

ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Master Thesis Behavioural Economics

Master Thesis

Destructive behaviour of females and males after competition. Comparison
between ingroup and outgroup members.

Name student: Joyce Bahnerth

Student number: 491731

Supervisor: David Gonzalez Jimenez

Second assessor: Johan de Jong

Date: 30-10-2023

The views stated in this thesis are those of the author and not necessarily those of the supervisor,
second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

Abstract

Competitions can cause individuals to engage in destructive behaviour, however, many companies incorporate competition to motivate employees and enhance productivity. Understanding this behaviour is crucial for companies to prevent it. Evidence indicates that in general, females are more averse to competition, but their behaviour is not explored under different circumstances. The study by Jauernig et al. (2016) provides evidence that winners engage in more destructive behaviour toward losers, without considering the effect of gender. Therefore, this study focusses on the destructive behaviour of females when paired with different opponents. A setting is created where respondents are matched after a speed-based calculation task and 158 responses were collected. The sex of the opponent and their scores are manipulated to assess if there is a difference in the destructive behaviour of the respondents. Multiple balance tests and regressions are run to investigate the impact of various variables on destructive behaviour. Overall, males tend to engage in more destructive behaviour and are more generous towards women. On the other hand, females engage in more destructive behaviour when competing against a strong opponent or when she has won the competition. Moreover, females engage in more destructive behaviour when paired with a female opponent. These results have implications for preventing this behaviour within companies that use competition to enhance employee motivation.

Table of contents

Abstract	2
Introduction	4
Literature review	6
Experimental design	10
Exploration Variables	11
Sample	13
Stimuli/materials	14
Procedure	14
Analysis	15
Summary statistics	16
Behaviour specific gender	20
Behaviour toward the score of the opponent.	21
Behaviour when the respondent has won.	23
Behaviour towards the sex of the opponent.	24
Discussion	26
References	29
Appendix A: Survey	33
Appendix B: Descriptive statistics	40

Introduction

Many standard economic theories state that individuals always seek to maximize their payoff. However, evidence from multiple studies contradict this notion. Individuals often express concern for the wellbeing of others and show a preference for fair distributions. The study by Hoffmann et al. (1994) present that in an ultimatum game where an earned entitlement is combined with an exchange, 85% of the respondents offer four euros or more of the ten euros they possessed. Furthermore, the research conducted by Güth et al. (1982) reveals that when individuals participate in an ultimatum game, they tend to offer what they perceive as fair. Thus, they only accept an offer when they believe it to be fair. Despite substantial evidence of pro-social behaviour, several studies uncover instances of anti-social behaviour after competition. Subjects inflict substantial harm on others, even when they are certain that their contestant is not a threat (Jauernig & Uhl, 2019). Destructive behaviour in participants is measured through the concept of ‘money burning’, where the respondents receive the opportunity to deduct the earnings of their opponent. In a setting where there is no fear of retaliation, money is destroyed in almost 40% of the cases (Abbink & Sadrieh, 2009). The study by Jauernig and Uhl (2019) discovers that participation in a competition often drives destructive behaviour.

Regardless of this behaviour, many companies incorporate competitions in which employees must compete against each other for a monetary bonus or promotion (Jauernig & Uhl, 2019). Companies introduce competition because they believe it encourages employees to perform better and be more effective. Without competition, employees might become unproductive. Therefore, competitions can benefit the organization. Tjosvold et al. (2003) present that competitive experiences can contribute to task effectiveness, enjoyment of the experience, a desire to participate, and personal benefits such as learning, self-efficiency, and social support. Competitions can also enhance commitment to continue working for the organization and motivate them to take on challenging projects in the future. Furthermore, competition can serve as a means to reduce indifference among employees and foster innovation (Miller, 2014). While competitions offer numerous advantages, they might not always be beneficial. They can induce stress on the employees and create tension within an organization. Employees might withhold their experiences, knowledge, and resources. Additionally, competition can also lead to prejudice and discrimination (Boz Semerci, 2019). The emergence of such behaviour strongly depends on the institutional environment (Muller et al., 2022). Hence, for companies, understanding the driving factors behind destructive behaviour is essential to exclude it and focus on the positive aspects of competition.

To gain a more comprehensive understanding of anti-social behaviour, multiple studies present evidence that female participants engage in higher overall destruction rates compared to male participants (Zebalos, 2018; Sadrieh and Schröder, 2016). Several studies provide evidence that women are not particularly fond of competitions and sometimes even shy away from them. One reason for this is that

women tend to be more risk-averse compared to men. The study by Jauernig and Uhl (2019) presents evidence of differences in how losers and winners are treated in competitive settings, highlighting that there is a difference between the treatment of ingroup members and outgroup members. However, the study did not specifically focus on the difference in the treatment of males and females.

Given this background, my study aims to investigate whether there is a difference in the destructive behaviour of ingroup and outgroup members when considering gender. Thus, examining whether females engage in more destructive behaviour when paired with another female (ingroup) opposed to being paired with a male (outgroup). The following research question is proposed: *Are females more likely to engage in destructive behaviour after competition when paired with a male opponent??*

In this study, data is collected through a survey and the behaviour of females and males is analysed. The survey involves respondents answering nineteen different mathematical questions. Subsequently, the respondents are matched with an opponent who have a specific score of correct answers. After pairing, the respondents are asked to burn the money of their opponent, which is defined as destructive behaviour. The respondents are matched with an opponent of the same sex or the opposite sex, to assess whether the sex of the opponents influences their behaviour. Multiple questions are asked about the demographics of the respondents to determine whether these influence the amount of money burned.

To analyse the effects, multiple balance tests are conducted, to conclude the distribution of the money burned across two samples. Furthermore, different regressions are run to assess whether the gender of the respondent and the sex of the opponent, in combination, influence the destructive behaviour of the respondents. Additionally, this allows for drawing conclusions about the effect of a strong opponent and the gender of the respondent on destructive behaviour. Lastly, this study assesses the effect of the gender of the respondent and whether they have won the competition.

The findings suggest that overall, males engage in more destructive behaviour compared to females. The destructive behaviour of females is influenced by whether they have won the competition and if they faced a strong opponent. Moreover, females tend to treat other females more harshly than male opponents. However, the results are insignificant and no conclusive evidence can be found. I find evidence that young adults tend to engage in less destructive behaviour compared to adults or elderly. These results are important because they emphasize the importance of implementing rules within companies to prevent destructive behaviour after a competition and they provide insight for managers on whether to implement competition.

Literature review

This section discusses several studies analysing the advantages and disadvantages of competition and what causes destructive behaviour afterward. Studies reveal that engagement in competitions might trigger destructive behaviour in participants. Destructive behaviour is measured through money burning, where respondents have the opportunity to take away part of the earnings of their opponent. Jauernig et al. (2016) report that participants burn a substantial amount of money, while all extrinsic incentives to harm are ruled out. Motivators for this behaviour include spite and pre-emptive retaliation.

The study by Zizzo and Oswald (2001) investigates whether spite is a motivator. Their findings reveal that individuals are willing to sacrifice their earnings to burn other people's money. Subjects burn significant portions of their earnings to inflict harm upon others. Similarly, this motive is also examined by Abbink and Sadrieh (2009). In their experimental setup, participants have the opportunity to burn money, but all other conventional reasons are removed. Importantly, if the participants burn the money of the other players, their wrongdoing is not punished. On average 40% of all decisions involve money burning and the reason for it is to harm others. Therefore, spite is a motivator for destructive behaviour. Destructive behaviour is also driven by a motive of pre-emptive retaliation. Fear of the contestant causes subjects to do considerable damage to each other. In the experiment of Abbink and de Haan (2014), two players have to complete various tasks, which are divided over several rounds, gaining the opportunity to earn a bonus each round. One player could decide to deactivate their opponent. Consequently, all the accumulated earnings of this opponent are destroyed. Despite the considerable damage this does to another participants; around 77.8% of the participants decided to deactivate their opponent. Thus, participants feel a strong need for self-protection. These findings align with those of Simunovic et al. (2013), in 50% of the cases, the participants chose to use the option for a pre-emptive attack without personal gain. To conclude, spite and pre-emptive retaliation are drivers for destructive behaviour.

To determine whether there is a difference between the behaviour of losers and winners, Jauernig et al. (2016) conducted an experiment in which players could mutually punish each other with no additional gain and their behaviour could even lead to a loss. Importantly, the money taken away from their opponent is not subtracted from their earnings. The experiment consists of two stages. In the first stage they are randomly matched and in the second stage, participants can decide to penalize their opponent. During the second stage, they either remain with the same individual or are rematched with a different participant. The findings indicate that losers and winners are treated comparably by outgroup members. Ingroup members punish the losers less severely compared to outgroup members while winners are treated the same by both groups. Thus, losers treat other losers less harshly compared to winners. These observations align with the research of Muller et al. (2012), which presents that when individuals are better off than their opponent, they exhibit more aggressive behaviour. Additionally, Chen and Li (2009)

discover that ingroup members show less charity when they have a lower payoff compared to when they have a higher payoff.

Women shy away from competition and therefore, from applying for a job that is relatively more competitive (Sutter and Glätzle-Rützler, 2015). Significant differences are found between the willingness to join a competition when women are compared to men. Research shows that there are multiple causes for this behaviour. First of all, women tend to be more risk-averse than men and prefer a fixed wage compared to a variable payment (Dohmen and Falk, 2011). This is because women report overall more intense fear and nervousness when anticipating negative outcomes. Individuals who are afraid, as opposed to those who are angry, evaluate a gamble as riskier. Secondly, the social preferences of men are less situationally specific compared to females. Thirdly, women are more averse to competition in general (Croson and Gneezy, 2009). Moreover, Günther et al. (2010) uncover evidence that women do not want to compete against men in areas where they think they might lose. However, if there is a possibility that they have a chance, their performance does improve. Compared to women, men more often choose competitive payment structures (Dohmen and Falk, 2011). Research has revealed that the performance of men is more affected by competition compared to the performance of women. Men exhibit higher levels of effort overall when only the best person can win, while women do not exert extra effort in competitive situations (Croson and Gneezy, 2009). Thus, overall men are more likely to enter a competition.

Numerous studies look at the difference between the destructive behaviour of men and women. Zeballos (2018) discovers that male participants engage in less destructive behaviour compared to women. These findings align with the research of Sadrieh and Schröder (2016) who find that overall female dictators choose a higher level of destruction compared to male dictators. Therefore I expect that women may exhibit increased involvement in destructive behaviour, leading to the first hypothesis.

Hypothesis 1. After competition, females are more likely to engage in destructive behaviour compared to males.

Individuals compare themselves with their opponent and commonly desire to achieve or maintain a superior position (Garcia et al., 2013). Social comparison implies looking for or identifying a similarity or a difference between the other and the self in some dimension (Wood, 1996). Individuals frequently seek social comparison, Even though, unfavourable social comparison information can trigger unpleasant emotions (Moran & Schweitzer, 2008). They try to improve their performance and simultaneously minimize or pre-empt discrepancies between their level of performance and that of others. For example in racquetball where the opponents are somewhat better, individuals exhibit more aggressive behaviour (Garcia et al., 2013), as the success of one participant comes at the expense of another (Kilduff et al., 2016). Social comparison, together with competition, can lead to rivalries and competitive behaviour.

Competitive behaviour can manifest in various ways. For example, when the participant becomes jealous. Envy is a feeling that arises when a person lacks another's superior quality, achievement, or possession and either desires it or wishes the other person lacked it. Previous research suggest that envy can exert a substantial influence on interpersonal attitudes and behaviour. Envy is especially evoked when individuals are outperformed in a domain relevant to their self-concept (Moran & Schweitzer, 2008b). Individuals also display stronger interpersonally harmful behaviour when their opponent has a higher task performance (Poortvliet, 2013). Females have a greater sense of envy concerning money as a means of obtaining things and experiences that they can enjoy in the present (*LibKey*, z.d.). Competitive behaviour can also occur when a respondent faces a strong opponent. Individuals will tell self-serving lies to cast themselves in a more positive light to feel better and protect themselves from negative outcomes. When individuals feel threatened, their willingness to lie is augmented to protect themselves (Argo et al., 2006). Overall, individuals are more threatened by strong opponents and are therefore more willing to lie to protect themselves.

Since individuals present more antisocial behaviour when paired with a strong opponent and envy arises when individuals are outperformed. I expect females to engage in more destructive behaviour when paired with an opponent with a high number of correct answers, leading to the second hypothesis.

Hypothesis 2. After competition, females are more likely to engage in destructive behaviour when paired with an opponent with a high number of correct answers.

A competition induces anti-social behaviour whether one leaves the competition as a loser or as a winner. The study by Jauernig and Uhl (2019) present that winners are more likely to harm their opponent. There is also a difference between the destructive behaviour of ingroup members compared to the behaviour of outgroup members. According to the study of Jauernig et al. (2016), losers are punished less severely by ingroup members (other losers) than by outgroup members (winners).

Thus, since winners are more likely to harm their opponent and research has provided evidence that females engage in more destructive behaviour, the third hypothesis is introduced to support the findings of the study of Jauernig and Uhl (2019) and Jauernig et al. (2016).

Hypothesis 3. After competition, females are more likely to engage in destructive behaviour when they have won the competition.

The global gender gap is still very present in our society, with a lot of dissimilarities between men and women. These differences manifest in work titles, job assignments and, an overrepresentation of men in top positions (Pema & Mehay, 2010). As previously discussed, this is due to gender differences in ability and gender discrimination, but also because men are strongly motivated by competitive environments compared to women (Delfgaauw et al., 2013). Women shy away from competition and therefore do not

apply for more competitive jobs (Sutter and Glätzle-Rützler, 2015). Men are more confident thus, more inclined to participate in competitions (Sutter and Glätzle-Rützler, 2015). Men also perform better when competing against women (Antonovics et al., 2003). Research has shown that males behave more competitively when interacting with another man than when interacting with a woman. When in the presence of a woman, men donated significantly more to charity compared to when in the presence of a man. Men also behaved more prosocial towards women than women behaved towards men (Buunk & Massar, 2012).

Women do not like to compete against men in a male-typed domain. Their willingness to enter significantly increases when more women enter the competition. Therefore, women prefer a more sex-specific competition (Geraldes, 2020). Thus, women engage in more destructive behaviour and are less willing to compete against men. Consequently, I suspect that women may deduct more money when paired with men leading to the fourth hypothesis.

Hypothesis 4: After competition, females are more likely to engage in destructive behaviour when paired with a male opponent.

Methodology

To address the research question, ‘Are females more likely to engage in destructive behaviour after competition when paired with a male opponent?’ a survey is constructed to explore whether females engage in more destructive behaviour following competitive situations when competing against individuals of the same sex. This relationship is explored by creating a competition where respondents are matched with someone from the same or different sex and scores are subsequently compared. After the comparison a winner is determined and destructive behaviour is measured through money burning. Approval is received through the ethical thesis check.

Experimental design

To investigate whether women engage in more destructive behaviour, particularly towards men, two different online surveys are conducted. In the first survey ten individuals are selected, evenly divided between females and males. The survey is divided into two sections.

The first section begins with an example question, followed by nineteen different mathematical equations, which are presented in Appendix A. The mathematic equations are based on the method used by Jauernig et al. (2016). Matrices are induced where respondents must select two numbers, which add up to ten. In this survey, a slight variation is introduced, requiring the participants to select the row in which the numbers add up to ten. Following this, respondents are asked to provide some general demographic information. Toward the end of the survey, the respondents have the opportunity to receive information about the outcome of the research when it becomes available, the respondents can choose to provide their email address if interested but this is not mandatory. Subsequently, they receive information about their number of correct answers.

From the initial pool of ten respondents, the highest score and lowest score are selected as the foundation for the second survey. Four conditions are created.

1. A male with the highest score of the first survey (18 correct answers).
2. A female with the highest score of the first survey (18 correct answers).
3. A male with the lowest score of the first survey (12 correct answers).
4. A female with the lowest score of the first survey (12 correct answers).

To enhance the sense of natural competition in the second survey, participants are divided into these four different conditions. The identity of their opponent is unknown to the respondent of the second survey. The information provided is the sex of their opponent, their given name and the correct number of answers. The name of the opponent is changed because of confidential reasons.

The second survey mirrors the first one, with respondents going through the same nineteen mathematic equations. After completing the mathematical section, the respondents receive a message indicating whether they are matched with a female or a male, followed by a message about their number of correct answers and whether this count is higher, equal, or lower than their opponent's. This ensures that participants are aware of whether they have won or lost and if they compete against a male or a female.

After receiving the message, the respondents are given the opportunity to engage in destructive behaviour by deciding whether to take away a part of the earned money of their opponent (the respondent from the first survey). However, it is important to note that the money taken away is also deducted from their earnings and is limited to a maximum of ten euros.

Afterward, the respondents receive the same demographic questions as the first survey and have the same opportunity to gain knowledge about the outcome of the research. Additionally, an extra question is introduced, which allows respondents to provide their email address for a chance to win the money they earned.

Exploration Variables

To explore the data, four different formulas are employed. The first formula investigates the relationship between the amount of money burned and gender. The second formula examines the relationship between gender and the opponent's score. The third formula checks for destructive behaviour among females after winning the competition and the last one evaluates the relationship between gender and the sex of their opponent. All of these formulas control for specific variables, the variables remain constant over time and follow a between-subject design, since the survey consists of cross-sectional data.

$$Moneyburnt = \beta_0 + \beta_1 * Age + \beta_2 * Income + \beta_3 * Gender + \mu \quad (1)$$

$$Moneyburnt = \beta_0 + \beta_1 * Age + \beta_2 * Income + \beta_3 * Gender + \beta_4 * High_{score} + \beta_5 * (Gender * High_{score}) + \mu \quad (2)$$

$$Moneyburnt = \beta_0 + \beta_1 * Age + \beta_2 * Income + \beta_3 * Gender + \beta_4 * Winner + \beta_5 * (Female * Winner) + \mu \quad (3)$$

$$\begin{aligned}
 \text{Moneyburnt} = & \beta_0 + \beta_1 * \text{Age} + \beta_2 * \text{Income} + \beta_3 * \text{Gender} + \beta_4 \\
 & * \text{sex}_{\text{opponent}} + \beta_5 * (\text{Female} * \text{Male}_{\text{opponent}}) + \mu
 \end{aligned}
 \tag{4}$$

Money burnt (destructive behaviour) is the dependent variable and therefore, the primary focus of this study. The variable measures the extent of destructive behaviour exhibited by respondents and contains the amount of money the respondents are willing to take away from their opponent. The variable is measured between-subjects, with values ranging from 0 to 10. A dummy variable is created to check the proportion of individuals who burned money.

Age is an independent variable and is included since the study of Birditt and Fingerman (2005) provides evidence that younger people are more likely to use destructive behaviour compared to older individuals. This is in line with the study of Birditt and Fingerman (2003). Younger participants report more intense aversive responses compared to older individuals. Older individuals are less likely to respond with anger in response to interpersonal tension. The variable is continuous and is used to exclude respondents under the age of 18 from the results. To check the differences in behaviour a categorical variable is created. According to the Young Adult Development Project (n.d.), someone is a young adult between the ages of 18 and 25. Since in the Netherlands an individual retires after the age of 67, these individuals are considered “elderly”

Income is an independent variable and consists of the yearly gross household income of the respondents. The variable is included since the study by Harbring and Irlenbusch (2011) present evidence that sabotage activities within the company increase when the spread in wages is widened, indicating that income influences destructive behaviour. Moreover, the study of Piotrowska et al. (2019) provides evidence that individuals with a lower socioeconomic status are more prone to develop behavioural disorders. The variable is categorical and the categories can be seen in Appendix A. A new variable is created to facilitate a comparison between low, medium, and high income. According to the municipality of Amsterdam, the yearly gross household income is low when it is below 30,000 euros a year when individuals live together with a partner, this is taken as a reference point. A medium income consist of 40,000 euros as this is the average income in the Netherlands.

Gender is an independent variable and consists of the gender of the respondents who participate in the second survey. The variable is added to assess its effect on destructive behaviour, because the study of Zeballos (2018) provides evidence that male participants engage in less destructive behaviour.

High score is an independent variable and is created of the four different conditions. It is a dummy variable, the opponents with eighteen correct answers are put together and the opponents with 12 correct answers are grouped. The variable is added to explore the effect on destructive behaviour since the research of Poortvliet (2013) presents evidence that respondents engage in more harmful behaviour when paired with a strong opponent.

Female*High Score is an interaction variable added to examine the relationship between the gender of the respondents and the score of the opponent on destructive behaviour.

Winner is an independent variable and the respondents who have won the competition are included and the respondents who have lost the competition. Individuals cannot have won in the first and second conditions since the maximum amount of correct answers is 16 and their opponents have a score of 18. In the third and fourth conditions, individuals have won the competition when their score exceeds 12 correct answers. Research by Jauernig and Uhl (2019) presents evidence that winners engage in more destructive behaviour and therefore the variable is added to the model.

Female*Winner is an interaction variable and is added to the model to examine the effect of females who have won the competition on destructive behaviour.

Sex-opponent is an independent variable and is introduced to explore the effect of the sex of the opponent on destructive behaviour.

Female_Male-opponent is an interaction variable, added to examine the combined effect of the gender of the respondent and the sex of their opponent on destructive behaviour, to answer the research question.

Adding these variables into the design allows for a better understanding of the factors that influence destructive behaviour, especially various socioeconomic and gender dynamics.

Sample

A power analysis in G*power is performed to calculate the required number of participants. The paper of Jauernig et al. (2016) is used to define the effect size, where the amount taken away by winners and losers in the context of ingroup strangers compared to outgroup strangers is examined to identify differences in behaviour. This comparison is relevant for this study, which investigates whether there is a difference between the behaviour of females towards females and males. The effect size used for the power analysis is approximately 0.2, calculated by subtracting the mean of ingroup stranger and dividing by the standard deviation of ingroup stranger.

Standard values are used for the significance level and the power ($1-\beta=0.8$, $\alpha=0.05$). There are five predictors in the model, where two variables are used as control variables and three variables are used to estimate the effect. A total sample size of 59 participants is needed, leading to 15 participants per condition.

Participants for the study, are recruited through various means, such as sending a link to family and friends and approaching individuals on campus. Since the aim of the research is to discover whether or

not females engage in more destructive behaviour towards men or women, the recruitment criteria is limited to respondents who identify as either male or female and are above the age of 18.

In total, 341 responses are collected, however; 180 responses are found to be incomplete and are subsequently removed from the sample. Moreover, three respondents did not identify as men or women and since the purpose of this study is to analyse destructive behaviour influenced by gender, the decision is made to exclude them from the sample. Before removing the responses, a check is done to ensure an even distribution across conditions, this is the case so the changes of bias are minimized. In total 158 answers are utilized, which is sufficient when looking at the results of the G*Power analysis.

Stimuli/materials

The survey takes approximately around 6-9 minutes to complete. During the survey, the participants have the opportunity to earn money based on their performance. In the end, three random participants are selected to receive the amount they have earned. The amount depends on whether they have won the competition and whether they decide to burn the money of their contestant, thereby reducing their own earnings.

A question about employment status is added to the survey since this research provides insight into competition and behaviour of the contestants afterward. Competitions are often used by companies to enhance creativity and productivity. Therefore, the outcome of this survey offers valuable insights to companies and provides guidance on whether to use them.

Procedure

Participants are recruited through various methods, including receiving a link through WhatsApp, Facebook, and LinkedIn, or by being asked to fill in the survey while handing out QR-codes on campus. Before beginning the survey, the respondents receive information about the purpose of the survey, which is to gather data for this master's thesis. The introduction explains that the survey consists of both mathematical questions and general questions, estimated to take about six to nine minutes to complete. Respondents are assured that their answers are recorded anonymously. These are the conditions the participants have to agree to before going through the survey. Furthermore, participants can only continue if they confirm that they are eighteen years or older.

Upon agreeing with the terms, the respondents receive instructions about the mathematical questions. They are informed that they will encounter nineteen matrices, each consisting of three rows with four numbers. Their task is to select the row in which the numbers add up to the exact amount of ten. All the nineteen matrices have a time limit of fifteen seconds. The respondents are made aware that the goal of

the matrices is to get as many correct answers as possible because, after the mathematical questions, they get matched with an opponent. Once matched the answers of both are compared and a winner is determined. The winners earn twenty euros, while if the number of correct answers is even they both receive fifteen euros and the loser receives ten euros. Three of the respondents are randomly selected to receive the exact amount they have earned while going through all the questions of the survey.

Following this information, participants receive an example question to familiarize them with the task, followed by the nineteen matrices. After the nineteen matrices, the four conditions are introduced but these conditions remain unknown to the respondents. The respondents are either matched with Brian who has eighteen correct answers, Brian who has twelve correct answers, Emma who has eighteen correct answers and Emma who has twelve correct answers. Participants then receive information about their number of correct answers and whether this is higher, even, or lower than their opponent. After the message, the respondents receive the opportunity to deduct a portion of the earnings of their opponent. However, the respondents are informed that the amount taken away is also deducted from their earnings and that the maximum amount to deduct is ten euros. It is emphasized that their answers are recorded anonymously.

After the burning money questions, some general questions are asked about their age, gender, education, income, and employment status. In the end, the respondents are granted the opportunity to provide their email address, with a chance to become one of the three respondents who would receive payment corresponding to the amount they earned during the survey. Additionally, they could leave their email address if they wished to be informed about the outcome of the research when available. Finally, the respondents were thanked for their participation and reminded that their answers were recorded anonymously.

Analysis

The data is analysed using various methods. First of all a balance test is used to verify whether the distribution of the demographics does not differ across the two groups. Multiple Mann-Whitney U tests are conducted to determine if there is a difference in the distribution of the control variables across the two conditions. These tests are run to make sure that the true effect can be measured since evidence is found that when the groups are not balanced this can affect the dependent variable. The Mann-Whitney U test is performed to assess whether there is a difference in the distribution of the age of the respondents and their income across the two different conditions. A Fisher Exact test is used to assess the distribution of the gender of the respondents across the sex of the opponent.

Secondly, another balance test is used, to provide a partial answer to the first, second, and third hypothesis. For the first hypothesis, a Mann-Whitney U test is performed to check whether there is a

difference in the distribution of the money burned when comparing females to males. This test is similar to the test used in the paper of Abbink & Sadrieh (2009) and Jauernig and Uhl (2019). For the second hypothesis a Mann-Whitney U test is performed to check whether there is a difference in the distribution of the money burned when respondents with an opponent with a high score (18 correct answers) are compared to respondents with an opponent with a low score (12 correct answers). Another Mann-Whitney U test is performed to check whether there is a difference in destructive behaviour when winners are compared to losers. For the last hypothesis, a Mann-Whitney U test is run to assess the distribution of the amount of money burned across the sex of the opponent. It is important to note that the test does not enclose information about what causes the difference if there is a difference.

Therefore, a regression analysis is utilized to provide an answer to the four hypotheses. A regression is run to check whether a change in the dependent variable is caused by a change in the independent variable, so it is clear what causes the difference. An interaction variable is added for the second hypothesis to assess if women engage in more destructive behaviour when paired with a respondent with a high score or a low score. For the third hypothesis, an interaction variable is added to assess the combined effect of the gender of the respondents after they have won the competition. Lastly, for the fourth hypothesis, an interaction variable is added to assess the destructive behaviour of women toward a specific sex of their opponent. Multiple control variables are included to check whether they affect the dependent variable.

Results

As previously mentioned, respondents contribute data through a survey, which includes mathematical questions, burning money questions, and some general inquiries.

Summary statistics

In total, 158 participants are divided over the four different conditions, as seen in Table 1 of Appendix B. The average age of the respondents is 35 years old. The youngest participants are 18 years old, so no minors entered the survey. Out of the 158 participants, 74 are female and 84 are male, resulting in an almost even distribution. Among these 158 participants, 50.6 % (80 respondents) engage in destructive behaviour, on average respondents burn 2.823 euros. When examining the score, it is important to note that no respondents managed to exceed the score of 16 and, therefore, could not win in the first and second conditions, since the score of their opponent is set at 18. On average, the participants had 11 correct answers, which is also below the score given to their opponents in the third and fourth conditions

since the score is set at 12. Out of the 142 participants who provided an answer for the working situation without giving an alternative solution, 26 are unemployed and 116 are employed, which is relevant for the study since the data is analysed to help companies decide whether to apply competition into company policies.

As evident from table 1 and Figure 1, the data contradicts the notion that people always act rationally as surprisingly more than half of the people decide to burn money instead of maximizing their profit. Individuals act purely out of nasty behaviour, as taking away money from their opponents reduces their accounts.

When comparing the results with the study of Abbink and Sadrieh (2009), the distribution follows a similar trend. In their study, approximately 20.4% of the maximum amount is burned, while in this study roughly around 28.2% of the maximum amount is burned.

Additionally, The results are also in line with the study of Jauernig et al. (2019), as out of the people who perceive the experiment as competitive, 52.2% of the participants decided to burn part of their opponent's money, which is close to the 50.6% observed in this study.

Table 1

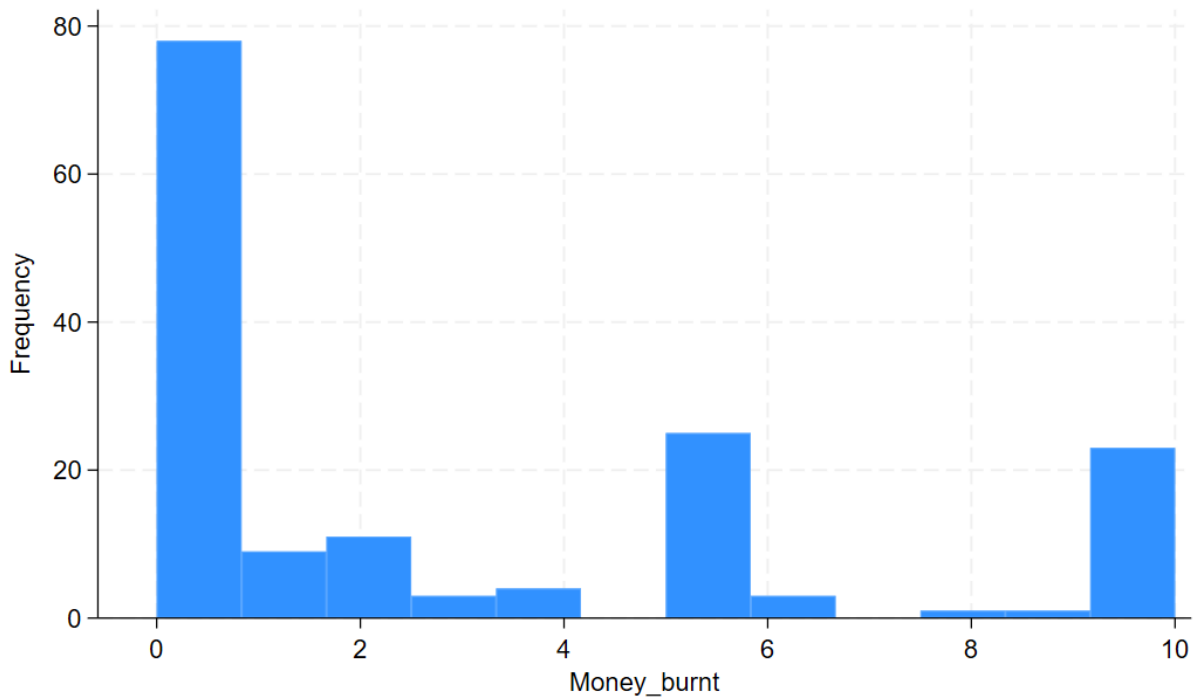
Summary statistics for study variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
Money burnt	158	2.823	3.625	0	10
Age number	158	34.665	15.602	18	76
Score	158	10.557	2.865	2	16
Gender	158	.468	.501	0	1
Burner	158	.506	.502	0	1
Work situation	142	.817	.388	0	1

Note. Gender is a dummy variable where 0 = male and 1 = Female. Burner is a dummy variable where 0 = No and 1 = Yes. Work situation is a dummy variable where 0 = Unemployed and 1 = Employed

Figure 1

Graphical representation of the frequency of the specific amount burnt by respondents.

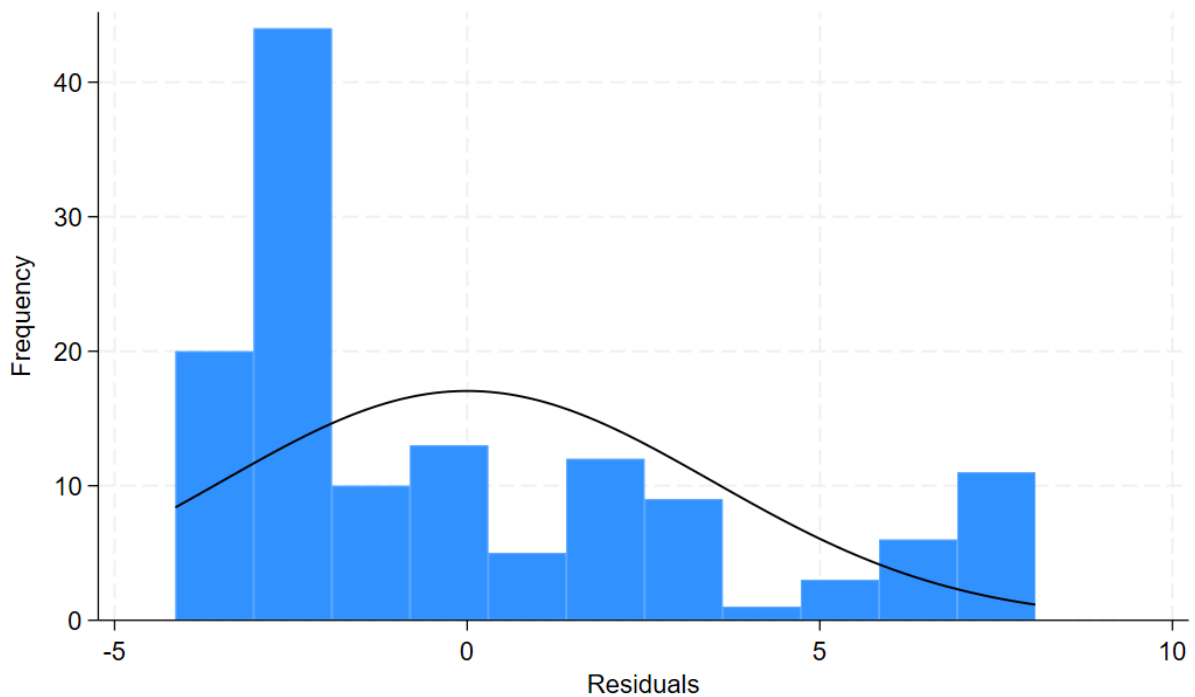


General structure

In performing regression analysis, it is assumed that the data follows a normal distribution. After inspecting the residuals, it is evident that the data does not follow a normal distribution, as can be seen in Figure 2. Therefore, a non-parametric test is used to assess the difference in the distribution of the money burned across the gender of the opponents. A regression is conducted to explore the effects of the control and interaction variables.

Figure 2

Graphical representation of the residuals.



To check for an even distribution, various balance tests are conducted, including different Mann-Whitney U tests and a Fisher exact test. To run these tests, a dummy variable is created that groups conditions one and three, as well as conditions two and four, to account for the sex of the opponent.

The median age for respondents with a male opponent is 24 years, while for respondents with a female opponent, it is 26 years. The distribution of ages is not statistically different across the two samples and the results suggest that the samples are balanced concerning the age of the respondents (Mann-Whitney $U = .978$, $N1 = 86$, $N2 = 72$, $P = .328$).

Moreover, there is no statistically significant difference in the distribution of income across the two samples, suggesting that they are balanced (Mann-Whitney $U = .171$, $N1 = 86$, $N2 = 72$, $P = .864$). The median income category for respondents with a male opponent is category 4 (between €36.501 and €43.500), while for respondents with a female opponent, it is category 5 (between €43.501 and €73.000). All categories can be seen in Appendix A.

A fisher exact test is used to assess the distribution of gender among respondents across the two different conditions. The test reveals that both groups have a similar gender distribution and no statistical differences are observed ($P = 0.523$, two-tailed) at the alpha level of 0.05. Therefore, the results suggest that the groups are balanced concerning the gender of the respondents.

To check if the respondents paid attention during the survey, the time to respond to the questions is examined. If respondents were not paying attention, they would leave questions unanswered or skip them. However, the first question has an average response time of 13.52 seconds and the last question has an average response time of 11.55 seconds, suggesting that the respondents paid attention throughout the survey and can remain in the dataset.

Behaviour specific gender

To test the effect of gender on destructive behaviour (H1), the differences in the destructive rate are compared between male and female respondents. A Mann Whitney U explores if there is a difference in behaviour. A regression controls for certain variables and enables an analysis of the behaviour of males and females.

First, analysing the behaviour of males. Out of the 84 male respondents, 44 (52,38%) choose to burn the money of their respondent. This indicates that more than half of the male respondents did not act rationally. On average, each respondent burns 3,31 euros (sd = 0.45).

Next, analysing the behaviour of females. In total 36 (48.65%) females burn the money of their direct opponent, this is a little bit less than half of the female respondents since 38 females decided not to engage in destructive behaviour. The average money burned is 2,27 euros (sd = 0.34).

There is a difference in behaviour when the distribution of the amount of money burned is different across female and male respondents. Therefore, a Mann-Whitney U test is performed. The median for male respondents is one euro and for females the median is zero euros. The results present that there is not a significant difference between the distribution of the amount of money burned across the two samples, as is shown in Table 2. Therefore, suggesting that both groups have a similar destructive behaviour distribution.

Table 2

Mann Whitney U results for the distribution of the amount of money burned across; Gender, High score, Winner, and Sex-opponent

Money burnt	N1	N2	U	P
Gender (Female/Male)	74	84	-1.164	.2444
High/Low score	80	78	.711	.4769
Winner/Loser	40	27	.203	.839
Sex opponent (Female/Male)	86	72	-.740	.459

Note. Gender is divided into two groups where N1 = Female respondent and N2 = Male respondent. Sex-opponent is divided into two groups where N1 = Female opponent and N2 = Male opponent. Overall the results are statistically insignificant and the distribution of the average amount burned does not differ between groups.

Table 3 displays a linear regression model of the independent variables on the amount of money burned. On average, young adults burn less money compared to adults and elderly. Individuals with a high income burn on average, less money compared to those with a low income and individuals with a medium income burn more money compared to individuals with a low income. Nevertheless, the control variables provide an insignificant result at a 5% significance level and a conclusion cannot be drawn on the effect of the control variables on destructive behaviour.

The main variable of interest is the gender of the respondents. The results present that overall females engage in less destructive behaviour, therefore the findings fail to provide support for Hypothesis 1. However, this effect is insignificant at a 5% significance level. Therefore, I am not able to draw a conclusion about the effect of the gender of the respondents on destructive behaviour.

Table 3

A linear regression model with the effect of the independent variables on the amount of money burned.

Money burnt	Coefficient
Category Age (Adults)	1.122 (.734)
Category Age (Elderly)	2.780 (1.744)
Category Income (Medium)	.982 (1.135)
Category Income (High)	-.452 (.720)
Gender (Female)	-.865 (.678)
Constant	2.808 (.742)***

Note. The table represents the coefficient of the first linear model. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Behaviour toward the score of the opponent.

To assess the effect of the opponent's score on destructive behaviour, the behaviour of the respondents is compared when paired with an opponent with 18 correct answers (High) to those paired with an opponent with 12 correct answers (Low). A Mann-Whitney U is used to check whether the distribution of the money burned differs among respondents paired with a high-scoring opponent and those with a low-scoring opponent. A regression is run to control for certain variables and an interaction variable is added to assess the combined effect of respondent's gender and the opponent's score.

First, the behaviour of respondents paired with a low-scoring opponent is analysed. Out of the 80 respondents, 43 (53.75%) chose to burn money, with an average of 2.975 euros (sd = .411) burned.

Next, the behaviour of respondents who are paired with an opponent with a high score is analysed. In total 37 (47.44%) respondents burned the money of their direct opponent. The average money burned is 2.667 euros (sd = .407).

A Mann-Whitney U test is performed to check for differences in the distribution of the money burned between respondents with a high-scoring opponent (18 correct answers) and those paired with a low-scoring opponent (12 correct answers). The median amount burned for respondents with a high-scoring opponent is zero euros, while for those paired with a low-scoring opponent, it is one euro. The results of the Mann-Whitney U test are presented in Table 2. There is not a significant statistical difference in the behaviour of the respondents. Therefore, the results suggest that both groups (High or Low opponent) have a similar distribution of the amount of money burned.

The average amount burned for females when paired with a high-scoring opponent is 2.417 euros (sd = .550). The average amount burned for females paired with a low-scoring opponent is 2.132 euros (sd = .413). The results are presented in Appendix B Table 2. To draw conclusions about the destructive behaviour of female respondents, while paired with an opponent with a high or low score, a regression is run. Table 4 represents the linear regression model that considers the combined effect of the opponent's score and the respondent's gender. Overall respondents facing a high-scoring opponent (18 correct answers) burn less money compared to respondents who are paired with a low-scoring opponent (12) but the effect is insignificant at 5%. Females who have an opponent with a high score burn more money compared to females who are paired with an opponent with a low score, which supports Hypothesis 2. However, the effect is statistically insignificant at 5% and therefore, a conclusion cannot be drawn.

Table 4

A linear regression model with the effect of the independent variable on the amount of money burned with an interaction variable for the score of the opponents and the gender of the respondent.

Money burnt	Coefficient
Category Age (Adults)	1.141 (.739)
Category Age (Elderly)	2.614 (1.717)
Category Income (Medium)	.948 (1.177)
Category Income (High)	-.462 (.734)
Gender (Female)	-1.225 (.948)
High (Opponent 18 correct answers)	-.606 (.998)
High#Female	.679 (1.2670)
Constant	3.134 (.947)***

Note. The table represents the coefficient of the second linear model. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Behaviour when the respondent has won.

To explore whether the respondent winning affects destructive behaviour, the amount of money burned is compared to when the respondent has won or lost. Only the respondents from the third and fourth condition are considered, reducing the number of observations to 67 individuals. A Mann-Whitney U test assesses whether the distribution of the amount of money burned differs between winners and losers. Then, a regression is run to explore the relationship between the competition's outcome and the gender of the respondent on destructive behaviour.

Losers on average burn 2.925 (sd = .590) euros and out of the 40 losers, 23 (57.5%) engaged in destructive behaviour. Compared to winners who burn on average 2.963 (sd = .713) euros and 13 (48.15%) out of the 27 winners burned money.

To assess whether there is a difference in the distribution of the amount of money burned across winners and losers, a Mann-Whitney U test is performed. Winners are respondents who have more than 12 correct answers in the third and fourth condition. The median for winners is zero euros. Losers are the respondents who have less than 12 correct answers in the third and fourth condition. The median for losers is one euro. However, the test results are statistically insignificant, as is shown in Table 2. Therefore, the results suggest that there is a balance in destructive behaviour between winners and losers.

Female winners burn on average 1.833 euros (sd = .696) and female losers burn on average 2.35 euros (sd. 617), the results are presented in Table 3 of Appendix B. To assess if there is a difference in

behaviour between female winners and female losers a linear regression is conducted. The linear regression, which is presented in Table 5 explores the destructive behaviour of winners. Overall, winners burn more money compared to losers, which is in line with the study of Jauernig et al (2016), but the effect is insignificant at 5% and conclusions cannot be drawn. The results of Table 9 do not support Hypothesis three since females who have won the competition burn less money compared to female losers. However, the effect is insignificant at 5%.

There is a significant relationship between elderly and destructive behaviour. Overall individuals who belong to the category Elderly (67 years or older) burn on average 2.62 euros more compared to the category Young adults (18 to 25 years old). The effect is statistically significant at 5%.

Table 5

A linear regression model with the effect of the independent variables on the amount of money burned with an interaction variable for the gender of the respondent and the outcome of the competition.

Money burnt	Coefficient
Category Age (Adults)	1.129 (1.177)
Category Age (Elderly)	2.962 ** (1.447)
Category Income (Medium)	2.189 (1.822)
Category Income (High)	-.283 (1.087)
Gender (Female)	-.180 (1.487)
Winner	1.666 (1.709)
Winner#Female	-1.852 (1.989)
Constant	2.038 (1.447)***

Note. Only conditions three and four are taken into account since these are the only conditions that portray winners and losers. The table represents the coefficient of the third linear model. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Behaviour towards the sex of the opponent.

To assess the effect of the sex of the opponent on destructive behaviour, the amount of money burned is compared when a respondent is paired with a female opponent versus a male opponent. A Mann-Whitney U test is used to check if the distribution of the money burned is different across the sex of the opponent. A regression is run to explore the effect of gender together with the sex of the opponent on destructive behaviour and control for certain variables.

Respondents with a male opponent burn on average 2.944 euros (sd = .418) and out of the 72 respondents who face a male opponent, 39 (54.17%) engage in destructive behaviour. Respondents with a female

opponent burn on average 2.721 euros (sd = .400) and out of the 86 respondents who compete against a female opponent, 41 (47.67%) engage in destructive behaviour.

A Mann-Whitney U test is performed to assess whether the distribution of the money burned is different when a respondent faces a male opponent as opposed to a female opponent. The median amount burned is zero euros when respondents face a female opponent, while for male opponents, it is one euro. The test results are presented in Table 2 and present that there is not a statistically significant difference in the distribution of destructive behaviour. Thus, suggesting that both groups are balanced with the distribution of the amount of money burned.

female respondents who are paired with a male opponent burn on average 2.444 euros (sd = .482), while those facing female opponents burn on average 2.105 (sd = .483). The average amount burned is shown in Appendix B Table 4. To assess whether there is a difference in behaviour of female respondents who face a male opponent as opposed to facing a female opponent, a regression is conducted. Table 6 represents the fourth linear regression. Overall respondents burn more money when paired with a male respondent, but the result is statistically insignificant at a 5% significance level. Female respondents, on the other hand, burn less money when they are paired with a male opponent. These findings do not support Hypothesis 4, as females engage in more destructive behaviour towards ingroup members compared to outgroup members. However, this effect is insignificant at a 5% significance level and therefore, no conclusive conclusions can be drawn.

Table 6

A linear regression model with the effect of the independent variables on the amount of money burned with an interaction variable for the gender of the respondent and the sex of the opponent.

Money burnt	Coefficient
Category Age (Adults)	1.132 (.730)
Category Age (Elderly)	2.958 * (1.632)
Category Income (Medium)	1.018 (1.164)
Category Income (High)	-.461 (.715)
Gender (Female)	-.720 (.849)
Male opponent	.846 (.990)
Male opponent/Female respondent	-.359 (1.247)
Constant	2.426 (.828)***

Note. The table represents the coefficient of the fourth linear model. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Discussion

Numerous studies consistently reveal that individuals tend to engage in more destructive behaviour, especially when their behaviour is concealed. Moreover, the studies by Jauernig et al. (2016) and Jauernig & Uhl (2019) uncover that winners burn more money overall when compared to losers. Thus, there is a difference between the behaviour towards outgroup members compared to ingroup members. While multiple studies focus on the destructive behaviour of individuals, this study takes a unique approach.

In the current study, I hypothesize that when participating in a survey involving nineteen mathematical questions, where females have to compete, they would engage in more money burning after a competition, especially when competing against male opponents. I did not anticipate a similar trend among men, since men tend to act more pro-socially towards women than women towards men. The results partially confirm my expectations.

Overall, just over half of the respondents engage in destructive behaviour, with an average of 2.823 euros burned ($d_s = 3.625$). This behaviour was especially visible among male respondents, as they burn, on average, more money and exhibit higher destructive rates. However, after careful consideration, the results of the statistical test are insignificant. The results contradict my notion that females engage in more destructive behaviour. The difference could be explained by the level of testosterone in males. Males with a high level of endogenous testosterone encourage dominant behaviour to enhance their status. To dominate they, try to improve their performance and simultaneously minimize or pre-empt discrepancies between their performance and that of others (Garcia et al., 2013). This dominant behaviour can translate into antisocial behaviour, leading to males burning more money compared to females. This behaviour is especially seen in male victors when their testosterone levels rise (Mazur & Booth, 1998).

Females who are paired with a male respondent overall burn less money, which contradicts Hypothesis 4, but the results are insignificant. The study by Buunk and Massar (2012) provides evidence that males are more generous towards the opposite sex compared to females. Overall, males behave more pro-socially towards women than they do towards men. This is particularly, true as males engage in quite fierce competition over status and resources with other males, especially to impress females. This behaviour is driven by the motive to obtain and maintain access to mates and females are a scarce resource over which males compete. Females on the other side tend to compete relatively more in the domain of physical attractiveness. Therefore, women are less in competition with others over the acquisition of resources since it is less important to them compared to men.

To address the research question, this research would suggest that females do not engage in more destructive behaviour and treat ingroup members more harshly compared to outgroup members when

a comparison is made between the gender of the respondent and the sex of the opponent. However, no evidence was found to support these claims.

For managers, the information is pertinent when deciding when to introduce competition in the workplace to prevent destructive behaviour and enhance productivity within the company. It is important to consider the demographics of the employees, as a higher number of male employees may lead to a higher change of destructive behaviour after a competition. The results indicate that employees who face stronger opponents engage in more destructive behaviour. They also exhibit more destructive behaviour when they have won the competition. This information is valuable when a manager considers using competitions repeatedly with the same employees. Moreover, some employees should be closely observed, as competitions reoccur and different situations lead to varying behaviour. This information is also relevant for policy makers, as this study presents the behaviour of individuals under certain circumstances. This information can be used to limit destructive behaviour since policy makers can establish rules to discourage and sanction this behaviour.

To draw conclusions about the combined effect of multiple variables, this study employs linear regression models. However, the residuals are not normally distributed. This limitation affects the distribution of the estimates and consequently, the width of the confidence interval. When the confidence intervals are not accurately measured, the decision to accept or reject the null hypothesis is influenced and the wrong decision can be taken, potentially leading to biases. The study collects data through a survey, but this method introduced several limitations. Firstly, the survey was distributed to friends and family, leading to a sampling error, as a portion of the population is overrepresented. This makes the data less generalizable to the entire population. Moreover, since most respondents are friends and family, response bias might occur as they might want to appear favourable and conform to social norms. The survey did not involve real money, which could have influenced behaviour, even though three respondents could earn money. The sample size is also small, which could have led to non-normal data and imprecise estimations. It is challenging to determine if respondents understood that they were competing against opponents of a specific gender, potentially introducing bias. The use of a survey also increases the probability that other factors influence the dependent variable since they cannot be controlled for, as would be the case in an experiment.

Several recommendations can be made to address these limitations. To gain more information about the destructive behaviour of females to a specific sex, a new survey could be conducted. In this new survey, it is important that a greater emphasis is placed on the sex of the opponent. Researchers should match the respondents at the beginning and reminders about the sex of their opponent should be provided during the survey. This could enhance the internal validity of the research. Moreover, the survey should be distributed and made available for a more diverse group of individuals, increasing

the likelihood that the residuals will follow a normal distribution and enabling more robust conclusions to be drawn from the data.

Additionally, more research is needed to explore the sanctions that limit the destructive behaviour of employees after a competition. The sanctions have to be tested to work and assess whether they have a different effect on males compared to females.

Conclusion

Competitions are commonly used to motivate employees. However, multiple studies provide evidence that competition could lead to destructive behaviour. Losers and winners both engage in destructive behaviour, but losers are punished more severely by winners. Therefore, individuals do not only wish to outperform each other, but their overall level of aggression increases and others are hurt in the process.

Overall males engage in more destructive behaviour compared to females but the behaviour of the respondents is influenced by their opponent and different situations have been examined. Firstly, females engage in more destructive behaviour when their opponent is strong. Secondly, when females have won the competition, they treat their opponent more harshly. Lastly, against all expectations, females engage in more destructive behaviour when paired with another female.

This paper provides fundamental insights into destructive behaviour caused by competition for managers. With this information, a manager can make informed decisions about when to implement competition to avoid this behaviour and enhance productivity within the company. Policy makers within the organization should pay special attention to the results and consider implementing rules to sanction destructive behaviour and limit it. Certain employees should be monitored since competitions take place more often in the working environment and this paper suggests that in certain situations, employees engage in more destructive behaviour. For example, females engage in more destructive behaviour when paired with another female.

References

- Abbink, K., & de Haan, T. (2014). Trust on the brink of Armageddon: The first-strike game. *European Economic Review*, 67, 190-196.
- Abbink, K., & Sadrieh, A. (2009). The pleasure of being nasty. *Economics letters*, 105(3), 306-308.
- Antonovics, K., Arcidiacono, P., & Walsh, R. (2003). Competing against the opposite sex. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.410929>
- Argo, J. J., White, K., & Dahl, D. W. (2006, juni). Social Comparison Theory and Deception in the Interpersonal Exchange of Consumption Information. *Journal of Consumer Research*. <https://academic.oup.com/jcr/article/33/1/99/1822628>
- Babcock, L., Recalde, M. P., Vesterlund, L., & Weingart, L. (2017). Gender differences in accepting and receiving requests for tasks with low promotability. *American Economic Review*, 107(3), 714-747.
- Bowles, H. R., Babcock, L., & Lai, L. (2007). Social incentives for gender differences in the propensity to initiate negotiations: Sometimes it does hurt to ask. *Organizational Behavior and human decision Processes*, 103(1), 84-103.
- Boz Semerci, A. (2019). Examination of knowledge hiding with conflict, competition and personal values. *International Journal of Conflict Management*, 30(1), 111-131.
- Buunk, A. P., & Massar, K. (2012). Intrasexual competition among males: competitive towards men, prosocial towards women. *Personality and Individual Differences*, 52(7), 818–821. <https://doi.org/10.1016/j.paid.2012.01.010>
- Chen, Y., & Li, S. X. (2009). Group identity and social preferences. *American Economic Review*, 99(1), 431-457.
- Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic literature*, 47(2), 448-474.
- Delfgaauw, J., Dur, R., Sol, J., & Verbeke, W. (2013). Tournament incentives in the field: Gender differences in the workplace. *Journal of Labor Economics*, 31(2), 305–326. <https://doi.org/10.1086/667996>

Miller, B. (2014). Does Competition Among Employees Work as a Motivator. HR Daily Advisor.

Retrieved from <https://hrdailyadvisor.blr.com/2014/12/12/does-competition-among-employees-work-as-a-motivator/>

Dohmen, T., & Falk, A. (2011). Performance pay and multidimensional sorting: Productivity, preferences, and gender. *American economic review*, 101(2), 556-590.

Eisenberg, N., Eggum, N. D., & Di Giunta, L. (2010). Empathy-related responding: Associations with prosocial behavior, aggression, and intergroup relations. *Social issues and policy review*, 4(1), 143-180.

Garcia, S. M., Tor, A., & Schiff, T. M. (2013). The psychology of competition. *Perspectives on Psychological Science*, 8(6), 634–650. <https://doi.org/10.1177/1745691613504114>

Geraldes, D. (2020). Women dislike competing against men. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.3741649>

Güth, W., Schmittberger, R., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of economic behavior & organization*, 3(4), 367-388.

Hoffman, E., McCabe, K., Shachat, K., & Smith, V. (1994). Preferences, property rights, and anonymity in bargaining games. *Games and Economic behavior*, 7(3), 346-380.

Jauernig, J., & Uhl, M. (2019). Spite and preemptive retaliation after tournaments. *Journal of Economic Behavior & Organization*, 158, 328-336.

Jauernig, J., Uhl, M., & Luetge, C. (2016). Competition-induced punishment of winners and losers: Who is the target?. *Journal of Economic Psychology*, 57, 13-25.

Kilduff, G. J., Elfenbein, H. A., & Staw, B. M. (2010). The Psychology of Rivalry: A relationally dependent analysis of competition. *Academy of Management Journal*, 53(5), 943–969. <https://doi.org/10.5465/amj.2010.54533171>

Kilduff, G. J., Galinsky, A. D., Gallo, E., & Reade, J. J. (2016). Whatever it takes to win: rivalry increases unethical behavior. *Academy of Management Journal*, 59(5), 1508–1534. <https://doi.org/10.5465/amj.2014.0545>

LibKey. (z.d.). [https://libkey.io/libraries/2163/articles/8701582/full-text file?utm_source=api_975](https://libkey.io/libraries/2163/articles/8701582/full-text%20file?utm_source=api_975)

- Livingston, J. (2017). 9 ways to create healthy competition in a work environment. *HR Future*, 2017(6), 14-17.
- Mazur, A., & Booth, A. (1998). Testosterone and dominance in men. *Behavioral and Brain Sciences*, 21(3), 353–363. <https://doi.org/10.1017/s0140525x98001228>
- Moran, S., & Schweitzer, M. E. (2008). When better is worse: envy and the use of deception. *Negotiation and Conflict Management Research*, 1(1), 3–29. <https://doi.org/10.1111/j.1750-4716.2007.00002.x>
- Muller, D., Bushman, B. J., Subra, B., & Ceaux, E. (2012). Are people more aggressive when they are worse off or better off than others?. *Social Psychological and Personality Science*, 3(6), 754–759.
- Müller, J., Schwieren, C., & Spitzer, F. (2022). How to prevent destruction—On the malleability of anti-social behavior. *Journal of Behavioral and Experimental Economics*, 97, 101798.
- Poortvliet, P. M. (2013). Harming others' Task-Related efforts. *Social Psychology*, 44(6), 373–379. <https://doi.org/10.1027/1864-9335/a000161>
- Sadrieh, A., & Schröder, M. (2016). Materialistic, pro-social, anti-social, or mixed—A within subject examination of self-and other-regarding preferences. *Journal of Behavioral and Experimental Economics*, 63, 114-124.
- Simunovic, D., Mifune, N., & Yamagishi, T. (2013). Preemptive strike: An experimental study of fear-based aggression. *Journal of Experimental Social Psychology*, 49(6), 1120-1123.
- Sutter, M., & Glätzle-Rützler, D. (2015). Gender differences in the willingness to compete emerge early in life and persist. *Management Science*, 61(10), 2339-2354.
- Tjosvold, D., Johnson, D. W., Johnson, R. T., & Sun, H. (2003). Can interpersonal competition be constructive within organizations?. *The Journal of Psychology*, 137(1), 63-84.
- Wood, J. V. (1996). What is social comparison and how should we study it? *Personality and Social Psychology Bulletin*, 22(5), 520–537. <https://doi.org/10.1177/0146167296225009>
- Young Adult Development Project*. (z.d.). <https://hr.mit.edu/static/worklife/youngadult/changes.html>

Zeballos, E. (2018). Destructive actions and productivity: Experimental evidence on interpersonal comparisons among dairy farmers in Bolivia. *Journal of Behavioral and Experimental Economics*, 76, 82-94.

Zizzo, D. J., & Oswald, A. J. (2001). Are people willing to pay to reduce others' incomes?. *Annales d'Economie et de Statistique*, 39-65.

Pema, E., & Mehay, S. L. (2010). The role of job assignment and human capital endowments in explaining gender differences in job performance and promotion. *Labour Economics*, 17(6), 998–1009. <https://doi.org/10.1016/j.labeco.2010.02.006>

Appendix A: Survey

This is an example of a participant who had 18 correct answers and is matched with Brian who had 18 correct answers (Condition 1)

Thank you for participating in this survey, I am a master's student at Erasmus University Rotterdam. As part of my thesis, I am conducting a survey. you will be asked to do some calculations and some general questions will be asked. The survey will take approximately between 6 and 9 minutes to complete. Your answers will be recorded anonymously.

- I hereby agree to continue this survey and confirm that I am 18 years or older

In the following section, you are asked to do some calculations. 19 matrices will be shown, and you will have to find the row that adds up to 10. Each matrix will be shown for 15 seconds. The goal is to get as many answers right as possible. The results from your participation will be matched randomly with another participant. Both of your performances will be compared, the participant with the highest number of correct answers wins! The winner will earn twenty euros, for a draw you will earn fifteen euros and when you have lost you will earn ten euros. In the end, three participants will randomly be selected to receive the amount earned after going through all the questions.

First, an example will be shown

Please indicate which row adds up to the amount of 10. You will have 15 seconds.

Rij 1	2,3	2,3	2,3	3,1
Rij 2	2,8	1,9	2,4	2,0
Rij 3	3,8	2,7	2,2	2,3

- Row 1
- Row 2
- Row 3

You will now see the matrices one by one

1. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	1,2	3,3	1,7	3,8
Row 2	2,8	1,9	1,4	2,6
Row 3	2,8	1,9	2,4	4,1

- Row 1
- Row 2
- Row 3

2. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	2,8	1,9	3,4	3,9
Row 2	2,6	2,9	2,1	3,5
Row 3	0,5	3,2	3,8	2,5

- Row 1
- Row 2
- Row 3

3. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	2,3	2,7	1,6	3,5
Row 2	1,8	1,8	4,6	1,8
Row 3	2,3	3,7	1,6	3,6

- Row 1
- Row 2
- Row 3

4. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	2,4	2,1	2,5	3,1
Row 2	2,7	0,9	1,1	5,3
Row 3	2,3	3,7	0,6	2,1

- Row 1
- Row 2
- Row 3

5. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	3,9	0,6	1,1	4,4
Row 2	1,4	3,3	1,6	4,7
Row 3	3,3	1,8	2,7	2,3

- Row 1
- Row 2
- Row 3

6. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	0,3	3,2	2,1	4,4
Row 2	3,3	1,8	3,1	2,0
Row 3	2,3	3,7	1,6	4,4

- Row 1
- Row 2
- Row 3

7. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	2,3	3,1	1,2	2,4
Row 2	0,6	2,2	4,7	3,5
Row 3	2,5	0,7	1,3	5,5

- Row 1
- Row 2
- Row 3

8. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	1,4	2,4	2,4	3,8
Row 2	1,9	3,1	1,5	3,4
Row 3	3,3	1,8	2,1	1,5

- Row 1
- Row 2
- Row 3

9. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	1,2	3,3	2,5	3
Row 2	1,1	1,9	4,2	2,9
Row 3	2,4	2,6	2,2	2,7

- Row 1
- Row 2
- Row 3

10. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	0,6	1,8	4,4	3,2
Row 2	1,8	2,7	1,1	3,4
Row 3	3,3	1,8	4,7	2,2

- Row 1
- Row 2
- Row 3

11. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	3,3	1,8	2,7	2,1
Row 2	2,5	2,2	1,8	3,5
Row 3	1,7	3,6	2,2	3,7

- Row 1
- Row 2
- Row 3

12. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	0,7	3,6	2,2	2,2
Row 2	0,8	3,7	3,2	2,2
Row 3	1,1	1,1	1,1	6,7

- Row 1
- Row 2
- Row 3

13. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	2,4	2,1	3,5	3,2
Row 2	0,9	1,6	2,8	4,7
Row 3	0,5	0,5	2,5	5,5

- Row 1
- Row 2
- Row 3

14. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	3,3	1,1	1,1	4,5
Row 2	2,2	2,1	2,5	3,1
Row 3	2,4	2,1	2,5	1,7

- Row 1
- Row 2
- Row 3

15. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	0,8	3,3	3,6	2,3
Row 2	1,1	1,9	2,2	4,8
Row 3	0,7	3,6	2,2	5,5

- Row 1
- Row 2
- Row 3

16. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	3,3	1,8	2,7	2,3
Row 2	1,2	2,6	1,9	4,3
Row 3	2,4	2,1	4,5	3,0

- Row 1
- Row 2
- Row 3

17. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	2,8	1,9	3,4	2,7
Row 2	2	2	2,5	2,5
Row 3	2,5	1,5	2,5	3,5

- Row 1
- Row 2
- Row 3

18. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	1,7	3,6	2,2	2,6
Row 2	0,7	1,8	2,2	5,3
Row 3	2,4	2,1	4,5	1,8

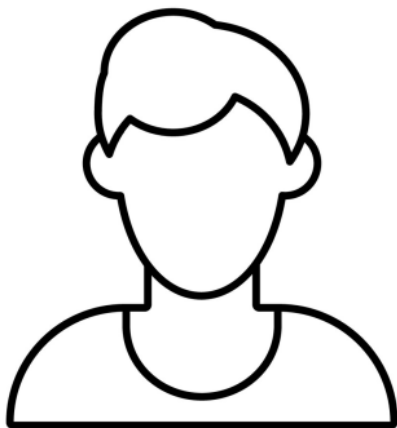
- Row 1
- Row 2
- Row 3

19. Please indicate which row adds up to the amount of 10. You will have fifteen seconds.

Row 1	2,4	2,1	3,5	3,2
Row 2	0,7	3,6	2,2	2,2
Row 3	1,8	1,8	4,6	1,8

- Row 1
- Row 2
- Row 3
-

Thank you for filling out the math part of this survey. You will now be matched with Brian.



Unfortunately, you had **8** correct answers which is **lower** than the amount of correct answers from your opponent Brian, he had **18** correct answers. Therefore you have **lost** the competition however you still **earn ten euros**.

20. In this question, you get to decide if you want to take away some of the money that your opponent has earned. You can take up to a maximum of ten euros. Please note that the amount you take away from your opponent will be deducted from your earnings, making sure your earnings are reduced. Please be reminded that your answers are recorded anonymously.

0 1 2 3 4 5 6 7 8 9 10

How much money would you like to take away?

0



The following section will contain some general questions.

21. What is your age?

22. What is your gender?

- Female
- Male
- Non-binary
- Prefer not to state

23. What is your current/highest completed level of education?

- Primary school
- Secondary school
- Secondary vocational degree (MBO)
- Applied university degree (HBO)
- University degree (WO)

24. What is your yearly gross household income?

- Less than € 14.100
- Between € 14.101 and € 29.500
- Between € 29.501 and € 36.500
- Between € 36.501 and 43.500
- Between €43.501 and € 73.000
- Between € 73.001 and € 87.100
- Between €87.101 and € 100.000
- More than €100.000
- Don't know/prefer not to state

25. What is your employment status?

- I work full-time (>32 hours a week)
- I work part-time (<32 hours a week)
- I am looking for a job
- I am unemployed (not looking for a job)
- I am retired/AOW
- Other:

26. Three respondents will receive the amount they have earned while filling in the survey.

Please fill in your email if you want to have a chance at winning the amount you have earned.

27. Please fill in your e-mail if you would like to receive information about the outcome of the research. You will receive a message in a couple of weeks. It is not necessary.

Thank you for your participation. Your answers will be recorded anonymously.

Appendix B: Descriptive statistics

Table 1

Distribution of the respondents into the four categories.

Condition	Frequency
1	40
2	38
3	32
4	48

Note. Condition one: Brian with 18 correct answers. Condition two: Emma with 18 correct answers. Condition three: Brian with 12 correct answers. Condition four: Emma with 12 correct answers.

Table 2

The average amount of money burned while taking into consideration the gender and score of the opponent.

Money burnt (High_Score#Gender)	Mean
Low#Female	2.132
Low#Male	3.738
High#Female	2.412
High#Male	2.881

Note. The variable High Score is split into two, an opponent with 12 correct answers (low) and an opponent with 18 correct answers (High). Gender is split into Female and Male.

Table 3

The average amount of money burned while taking into consideration the gender and the outcome of the competition.

Money burnt (Winner#Gender)	Mean
Loser#Female	2.35
Loser#Male	3.5
Winner#Female	1.833
Winner#Male	3.867

Note. Only conditions three and four are taken into account since there are no winners in conditions one and two. A respondent has won the competition when the number of correct answers exceeds 12. A loser has less than 12 correct answers.

Table 4

The average amount of money burned while taking the gender and the sex of the opponent into consideration.

Money burnt (Sex-opponent#Gender)	Mean	Std. err.	95% conf. interval	
Female#Female	2.105	.483	1.152	3.059
Female#Male	3.208	.601	2.020	4.396
Male#Female	2.444	.482	1.492	3.397
Male#Male	3.444	.679	2.103	4.786

Note. The first variable that is mentioned in the row is the sex of the opponent and the second variable is the gender of the respondent.