \text{TIMES} + \beta_3 * \text{Year} + \beta_4 * \text{Age} + \beta_5 * \text{GYM} + \beta_6 * \text{I} + \beta_7 * \text{NF} + \beta_8 * \text{NT} + \beta_9 * \text{SJ} + \varepsilon$$

This hypothesis results are following:

Model with Keirsey–Bates variables: observations 1 - 334

Dependent variable: Grade

	<i>Coefficient</i>	<i>p-value</i>	
const	1,11509	0,35225	
GYM	-0,0168917	0,87887	
Age	0,0829136	0,16600	
Year	-0,197482	0,05661	*
TIMES	0,13374	0,03633	**
Woman	0,189877	0,06470	*
I	0,0658424	0,49644	
NF	0,0230956	0,85344	
NT	-0,00653138	0,96804	
SJ	0,166383	0,18437	

$$R^2 = 0.0359$$

$$R^2_{adj} = 0.0091$$

Model with MBTI variables; observations 1-334

Dependent variable: Grade

	<i>Coefficient</i>	<i>p-value</i>	
const	1,10113	0,35864	
GYM	-0,0152057	0,89068	
Age	0,0859169	0,15190	
Year	-0,207877	0,04473	**
TIMES	0,135787	0,03347	**
Woman	0,166465	0,11142	
I	0,0700198	0,47320	
N	-0,080384	0,45650	
F	0,0678646	0,53545	
P	0,0593854	0,55062	

$$R^2 = 0.0331$$

$$R^2_{adj} = 0.0062$$

\*Significant at the .10 level; \*\*significant at the .05 level; \*\*\*significant at the .01 level

According to results, we can depict coefficients into our two equations:

$$\text{GRADE} = 1,12 + 0,19 * \text{Woman} + 0,13 * \text{TIMES} - 0,2 * \text{Year} + 0,08 * \text{Age} - 0,02 * \text{GYM} + 0,07 * I + 0,02 * \text{NF} - 0,01 * \text{NT} + 0,17 * \text{SJ}$$

$$\text{GRADE} = 1,1 + 0,17 * \text{Woman} + 0,14 * \text{TIMES} - 0,21 * \text{Year} + 0,09 * \text{Age} - 0,02 * \text{GYM} + 0,07 * I - 0,08 * N + 0,07 * F + 0,06 * P$$

According to our hypothesis and previous researches, we have expected positive correlation between personality types and final grade. As we can see on tables above, there is no significant effect on student's results. Both previous papers proved that students with SJ personality type have significantly higher final scores than their schoolmates with SP's. This difference between Czech and American students could be caused by many factors reflected in very low coefficient of determination. These two models have proved only 3.5 respectively 3.3 percents of our model.

On the other hand, we have confirmed situation from the previous model which showed us positive correlation between number of times we are attending the course and final grade (negative correlation between year we are attending the course and final grade). As we go further this paper, we can claim that these two variables represent a highly important influence on student's final grade at the University of Economics, Prague.

### Hypothesis 3: "Chosen" personality types correlated with gender should have positive effect on study results.

Unless we have not proved our previous hypothesis, still there is a chance to find an effect on good grades with gender correlated with Keirsey-Bates personality types.

This model would be described as following:

$$\text{GRADE} = \beta_0 + \beta_1 * \text{MI} + \beta_2 * \text{TIMES} + \beta_3 * \text{Year} + \beta_4 * \text{Age} + \beta_5 * \text{GYM} + \beta_6 * \text{MNF} + \beta_7 * \text{MNT} + \beta_8 * \text{MSJ} + \beta_9 * \text{MSP} + \varepsilon$$

respectively

$$\text{GRADE} = \beta_0 + \beta_1 * \text{WI} + \beta_2 * \text{TIMES} + \beta_3 * \text{Year} + \beta_4 * \text{Age} + \beta_5 * \text{GYM} + \beta_6 * \text{WNF} + \beta_7 * \text{WNT} + \beta_8 * \text{WSJ} + \beta_9 * \text{WSP} + \varepsilon$$

Test results are in following table:

Model Keirsey – Bates interactions with MALE gender: observations 1-334

Dependent variable: Grade

	<i>Coefficient</i>	<i>p-value</i>	
const	1,39863	0,23540	
GYM	-0,0229872	0,83603	
Age	0,0831117	0,16590	
Year	-0,208199	0,04491	**
TIMES	0,139236	0,02916	**
MI	0,112243	0,43037	
MNF	-0,370938	0,07088	*
MNT	-0,314594	0,11105	
MSJ	-0,128535	0,39854	
MSP	-0,248566	0,14017	
	$R^2 = 0.0349$		
	$R^2_{adj} = 0.0081$		

Model with Keirsey – Bates interactions with FEMALE gender: observations 1-334

Dependent variable: Grade

	<i>Coefficient</i>	<i>p-value</i>	
const	1,27187	0,28382	
GYM	-0,0135328	0,90158	
Age	0,0781072	0,18978	
Year	-0,18737	0,06681	*
TIMES	0,135546	0,03273	**
WI	0,0521134	0,69330	
WNF	0,185176	0,23674	
WNT	0,144529	0,61610	
WSJ	0,00105374	0,99401	
WSP	0,429775	0,01231	**

$$R^2 = 0.0467$$

$$R^2_{adj} = 0.0202$$

\*Significant at the .10 level; \*\*significant at the .05 level; \*\*\*significant at the .01 level

The equations expressing our models are following:

$$\text{GRADE} = 1,4 + 0,11 * MI + 0,14 * TIMES - 0,21 * Year + 0,08 * Age - 0,02 * GYM - 0,37 * MNF - 0,32 * MNT - 0,13 * MSJ - 0,25 * MSP$$

$$\text{GRADE} = 1,27 + 0,05 * WI + 0,14 * TIMES - 0,19 * Year + 0,08 * Age - 0,01 * GYM + 0,19 * WNF + 0,15 * WNT + 0,001 * WSJ + 0,43 * WSP$$

This model again showed a statistically significant effect of variables TIMES and Year on final grade. Model could also prove or refute influence of correlated gender with certain personality types. Both models finally gave us some answers. Male NF's reach worse final grades (coefficient -0.37) than those male students who have different personality types (or female students with identical personality type). The second table displays results for female students. As we can see, female SP's significantly (coefficient 0.43) get better marks than other female students can. Coefficient of determination is in both cases higher than in previous models but still we cannot claim these models statistically strong.

## 7. Model 2: Professor as an influence on student's final grades

For purposes of this part of thesis will perfectly fit the same method – OLS expressed as following:

$$GRADE = f(\text{Age, Woman, TIMES, GYM, YEAR, MBTI variables, MBTI interaction variables})$$

### Hypothesis 4: Students with similar personality type get better results.

Process of testing this model is similar to previous hypothesis. Hypothesis will be described by following:

$$GRADE = \beta_0 + \beta_1 * Woman + \beta_2 * Year + \beta_3 * TIMES + \beta_4 * GYM + \beta_5 * Age + \beta_6 * TEACHMATCH + \varepsilon$$

Results are summarized in following table<sup>14</sup>:

Model with teacher's personality type; observations 1-65

Dependent variable: Grade

	<i>Coefficient</i>	<i>p-value</i>
const	1,11359	0,56595
TEACHMATCH	-0,117293	0,58621
Age	0,0524055	0,57688
GYM	0,32262	0,17129
TIMES	0,0491041	0,76614
Year	0,147024	0,44032
Woman	-0,0498417	0,81130

$$R^2 = 0.055$$

$$R^2_{adj} = 0.042$$

\*Significant at the .10 level; \*\*significant at the .05 level; \*\*\*significant at the .01 level

Let's summarize results to this equation:

$$GRADE = 1,11 - 0,05 * Woman + 0,15 * Year + 0,05 * TIMES + 0,32 * GYM + 0,05 * Age - 0,12 * TEACHMATCH$$

Proving this hypothesis had to be just a “formality”. Finding correlation with some Keirsey-Bates personality types gave us hope that also this hypothesis will be successful. After testing, we have found interesting fact: Czech students with similar personality type (in our case ESFJ) do not get better results than other students get. This model has not proved any statistical significance. Problem could be in fact that course is divided between lectures and seminars, which are taught by other teachers. However, we can still observe some interesting correlations shown just in this model – female students get worse grades (coefficient -0.05) than their male school mates. This is an interesting conclusion even if we realize that course 5EN253 is the only course taught by a female professor. Another interesting fact shown only in this model is positive correlation between variable GYM and Year and final grade. This opposite correlation from previous models could be caused by many factors and therefore, it deserves more focus in the future.

<sup>14</sup> We gain personality type only from professor Eva Hromadkova who taught course 5EN253. Therefore in our model is only 65 valid observations.

### Hypothesis 5: Students with similar gender with their professors get better results.

Test of this hypothesis can show correlation between gender of teacher, student's gender and final grades. If we find some relation in this model, it can have interesting impact on our output of this paper.

Model is described as following:

$$GRADE = \beta_0 + \beta_1 * Woman + \beta_2 * Year + \beta_3 * TIMES + \beta_4 * Age + \beta_5 * GYM + \beta_6 * MATCHSEX\_W + \varepsilon$$

Following table shows results of testing this hypothesis:

Model with matching teacher's gender; observations 1-334

Dependent variable: Grade

	<i>Coefficient</i>	<i>p-value</i>	
const	1,20541	0,31248	
GYM	-0,0220024	0,84076	
Age	0,0825365	0,16848	
MATCHSEX_W	0,0461381	0,79668	
Woman	0,170372	0,10145	
Year	-0,196358	0,05717	*
TIMES	0,134934	0,03398	**

$$R^2 = 0.028$$

$$R^2_{adj} = 0.011$$

\*Significant at the .10 level; \*\*significant at the .05 level; \*\*\*significant at the .01 level

Equation with results of this model is:

$$GRADE = 1,2 + 0,17 * Woman - 0,2 * Year + 0,13 * TIMES + 0,08 * Age - 0,02 * GYM + 0,05 * MATCHSEX\_W$$

Table shows that our hypothesis does not work very well because statistically significant are again only those variables where we were expecting it. We have confirmed what was confirmed in previous models – TIMES and Year has impact on student's final grades. Even if the effect of variable MATCHSEX\_W is not statistically significant, we can observe positive correlation (coefficient 0.05) between matching student's and teacher's gender and student's final grade. However, coefficient of determination is very low. It could be caused by wrong model we predicted or a wrong dataset we used.

Interesting fact, which appears in the whole paper, is negative effect of GYM variable on final grade. Every gymnasium student is growing in environment of his superiority. Other types of secondary schools are said to be lower-classed and gymnasium would prepare students for tertiary schooling not as any other. Our assumption was variable GYM would have positive effect on student's result. However, all our models showed that being a former gymnasium student is predetermining students to get worse grades. This could be correlated with the feeling of superiority and satisfaction of getting to university. This can represent a target that students are willing to reach and students loose motivation after its reaching. Maybe we can find a parallel with men and women in economic courses. Former gymnasium students have the same low motivation to have good grades as male students and female students could be assimilated to students from other high schools.



## Conclusion

The main aim of this thesis was to confirm or displace a common saying about women in economics and what is the reason of lack of women in this field of study. This lack of women is not that striking at universities but we have observed diminishing trend at Faculty of Economics and Public Administration, UEP. Share of female students is getting lower in past five years and we can expect continuing of this trend. Hence this work used theory of personality type and its influence on student's results for explaining trends at our university. This may lead to disclosing – at least a little – of Czech tertiary schooling environment. Hypotheses we used for purposes of our paper were built up under previous researches conditions and modified for UEP needs.

Testing of all our hypotheses led to many interesting results – personality types were found as a not very significant variables influencing final grade. Some influence was detected in case of males with personality type NF causing worse grades. On the other hand, better results reach female students with SP personality type. Also model dealing with gender led to interesting result – women obtain better final results than their male colleagues. This may represent an interesting argument for the following testing. That may focus on this variable and remit it to deeper research – if women at UEP get better results, why there are so little PhD female students? University of Economics, Prague has some specifics which are unique in Czech schooling system – students have 36 spare credits which can be lost in case of failing course. This trend therefore had to be consulted in our model we used in paper. We have found out the fact that TIMES (number of times student is attending course) positively influence grade student finally gets. In addition, variable YEAR (school year when student attended particular course) affects negatively final grade. This represents interesting outcome of this thesis because general theory assumes higher year – more knowledge student has and therefore better results he obtains. As we can see, theory does not fit well and this could represent interesting point for following testing. Another interesting effect (more precisely a negative effect) has variable GYM corresponding to absolved secondary education. Testing showed no statistically significant – but negative - correlation between student's secondary education at gymnasium and his final grades. This may represent an interesting conclusion and even more interesting impulse for deeper analysis of secondary schooling system in the Czech Republic.

Even if we have found out many interesting facts from our testing, models we used in this thesis proved a very little of dataset. It may be caused due to unsuitable testing methods and it is very likely that simple method of locating students MBTI personality type indicator had its share on unfitting model. This may be an impulse for another testing with different models or changing variables to fit more to Czech schooling environment.

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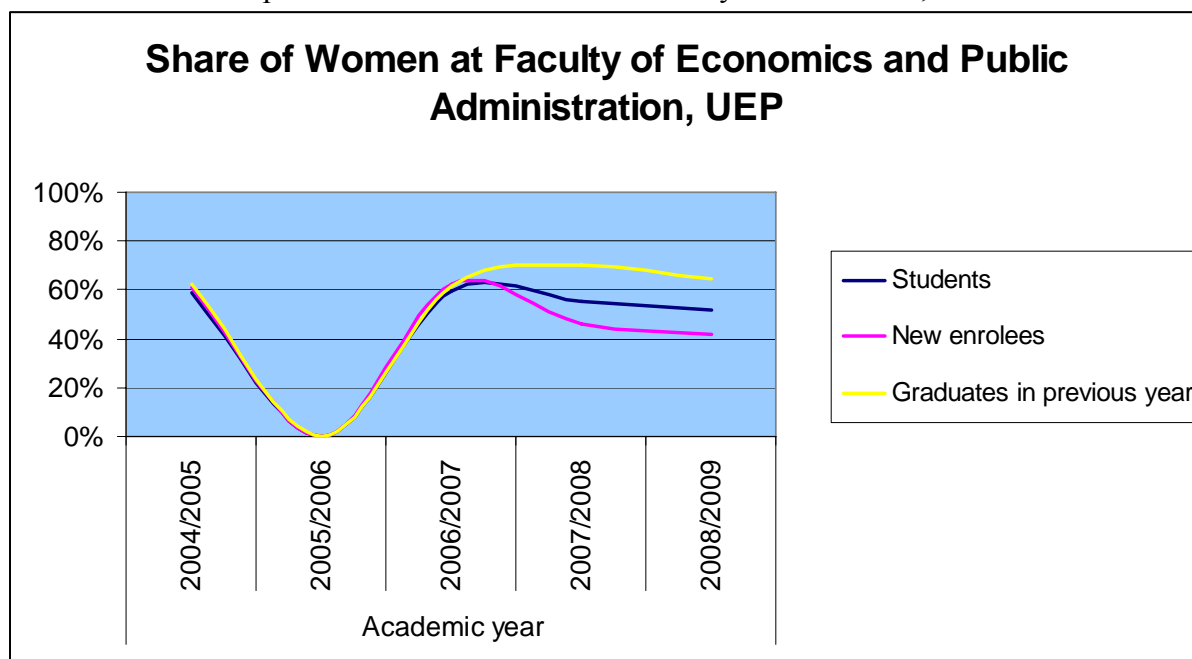
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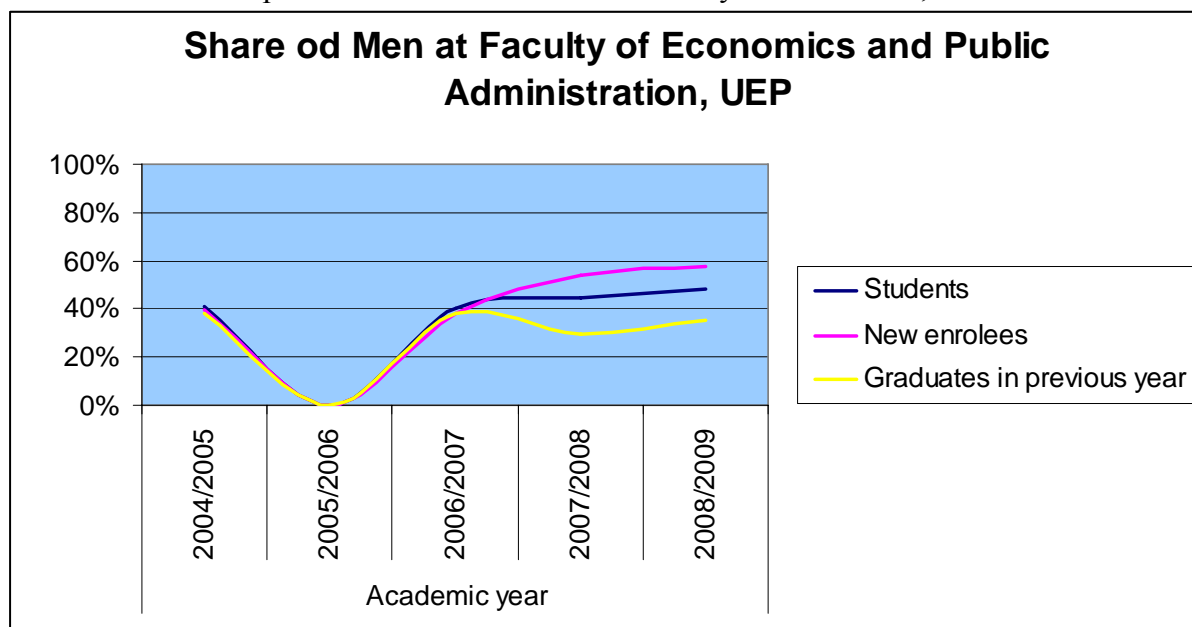
## Appendix

Graph 1: Share of Women at the Faculty of Economics, UEP



Source: [www.czso.cz](http://www.czso.cz); own arrangement

Graph 1: Share of Women at the Faculty of Economics, UEP



Source: [www.czso.cz](http://www.czso.cz); own arrangement

Table 2: Share of Women and Men in selected Fields of Study in 2008/2009

Fields of study	Students		New enrollees in 2008		Graduates in 2008	
	women	men	women	men	women	men
Natural sciences	42,54%	57,46%	43,08%	56,92%	45,57%	54,43%
Technology	25,75%	74,25%	26,51%	73,49%	26,97%	73,03%
Agriculture, forestry and veterinary medicine	57,64%	42,36%	57,46%	42,54%	59,91%	40,09%
Health services, medicine and pharmacy	72,00%	28,00%	77,33%	22,67%	79,95%	20,05%
Humanities and social science	65,80%	34,20%	68,63%	31,37%	68,52%	31,48%
Economic sciences	60,69%	39,31%	62,90%	37,10%	65,74%	34,26%
Law and legal science	54,75%	45,25%	59,33%	40,67%	55,45%	44,55%
Pedagogy, tutorship and social care	78,78%	21,22%	80,57%	19,43%	77,57%	22,43%
Culture and art	60,25%	39,75%	59,34%	40,66%	60,94%	39,06%

Source: www.czso.cz; own arrangement

Table 6: Descriptive statistics of chosen variables; observations 1 - 334

Variable	Mean	Median	Minimum	Maximum	Variance
Woman	0,535928	1,00000	0,000000	1,00000	0,499456
Year	2,78443	3,00000	1,00000	4,00000	0,644867
TIMES	1,49401	1,00000	1,00000	5,00000	0,865571
WI	0,254491	0,000000	0,000000	1,00000	0,436228
I	0,497006	0,000000	0,000000	1,00000	0,500741
N	0,359281	0,000000	0,000000	1,00000	0,480510
NF	0,236527	0,000000	0,000000	1,00000	0,425587
WNF	0,161677	0,000000	0,000000	1,00000	0,368706
NT	0,122754	0,000000	0,000000	1,00000	0,328648
WNT	0,0299401	0,000000	0,000000	1,00000	0,170678
F	0,452096	0,000000	0,000000	1,00000	0,498447
SJ	0,404192	0,000000	0,000000	1,00000	0,491471
WSJ	0,236527	0,000000	0,000000	1,00000	0,425587
WSP	0,107784	0,000000	0,000000	1,00000	0,310573
SP	0,236527	0,000000	0,000000	1,00000	0,425587
P	0,425150	0,000000	0,000000	1,00000	0,495107
GYM	0,733533	1,00000	0,000000	1,00000	0,442775
Age	21,9910	22,0000	20,0000	27,0000	1,04115
Grade	2,75449	3,00000	1,00000	4,00000	0,879988
TEACHSEX_W	0,194611	0,000000	0,000000	1,00000	0,396495
MATCHSEX_W	0,0868263	0,000000	0,000000	1,00000	0,282003

Table 7: Basic statistics of chosen variables; observations 1 - 334

	<b>TOTAL</b>	<b>5EN200</b>	<b>5EN253</b>	<b>5EN302</b>
<b>Variable</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>	<b>Total</b>
WOMAN	179	86	30	64
MAN	155	64	36	54
YEAR	2.78	2.73	2.55	2.97
TIMES	1.49	1.79	1.5	1.12
GYM	245	111	48	85
AGE	21.99	21.96	21.94	22.04
GRADE	2.75	2.92	2.88	2.48