

GENDER DIFFERENCES IN NETWORKING BEHAVIOUR

An Experimental Study Among High School Students

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ABSTRACT

This research analyses gender differences in the networking behaviour of male and female high school students. Empirical evidence is contributed to the existing theoretical and empirical literature on gender differences in networking behaviour, by conducting a strategic networking experiment among high school students in the Netherlands. In the experiment, the decisions of male and female students with respect to the disclosure of competences to other students and the establishment of connections with other students are observed. The results of the experiment show that male and female students are equally likely to send self-promoting messages to other students. Also, the results of the experiment show that male students are more likely to establish connections with other male students, compared to female students.

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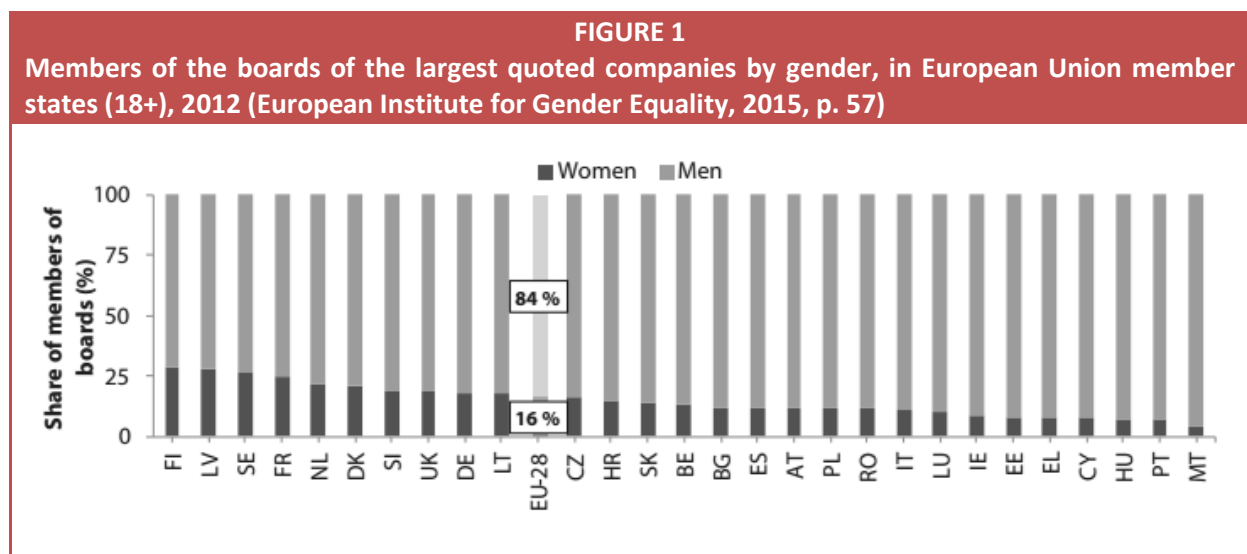
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1. INTRODUCTION

Recently a new edition of the Gender Equality Index on gender equality in the European Union member states was published (European Institute for Gender Equality, 2015). Despite multiple attempts with respect to the introduction of gender quota targets in the different European Union member states, achieving greater gender equality in the representation of men and women on the board of directors of organisations remains a difficult task (European Institute for Gender Equality, 2015). The results presented in this report show that an equal representation of males and females on the board of directors of organisations in all European Union member states is still far from reached, indicated by the 16 % female representation and the 84 % male representation for the European Union average (figure 1). There seems to be something holding back women from acquiring higher positions in organisations within the European Union. Therefore, it is important to look at reasons for this hold up of advancement of women to positions at the higher levels in organisations within the European Union.



A key factor discussed in the literature on why women are struggling to advance towards positions at the higher levels in organisations, concerns the fact that there are gender differences in the networking behaviour of men and women in organisations (Benschop, 2009; Metz, 2009; Beaman & Magruder, 2012; Kankunnen, 2014; Berger et al., 2015; Mengel, 2015). Men and women differ in their networking behaviour with respect to the disclosure of their competences to members at the higher levels in the organisation and the establishment of connections with influential members at the higher levels in the organisation, which are both considered to be important for obtaining advancement opportunities for

positions at the higher levels in organisations (Beaman & Magruder, 2012; Mengel, 2015). Therefore, it is important to look at gender differences in the networking behaviour of men and women in organisations, in order to find out what exactly is holding back women from advancing to positions at the higher levels in organisations. However, research with respect to gender differences in the networking behaviour of men and women is limited.

Most of the research with respect to gender differences in the networking behaviour of men and women has been focused on explaining differences (gender inequality) in income of men and women with similar positions in organisations (Mengel, 2015) and differences (gender inequality) in opportunities for men and women with respect to advancement to positions at the higher levels in organisations (Metz, 2009; Beaman & Magruder, 2012; Kankunnen, 2014; Berget et al., 2015). However, little attention has been paid to the origin of these gender differences in networking behaviour. The existing literature primarily focuses on the networking behaviour of men and women at the organisational level, thereby foregoing gender differences in networking behaviour in the earlier stages of the lives of men and women ('pre-organisational life'), that in turn may shape future gender differences in the networking behaviour of men and women at the organisational level again. Therefore, the goal of this research is to gain insights in the development of gender differences in the networking behaviour of men and women in the earlier stages of their lives, before they are affected by the 'networking cultures' of existing organisations ('pre-organisational life'), by conducting a strategic networking experiment among high school students in the Netherlands.

The central research question this paper addresses is: *In what way do male and female high school students differ with respect to networking behaviour?*

To answer this research question, the paper is structured as follows. In chapter 2 a review of the existing literature on gender differences in the networking behaviour of men and women is presented. In chapter 3 the methodology and data used throughout this research are presented. The results of the strategic networking experiment are analysed in chapter 4. In chapter 5 the conclusions and discussion of this research are presented, together with its limitations and recommendations for future research.

2. LITERATURE REVIEW

In this section an overview of the existing literature on gender differences in the networking behaviour of men and women is presented, in order to get a greater understanding of the different paths that men and women follow with respect to networking behaviour. There are two main aspects of networking behaviour in organisations in which men and women differ from each other, according to the existing literature: the disclosure of competences to other members in the organisation and the establishment of connections with other members in the organisation (Beaman & Magruder, 2012; Mengel, 2015). Therefore, it is important to review both gender differences in the disclosure of competences of men and women and gender differences in the establishment of connections of men and women.

The literature review is divided into three subsections. In the first subsection, the literature on gender differences with respect to the disclosure of competences to other members in the organisation is discussed. In the second subsection, the literature on gender differences with respect to the establishment of connections with other members in the organisation is discussed. In the third and final subsection the hypotheses with respect to gender differences in the networking behaviour of men and women, which are evaluated in the remainder of this paper, are presented.

2.1 Gender differences in disclosure of competences

The first main aspect of networking behaviour in which men and women differ from each other is concerned with gender differences in the disclosure of competences to other members in the organisation (Beaman & Magruder, 2012; Mengel, 2015). In order for men and women to be able to advance from lower positions to higher positions in organisations, men and women have to convince the members that are working at the higher levels in the organisation of their competences for a position at the higher levels of the organisation (Singh et al., 2002; Mengel, 2015). However, men and women do not seem to follow the same path with respect to the disclosure of their competences to convince the members that are working at the higher levels in the organisation, due to differences in gender stereotypical expectations with respect to the presentation of competences of men and women (Rudman, 1998; Singh et al., 2002).

On the one hand, men are expected to be confident and ambitious with respect to the presentation of their competences to the members that are working at the higher levels of the

organisation, in order for the men to be eligible for advancement to a position at a higher level in the organisation (Rudman, 1998). Men that do not adhere to these expectations and prefer a more moderate approach with respect to the presentation of their competences, are considered to be violating gender stereotypical expectations and are therefore considered to be less suitable for advancement to a position at a higher level in the organisation (Moss-Racusin et al., 2010). Therefore, men are pressured towards promoting themselves as successful, confident and ambitious as possible when disclosing information to the members at the higher levels in the organisation, in order to be eligible for advancement to a position at a higher level in the organisation (Singh et al., 2002; Moss-Racusin et al., 2010).

On the other hand, women are expected to be less confident and ambitious with respect to the presentation of their competences to the members that are working at the higher levels of the organisation, in order for the women to be eligible for advancement to a position at a higher level in the organisation (Rudman, 1998). Women that do not adhere to these expectations and prefer a more prominent approach with respect to the presentation of their competences, are considered to be violating gender stereotypical expectations and are therefore considered to be less suitable for advancement to a position at a higher level in the organisation (Rudman, 1998; Heilman & Wallen, 2004; Bowles et al., 2007). Also, women that present themselves as successful, confident and ambitious, are considered to be less competent with respect to social skills and fear the risk of their shortcomings becoming too visible for the members at the higher levels of the organisation (also called the ‘backlash effect’ (Rudman, 1998)), leading to the fact that men are selected more often over women for a position at a higher level in the organisation (Phelan et al., 2008). Therefore, women are pressured towards promoting themselves in a more humble way with respect to successfulness, confidence and ambition when disclosing their competences to the members at the higher levels in the organisation, in order to be eligible for advancement to a position at a higher level in the organisation (Singh et al., 2002).

In sum, there seems to be a gender difference in the disclosure of competences of men and women in organisations, with men being more focused on promoting themselves as successful, confident and ambitious as possible and women being more focused on promoting themselves in a more humble way with respect to successfulness, confidence and ambition, in order to be eligible for advancement to a position at a higher level in the organisation (Singh et al., 2002).

2.2 Gender differences in establishment of connections

The second main aspect of networking behaviour in which men and women differ from each other is concerned with gender differences in the establishment of connections with other members in the organisation (Beaman & Magruder, 2012; Mengel, 2015). In order for men and women to be able to advance from lower positions to higher positions in organisations, it is important to establish connections with influential members in the organisation (Lyness & Thompson, 2000). The members at the higher levels in the organisation have valuable information with respect to advancement possibilities, requirements and experiences, that can be shared with men and women that are working at the lower levels of the organisation and desire to advance to a higher level in the organisation (Lyness & Thompson, 2000). Therefore, the establishment of connections with these influential members in the organisation provide men and women with an opportunity for advancement to a higher position within the organisation. However, men and women do not seem to follow similar paths with respect to the establishment of connections with other members in the organisation, due to differences in networking and advancement opportunities for men and women (Aldrich et al., 1989; Forret & Dougherty, 2004; Metz, 2009; Watson, 2011; Brink & Benschop, 2014).

Men and women do not seem to differ with respect to the importance of establishing connections with other men in the organisation, due to the fact that the majority of members working at the higher levels in the organisation are men (Lalanne & Seabright, 2011). Both men and women establish connections with other men that are working at the higher levels in the organisation, in order to obtain so-called ‘mentoring relations’, that are important for obtaining valuable information and guidance with respect to advancement opportunities, requirements and experiences (Lyness & Thompson, 2000; Searby & Tripses, 2006). However, looking at the share of connections with other men in the organisation in the networks of men and women, the networks of men consist almost entirely of connections with other men and almost no connections with other women, while the networks of women consist of a more balanced mix between connections with other men and connections with other women (Aldrich et al., 1989; Renzulli et al., 2000; D’Exelle & Holvoet, 2011, Mengel, 2015). Watson (2011) argues that this difference can be explained by the fact that women tend to focus more on establishing connections with other members in the organisation based on a ‘friendliness perspective’, while men tend to focus more on establishing connections with other members in the organisation based on ‘business perspective’ (also: Ibarra, 1992). Therefore, men are more likely to be selected for advancement to a higher position within the

organisation than women, due to the fact that men tend to focus more on establishing ‘instrumental’ connections instead of ‘affective’ connections, compared to women (Watson, 2011).

The former paragraph discusses the fact that men and women are establishing different connections with other members in the organisation on a voluntary base. However, the fact that men and women differ with respect to networking behaviour can also be caused by differences in opportunities for the establishment of connections with other members in the organisation (Linehan, 2001; Forret & Dougherty, 2004). Forret & Dougherty (2004) argue that women have a lower chance to access influential members in the organisation, compared to men. This in turn leads to the fact that women have a lower chance to establish connections with the men at the higher levels in the organisation to obtain so-called ‘mentoring relations’, that are important for obtaining value information and guidance with respect to advancement opportunities, requirements and experiences (Lyness & Thompson, 2000; Linehan, 2001). Linehan (2001) adds to this that women are excluded from business and social networks, described as the ‘isolation effect’, leading to a reinforcement cycle of differences in the networking behaviour of men and women. In the end, this difference in opportunities for the establishment of connections with other members in the organisation causes networking to be more beneficial for the advancement process of men than for the advancement process of women in organisations (Forret & Dougherty, 2004; Metz, 2009). In this paper, differences in opportunities for the establishment of connections are not addressed, due to the fact that male and female students receive equal opportunities with respect to the establishment of connections in the experiment.

Another important explanation for the fact that men and women differ with respect to the establishment of connections with other members in the organisations is based on differences in advancement opportunities (Forret & Dougherty, 2004; Metz, 2009; Brink & Benschop, 2014). Women focus more on establishing connections with other women that are working at the higher levels of the organisation, instead of establishing connections with other men that are working at the higher levels of the organisation, in order to increase the likelihood of being selected for advancement to a higher position within the organisation (Ghani et al., 2013; Checchi et al., 2015). Ghani et al. (2013) argue that this can be explained by the fact that women that are working at the higher levels of the organisation, can provide valuable information and guidance with respect to advancement opportunities, requirements and experiences, to the other women. However, the establishment of connections with women that are working at the higher levels of the organisation may not be as beneficial to the women

as presumed. Brink & Benschop (2014) argue that both men and women that are working at the higher levels of the organisation, seem to prefer networking with other men, instead of women, leading to the fact that men are relatively more informed about advancement opportunities, requirements and experiences than women. In the end, networking seems to be more beneficial again for the advancement process of men than for the advancement process of women in organisations (Brink & Benschop, 2014). In this paper, differences in advancement opportunities are not addressed, due to the fact that male and female students receive equal opportunities with respect to the establishment of connections in the experiment.

In sum, there seems to be a gender difference in the establishment of connections of men and women, with men being more focused on establishing connections with other men in the organisation and women being more focused on establishing a balanced mix between connections with other men and connections with other women in the organisation (Aldrich et al., 1989; Renzulli et al., 2000; D'Exelle & Holvoet, 2011, Mengel, 2015).

2.3 Hypotheses

The literature discussed in the previous subsections with respect to gender differences in the networking behaviour of men and women, shows the following gender differences in the networking behaviour of men and women. First of all, with respect to the disclosure of competences to other members in the organisation, men and women seem to differ from each other, with men being more focused on promoting themselves as successful, confident and ambitious as possible and women being more focused on promoting themselves in a more humble way in terms of successfulness, confidence and ambition (Singh et al., 2002). Secondly, with respect to the establishment of connections with other members in the organisation, men and women seem to differ from each other, with men being more focused on establishing connections with other men in the organisation and women being more focused on establishing a balanced mix between connections with other men and connections with other women in the organisation (Aldrich et al., 1989; Renzulli et al., 2000; D'Exelle & Holvoet, 2011, Mengel, 2015).

Based on this information, two hypotheses are constructed with respect to gender differences in the networking behaviour of male and female high school students, which are evaluated empirically in the remainder of this paper.

For the gender differences in the disclosure of competences of male and female high school students, the following hypothesis is used throughout the paper.

Hypothesis 1: *Male students are more likely to send self-promoting messages to other students, compared to female students.*

For the gender differences in the establishment of connections of male and female high school students, the following hypothesis is used throughout the paper.

Hypothesis 2: *Male students are more likely to establish connections with other male students, compared to female students.*

3. METHODOLOGY

In this section an overview of the experimental design and data used throughout this paper is presented. Earlier research shows that although the networking behaviour of individuals can often not be observed in real-life, the use of a lab experiment makes it possible to observe the networking behaviour of individuals in a controlled environment, providing both male and female high school students with the same networking opportunities (Mengel, 2015). Although the results from such a lab experiment cannot be translated 1 on 1 to the real world, due to the simplifications that are made in the lab experiment (controlled environment), the results can still be used as an approximation of differences in behaviour of individuals in the real world. Therefore, in this research, a new lab experiment is designed to get an approximation of gender differences in the networking behaviour of male and female students in real-life.

The methodology is divided into two subsections. In the first subsection the experimental design is discussed, focusing on the measurement of gender differences in the networking behaviour of male and female students, important for the evaluation of the hypotheses presented in the previous section. In the second subsection the data used throughout this paper is discussed.

3.1 Experimental design

An experiment is conducted in which the students solve two tasks twice. In the first round of tasks, the students are working for themselves on each of the tasks. The payoff of the students in this round of tasks only depends on their own performance on each of the tasks. In the second round of tasks, the students are working together with someone else on each of the tasks. The payoff of the students in this round of tasks depends not only on their own performance on each of the tasks, but also on the performance of another student on each of the tasks. In between the two rounds of tasks, the students are first asked to decide whether or not to disclose their competences on each of the tasks to the other students. After that, the students are asked to choose one other student for each of the tasks, to work with on the tasks in the second round. The decisions made by the students are used to test whether or not there are gender differences in the networking behaviour of male and female students.

3.1.1 Tasks

The two tasks used in the experiment are the following: adding up games and matrix games. In the adding up games, the students have to add up five two-digit numbers per puzzle and write down the total number for each puzzle (based on Niederle & Vesterlund, 2007). In the matrix games, the students have to count the number of '1' entries in an 8 by 8 matrix, filled with only '0' and '1' entries (based on Mengel, 2015). Both the adding up games and the matrix games are considered to be gender neutral tasks, involving a basic counting procedure that does not favour male students over female students or the other way around with respect to performance (Niederle & Vesterlund, 2007). For each of the tasks, the students have a three minute time limit to answer the puzzles (without the use of a calculator). The scores of the students are calculated based on the amount of puzzles solved correctly. The students do not get to know their scores on each of the tasks until the end of the experiment. The students have an incentive to answer as many puzzles as possible correctly for each of the tasks, because they can earn more money by answering the puzzles correctly.

3.1.2 Introduction of the experiment

At the start of the experiment, all students are asked to read through the experimental instructions together with the researcher, who reads these instructions out loud in the classroom. The students are informed about the fact that they are participating in a decision making experiment, consisting of an individual part (first round of tasks) and a group part (second round of tasks), in which they can earn a real amount of money. Also, the students are informed that their payoff for the experiment is denoted in points (at a conversion rate of 1 point = 0.01 euro's) and that this payoff depends on the decisions that they make in the experiment (together with a fixed participation fee of 50 points). To ensure that the decisions of the students are anonymous and remain anonymous after the experiment is completed, each student receives a participant number. The students are informed that this number is only used to determine the winning student of the experiment, by drawing a random number out of a hat.

After the students are informed about the experimental design, the tasks that need to be performed in the experiment and the decisions that need to be made in the experiment, the students are asked to answer general questions concerning their age, gender, hobbies and sports. By including this mix of questions, the risk of students expecting the experiment to be about gender is minimised, leaving the results of the experiment unbiased.

3.1.3 Measuring disclosure of competences of students

After the first round of tasks, the students are asked to estimate their scores for each of the tasks in the first round of tasks, to get an assessment of the confidence of the students. After that, the students have to make a trade-off with respect to whether or not they are willing to disclose their actual scores (without knowing their actual scores) on each of the tasks to the other students, knowing that the other students will be choosing between them and someone else (who made the same decision with respect to the disclosure of their scores on each of the tasks) for the second round of tasks in the experiment. The students also know that the more they are chosen by the other students for the second round of tasks in the experiment, the higher their payoff gets. The students can decide to disclose their scores for both tasks, for only one of the tasks or for none of the tasks.

The differences between the decisions of the male and female students with respect to the disclosure of their scores on each of the tasks are used to test whether or not male students are more likely to disclosure their competences to the other students, compared to female students (hypothesis 1).

3.1.4 Measuring establishment of connections of students

After making the decision on whether or not to disclose their actual scores to the other students in the experiment, the students are asked to answer a questionnaire, to get an assessment of the skills and confidence of the students. After that, the students have to choose one other student for each of the tasks, to work together with on the tasks in the second round of tasks. For one of the tasks, the students have to choose between two students (coded as ‘student A’ and ‘student B’) that decided to disclose their actual scores. For the other task, the students have to choose between two students (coded as ‘student A’ and ‘student B’) that decided to not disclose their actual scores. The two students (coded as ‘student A’ and ‘student B’) are matched with each other (one male and one female student) based on their decisions with respect to the disclosure of their scores on each of tasks, in order to ensure that none of the students has an advantage over the other students regarding the chance of being selected. The students that decided to disclose their actual scores are in turn matched with each other (one male and one female student) to create the following three types of matches: a high scoring male with a low scoring female, a low scoring male with a high scoring female and a male and a female with the same scores. This is done to test whether or not male and female students differ with respect to the establishment of connections, based on the type of information that they receive about the scores of the students to choose from. All students and

all types of matches are represented an equal amount of times, as far as this is possible, to ensure that none of the students has an advantage over the other students regarding the chance of being selected.

The differences between the decisions of the male and female students with respect to the establishment of connections for each of the tasks are used to test whether or not male students are more likely to establish connections with other male students, compared to female students (hypothesis 2).

3.1.5 Treatment condition

The treatment condition in this experiment is concerned with the amount of information that the students receive for their decisions with respect to the selection of another student for each of the tasks, to work together with on the tasks in the second round. The students in the treatment group and control group follow the same experimental set-up. The only difference between these two groups is that the students in the treatment group receive additional information, revealing the gender of the students to choose from, while the students in the control group do not receive this additional information. This is done to test whether or not male and female students make different decisions with respect to the establishment of connections, when they know the gender of the students to choose from, compared to when they do not know the gender of the students to choose from (treatment effect for hypothesis 2).

3.1.6 Payoff Structure

At the end of the experiment, one student per class is selected at random, by drawing a number out of a hat. The number drawn from the hat corresponds with one of the participant numbers in the classroom, reflecting the winning student of the experiment. The winning student receives his or her payoff in cash in private. The payoff of the student consists of a fixed participation fee, earnings from the adding up games, matrix games and the estimation of the performance on these tasks in the individual part of the experiment, earnings from the questionnaire and earnings from the adding up games and matrix games in the group part of the experiment. The total payoff of the students ranged from a minimum of 430 points to a maximum of 1370 points with an average of 763 points, corresponding to a minimum payoff of € 4.30 and a maximum payoff of € 13.70 with an average of € 7.63 (at a conversion rate of 1 point = 0.01 euro's).

3.2 Data

The experiment, discussed in the previous section is used for the measurement of gender differences in the networking behaviour of high school students in the Netherlands. An overview of the experiment is included in appendix A (translation of the Dutch original version). Due to the low response rate among high schools in the provinces of Noord-Brabant, Gelderland and Limburg for participation in this research, the experiment is conducted at one high school only, called ‘Het Bouwens van der Boijecollege’ (located in Panningen in the province of Limburg). The experiment (the Dutch original version) is conducted four times in total, in different classes that follow the same course and have the same teacher, to ensure that none of the students participates more than once in the experiment. Two classes from the Dutch educational level VWO (grade 4 and 5) and two classes from the Dutch educational level HAVO (grade 3 and 4) are included, resulting in a balanced sample of students aged between 14 and 18 years. The experiment is conducted during consecutive teaching hours, as far as possible, to reduce the risk of exchanging information on the experiment among students during breaks. Unfortunately, classes from the Dutch educational levels HAVO and VWO from grade 5 and 6 respectively are not included, due to the fact that the students from these educational levels and grades already finished their final national exams and therefore also finished school. Nevertheless, two balanced experimental groups are created, with on the one hand a treatment group consisting of a HAVO class (grade 3) and a VWO class (grade 5) and on the other hand a control group consisting of a HAVO class (grade 4) and a VWO class (grade 4). The representation of male and female students among the treatment group and control group within this experiment is presented in table 1. Also, the representation of male and female students with respect to age and educational level in the different experimental groups is presented in table 2. The results of the Wilcoxon rank-sum test show that the treatment group and control group in the experiment are comparable with respect to the gender, age and educational level of the students.

TABLE 1					
Representation of male and female students in experimental groups – Gender. Significance of differences between experimental groups according to Wilcoxon rank-sum test.					
	Treatment group		Control group		Wilcoxon rank-sum test
	Students	%	Students	%	
Number of male students	22	41.5	16	36.4	p = 0.6071
Number of female students	31	58.5	28	63.6	
Total number of students	53	100.0	44	100.0	

TABLE 2

Representation of male and female students in experimental groups – Age (in average years, st.dev in parentheses) and educational level (in percentages). Number of observations N in parentheses. Significance of differences between experimental groups according to Wilcoxon rank-sum test.

		Treatment group		Control group		Wilcoxon rank-sum test
		Male students (N = 22)	Female students (N = 31)	Male students (N = 16)	Female students (N = 28)	
Age		15.7 (1.188)	15.7 (1.156)	15.6 (0.716)	16.0 (0.614)	p = 0.4715
Educational level	HAVO	45.5	48.4	43.8	64.3	p = 0.3463
	VWO	54.5	51.6	56.2	35.7	

4. RESULTS AND ANALYSIS

In this section an overview of the results from the decision making experiment among high school students is presented. The analysis of the results is divided into two subsections. In the first subsection the results with respect to the disclosure of competences of male and female students to the other students are evaluated, in order to formulate an answer to the first hypothesis in this paper. In the second subsection the results with respect to the establishment of connections of male and female students with the other students are evaluated, in order to formulate an answer to the second hypothesis in this paper. The results and analysis are presented in this exact order, to be able to obtain valid conclusions concerning gender differences in the networking behaviour of male and female high school students.

4.1 Disclosure of competences of students

In this subsection the results with respect to the disclosure of competences of male and female students to the other students in the experiment are discussed, in order to find out whether or not male students are more likely to send self-promoting messages to the other students, compared to female students (hypothesis 1). The numerical results for the gender differences with respect to the disclosure of competences of male and female students for the adding up games and matrix games are presented in table 3.

TABLE 3				
Gender differences in disclosure of competences of male and female students – Adding up games and matrix games (in percentages). Number of observations N in parentheses. Significance of gender differences according to Wilcoxon rank-sum test.				
Task	Decision	Male students (N = 38)	Female students (N = 59)	Wilcoxon rank-sum test
Adding up games	Disclose	86.8	89.8	p = 0.6522
	Not disclose	13.2	10.2	
Matrix games	Disclose	81.6	88.1	p = 0.3722
	Not disclose	18.4	11.9	

Based on the numerical results in table 3, there are no significant gender differences between the decisions of the male and female students with respect to the disclosure of competences to other students, according to the results of the Wilcoxon rank-sum test. Male and female students seem to be equally likely to disclose their competences to the other students in the

experiment, with the majority of both the male and female students willing to disclose their competences to the other students in the experiment.

In order to test the robustness of the results from the Wilcoxon rank-sum test presented in table 3, a logistic regression model is developed. The dependent variable of interest in this subsection, the disclosure of competences, is a binary choice variable with only two possible values (disclose and not disclose). Therefore, a linear probability model cannot be used to test the results, because this model assumes that the dependent variable included in the model can have infinite values (Carter Hill et al., 2012; Studenmund, 2014). In order to correct for this, a logistic regression model is used instead (Carter Hill et al., 2012; Studenmund, 2014). The variables that are used to explain the disclosure of competences of the students (dependent variable) are the following: the gender of the decision maker (to find out whether or not male and female students differ in their decisions with respect the disclosure of competences to the other students), the educational level of the decision maker (to correct for differences in the educational level of male and female students) and the age of the decision maker (to correct for differences in the age of male and female students). An overview of the definitions of the logistic regression variables used in this section, is included in appendix C. The results of the logistic regression model for gender differences in the disclosure of competences are presented in table 4.

TABLE 4		
Logistic regression results for gender differences in disclosure of competences of male and female students.		
	Dependent variable	
	Disclosure of competences for adding up games	Disclosure of competences for matrix games
Female student	1.493 (0.60)	1.663 (0.85)
Educational level VWO	2.214 (1.02)	0.682 (-0.55)
Age	0.840 (-0.45)	0.726 (-0.90)
Constant	67.057 (0.72)	883.870 (1.24)
Number of observations	96	96
Pseudo R²	0.019	0.037
LR Chi²	1.27	2.93
Degrees of freedom	3	3
Notes:		
- Odds Ratios presented (value below 1 indicates a negative effect, value above 1 indicates a positive effect and value equal to 1 indicates no effect).		
- Z-statistics in parentheses.		

Based on the results of the logistic regression model in table 4, there are no significant gender differences in the disclosure of competences of male and female students to the other students in the experiment, for both the adding up games and the matrix games.

In sum, male students were expected to be more likely to send self-promoting messages to the other students in the experiment, compared to female students (hypothesis 1). However, the results of the Wilcoxon rank-sum test and the logistic regression model show that there are no significant gender differences with respect to the disclosure of competences of male and female students to the other students in the experiment. Therefore, hypothesis 1 is rejected based on the results presented in this subsection (in addition to this, an overview of the results with respect to gender differences in skills and confidence of male and female students is presented in appendix B).

4.2 Establishment of connections of students

In this subsection the results with respect to the establishment of connections of male and female students with the other students in the experiment are discussed, in order to find out whether or not male students are more likely to establish connections with other male students, compared to female students (hypothesis 2). The numerical results for the gender differences with respect to the establishment of connections of male and female students for the adding up games and matrix games are presented in table 5 (treatment group) and table 6 (control group).

Based on the numerical results in table 5 (treatment group), there is only one situation for which a significant difference between the decisions of the male and female students with respect to the establishment of connections with other students is found, according to the results of the Wilcoxon rank-sum test. This significant difference is concerned with the decisions made by the male and female students that received ‘No scores’ information (not knowing the scores of both students) for the adding up games, representing a decision between establishing a connection with student A (only knowing that student A is a male) or establishing a connection with student B (only knowing that student B is a female). This result shows that male students are more likely to establish a connection with another male student for the adding up games, while female students are more likely to establish a connection with another female student for the adding up games, when they only know the gender of the other students.

TABLE 5					
Gender differences in establishment of connections of male and female students (treatment group) – Adding up games and matrix games (in percentages). Number of male observations N(m) and female observations N(f) in parentheses. Significance of gender differences according to Wilcoxon rank-sum test.					
Task	Type of information	Decision	Male students	Female students	Wilcoxon rank-sum test
Adding up games	High score / Low score (N(m) = 2 & N(f) = 7)	Chooses A	100.0	100.0	No difference
		Chooses B	0	0	
	Low score / High score (N(m) = 5 & N(f) = 4)	Chooses A	20.0	0	p = 0.3711
		Chooses B	80.0	100.0	
	Same scores (N(m) = 2 & N(f) = 7)	Chooses A	0	57.1	p = 0.1763
		Chooses B	100.0	42.9	
Matrix games	High score / Low score (N(m) = 5 & N(f) = 3)	Chooses A	100.0	66.7	p = 0.1967
		Chooses B	0	33.3	
	Low score / High score (N(m) = 4 & N(f) = 5)	Chooses A	0	0	No difference
		Chooses B	100.0	100.0	
	Same scores (N(m) = 4 & N(f) = 5)	Chooses A	75.0	20.0	p = 0.1198
		Chooses B	25.0	80.0	
	No scores (N(m) = 9 & N(f) = 18)	Chooses A	33.3	16.7	p = 0.3352
		Chooses B	66.7	83.3	

TABLE 6					
Gender differences in establishment of connections of male and female students (control group) – Adding up games and matrix games (in percentages). Number of male observations N(m) and female observations N(f) in parentheses. Significance of gender differences according to Wilcoxon rank-sum test.					
Task	Type of information	Decision	Male students	Female students	Wilcoxon rank-sum test
Adding up games	High score / Low score (N(m) = 0 & N(f) = 8)	Chooses A	-	100.0	-
		Chooses B	-	0	
	Low score / High score (N(m) = 4 & N(f) = 3)	Chooses A	0	0	No difference
		Chooses B	100.0	100.0	
	Same scores (N(m) = 3 & N(f) = 4)	Chooses A	66.7	50.0	p = 0.6831
		Chooses B	33.3	50.0	
Matrix games	High score / Low score (N(m) = 1 & N(f) = 7)	Chooses A	100.0	100.0	No difference
		Chooses B	0	0	
	Low score / High score (N(m) = 4 & N(f) = 3)	Chooses A	0	0	No difference
		Chooses B	100.0	100.0	
	Same scores (N(m) = 4 & N(f) = 3)	Chooses A	50.0	33.3	p = 0.6831
		Chooses B	50.0	66.7	
	No scores (N(m) = 7 & N(f) = 15)	Chooses A	100.0	53.3	p = 0.0325
		Chooses B	0	46.7	

Based on the numerical results in table 6 (control group), there is again only one situation for which a significant difference between the decisions of the male and female students with respect to the establishment of connections with other students is found, according to the results of the Wilcoxon rank-sum test. This significant difference is concerned with the decisions made by the male and female students that received ‘No scores’ information (not knowing the scores of both students) for the matrix games, representing a decision between establishing a connection with student A or establishing a connection with student B. This result shows that male students are more likely to establish a connection with student A for the matrix games, when they know nothing about the other students, compared to female students.

In order to test the robustness of the results from the Wilcoxon rank-sum tests presented in table 5 and 6, a logistic regression model is developed. The dependent variable of interest in this subsection, the establishment of connections, is a binary choice variable with only two possible values (establish a connection with student A and establish a connection with student B). Therefore, a linear probability model cannot be used to test the results, because this model assumes that the dependent variable included in the model can have infinite values (Carter Hill et al., 2012; Studenmund, 2014). In order to correct for this, a logistic regression model is used instead (Carter Hill et al., 2012; Studenmund, 2014). The variables that are used to explain the establishment of connections of the students (dependent variable) are the following: the gender of the decision maker (to find out whether or not male and female students differ in their decisions with respect the establishment of connections with other students), the educational level of the decision maker (to correct for differences in the educational level of male and female students), the age of the decision maker (to correct for differences in the age of male and female students) and the task performed by the decision maker (to correct for differences in the decisions for the adding up games and matrix games). An overview of the definitions of the logistic regression variables used in this section, is included in appendix C. The results of the logistic regression model for gender differences in the establishment of connections are presented in table 7.

Based on the results of the logistic regression model in table 7, there are no significant gender differences found with respect to the establishment of connections of male and female students with other students in the experiment, for the students in the control group. However, there is a significant gender difference found with respect to the establishment of connections of male and female students with other students in the experiment, for the students in the treatment group. This result shows that male students are more likely to establish connections

with other male students, compared to female students, when the gender of the other students is known. Also, this result significantly depends on the type of task, with both male and female students being more likely to establish connections with other male students for the adding up games, compared to the matrix games.

TABLE 7		
Logistic regression results for gender differences in establishment of connections of male and female students.		
	Dependent variable	
	Establishment of connections (treatment group)	Establishment of connections (control group)
Female student	0.357** (-2.38)	1.535 (0.89)
Educational level VWO	1.796 (0.70)	0.996 (-0.01)
Age	1.216 (0.54)	0.891 (-0.33)
Adding up games	2.869** (2.44)	0.682 (-0.87)
Constant	0.027 (-0.68)	7.316 (0.36)
Number of observations	106	86
Pseudo R²	0.118	0.013
LR Chi²	17.06	1.57
Degrees of freedom	4	4
Notes: - Odds Ratios presented (value below 1 indicates a negative effect, value above 1 indicates a positive effect and value equal to 1 indicates no effect). - Z-statistics in parentheses. - ** Significant at 5% level.		

In sum, male students were expected to be more likely to establish connections with other male students in the experiment, compared to female students (hypothesis 2). The results of the Wilcoxon rank-sum tests and the logistic regression model show that there are significant gender differences with respect to the establishment of connections of male and female students with other students in the experiment, with male students being more likely to establish connections with other male students, compared to female students, when the gender of the other students is known. Therefore, hypothesis 2 is confirmed based on the results presented in this subsection.

5. CONCLUSIONS AND DISCUSSION

In this section an overview of the conclusions and discussion of this research with respect to gender differences in the networking behaviour of male and female high school students is presented. Also, the limitations of this research are discussed, together with recommendations for future research on gender differences in networking behaviour.

The central research question that this paper addressed, was: *In what way do male and female high school students differ with respect to networking behaviour?*

In order to answer this question, the specific aspects of the networking behaviour of male and female high school students, concerning the disclosure of competences to other students and the establishment of connections with other students, were reviewed. Based on the literature review, a difference in the networking behaviour of male and female students with respect to the disclosure of competences to other students was expected, with male students being more likely to send self-promoting messages to other students, compared to female students (Singh et al., 2002). Also, based on the literature review, a difference in the networking behaviour of male and female students with respect to the establishment of connections with other students was expected, with male students being more likely to establish connections with other male students, compared to female students (Aldrich et al., 1989; Renzulli et al., 2000; D'Exelle & Holvoet, 2011; Mengel, 2015).

Following former research by Beaman & Magruder (2012) and Mengel (2015), a strategic networking experiment was designed to measure gender differences in the networking behaviour of male and female high school students in the Netherlands. In the experiment, the students were tested with respect to the disclosure of competences to other students and the establishment of connections with other students. For the establishment of connections, a treatment condition was included, to test whether or not male and female students made different decisions with respect to the establishment of connections when they did know the gender of the students to select from, compared to when they did not know the gender of the students to select from. Reviewing the networking decisions of the male and female students in the experiment, the following conclusions can be drawn.

For the networking decision of male and female high school students with respect to the disclosure of competences to other students, the majority of both the male students and the female students is willing to disclose their competences to the other students. There is no

significant gender difference found with respect to the disclosure of competences of male and female students to other students. Therefore, hypothesis 1, stating that male students are more likely to send self-promoting messages to other students, compared to female students, is rejected.

For the networking decision of male and female high school students with respect to the establishment of connections with other students, male students are more likely to establish connections with other male students, compared to female students, when the gender of the other students is known. Therefore, hypothesis 2, stating that male students are more likely to establish connections with other male students, compared to female students, is confirmed.

There are several limitations for this research, that are discussed in the remainder of this section, together with recommendations for future research on gender differences in networking behaviour. First of all, a limitation for this research is the fact that high school students from only one high school are included in this research, due to a low response rate among high schools in the provinces of Noord-Brabant, Gelderland and Limburg for participation in this research. Including students from multiple high schools in multiple provinces in the Netherlands could lead to different results with respect to the networking behaviour of male and female students. Also, by including students from multiple high schools in multiple provinces in the Netherlands, the results could be more representative for all high school students.

Another limitation for this research is the fact that this research only focuses on high school students from the Dutch educational levels HAVO and VWO from grade 3-4 and 4-5 respectively. Students from the Dutch educational levels HAVO and VWO from grade 5 and 6 respectively could not be included in this research, due to the fact that these students already finished their final, national exams and therefore also finished school at the time that this experiment was conducted. Including students from multiple grades and educational levels (including the Dutch educational level VMBO) again could lead to different results with respect to the networking behaviour of male and female students, while also making the results more representative for all high school students.

Also, the results of this research may be influenced by the fact that the experiment was conducted using a paper version, consisting of multiple parts that needed to be handed out and collected over and over. Although the experiment was conducted in a controlled environment as far as possible, the students still communicated with each other during the short time in

which the papers for the experiment were handed out and collected, causing noise in the collected data. In order to overcome this problem, the paper version of the experiment could be translated into a computer version of the experiment, taking away the handing out and collection procedure of the papers for the experiment and reducing the amount of noise in the collected data.

Based on the limitations discussed in the previous paragraphs, future research on gender differences in networking behaviour is needed to find out whether or not male and female high school students actually differ with respect to networking behaviour. In order to do so, future research could include a larger number of students from different high schools and from different provinces in the Netherlands (or even compare students from different countries). Also, students from different educational levels and grades could be included in order for the results to be more representative of high school students in general. Furthermore, transforming the paper version of this experiment into a computer version could result into different results for the networking decisions of students. This research provides a promising base for experimental research on gender differences in the networking behaviour of male and female high school students.

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APPENDIX A: Experimental papers

Assignment Form Part A: Experimental Instructions

Introduction

Welcome. You will be participating in a paid decision making experiment. Your payoff will depend on your own decisions and on the decisions of the other participants in the experiment. It is important to read the following instructions carefully, because there is real money to be earned.

You are not allowed to communicate with the other participants during the experiment. If you have any questions during the experiment, please raise your hand and the researcher will come to your table. The use of mobile devices, calculators and other devices that can have a disturbing effect on the experiment, are not allowed. You are only allowed to use the assignment and answer forms, a piece of scrap paper and a pencil. All decisions made in the experiment need to be written down on the answer forms, otherwise they will not be taken into account.

The entire experiment should be completed in about 50 minutes. At the start of the experiment you will receive your participant number. During this experiment you will never be asked to reveal your true identity. All information with respect to your decisions and payoffs in the experiment is anonymous and will remain anonymous after the experiment is completed.

At the end of the experiment, one of you will receive your payoff of the experiment in private. This payoff is in cash and consists of a fixed participation fee of 50 points for completing the experiment and a variable part that depends on your decisions made in the experiment. In this experiment your payoff will be denoted in points instead of in euro's. Eventually, your points earned in the experiment will be converted into euro's using a conversion rate of: 1 point = 0.01 euro's. The winning participant will be selected at the end of the experiment, at random, by drawing a number out of a hat. This hat contains cards with all the numbers of the participants in the experiment, one card for each participant, reflecting an equal chance for each participant to be selected.

Structure of the experiment

The experiment consists of two parts. In the first part of the experiment you will be working for yourself. In the second part of the experiment you will be working together with someone else. In both the individual and group part of the experiment you will be performing two tasks. The first task involves adding up five two-digit numbers (adding up game). The second task involves 10 by 10 matrices filled with '1' and '0' entries, in which you have to count the number of '1' entries within the matrix (matrix game). For each task (adding up game and matrix game) you have three minutes to provide as many correct answers as possible. Each correct answer increases your points total by 20 points. The more correct answers you give on the two tasks, the higher your total payoff gets.

Part 1: Working for yourself

Each of you is seated at a table with the assignment and answer forms, a piece of scrap paper and a pencil. In this part of the experiment you will be working for yourself. First, you will have to answer some general questions. After that, the first task starts. In the first task, you have three minutes to provide as many correct answers as possible for the adding up games. Each correct answer increases your points total by 20 points. When the three minutes time limit is over, the second task starts. In the second task, you again have three minutes, but this time to provide as many correct answers as possible for the matrix games. Each correct answer increases your points total by 20 points.

When the three minutes time limit is over again, you will be asked to estimate the amount of correct answers you gave for each of the tasks (adding up game and matrix game). You will receive a payoff for estimating the number of your correct answers correctly. You will receive 50 points per task (adding up game and matrix game) minus 10 points for every point of difference between your estimate and your actual amount of correct answers on each of the tasks. You cannot earn a negative amount of points for your estimates.

- Example 1: If you estimate your amount of correct answers for the matrix games to be nine correct answers, while in fact you only have five correct answers, you will earn 10 additional points ($= 50 - (9 - 5) * 10$).

- Example 2: If you estimate your amount of correct answers for the adding up games to be eight correct answers, while in fact you have ten correct answers, you will earn 30 additional points ($= 50 - (10 - 8) * 10$).

Note that you will not learn at this moment whether your estimates of the amount of your correct answers are correct. This will only be announced at the end of the experiment.

After that, you will have to decide whether or not you are willing to disclose the actual number of correct answers for each of the tasks to the other participants of the experiment. This is an important decision, because your payoff in the upcoming, second part of the experiment is partly dependent on the number of other participants that choose you as a group member to work with for the group part of the experiment. The more other participants choose you as a group member, the higher your total payoff gets. The actual number of correct answers is known by us, and we will provide the other participants with the actual numbers in case you decide to make such a disclosure. Note that you can decide to disclose your scores for both tasks, for only one of the tasks or for none of both tasks.

Part 2: Working in a group

For each task, we will now randomly create groups of two people who decided to disclose their actual scores on a given task and groups of two people who decided to not disclose their actual scores on a given task. Each of you will then be presented with one group of people for each of the tasks. This can be either a group composed only of people who disclosed their actual scores or a group composed only of people who did not disclose their actual scores. In each case, you will have to choose one person for each task, to work together with you in the second part of the experiment. This means that you will both be performing the same tasks as before (adding up games and matrix games).

Note also that you will always be in a group from which some other participant will be able to choose, both if you choose to disclose your actual scores or if you choose to not disclose your actual scores. In the upcoming group part of the experiment you will again be answering adding up games and matrix games. However, this time your total payoff depends on your own performance, on the performance of the participant(s) you choose to work with for each of the two tasks and on how many times other participants select you for one or both of the tasks to perform with them.

You will receive the following payoff in the second part of the experiment:

- 10 points for each correct answer you give in each of the tasks (adding up games and matrix games);
- 10 points for each correct answer the other person you selected to work with for the adding up task gives in the adding up task;
- 10 points for each correct answers the other person you selected to work with for the matrix task gives in the matrix task;
- And, 10 points for each correct answer you give for any of the tasks in case other participants select you to work with them in the tasks (adding up games and matrix games).

This means that your payoff in the second part of the experiment will be higher the more correct answers you provide in the tasks, the more correct answers the participants that you selected provide in the tasks and the more other participants select you to work with them in the tasks. Therefore, it is important to make a good decision whether you want the other participants to select you to work with them, based on seeing your actual scores for one or both tasks or whether you want the other participants to have a possibility to select you at random from a group of two people, who both did not decide to disclose their actual scores for one or both tasks.

When you made your decision to disclose your scores or not for each of the tasks (adding up games and matrix games), you will be asked to answer a questionnaire. You will have ten minutes to answer this questionnaire and each correct answer on this questionnaire increases your points total by 20 points. While you answer these questions, we will calculate your actual amount of correct answers for the adding up games and matrix games. When you are finished with the questionnaire you will be asked to wait for the experiment to continue. In the meantime you are not allowed to communicate with the other participants of the experiment.

When the experiment continues, you will receive an assignment form with information of the groups of people you are choosing from for each of the tasks. Each group will consist of two other participants of the experiment. For one task, these will be two people who decided to disclose their actual scores for that task. For the other task, these will be two people who decided to not disclose their actual scores for that task. *(For the treatment group, the following sentence is added here:* Additionally to this, you will also receive information on

the gender of these participants). In each case, you will have to choose one person for each task, to work together with you in the second part of the experiment. When you made your decision, you are asked to wait for the experiment to continue. In the meantime you are not allowed to communicate with the other participants of the experiment.

After that, you will be performing the same tasks as before (adding up games and matrix games). You will again have three minutes to provide as many correct answers as possible for the adding up games and then you will have another three minutes to provide as many correct answers as possible for the matrix games. Keep in mind that your payoff for this second part of the experiment depends on your own performance, on the performance of the participant(s) you selected to work with for each of the tasks and on how many times the other participants selected you to work with them in each of the tasks. When the second three minutes time limit is over, you are asked to wait for the experiment to continue. In the meantime you are not allowed to communicate with the other participants of the experiment.

End

At the end of the experiment, after finishing both the individual part and the group part of the experiment, the teacher of the class is asked to draw a random number out of the hat. The number drawn from the hat reflects the winning participant of the experiment. This participant will receive his or her payoff of the experiment in private. If there are no further questions, we can begin the experiment.

This is the end of part A. Please wait for the experiment to continue.

Assignment Form Part B: General Questions

Please answer the following questions on the answer form.

- (1) What is your age?
- (2) What is your gender?
- (3) What educational level do you follow?
- (4) What are your hobbies?
- (5) What sports do you practice (with regular trainings)?
- (6) How good are you at the sports that you practice, compared to the other people that practice this sport with you? Select one of the following answers below or keep empty if no sports.

Much better	Somewhat better	Average	Somewhat worse	Much worse
☐	☐	☐	☐	☐

This is the end of part B. Please wait for the experiment to continue.

Assignment Form Part C: Adding Up Game (part 1)

Please answer the following adding up games on the answer form.

Puzzle 1				
24	37	16	29	13

Puzzle 2				
63	11	48	20	51

Puzzle 3				
12	87	35	51	27

Puzzle 4				
33	25	67	41	59

Puzzle 5				
15	67	44	98	32

Puzzle 6				
56	71	13	14	65

Puzzle 7				
23	54	33	86	62

Puzzle 8				
72	41	11	83	42

Puzzle 9				
67	88	43	22	79

Puzzle 10				
50	43	69	96	21

Puzzle 11				
65	18	55	32	76

Puzzle 12				
32	20	54	66	52

Puzzle 13				
14	22	42	31	88

Puzzle 14				
18	54	98	21	45

<i>Puzzle 15</i>				
52	67	32	34	99
<i>Puzzle 16</i>				
33	76	44	21	24
<i>Puzzle 17</i>				
85	26	55	85	31
<i>Puzzle 18</i>				
30	42	64	33	22
<i>Puzzle 19</i>				
92	58	91	20	85
<i>Puzzle 20</i>				
67	71	81	56	63
<i>Puzzle 21</i>				
42	22	41	52	81
<i>Puzzle 22</i>				
61	99	42	82	39
<i>Puzzle 23</i>				
76	24	52	11	24
<i>Puzzle 24</i>				
29	67	39	76	19
<i>Puzzle 25</i>				
91	77	42	83	11
<i>Puzzle 26</i>				
65	81	53	22	64
<i>Puzzle 27</i>				
34	63	65	71	29
<i>Puzzle 28</i>				
88	95	16	63	18
<i>Puzzle 29</i>				
81	52	93	62	30

This is the end of part C. Please wait for the experiment to continue.

Assignment Form Part D: Matrix Game (part 1)

Please answer the following matrix games on the answer form.

Puzzle 1									
1	0	0	1	0	1	1	1	1	1
0	0	1	0	1	0	0	0	0	0
1	1	1	1	0	0	1	0	0	1
1	1	0	0	1	1	1	1	0	1
1	1	1	1	1	0	1	1	1	0
1	1	0	0	1	1	1	0	1	1
0	0	1	1	1	0	1	1	0	1
1	1	0	0	0	1	1	0	0	1
0	1	0	0	0	0	0	0	1	1
0	0	0	1	1	1	1	1	0	0

Puzzle 2									
0	1	1	0	0	0	1	1	1	0
1	0	1	1	1	0	0	1	0	1
1	0	1	0	0	1	1	0	1	0
1	1	0	1	0	1	0	0	1	1
0	1	1	1	1	1	0	1	1	1
0	1	1	0	1	0	1	1	0	1
1	0	0	0	1	0	1	0	0	1
1	1	1	0	1	1	1	1	1	0
1	0	0	0	0	1	0	1	0	0
0	1	1	1	0	1	0	1	0	1

Puzzle 3									
0	1	1	1	1	0	1	1	0	1
0	0	0	1	1	1	0	1	1	1
1	0	1	0	1	0	0	0	0	1
1	1	1	1	1	1	0	1	1	1
0	1	1	1	0	1	0	1	0	1
0	1	1	1	0	0	0	0	1	1
1	0	0	0	1	1	1	0	1	0
0	1	1	0	1	0	0	1	1	1
0	1	0	1	0	0	0	1	0	1
1	1	1	1	0	1	0	1	0	1

Puzzle 4									
0	1	0	0	0	1	1	1	0	1
1	1	0	0	1	1	1	1	0	1
0	1	0	1	0	1	0	1	0	1
1	1	1	0	0	0	1	1	0	0
0	0	1	1	0	1	1	1	1	1
1	1	0	0	1	0	1	0	1	0
0	1	1	1	1	0	0	1	0	1
0	1	0	1	0	1	0	1	1	0
1	1	1	1	1	1	1	0	1	1
1	0	1	0	1	1	0	1	1	1

Puzzle 5									
1	1	1	0	1	1	1	0	1	0
0	0	1	1	1	0	1	1	1	0
1	1	0	0	0	0	1	1	0	1
0	0	0	1	1	1	1	1	0	1
1	1	1	1	1	1	0	0	1	0
0	1	0	1	0	1	0	1	0	1
0	1	1	1	0	1	1	1	1	0
1	1	0	0	0	1	0	0	0	0
1	1	1	0	1	1	1	1	1	0
0	1	0	1	0	1	0	0	0	1

Puzzle 6									
1	0	1	0	1	0	1	0	1	0
0	0	0	1	1	1	0	1	1	1
1	1	0	1	0	1	0	1	1	0
1	1	0	0	1	1	0	1	0	0
0	0	0	1	1	0	1	1	1	1
1	0	1	1	1	1	0	1	0	1
1	0	1	0	1	0	1	0	1	0
0	1	1	1	0	1	1	0	0	1
1	0	1	0	1	0	0	0	1	1
1	1	1	1	0	1	1	1	1	0

Puzzle 7									
0	0	1	1	1	1	0	1	0	1
1	1	1	1	1	1	1	0	1	1
1	0	0	0	1	1	0	1	0	1
0	0	1	1	1	0	1	1	1	0
1	0	1	0	1	0	1	0	1	0
0	0	1	1	1	0	1	1	0	1
1	1	1	0	1	0	1	0	1	0
1	1	1	1	0	1	0	1	0	0
0	1	0	1	0	1	1	1	0	1
1	1	1	0	1	1	1	0	0	0

Puzzle 8									
0	1	1	1	0	1	0	1	0	1
1	1	1	0	0	1	1	0	0	1
0	0	0	1	0	1	0	1	1	1
1	1	1	1	1	1	1	1	1	1
0	0	0	1	1	0	0	0	0	0
1	1	0	1	0	1	0	1	0	1
0	1	0	1	0	1	0	0	0	1
1	1	1	1	1	0	1	1	1	1
0	0	1	0	1	0	1	1	1	0
1	0	1	1	1	1	1	0	1	0

Puzzle 9									
1	1	1	1	1	1	0	0	1	1
1	1	1	0	0	0	0	1	0	1
0	0	1	0	1	0	1	0	1	1
1	0	0	0	1	0	1	0	0	1
1	1	1	1	0	1	0	1	1	1
0	1	1	0	1	1	1	0	1	0
0	1	1	1	1	0	1	0	1	1
1	0	0	0	1	1	1	1	0	1
0	1	1	1	1	1	1	1	0	0
1	0	1	0	1	0	0	0	0	1

Puzzle 10									
1	1	1	1	1	1	0	0	0	1
0	1	1	0	1	0	1	0	1	1
1	0	0	0	1	1	0	1	1	0
0	1	0	1	0	1	0	1	0	0
1	1	1	0	1	1	1	1	1	0
0	0	1	1	1	1	1	1	1	0
0	1	0	1	0	1	0	1	0	1
1	1	1	1	0	1	0	1	1	1
0	1	1	0	1	1	0	0	0	1
0	1	0	1	1	1	0	1	1	0

Puzzle 11									
1	0	0	1	1	1	1	0	1	1
0	1	1	1	1	0	0	0	0	0
0	0	0	1	1	1	0	1	0	1
1	0	1	0	1	0	1	1	1	0
1	1	1	1	1	1	0	1	1	1
0	0	1	0	1	0	1	0	0	1
1	1	1	1	1	1	1	0	1	0
0	0	1	0	1	0	0	0	1	1
1	1	1	0	1	0	1	1	1	1
1	0	1	0	1	0	1	1	1	0

<i>Puzzle 12</i>									
1	1	1	1	0	1	0	1	0	1
1	1	0	1	0	1	1	1	0	1
0	0	1	1	1	0	1	1	1	1
1	0	1	1	1	1	0	1	0	1
0	0	0	0	1	1	0	0	1	1
0	1	0	1	0	1	0	1	0	1
1	0	1	0	1	0	0	0	1	1
1	1	1	0	1	1	0	1	0	1
1	1	0	1	0	1	0	0	1	1
1	1	1	1	1	0	1	1	0	1

<i>Puzzle 13</i>									
0	1	1	1	1	0	0	1	0	1
0	1	1	0	1	1	0	1	1	0
1	0	0	0	1	1	1	1	0	1
1	1	1	0	1	0	1	0	1	1
0	1	0	1	0	1	0	1	0	1
1	1	1	0	1	1	0	1	1	0
0	0	1	0	0	0	1	1	1	1
1	1	1	1	1	0	1	0	0	1
1	1	1	0	1	0	1	1	1	0
1	0	1	0	1	1	1	0	1	0

<i>Puzzle 14</i>									
0	1	1	1	1	0	1	0	1	0
1	1	1	0	1	0	0	1	1	0
0	1	0	1	0	1	0	1	0	1
1	1	1	0	1	1	0	0	1	0
0	1	1	0	1	1	0	1	1	1
1	1	0	1	0	1	0	0	0	1
1	1	1	1	1	1	1	0	1	0
0	1	1	1	0	1	0	1	0	0
0	0	0	0	0	1	1	1	0	1
0	1	0	1	1	1	1	1	0	1

This is the end of part D. Please wait for the experiment to continue.

Assignment Form Part E: Performance Estimates

Please answer the following questions on the answer form.

- (1) How many adding up games do you think that you answered correctly?
- (2) How many matrix games do you think that you answered correctly?
- (3) Do you want to disclose your actual amount of correct answers for the adding up games to the other participants of the experiment?
- (4) Do you want to disclose your actual amount of correct answers for the matrix games to the other participants of the experiment?

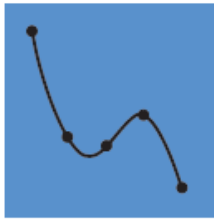
This is the end of part E. Please wait for the experiment to continue.

Assignment Form Part F: Questionnaire

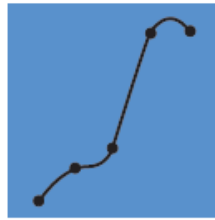
Please answer the following questions on the answer form.

- (1) A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost?
- (2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?
- (3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take the patch to cover half of the lake?
- (4) Which of the following is the earliest date?
 - a. Jan. 16, 1898
 - b. Feb. 21, 1889
 - c. Feb. 2, 1898
 - d. Jan. 7, 1898
 - e. Jan. 30, 1889
- (5) LOW is to HIGH as EASY is to .?.
 - a. SUCCESSFUL
 - b. PURE
 - c. TALL
 - d. INTERESTING
 - e. DIFFICULT

- (6) A featured product from an Internet retailer generated 27, 99, 80, 115 and 213 orders over a 5-hour period. Which graph below best represents this trend?



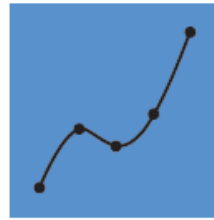
A



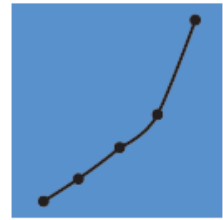
B



C



D



E

- (7) What is the next number in the series? 29 41 53 65 77 .?.

- a. 75
- b. 88
- c. 89
- d. 98
- e. 99

- (8) One word below appears in colour. What is the *OPPOSITE* of that word?

She gave a **complex** answer to the question and we all agreed with her.

- a. Long
- b. Better
- c. Simple
- d. Wrong
- e. Kind

- (9) Jose's monthly parking fee for April was \$150; for May it was \$10 more than April; and for June \$40 more than May. His average monthly parking fee was .?. for these 3 months.

- a. \$66
- b. \$160
- c. \$166
- d. \$170
- e. \$200

(10) *If the first two statements are true, is the final statements true?*

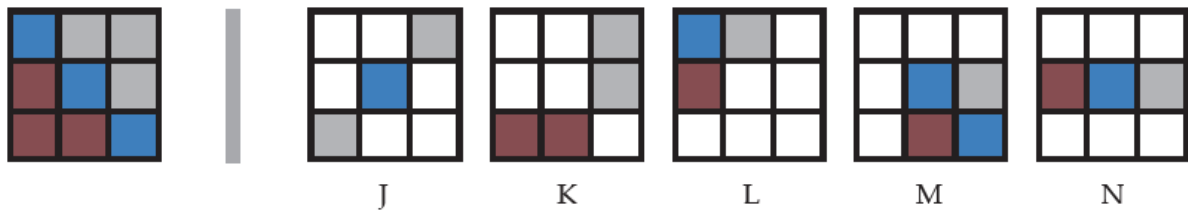
Sandra is responsible for ordering all office supplies.

Notebooks are office supplies.

Sandra is responsible for ordering notebooks.

- a. Yes
- b. No
- c. Uncertain

(11) Which THREE choices are needed to create the figure on the left? Only pieces of the same colour may overlap.



(12) Which THREE of the following words have similar meanings?

- a. Observable
- b. Manifest
- c. Hypothetical
- d. Indefinite
- e. Theoretical

(13) Last year, 12 out of 600 employees at a service organisation were rewarded for their excellence in customer service, which was .?. of the employees.

- a. 1%
- b. 2%
- c. 3%
- d. 4%
- e. 6%

The following two questions will not influence your total payoff of the experiment. Please answer the following questions on the answer form.

- (14) How well do you think you performed in this room on the adding up game. How does your actual score on the adding up game compare to the other participants in this room?
- a. I think I am among the best 10% in this room.
 - b. I think I am not among the best 10% in this room, but better than average.
 - c. I think I am approximately as good as the average person in this room.
 - d. I think I am somewhat less than the average person in this room, but not the worst.
 - e. I think I am among the worst 10% in this room.
- (15) How well do you think you performed in this room on the matrix game. How does your actual score on the matrix game compare to the other participants in this room?
- a. I think I am among the best 10% in this room.
 - b. I think I am not among the best 10% in this room, but better than average.
 - c. I think I am approximately as good as the average person in this room.
 - d. I think I am somewhat less than the average person in this room, but not the worst.
 - e. I think I am among the worst 10% in this room.

This is the end of part F. Please wait for the experiment to continue.

Assignment Form Part G: Selection of Group Members (Example for Treatment Group)

Please answer the following questions on the answer form.

Adding up game		
	Participant A	Participant B
Gender	Male	Female
Score		

- (1) Which participant do you select as a group member for the adding up games? Please write down the letter of the selected participant on the answer form.

Matrix game		
	Participant A	Participant B
Gender	Male	Female
Score	-	-

- (2) Which participant do you select as a group member for the matrix games? Please write down the letter of the selected participant on the answer form.

This is the end of part G. Please wait for the experiment to continue.

Assignment Form Part G: Selection of Group Members (Example for Control Group)

Please answer the following questions on the answer form.

Adding up game		
	Participant A	Participant B
Score	-	-

- (1) Which participant do you select as a group member for the adding up games? Please write down the letter of the selected participant on the answer form.

Matrix game		
	Participant A	Participant B
Score		

- (2) Which participant do you select as a group member for the matrix games? Please write down the letter of the selected participant on the answer form.

This is the end of part G. Please wait for the experiment to continue.

Assignment Form Part H: Adding Up Game (part 2)

Please answer the following adding up games on the answer form.

Puzzle 1				
63	78	42	59	21

Puzzle 2				
87	54	88	21	53

Puzzle 3				
22	14	89	37	54

Puzzle 4				
96	11	55	78	23

Puzzle 5				
56	57	33	97	16

Puzzle 6				
58	62	11	87	36

Puzzle 7				
44	33	78	25	67

Puzzle 8				
35	44	91	56	72

Puzzle 9				
19	64	57	34	69

Puzzle 10				
76	33	59	51	20

Puzzle 11				
60	87	93	54	91

Puzzle 12				
28	64	55	98	31

Puzzle 13				
84	13	44	68	25

Puzzle 14				
42	44	19	87	93

<i>Puzzle 15</i>				
55	79	12	13	87
<i>Puzzle 16</i>				
39	61	83	49	60
<i>Puzzle 17</i>				
59	34	12	54	88
<i>Puzzle 18</i>				
91	23	12	77	45
<i>Puzzle 19</i>				
17	66	54	79	28
<i>Puzzle 20</i>				
65	89	11	17	33
<i>Puzzle 21</i>				
46	49	39	94	88
<i>Puzzle 22</i>				
55	68	81	33	67
<i>Puzzle 23</i>				
89	64	38	61	24
<i>Puzzle 24</i>				
66	54	17	92	38
<i>Puzzle 25</i>				
91	36	87	55	27
<i>Puzzle 26</i>				
61	44	87	22	19
<i>Puzzle 27</i>				
11	67	89	91	23
<i>Puzzle 28</i>				
25	87	62	54	45
<i>Puzzle 29</i>				
63	52	47	33	40

This is the end of part H. Please wait for the experiment to continue.

Assignment Form Part I: Matrix Games (part 2)

Please answer the following matrix games on the answer form.

Puzzle 1									
1	1	1	0	1	0	1	0	0	1
1	0	1	0	1	0	1	0	0	1
1	1	1	1	1	1	1	0	0	1
0	0	1	0	1	0	1	1	1	0
1	0	1	0	1	1	1	1	0	1
0	1	1	1	1	0	1	0	1	0
1	1	1	0	1	0	1	1	1	1
0	0	0	1	0	0	1	1	1	1
1	1	0	1	1	0	1	1	0	1
0	1	0	1	0	1	0	1	1	1

Puzzle 2									
1	1	1	1	1	1	0	0	1	1
1	1	0	1	1	0	1	1	0	1
1	0	1	0	1	0	1	0	1	0
0	0	1	1	0	1	1	1	1	0
1	1	0	1	0	1	0	1	0	1
1	1	1	0	1	0	1	1	1	0
1	1	0	1	0	1	0	1	0	1
1	1	1	1	1	1	1	1	1	1
0	1	0	1	0	1	0	1	0	0
0	0	0	0	1	1	1	1	1	0

Puzzle 3									
0	0	1	1	1	0	1	0	1	0
1	1	1	1	1	1	0	1	0	1
1	1	0	1	0	1	0	1	0	0
0	0	1	1	1	0	1	1	1	1
1	1	1	1	0	0	0	1	0	1
0	1	0	1	0	1	0	1	0	1
1	0	1	0	1	0	0	0	0	1
0	1	1	1	0	1	1	1	1	1
1	1	0	1	0	1	0	1	1	1
0	1	1	1	0	1	0	1	0	1

Puzzle 4									
1	1	1	1	0	1	0	1	0	1
1	0	1	0	1	0	1	1	1	0
1	1	1	1	1	0	0	0	1	0
1	1	0	1	0	1	0	1	0	0
0	0	0	0	0	1	1	1	1	0
1	1	0	1	0	1	0	1	1	1
1	1	0	1	0	0	0	1	1	0
1	0	1	0	1	0	1	0	0	1
1	1	1	1	1	0	1	1	1	1
0	1	0	1	0	1	1	1	0	1

Puzzle 5									
0	1	1	1	0	1	0	1	1	1
1	1	1	0	0	1	1	1	0	0
0	1	0	1	0	1	0	1	0	1
1	1	1	1	1	1	1	1	0	1
0	0	1	1	1	0	1	0	1	0
1	1	0	1	0	1	0	1	0	1
1	1	1	1	1	1	1	0	0	1
0	0	0	1	1	0	1	0	1	1
1	1	1	1	1	1	1	0	1	0
0	1	1	0	1	0	1	0	1	1

Puzzle 6									
1	1	0	1	0	1	0	1	1	1
0	1	1	1	1	0	0	1	1	0
1	1	1	0	1	0	1	0	0	1
0	1	1	1	1	1	1	1	1	0
1	0	0	1	0	1	1	1	0	1
0	1	1	1	0	1	1	1	0	1
1	1	1	1	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
0	1	1	1	1	0	1	1	1	1
1	1	0	1	0	0	0	0	0	1

Puzzle 7									
0	1	1	1	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
0	0	0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	1	0	1
0	1	0	1	0	1	0	1	0	1
1	1	1	1	1	1	0	1	1	1
1	1	1	1	0	1	0	1	0	1
1	1	0	0	0	0	1	0	1	0
0	1	1	1	1	0	1	0	1	0
1	1	1	0	1	0	1	0	1	1

Puzzle 8									
1	1	1	1	1	0	1	0	1	0
1	1	0	1	0	0	0	0	1	1
1	1	0	1	0	1	0	1	0	1
0	0	1	1	1	1	1	1	1	1
1	1	1	0	0	0	0	0	1	0
0	0	1	1	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	1	1	1	1	1	0	1	0	1
0	1	1	1	0	1	1	0	0	0
0	1	0	1	0	1	1	0	1	1

Puzzle 9									
0	0	0	0	1	1	1	1	1	1
1	1	0	1	0	1	0	0	1	0
0	0	1	1	1	1	1	0	1	0
1	1	1	1	1	1	1	1	1	1
0	1	0	1	0	1	0	1	0	1
0	0	0	1	0	1	1	1	1	0
1	1	0	1	1	0	1	1	0	1
1	0	1	0	1	0	1	1	1	0
1	1	1	1	1	0	0	0	1	0
0	1	1	0	1	0	1	0	1	0

Puzzle 10									
1	1	1	1	1	1	1	0	0	0
0	0	1	1	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
0	1	0	1	0	1	0	1	0	1
1	1	1	0	1	0	1	0	1	1
0	1	0	1	0	1	0	1	1	1
1	1	1	1	0	0	1	1	0	0
1	1	0	1	0	1	1	1	1	0
1	0	1	0	1	0	1	0	1	1
1	1	1	1	0	1	1	1	1	0

Puzzle 11									
1	0	1	0	1	0	1	0	1	0
0	0	0	1	1	1	0	1	1	0
0	1	0	1	1	1	1	1	0	1
1	0	1	0	1	0	0	0	1	0
0	1	0	0	1	0	1	1	1	0
1	1	1	1	1	0	1	1	1	1
1	1	0	1	0	1	0	1	0	0
0	0	1	1	1	1	1	1	1	0
0	1	1	0	1	0	1	1	1	0
1	1	1	0	1	0	1	0	1	0

<i>Puzzle 12</i>									
0	1	1	1	0	1	0	1	0	1
1	1	1	0	1	0	0	0	1	0
1	1	0	1	0	1	1	1	0	1
1	1	0	1	0	0	1	0	0	0
0	1	1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	0	1	0
0	0	1	0	1	0	0	0	1	1
1	1	1	0	1	1	1	0	1	0
0	1	1	1	0	1	1	0	1	1
1	0	0	0	0	1	1	1	1	1

<i>Puzzle 13</i>									
0	1	1	1	1	1	0	1	0	1
1	1	1	0	1	0	1	0	1	0
0	0	0	1	1	1	1	1	0	1
1	1	1	1	1	1	1	1	1	0
0	1	1	0	1	1	1	0	1	1
1	0	1	0	1	0	1	0	1	0
0	0	0	1	0	1	0	1	0	0
1	1	1	1	1	0	0	0	1	1
0	1	0	1	0	1	1	1	1	1
1	1	1	0	1	1	1	1	0	1

<i>Puzzle 14</i>									
1	1	1	1	1	0	1	0	1	0
1	1	0	1	0	1	1	0	1	1
1	0	1	0	1	1	1	1	1	0
0	1	1	1	1	1	1	0	1	1
1	1	1	1	0	0	0	1	0	1
1	1	0	1	0	1	0	0	1	0
0	0	0	0	1	1	1	1	1	1
1	1	0	1	0	1	0	1	0	1
0	1	1	1	1	1	1	1	0	1
1	1	0	1	0	1	0	1	0	1

This is the end of part I.

Thank you for your participation in this experiment!

Answer Form Part B: General Questions

Question number	Answer
(1)	
(2) (circle the right answer)	Male / Female
(3) (circle the right answer)	HAVO / VWO
(4)	
(5)	
(6) (circle the right answer)	Much better / Somewhat better / Average / Somewhat worse / Much worse

Answer Form Part C: Adding Up Game (part 1)

<i>Puzzle number</i>	<i>Answer</i>	<i>Puzzle number</i>	<i>Answer</i>
(1)		(16)	
(2)		(17)	
(3)		(18)	
(4)		(19)	
(5)		(20)	
(6)		(21)	
(7)		(22)	
(8)		(23)	
(9)		(24)	
(10)		(25)	
(11)		(26)	
(12)		(27)	
(13)		(28)	
(14)		(29)	
(15)			

Answer Form Part D: Matrix Game (part 1)

<i>Puzzle number</i>	<i>Answer</i>
(1)	
(2)	
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	
(11)	
(12)	
(13)	
(14)	

Answer Form Part E: Performance Estimates

<i>Question number</i>	<i>Answer</i>
(1)	
(2)	
(3) (circle the right answer)	Yes / No
(4) (circle the right answer)	Yes / No

Answer Form Part F: Questionnaire

<i>Question number</i>	<i>Answer</i>
(1)	
(2)	
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	
(11)	
(12)	
(13)	
(14)	
(15)	

Answer Form Part G: Selection of Group Members

<i>Question number</i>	<i>Answer</i>
(1)	
(2)	

Answer Form Part H: Adding Up Game (part 2)

<i>Puzzle number</i>	<i>Answer</i>	<i>Puzzle number</i>	<i>Answer</i>
(1)		(16)	
(2)		(17)	
(3)		(18)	
(4)		(19)	
(5)		(20)	
(6)		(21)	
(7)		(22)	
(8)		(23)	
(9)		(24)	
(10)		(25)	
(11)		(26)	
(12)		(27)	
(13)		(28)	
(14)		(29)	
(15)			

Answer Form Part I: Matrix Game (part 2)

<i>Puzzle number</i>	<i>Answer</i>
(1)	
(2)	
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	
(11)	
(12)	
(13)	
(14)	

APPENDIX B: Gender differences in skills and confidence

TABLE 8

Gender differences in skills of male and female students – Adding up games, matrix games, CRT and WPT-R (in average amount of correct answers, st.dev in parentheses). Number of observations N in parentheses. Significance of gender differences according to Wilcoxon rank-sum test.

Task		Male students (N = 38)	Female students (N = 59)	Wilcoxon rank-sum test
Adding up games	Individual part	5.3 (2.94)	4.8 (2.13)	p = 0.5356
	Group part	6.0 (2.86)	5.4 (1.87)	p = 0.3855
Matrix games	Individual part	3.2 (1.81)	3.8 (1.34)	p = 0.0455
	Group part	3.4 (2.31)	4.1 (1.65)	p = 0.0908
Cognitive Reflection Test (CRT)		2.0 (1.03)	1.0 (0.97)	p = 0.000
Wonderlic Personnel Test (WPT-R)		8.3 (1.10)	8.0 (1.25)	p = 0.1622

TABLE 9

Gender differences in confidence of male and female students – Adding up games and matrix games (in percentages). Number of observations N in parentheses. Significance of gender differences according to Wilcoxon rank-sum test.

Task	Estimation of performance (compared to average)	Male students (N = 38)	Female students (N = 59)	Wilcoxon rank-sum test
Adding up games	Much higher	26.3	3.4	p = 0.0192
	Somewhat better	21.1	15.3	
	Average	34.2	55.9	
	Somewhat worse	10.5	13.6	
	Much worse	5.3	1.7	
	Unknown	2.6	10.2	
Matrix games	Much higher	2.6	1.7	p = 0.3820
	Somewhat better	28.9	6.8	
	Average	36.8	62.7	
	Somewhat worse	26.3	16.9	
	Much worse	2.6	1.7	
	Unknown	2.6	10.2	

APPENDIX C: Definition of logistic regression variables

TABLE 10		
Definition of logistic regression variables.		
<i>Dichotomous variables identifying characteristics of the decisions of the student (decision maker)</i>		
	Value 1	Value 0
Disclosure of competences	Student is willing to disclose his/her competences on the task	Student is not willing to disclose his/her competences on the task
Establishment of connections	Student establishes a connection with student A (male) for the task	Student establishes a connection with student B (female) for the task
<i>Dichotomous variables identifying characteristics of the student (decision maker)</i>		
	Value 1	Value 0
Female student	Student is a female	Student is a male
Educational level VWO	Student attains VWO	Student attains HAVO
Continuous variables identifying characteristics of the student		
Age	Age of student (in years)	
<i>Dichotomous variables identifying characteristics of the experimental setting of the student (decision maker)</i>		
	Value 1	Value 0
Adding up games	Student makes a decision for the adding up games	Student makes a decision for the matrix games