

Do Gender Stereotype Threats and Quantitative Skills Affect Risk Attitudes?

An Experimental Study

Written By:

Yashika Doshi

PG Diploma in Economics

Meghnad Desai Academy of Economics

Mumbai, India

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Advisor: Mr. Niranjan Rajadhyaksha

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Abstract

In this dissertation, I observe the effects of the presence and absence of gender stereotype threats on quantitative performance and risk attitudes among 228 men and women. Further I check whether or not higher quantitative skills have an effect on the degree of risk aversion. I do this by conducting an experiment, which consists of a maths test and a risk task. The results of my experiment suggest that in the presence of gender stereotype threat, women perform marginally worse than men, which is not true in the absence of the threat. When explicitly told that there exists no such stereotype, women did perform better. In the context of risk attitudes, I find that women are more risk averse than men. Further, I find that participants who perform better in the quantitative task, turned out to be less risk averse in nature. Policymakers should take into consideration these existing threats and should try and work towards reducing the same, by better educating women and making them aware of these prevailing threats. This will serve to build their confidence and help the overall growth of the society.

JEL classification codes: C90, I20, O12, D81, J16

Keywords: gender stereotypes, education, risk, gender, experiment

1. Introduction

Gender stereotypes are preconceived ideas where females and males are arbitrarily assigned characteristics, and their roles in society can be determined and can also be limited by their gender. An individual is not seen as a distinct being with her own attributes but solely as a member of a particular group conforming to some pre-conceived patterns. These gender stereotypes can affect every aspect of our lives, from everyday decision making, to risk-taking and even choosing educational fields, and thus in the long run, influencing our career. This entails that people who are the targets of particular stereotypes are likely to know them too, and it can be inferred that their conformity is internal. Gender stereotype threats occur when people are or feel themselves to be at risk of conforming to these stereotypes about their respective genders. The effects of such threats lead people to perform worse at a task due to the pressure of a negative stereotype associated with their gender's performance. The stereotype threat theory maintains that an individual may experience apprehension about the possibility of validating a (negative) stereotype that exists for their respective group in a given domain and hence may underperform (Steele, 1997; Steele & Aronson, 1998). This happens specifically in the case of women, who, when made aware of existing threats, are afraid to conform to it, or just become anxious.

Leslie R. Brody (1993) talks about how women experience negative emotions like fear and nervousness in a stronger way than men. Studies in psychology suggest that this goes for emotions on a whole, and hence emotional anxiety and wariness can effect risk taking behavior as well as scores in standardized tests for women.

In this paper, I evaluate the effects of gender stereotype threats on the gender difference in performance in quantitative tasks. I also examine the effects of gender and quantitative skills on risk aversion. To study the above effects, I design and conduct an experiment among male and female participants. The experiment contains two tasks which incorporates three treatments for a standardized quantitative test, and a common risk task for all participants. I find that, when primed with the gender stereotype threat, women underperform compared to men in the quantitative test. However, women perform as well men on average when these stereotype threats no longer exist. I also find that women are more risk-averse than men. Finally, I find that subjects who possess higher quantitative skills are less risk-averse in nature.

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The remainder of my paper proceeds as follows. The next section explains how gender stereotype threats hinder achievement in quantitative tasks for females, and how women are indeed more risk-averse than men. I explain this with the help of relevant literature. Section 3 describes the theory behind my hypotheses, the data collection method and the experimental design. The next section highlights the empirical results found thus. Section 5 summarises the paper and also describes some policy interventions.

2. Literature Review

Data often suggests that women tend to perform worse than men in a quantitative test. (Eccles, 1987; Spencer et al, 1999; Callahan, 1991; Jones, 2005)

Such findings can be explained by several factors. Firstly, Libertus (2011) suggests that there is a role played by genetics, as sometimes the genes that are passed on to us, can also affect our quantitative skills. Benbow (1980) suggested that the ability, which makes some people better at maths, may be inborn. Even though a majority of scientists agree that there is some difference between how the male and female brain is wired, as suggested by Sumner (year), no concrete evidence has been found whether these differences make one gender better than the other, or if these inborn cognitive abilities, like maths skills are affected or not. Second is the 'Deficit Theory', which implies that people who start out with poorer maths performance in early years of education are more likely to develop anxiety about maths (2013). This anxiety further decreases quantitative skills and people going through this are more likely to answer questions quickly but inaccurately, in an attempt to escape this disorder. Also, these two facts have a reciprocal effect on each other, affecting each other in turn and thus creating a vicious cycle. The third factor is the 'Social Role Theory'. This is a principle in sociology and social psychology that suggests men and women behave differently in social situations and carry on certain roles, due to the expectations that society puts upon them (Eagly, 2016). It is a process whereby a culture defines and enforces the appropriate ways of thinking, feeling, and behaving for men and women. This also includes gender stereotyping. This prevailing social norm may suggest another reason of why women perform poorly in a maths test than men.

Finally, it may so happen that women experience stereotype threats in maths-related domains that may cause them to feel that they are underperformers compared to men. These

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differences may occur since men are more encouraged to take science-oriented career paths than women, and there exists occupational sex segregation. This issue is highlighted by Eccles (1987), where she proposes a more gender-fair social system, to do away with these gender differences, and enable women to grow. The primary work on stereotype threats and its effects is done by Steele and Aronson (1995). Their paper focuses their study on Black and White Americans and finds that Blacks underperformed Whites, and there is a significant difference in their school achievements. This is explained by negative race stereotype threats prevailing in society and how those can transform into an ‘inferiority complex’, and how this can further translate into poor life success and low achievement rates throughout their adulthood. Spencer et al. (1999) find that women performed worse on difficult maths tests. They also find that this difference in performance is eliminated when they described the test as to not producing any gender differences. But, when it is said that there exists a stereotype threat, women performed worse than equally qualified men. This happened because women went under excessive pressure and didn’t want to be judged by the stereotype. Callahan (1991) find that the performance levels of top male students are superior to that of their female counterparts in many major college entrance exams. Jones (2005) report that the activation of a prevalent stereotype alleging female maths inferiority influences the maths performance of women. Tsui et al. (2016) on the other hand, conduct an experiment with students in China, to test the effects of gender stereotypes and find that these threats do not affect maths scores of women in China. This effect is observed because even though women were aware of the threat and they consciously chose to not believe in or accept it. Women tended to perform as well as men on a maths test when the test is administered by a woman with high competence in maths. In this paper, I add to existing literature that when participants are made aware of existing gender stereotypes before a maths test is administered, females underperform as compared to males. On the other hand, when participants are assured specifically that such stereotypes do not exist, females perform as well as men on average.

Whether men and women are different in their attitudes towards accepting risk and also while making decisions in the face of some kind of risk has always been a matter of much debate. Buser et al. (2017) suggest that men are better equipped to survive in competitive environments than women. This can be explained by the fact that women generally tend to be more risk-averse in nature and that this gender difference in willingness to compete may

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explain why women are less likely to be found in top positions. Grossman (2012) finds that not only are women more risk-averse than men, and when subjects are provided information about other subjects' survey responses, gender stereotypes still prevail, in assessing risk. Byrnes, Miller and Schafer (1999) discover larger gender gaps in some aspects of risk-taking, especially when situations are altered, like smoking, intellectual risk-taking, physical skills etc. Hence, they concluded that men were generally greater risk takers although the gender difference varied with the riskiness in the environment. Cheng (2012) studies the difference between men and women of their risk-taking decisions in financial markets and finds that women were more conservative in taking financial decisions. Croson and Gneezy (2009) report their main finding as men are indeed less risk averse than women, in lab settings as well as in a live field. Holt and Laury (2002) provides a simple yet effective model on how to assess risk. I use the same task, to measure risk aversion among genders. Apart from gender stereotypes, other factors may also have a role to play, like culture, societal norms, etc. Pondorfer et al. (2016), find gender differences in stereotypes across two societies - the patrilineal Palawan in the Philippines and the matrilineal Teop in Papua New Guinea. They found evidence for culture specific stereotypes, that Palawan men overestimated women's actual risk aversion and Teop men underestimated women's actual risk aversion. We can conclude that this depends on how men perceive women based in different cultural backgrounds. The fact that women are more risk-averse than men, can explain the fact as for why more microcredit is given to women, than to men. Micro creditors might feel safer lending to women, if they know that they will make decisions more soundly and carefully than men. If taken into account as a universal conclusion, we can consider the fact that all women, from all fields and households are indeed more risk-averse than men. But this might not necessarily be true for each instance, whenever we compare a man to a woman. Zahid Iqbal et al (2006) find that female executives were less risk-averse than their male counterparts when males engaged in higher diversification-related stock sales than females.

In my experiments, I find that women are more risk averse than men, and also when I consider the effect of quantitative skills on risk aversion, I find that participants who possess higher quantitative skills tend to be less risk averse while making decisions. A possible explanation behind this finding can be that possessing higher quantitative skills makes a person better equipped to calculate their expected returns, and hence they are able to assess their risk capacities better, along with the costs and benefits that come with their actions, in a more orderly fashion.

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3. Experimental Design

3.1. Experimental Framework and Hypotheses

In this paper, I study the following research questions - Do gender stereotype threats affect quantitative performance? Are females more risk-averse than males? What is the relationship between quantitative skills and risk aversion? More specifically, do higher numerical skills put people in a better position to evaluate and calculate risk?

Thus I have three hypotheses. First, women perform worse than men, when made aware of existing gender stereotypes. These threats prime women to perform worse than men, since they go under excessive pressure, and get affected by the threat. On the other hand, the average woman performs as well as an average man, when made aware that gender stereotypes do not hold in a given situation. In this situation, the threat is explicitly disregarded, and hence its effect is nullified.

Second, women are more risk-averse than men. This difference in risk-taking attitude exists due to the difference in gender characteristics between men and women.

Lastly, I believe that subjects who possess better quantitative skills are less risk-averse in nature. This is due to the fact that they are better equipped to calculate their expected returns, and are able to assess their risk capacities better, along with the costs and benefits that come with their actions, in a more orderly fashion. Hence, they know the probabilities associated with each outcome, and they do not refrain from choosing a riskier path if they know that the expected outcome is higher with that alternative.

I implement two tasks in this experiment – a maths test and a risk task. Three groups of males and females take part in the experiment. The first group is the control group, and the other two are the two treatment groups. Each group is given a maths test, a risk task and a demographics questionnaire. The maths test consists of 20 multiple-choice questions, of standard GRE level. The test remains the same for all three groups, with a variation in the instruction sheet. The instruction sheets differ in the following way –

Group 1 (Control Group): Instruction sheet

Group 2 Treatment: Instruction sheet containing the statement ‘*Statistically, it has been shown that men perform better than women in quantitative tests.*’

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Group 3 Treatment: Instruction sheet containing the statement '*Statistically, it has been shown that men perform better than women in quantitative tests. However, it is not true for this set of questions that you will be solving.*'

Post the maths test, the groups are given a risk task. This is the Holt and Laury (2002) lottery task, which contains 10 pairs of ordered lotteries, with two options under each of them. The participants select the lottery number from where they want to switch from option A to option B. Since the pairs are ordered, as a participant's choice to switch moves down the table, we know that she is more risk averse. This means that if she switches before lottery pair 5, she is a risk lover, and if she chooses to switch over at pair 5, she is risk neutral.

After both the tests, all participants fill a demographic-questions based questionnaire.

The participants are paid based on a 1:10 ratio i.e. I pay one person in every 10 participants. This incentivizes all participants to try and perform well, since each has an equal chance of getting paid, and their payoff depends on their performance. This is based on a chit system, where I draw a chit and pay the participant who has that number as their subject ID. After the participant is decided, I toss a coin to select for which task she will get paid, if heads turns up, she will be paid according to their score in the maths task. If subjects answer 15 or more questions right out of 20, I pay them Rs.100. If they answer 10 questions and above but less than 15 questions right, I pay them Rs. 50. However, if they are answer 9 questions and below right, they do not get paid.

If tails turns up, she will get paid according to the lottery she chooses. The participant draws a chit, numbered 1-10, to decide for which lottery number they will play. Looking at the number where they switched, I check whether Option A or Option B is chosen for that particular lottery. The participant again picks a chit, numbered 1-10, and plays the lottery as mentioned in the option of the lottery selected. The minimum amount a participant can win here is Rs.10 and the maximum is Rs. 385. The instruction sheets for both tasks, maths test, risk task as well as the personal questionnaire are under the section named 'Appendix'.

3.2 Data

The total sample of participants consisted of 228 subjects, from the cities of Mumbai and Baroda. In Mumbai, the sessions are held in Chembur, Santacruz and Dadar, and in Ramnarian Ruia College. In Baroda, two sessions were held in Sumandeep Vidyapeeth. Each session varied in the number of participants. These participants included students,

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housewives as well as professionals. In this pool, there were 96 males and 132 females. To avoid selection bias, they were randomly assigned to three treatment groups. At the end of the experiment, the subjects fill a questionnaire.

Table 1.1 provides summary statistics of the participants which includes their demographics, based on the duly filled questionnaires.

The average male participant is 27 years old, is a graduate and has about four family members. The average female participant is 25 years old, is a graduate, and has about five family members. On a whole, participants felt that the maths test was difficult.

For treatment 1, which is my control group, there are 32 males and 32 females. The average male participant is 25 years old, is a post-graduate in the field of science and has about five family members. The average female participant is 22 years old, is a graduate in the field of science, and has about five family members. The most significant variables here are their occupation, their religion, annual family income and the size of their family.

For treatment 2, there are 32 male and 52 female participants. The average male participant is 25 years old, is a graduate and has about four family members. The average female participant is 28 years old, is a graduate in the field of science, and has about five family members. The most significant variables here are their age, the stream of education, their marital status, caste and the size of their family.

For treatment 3, there are 32 male and 48 female participants. The average male participant is 30 years old, is a graduate and has about four family members. The average female participant is 24 years old, is a graduate, and has about five family members. The most significant variables here are their stream of education, occupation, family size, whether they thought the maths test was difficult and also the fact that they might worry about the consequences of their actions.

Table 1.1: Summary of individual level characteristics of subjects by gender and treatments

Individual Characteristics	All Treatments				Treatment 1				Treatment 2				Treatment 3			
	Pooled	Male	Female	Diff	Pooled	Male	Female	Diff	Pooled	Male	Female	Diff	Pooled	Male	Female	Diff
Age	25.68 (9.87)	26.75 (11.05)	24.90 (8.86)	1.84	23.46 (4.27)	25.28 (5.46)	21.65 (0.78)	3.62	26.77 (10.55)	25.03 (9.91)	27.84 (10.87)	-2.81**	26.3 (11.94)	29.93 (15.19)	23.87 (8.51)	6.06
Highest level of Education	3.79 (0.74)	3.98 (0.73)	3.65 (0.72)	0.34	3.78 (0.65)	4.12 (0.60)	3.43 (0.50)	0.68	3.84 (0.81)	3.87 (0.79)	3.82 (0.83)	0.04	3.75 (0.73)	3.96 (0.78)	3.60 (0.67)	0.364
Stream of Education	1.35 (0.74)	1.2 (0.47)	1.46 (0.86)	0.27***	1 (0)	1 (0)	1 (0)	0	1.46 (0.86)	1.22 (0.49)	1.61 (0.99)	-0.39***	1.52 (0.81)	1.37 (0.60)	1.62 (0.91)	-0.25**
Marital Status	1.20 (0.49)	1.23 (0.53)	1.18 (0.45)	0.05	1.14 (0.46)	1.28 (0.63)	1 (0)	0.28	1.27 (0.47)	1.12 (0.33)	1.36 (0.52)	-0.24***	1.18 (0.52)	1.31 (0.59)	1.10 (0.47)	0.20
Occupation	3.37 (1.27)	2.91 (1.48)	3.70 (0.97)	0.79***	3.15 (1.35)	2.31 (1.51)	4 (0)	-1.69***	3.35 (1.32)	3.34 (1.28)	3.36 (1.35)	-0.02	3.56 (1.13)	3.09 (1.48)	3.87 (0.67)	0.78***
Caste	1.25 (0.83)	1.26 (0.86)	1.25 (0.82)	-0.01	1.34 (1.04)	1.5 (1.27)	1.18 (0.73)	0.31	1.18 (0.73)	1 (0)	1.29 (0.92)	-0.29***	1.26 (0.75)	1.28 (0.72)	1.25 (0.78)	0.031
Religion	1.30 (1.02)	1.27 (0.99)	1.33 (1.03)	-0.06	1.06 (0.24)	1 (0)	1.12 (0.33)	-0.13***	1.32 (1.04)	1.28 (1.02)	1.34 (1.06)	-0.06	1.48 (1.31)	1.53 (1.36)	1.45 (1.28)	0.072
Annual Family Income	2.51 (0.96)	2.48 (0.84)	2.53 (1.03)	-0.05	2.43 (1.03)	2.21 (0.90)	2.65 (1.12)	-0.44***	2.57 (0.91)	2.58 (0.76)	2.576 (0.99)	0.01	2.51 (0.95)	2.65 (0.82)	2.41 (1.02)	0.23
Family Size	4.66 (2.03)	4.30 (1.81)	4.92 (2.14)	0.62***	4.84 (1.84)	4.59 (2.15)	5.09 (1.46)	-0.50**	4.77 (1.99)	4.25 (1.48)	5.09 (2.19)	-0.85***	4.4 (2.20)	4.06 (1.75)	4.62 (2.45)	-0.56**

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Difficulty level of Maths test	2.47 (1.01)	2.47 (1.11)	2.46 (0.92)	0.01	2.40 (1.04)	2.31 (1.09)	2.5 (1.01)	-0.18	2.55 (1.10)	3.03 (1.23)	2.26 (0.90)	0.76	2.43 (0.86)	2.09 (0.77)	2.66 (0.85)	-0.57***
I worry about consequences	2.72 (1.25)	2.48 (1.16)	2.89 (1.29)	-0.40***	2.67 (1.29)	2.46 (1.26)	2.87 (1.31)	-0.40	2.88 (1.22)	2.81 (1.14)	2.92 (1.28)	-0.11	2.6 (1.23)	2.18 (0.99)	2.87 (1.31)	-0.69***
Benefits and Risks of new activity	1.80 (0.82)	1.86 (0.94)	1.76 (0.72)	0.09	1.73 (0.82)	1.78 (0.94)	1.68 (0.69)	0.09	1.85 (0.85)	1.93 (0.89)	1.80 (0.84)	0.12	1.81 (0.79)	1.87 (1.01)	1.77 (0.62)	0.10
N	228	96	132		64	32	32		84	32	52		80	32	48	48

Levels of significance: ****' 0.001 ***' 0.01 '**' 0.05 '.' 0.1 ' ' 1

(Standard Errors in parentheses)

4. Results

4.1. Descriptive Analysis

I start by looking at gender differences in the maths test scores and the risk switch point in the pooled data and then, I see the same effects treatment wise.

In Table 1.2, the summary statistics of all males and females, for all three treatments together and individually in the sample are shown. The sixth column shows the differences in means between the maths test scores of the genders and also the risk switch points among them. The mean difference between risk switch points of males and females is significant at 1% level. As shown in Figure 1.1, women perform a little worse than men in the maths test. From Figure 1.2, I observe that females, on average, are more risk averse than men, as they switch at a lower lottery choice.

Now I look at the gender differences for the dependent variables, based on the three treatments.

Figures 1.3 and 1.4 show the mean maths scores and mean risk switch points of males and females under treatment 1. Women perform worse than men, by a small difference. The differences of means are not statistically significant.

Figures 1.5 and 1.6 show the mean maths scores and mean risk switch points of males and females under treatment 2. This is the treatment where participants are primed with the gender stereotype threat, which leads women to underperform than men. The difference of means for the risk switch points of males and females is found to be statistically significant at 1% level of significance.

Figures 1.7 and 1.8 show the mean maths scores and mean risk switch points of males and females under treatment 3. This is the treatment where the threat is disregarded explicitly, the effect of which is seen here, that the averages of the scores of men and women are almost the same. The difference of means for the risk switch points of males and females is found to be statistically significant at 1% level of significance.

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In all the three treatments, I find that women are more risk averse than men. I show this in Figure 1.4, Figure 1.6 and Figure 1.8.

Table 1.2: Summary statistics for all three treatments, together and individually

Variables	Statistics	Pooled	Males	Females	Mean Diff
All treatments (Maths Scores)	Mean	7.77	8.16	7.48	0.68
	Std Deviation	3.99	4.5	3.55	
	Max	18	18	17	
	Min	0	0	1	
All treatments (Risk)	Mean	6.15	5.87	6.36	-0.49***
	Std Deviation	1.88	1.69	1.99	
	Max	10	9	10	
	Min	2	2	2	
No. of observations		228	96	132	
T1 (Maths Scores)	Mean	7.69	7.88	7.5	0.38
	Std Deviation	4.04	4.6	3.46	
	Max	18	18	14	
	Min	2	2	2	
T1 (Risk)	Mean	6.14	5.97	6.31	-0.34
	Std Deviation	1.95	1.75	2.15	
	Max	10	9	10	
	Min	2	2	2	
No. of observations		64	32	32	
T2 (Maths Scores)	Mean	8.25	9.34	7.58	1.77
	Std Deviation	4.41	5.11	3.82	
	Max	18	18	17	
	Min	0	0	1	
T2 (Risk)	Mean	6.21	5.84	6.44	-0.60***
	Std Deviation	1.86	1.82	1.87	
	Max	10	9	10	
	Min	2	2	2	
No. of observations		84	32	52	

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T3 (Maths Scores)	Mean	7.34	7.28	7.38	-0.09
	Std Deviation	3.45	3.57	3.4	
	Max	16	16	14	
	Min	1	1	1	
T3 (Risk)	Mean	6.11	5.81	6.31	-0.50***
	Std Deviation	1.88	1.57	2.05	
	Max	10	9	10	
	Min	2	2	2	
No. of observations		80	32	48	

Levels of significance: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Figure 1.1: Mean Maths Scores: Pooled Males and Females

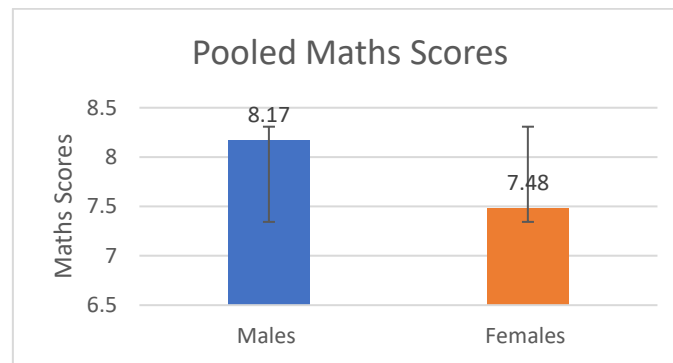
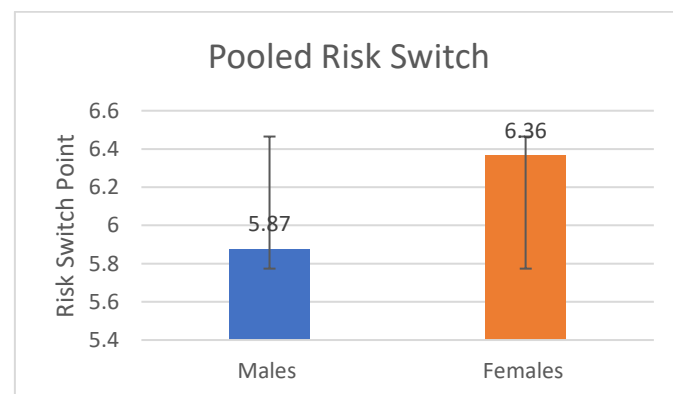


Figure 1.2: Mean Risk Switch Point: Pooled Males and Females



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Figure 1.3: Mean Maths Scores: Treatment 1

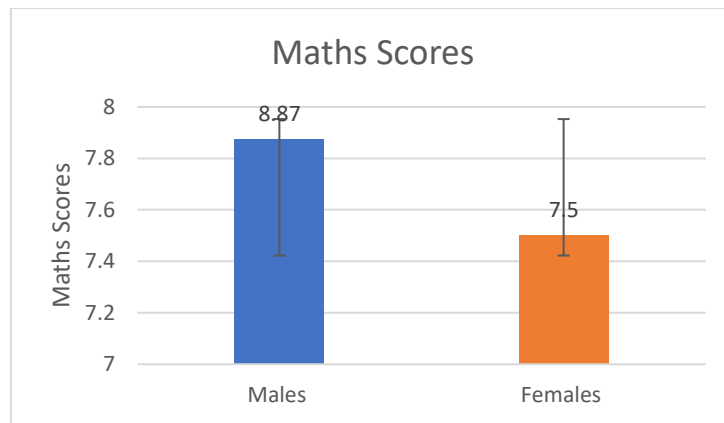
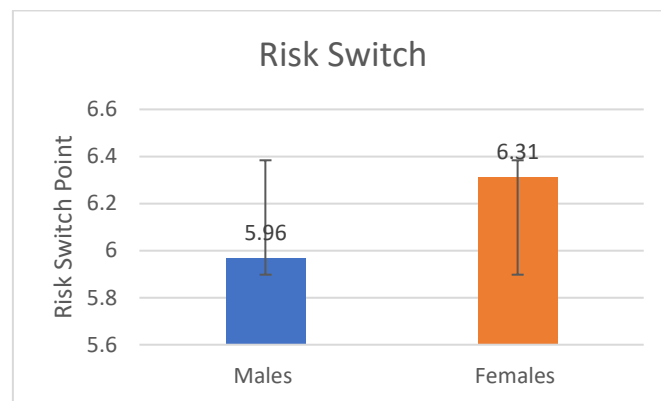


Figure 1.4: Mean Risk Switch Point: Treatment 1



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Figure 1.5: Mean Maths Scores: Treatment 2

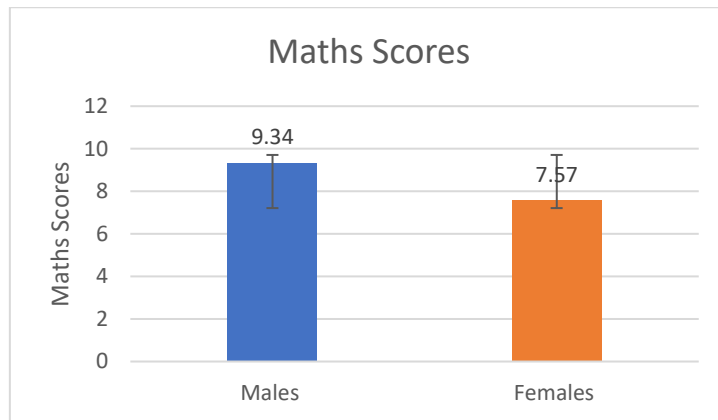
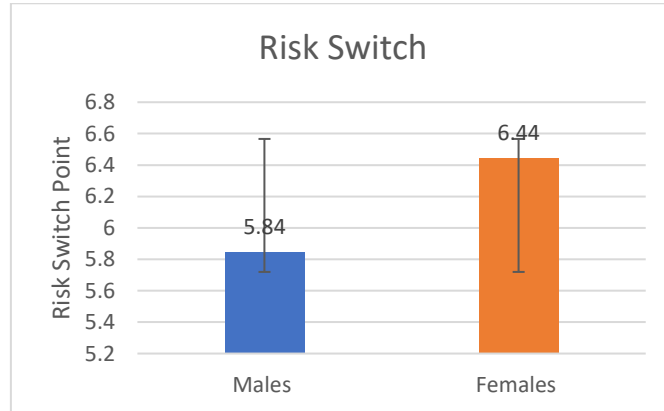


Figure 1.6: Mean Risk Switch Point: Treatment 2



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Figure 1.7: Mean Maths Scores: Treatment 3

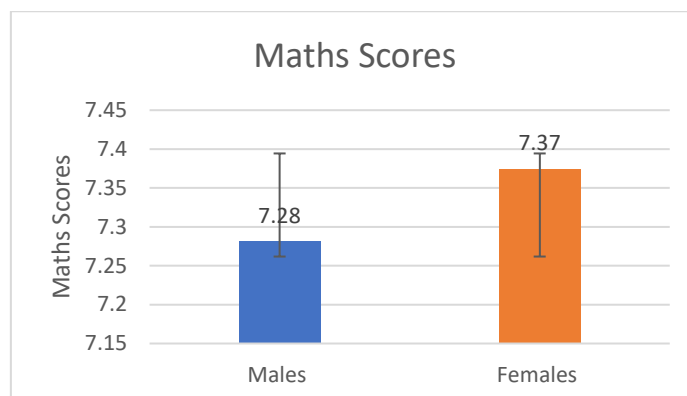
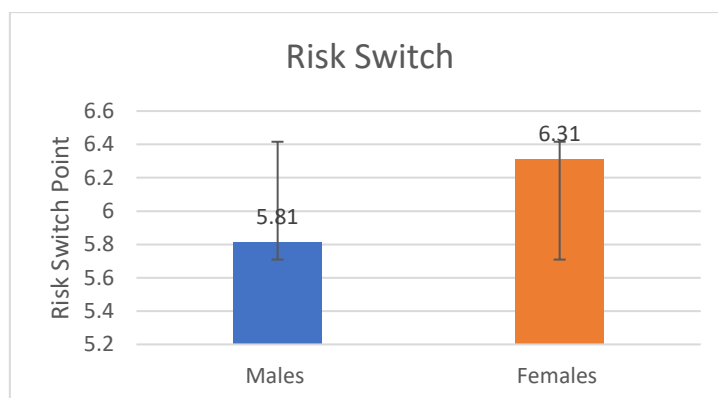


Figure 1.8: Mean Risk Switch Point: Treatment 3



4.2. Multiple Regression Analysis

By looking at the summary statistics, little can be said about the effects of demographic controls, the three different treatments and any other variable that may be influencing the dependent variables, maths test scores and the risk switch point, respectively. Hence, I run linear regression models (LRM) with heteroscedastic robust standard errors, with two dependent variables. Alongside, I also run Tobit models, since both my dependent variables are censored.

The independent variables include treatments, gender, their interaction, the 'Consequences, Benefits and Risk' (CBR) index and the control variable for demographics. Gender of the

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participant here, is a dummy variable (0, if male and 1, if female). The CBR index ranges from 1-5, and takes into account whether a participant considers the consequences of what he/she does and also whether they think about the benefits and risks before starting a new activity. In demographics, I include the participants' age, level of education, stream of education, marital status, occupation, caste, religion, annual family income and the size of their family.

The first dependent variable is Maths scores. In Table 1.3, I show the results of the effect of gender and the three treatments on scores. The first four columns show robust standard errors in parentheses and the next four Tobit models show normal standard errors. The first and second column show the effect of gender, treatments and their interactions on scores, respectively. Along with these three variables, the third and fourth columns show the effect of CBR index and demographics respectively, as well. Column 4 shows that on average, compared to males, females succeed in answering 0.1 questions more. Compared to Treatment 1, in treatment 2, participants successfully answer 1.72 questions more and in treatment 3, 0.43 questions right. When I interact female with treatment 2, I find that females in treatment 2, on average, answer 1.79 questions less successfully than females in treatment 1, when compared to their male counterparts in Treatment 1. When I interact female with treatment 3, on average, they answer 0.43 questions less successfully than females in treatment 1, when their scores are compared to their male counterparts in Treatment 1. When I test for the effect of CBR index, I find that when the index increase by 1 unit, participants answer 0.95 questions more correct, on average. However, none of these variables are statistically significant. The CBR index only becomes significant in the third, seventh and eight models (shown in columns 3, 7 and 8), where it is significant at 5%, 1% and 10% levels respectively. Among the demographics shown in columns 4 and 8, only age, occupation and family income are significant, at 1%, 1% and 10% levels of significance respectively.

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Table 1.3: Regression results for effect of gender and treatments on Maths scores, with Lower Bound 0 and Upper Bound 20 for Tobit Models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	LRM	LRM	LRM	LRM	Tobit ⁺	Tobit ⁺	Tobit ⁺	Tobit ⁺
Maths Scores								
Female	-0.52	0.02	-0.35	0.1	-0.67	-0.36	-0.66	-0.21
	(0.6)	(1.09)	(1.09)	(1.07)	(0.52)	(0.96)	(0.93)	(0.97)
Treatment 2	0.56	1.76	1.52	1.72	0.61	1.39	1.22	1.49
	(0.74)	(1.39)	(1.33)	(1.28)	(0.64)	(0.96)	(0.94)	(0.97)
Treatment 3	-0.2	-0.34	-0.13	0.43	-0.27	-0.57	-0.35	0.20
	(0.66)	(1.07)	(1.03)	(1.01)	(0.64)	(0.96)	(0.93)	(0.96)
Female*Treatment 2	-	-1.88	-1.52	-1.79	-	-1.31	-1.16	-1.47
		(1.62)	(1.59)	(1.58)		(1.29)	(1.26)	(1.30)
Female*Treatment 3	-	0.17	-0.01	-0.28	-	0.45	0.27	0.01
		(1.34)	(1.32)	(1.31)		(1.30)	(1.26)	(1.25)
CBR Index	-	-	1.48**	0.95	-	-	1.48***	0.99*
			(0.47)	(0.5)			(0.38)	(0.39)
Demographic Controls								
Age	-	-	-	-0.13***	-	-	-	0.14***
				(0.03)				(0.03)
Highest Level of Education	-	-	-	-0.49	-	-	-	-0.49
				(0.48)				(0.46)
Stream of education	-	-	-	0.26	-	-	-	0.26
				(0.39)				(0.38)
Marital Status	-	-	-	0.58	-	-	-	0.71
				(0.67)				(0.80)
Occupation	-	-	-	-0.91***	-	-	-	-0.86**
				(0.27)				(0.27)
Caste	-	-	-	-0.31	-	-	-	-0.35
				(0.26)				(0.29)
Religion	-	-	-	-0.29	-	-	-	-0.29
				(0.34)				(0.38)
Annual Family Income	-	-	-	0.53*	-	-	-	0.54*
				(0.26)				(0.26)
Family Size	-	-	-	0.06	-	-	-	0.05
				(0.14)				(0.12)
R-Squared	0.01	0.02	0.07	0.16	-	-	-	-

Levels of significance: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Standard Errors in parentheses

⁺Marginal coefficients

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Now, I analyze the effect of treatments and gender on risk attitude, for which I use the risk switch point as a proxy, making that the dependent variable. Table 1.4 shows the results for the same. The first four columns show robust standard errors in parentheses and the next four Tobit models show normal standard errors. When I regress only gender and treatments on the switch point (column 1), I find that gender is a significant variable at 10% level of significance. It can be seen that on average, compared to men, women switch at a 0.53 lower lottery number, showing that women are indeed more risk averse. In column 4, when I interact female with treatments 2 and 3, I find that, on average, when compared to females in Treatment 1, they switch at a 0.1 and 0.44 lower lottery number respectively. When I control for demographics, I find that the level of education, stream of education and the family size of the participants is significant, at 10%, 5% and 10% levels respectively. Also, when the CBR index increases by 1 point, the participants switch at 0.19 lower point. This finding is important since this means that participants who consider the consequences, risks and benefits that come with a new activity, they tend to become more risk averse when taking that decision.

When coefficients are estimated in the Tobit model specification, the gender of the participant is significant. On average, compared to men, women switch at a 0.48 lower lottery number, showing that women are more risk averse. When controlling for demographics, I find that the level of education of the participant is significant at 10% level of significance.

Table 1.4: Regression results for effect of gender and treatments on Risk switch point, with Lower Bound 2 and Upper Bound 10 for Tobit Models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	LRM	LRM	LRM	LRM	Tobit ⁺	Tobit ⁺	Tobit ⁺	Tobit ⁺
Risk Switch								
Female	0.53*	0.41	0.45	0.16	0.48	0.33	0.37	0.09
	(0.25)	(0.49)	(0.49)	(0.49)	(0.25)	(0.47)	(0.47)	(0.50)
Treatment 2	-0.09	-0.19	-0.07	-0.19	0.03	-0.11	-0.01	-0.14
	(0.33)	(0.47)	(0.46)	(0.53)	(0.31)	(0.47)	(0.47)	0.50
Treatment 3	-0.10	-0.17	-0.22	-0.47	-0.07	-0.14	-0.18	-0.36
	(0.32)	(0.42)	(0.42)	(0.45)	0.32	(0.47)	(0.47)	(0.49)
Female*Treatment 2	-	0.19	0.06	0.1	-	0.27	0.16	0.24
		(0.66)	(0.65)	(0.68)		(0.64)	(0.64)	(0.67)

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Female*Treatment 3	-	0.14 (0.65)	0.17 (0.65)	0.44 (0.6)	-	0.15 (0.64)	0.18 (0.64)	0.40 (0.65)
CBR Index	-	-	-0.23 (0.19)	-0.19 (0.21)	-	-	-0.21 (0.19)	-0.20 (0.20)
Demographic Controls								
Age	-	-	-	0.03 (0.01)	-	-	-	0.02 (0.02)
Highest Level of Education	-	-	-	-0.74* (0.23)	-	-	-	-0.61* (0.24)
Stream of education	-	-	-	-0.18** (0.2)	-	-	-	-0.25 (0.20)
Marital Status	-	-	-	0.65 (0.44)	-	-	-	0.70 (0.43)
Occupation	-	-	-	0.04 (0.19)	-	-	-	0.07 (0.14)
Caste	-	-	-	-0.01 (0.1)	-	-	-	-0.06 (0.15)
Religion	-	-	-	0.04 (0.19)	-	-	-	0.05 (0.19)
Annual Family Income	-	-	-	0.10 (0.12)	-	-	-	-0.12 (0.13)
Family Size	-	-	-	-0.12* (0.05)	-	-	-	-0.12* (0.06)
R-Squared	0.01	0.01	0.02	0.11	-	-	-	-

Levels of significance: ****' 0.001 ***' 0.01 **' 0.05 *' 0.1 ' ' 1

Standard Errors in parentheses

+Marginal coefficients

In Table 1.5, I show the results I find when I regress gender, treatments and Maths Scores on the point of switch in the risk task. In column 1, when I check for the effects of female and Maths scores on risk switch, I find that with an increase of one right question, participants switch at a 0.11 higher lottery number. The coefficient is statistically significant at 1% level of significance. In the same way, the coefficient for Maths scores is also significant when the Tobit model is specified, which is also significant at 1% level of significance. This is a very important finding, since it shows evidence that people with higher quantitative skills are less risk averse in nature.

After controlling for CBR index and demographics, I find that the level of education and family size are the statistically significant coefficients, in both the linear regression as well as

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Tobit models. The most essential finding thus, in my results is that Maths scores and level of education have great effect on the risk attitude of the participant, which can be seen in column 10.

Table 1.5: Regression results for effect of gender and treatments and Maths scores on Risk switch point, with Lower Bound 2 and Upper Bound 10 for Tobit Models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	LRM	LRM	LRM	LRM	LRM	Tobit	Tobit	Tobit	Tobit	Tobit
Risk Switch										
Female	0.43 (0.24)	0.4 (0.53)	0.4 (0.53)	0.39 (0.54)	0.14 (0.53)	0.41 (0.25)	0.43 (0.54)	0.40 (0.55)	0.39 (0.55)	0.16 (0.55)
Maths Scores	0.11*** (0.03)	-0.11** (0.04)	-0.11** (0.04)	-0.11** (0.04)	-0.11* (0.04)	-0.10*** (0.03)	-0.10* (0.04)	-0.11* (0.04)	-0.10* (0.04)	-0.11** (0.04)
Female*Maths Scores	-	0.01 (0.06)	0.01 (0.06)	0.01 (0.06)	0.01 (0.06)	-	-0.01 (0.06)	0.01 (0.06)	-0.01 (0.06)	0.01 (0.06)
Treatment 2	-	-	-0.03 (0.31)	0.01 (0.31)	-0.07 (0.34)	-	-	0.10 (0.31)	0.14 (0.31)	0.06 (0.32)
Treatment 3	-	-	-0.13 (0.06)	-0.13 (0.31)	-0.18 (0.31)	-	-	-0.10 (0.31)	-0.10 (0.31)	-0.1 (0.33)
CBR Index	-	-	-	-0.03 (0.2)	-0.05 (0.21)	-	-	-	-0.05 (0.19)	-0.08 (0.2)
Demographic Controls										
Age	-	-	-	-	0.01 (0.01)	-	-	-	-	0.01 (0.02)
Highest Level of Education	-	-	-	-	0.77*** (0.22)	-	-	-	-	0.66** (0.23)
Stream of education	-	-	-	-	-0.18 (0.21)	-	-	-	-	-0.21 (0.19)
Marital Status	-	-	-	-	0.66 (0.44)	-	-	-	-	0.75 (0.42)
Occupation	-	-	-	-	-0.4 (0.12)	-	-	-	-	-0.03 (0.13)
Caste	-	-	-	-	-0.05 (0.11)	-	-	-	-	-0.10 (0.14)
Religion	-	-	-	-	-0.01 (0.22)	-	-	-	-	0.01 (0.19)
Annual Family Income	-	-	-	-	-0.07 (0.05)	-	-	-	-	-0.06 (0.13)
Family Size	-	-	-	-	-0.11*	-	-	-	-	-0.11

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					(0.05)					(0.06)
R-Squared	0.07	0.07	0.07	0.07	0.14	-	-	-	-	-

Levels of significance: **** 0.001 *** 0.01 ** 0.05 . 0.1 ' ' 1

Standard Errors in parentheses

+Marginal coefficients

5. Conclusion

The paper evaluates the effects of gender stereotype threats on the performance of women in quantitative tasks and their risk aversion while making decisions. Also, I check whether possessing higher quantitative skills makes people less risk averse. With the experiments I conducted, I find that women are risk averse than men and also, participants possessing better quantitative skills are less risk averse in nature.

Such gender stereotypes are believed to be the driving force behind the under-representation of women in the field of science. Cultural factors and beliefs also have a role to play here, since from the beginning, parents often provide differential guidance to their children, depending on their gender. This phenomenon may also occur at educational institutes, where girls may not be encouraged to perform better at more quantitatively challenged subjects.

Hence, the main policy intervention here is to educate more and more women. Nudges should be constructed, to help improve quantitative skills of women. This will have long term implications and help to reduce the gender gap in the society on a whole. At educational and formal learning institutions, repeatedly presenting students with exemplars of successful people who share their gender identity will help to validate students' potential for success. Women should be encouraged to think of themselves in terms of their valued and unique characteristics. Despite being at a mild disadvantage at brawn-based jobs, women can put their developed skills at use, when intellectually advanced jobs are in context. Also, what is required is to make them aware of these stereotypes, so that they are better equipped to overcome them, and not let it affect not only their decision making capabilities, but also in the long run.

One of the limitations here is selection bias, which I try to control by randomising participants under treatments. Also, since I have a comparatively fewer number of participants, it may be the case that the analytical results may not be entirely right. Also, I do

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not pay every participant. Though they all have an equal chance of getting paid, only a few actually get paid. This along with some other influential factors might affect the performance of the participants, other than the treatment which is given to their respective groups, which again might hamper with the results I obtained.

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Appendix A: Instructions for maths test

Thank you for participating in today's experiment. It will take 30 minutes to finish this task.

Subject ID _____

No Talking Allowed

Now that the experiment has begun, we ask that you do not talk. If you have a question after we finish reading instructions, please raise your hand and the experimenter will approach you personally and answer your question.

Complete Privacy

This experiment is structured so that no other participant will come to know of the answers of anyone else in the experiment. All the participants are requested to not reveal their identity.

How to answer?

There are 20 questions and 4 options available for each question. Only one answer among these is the right one. Tick the right answer.

Answers

Please think before you mark your answer. Over writing is not encouraged.

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Appendix B: Instructions for maths test

Thank you for participating in today's experiment. It will take 30 minutes to finish this task.

Subject ID _____

No Talking Allowed

Now that the experiment has begun, we ask that you do not talk. If you have a question after we finish reading instructions, please raise your hand and the experimenter will approach you personally and answer your question.

Complete Privacy

This experiment is structured so that no other participant will come to know of the answers of anyone else in the experiment. All the participants are requested to not reveal their identity.

How to answer?

There are 20 questions and 4 options available for each question. Only one answer among these is the right one. Tick the right answer.

Answers

Please think before you mark your answer. Over writing is not encouraged.

Statistically, it has been shown that men perform better than women in quantitative tests.

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Appendix C: Instructions for maths test

Thank you for participating in today's experiment. It will take 30 minutes to finish this task.

Subject ID _____

No Talking Allowed

Now that the experiment has begun, we ask that you do not talk. If you have a question after we finish reading instructions, please raise your hand and the experimenter will approach you personally and answer your question.

Complete Privacy

This experiment is structured so that no other participant will come to know of the answers of anyone else in the experiment. All the participants are requested to not reveal their identity.

How to answer?

There are 20 questions and 4 options available for each question. Only one answer among these is the right one. Tick the right answer.

Answers

Please think before you mark your answer. Over writing is not encouraged.

Statistically, it has been shown that men perform better than women in quantitative tests. However, it is not true for this set of questions that you will be solving.

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Appendix D: Instructions for risk task

Thank you for participating in today's experiment. It will take 10 minutes to finish this task.

Subject ID _____

No Talking Allowed

Now that the experiment has begun, we ask that you do not talk. If you have a question after we finish reading instructions, please raise your hand and the experimenter will approach you personally and answer your question.

Complete Privacy

This experiment is structured so that no other participant will come to know of the answers of anyone else in the experiment. All the participants are requested to not reveal their identity.

How to answer?

There are 10 situations mentioned in the task. Everyone starts from selecting Option A in situation 1. As you go along the choices among the remaining situations, mention the situation where you would like to switch from Option A to Option B.

Answers

Please think before you mark the point of switching over to Option B. Over writing is not encouraged.

Appendix E: Maths Test

Subject ID _____

1. If a is the smallest prime number greater than 21 and b is the largest prime number less than 16, then $ab =$
A) 299 B) 323 C) 330 D) 351
2. A university admitted 100 students who transferred from other institutions. Of these students, 34 transferred from two-year community colleges, 25 transferred from private four-year institutions, and the rest transferred from public four-year institutions. If two different students are to be selected at random from the 100 students, what is the probability that both students selected will be students who transferred from two-year community colleges?
A) $25/34$ B) $14/265$ C) $17/150$ D) $18/250$
3. If j and k are positive odd integers and $j - k$ is even, which of the following must be even?
A) k B) $j*k$ C) $j+2k$ D) $(j*k) - j$
4. A student has taken ten tests, with an average score of 87. There are three tests remaining in the term. If her final testing average is 90 or more, she will get an A for the class. The maximum score on the tests is 100. What must her average on the last three tests be to achieve an A in the class?
A) 87 B) 90 C) 96 D) 100
5. The sum of Amy and Lauren's ages is 12. In 9 years, half of Amy's age will be the same as Lauren's age now. How old is Lauren now?
A) 1 B) 3 C) 7 D) 9
6. Which of the following is the largest?
A) 125% B) $0.0015/0.001$ C) $1 + 1/3$ D) 1.25
7. A certain line on the xy plane contains the points (3,2) and (6,0). Which of the following points may also be found along this line?
A) (1,2) B) (0,4) C) (2,3) D) (5,6)
8. If $N = \{8, 9, 5, 3, 7, 13, 9, 2\}$. The sum of the mean, mode, median, and range of set N is
A) 32 B) 34.5 C) 56 D) 448

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9. Which smallest number should be added to 7309 so that it will be completely divisible by 55?
A) 6 B) 1 C) 61 D) 16
10. A certain triangle has angles such that the ratio of the angles A:B:C = 1:3:5. Four times the measure of angle B is
A) 12 B) 36 C) 240 D) 400
11. If $-7x - 2y = -13$, and $x - 2y = 11$. The variable $y =$
A) -3 B) -4 C) 3 D) 4
12. Two trains leave from the same station, travelling in opposite directions. One train travels at a speed 15 km/hr slower than the other. After 16 hours they are 1680 km apart. Find the average speed of the slower train.
A) 15km/hr B) 30km/hr C) 45km/hr D) 60km/hr
13. The product of the greatest prime factor of 88 and the smallest prime factor of 117 is
A) 6 B) 33 C) 99 D) 104
14. Anna bought a collectible statuette at an auction for 40% above the starting bid of \$200. Then an appraiser told her that it was worth 15% less than she had paid. The statuette is worth
A) \$238 B) \$250 C) \$265 D) \$330
15. In a certain geometric sequence, the first five terms are m, n, o, p, and q. If $m = \frac{1}{2}$ and $o = 18$, the fifth term in the series is
A) 9 B) 18 C) 108 D) 648
16. If $x = 3^2$, then what is the value of x^x ?
A) 3^4 B) 3^8 C) 3^{12} D) 3^{18}

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17. At the local grocery store, apples normally cost 40 cents each. During a recent sale, the price was reduced to 3 apples for a dollar. How much money would be saved by purchasing 30 apples at the sale price?

- A) \$1 B) \$1.5 C) \$2 D) \$2.5

18. If j is a multiple of 12, and k is a multiple of 21, then $j \cdot k$ must be a multiple of which of the following?

- A) 8 B) 22 C) 28 D) 35

19. If $y = 4$ is a solution of the equation $y^2 + ay + 8 = 36$, then what is the value of a ?

- A) -7 B) 3 C) -3 D) 7

20. a , b , and c are integers such that $ab + c = 7$, $ac + b = 5$, and $a + b + c = 6$. What is the value of abc ?

- A) 2 B) 6 C) -5 D) -8

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Appendix F: Risk task

Subject ID _____

Nos.	OPTION A		OPTION B	
1	1/10 Of Rs. 200	9/10 Of Rs. 160	1/10 Of Rs. 385	9/10 Of Rs. 10
2	2/10 Of Rs. 200	8/10 Of Rs. 160	2/10 Of Rs. 385	8/10 Of Rs. 10
3	3/10 Of Rs. 200	7/10 Of Rs. 160	3/10 Of Rs. 385	7/10 Of Rs. 10
4	4/10 Of Rs. 200	6/10 Of Rs. 160	4/10 Of Rs. 385	6/10 Of Rs. 10
5	5/10 Of Rs. 200	5/10 Of Rs. 160	5/10 Of Rs. 385	5/10 Of Rs. 10
6	6/10 Of Rs. 200	4/10 Of Rs. 160	6/10 Of Rs. 385	4/10 Of Rs. 10
7	7/10 Of Rs. 200	3/10 Of Rs. 160	7/10 Of Rs. 385	3/10 Of Rs. 10
8	8/10 Of Rs. 200	2/10 Of Rs. 160	8/10 Of Rs. 385	2/10 Of Rs. 10
9	9/10 Of Rs. 200	1/10 Of Rs. 160	9/10 Of Rs. 385	1/10 Of Rs. 10
10	10/10 Of Rs. 200	0/10 Of Rs. 160	10/10 Of Rs. 385	0/10 Of Rs. 10

Mention the pair number where you would like to switch from Option A to Option B - _____

Do gender stereotype threats and quantitative skills affect risk attitudes?

Appendix G: Questionnaire

Subject ID: _____

Age: _____

- Gender:
 1. Male
 2. Female
 3. Other

- Highest level of Education:
 1. 10th
 2. 12th
 3. Graduation
 4. Post-Graduation
 5. Other (Please specify)

- Stream of education: _____

- Marital Status:
 1. Single
 2. Married
 3. Divorced
 4. Widowed

Do gender stereotype threats and quantitative skills affect risk attitudes?

- Occupation:
 1. Service
 2. Government Job
 3. Self-employed
 4. Student
 5. Other

- Cast:
 1. General
 2. ST
 3. SC
 4. OBC
 5. Other

- Religion:
 1. Hindu
 2. Muslim
 3. Christian
 4. Buddhist
 5. Atheist/Agnostic/Non-religious
 6. Others (Please specify)

- Yearly Family Income:
 1. Less than Rs. 5 lakhs
 2. Rs.5 lakhs - Rs.10 lakhs
 3. Rs.10 lakhs – Rs.20 lakhs
 4. Rs.20 lakhs and above

Do gender stereotype threats and quantitative skills affect risk attitudes?

- Size of the family (Number of family members in the house): _____

- How difficult did you find the Math test?
 1. Extremely difficult
 2. Difficult
 3. Somewhat difficult
 4. Not too difficult
 5. Not difficult at all

- “I don’t worry about the consequences of what I do”- with this statement I:
 1. Strongly Agree
 2. Agree
 3. Undecided
 4. Disagree
 5. Strongly Disagree

- “I always think about the benefits and risks before starting a new activity” - with this statement I:
 1. Strongly Agree
 2. Agree
 3. Undecided
 4. Disagree
 5. Strongly Disagree

Thank you for participating.