Anger and Dishonesty

An Experimental Study

Master's thesis

Msc. Behavioural Economics

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ABSTRACT

This study examines the effect of anger on cheating behaviour, by means of an online experiment. In this experiment subjects were randomly divided in a treatment group and a control group, the subjects in the treatment group are primed with anger before self-reporting back the total number of a virtual dice roll, the subjects in the control group did not receive this prime before reporting back the total number. Findings indicate that anger increases cheating behaviour, but that a higher intensity of anger does not lead to more cheating behaviour. Additionally demographic features like gender, age, religion and perceived income were found to have no effect on cheating behaviour.

Keywords: Anger, Dishonesty, Honesty Cheating, Behaviour, Cheating Behaviour, Emotions, Economics, Behavioural Economics

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1. INTRODUCTION

" ... when given the opportunity, many honest people will cheat."(Ariely, 2008, p.201)

The quote above is one of the most discussed findings on the topic of cheating behaviour over the last decade. Many researchers found that while some people tend to behave completely honest and others tend to cheat to full extend, most of us cheat but only partially (Ariely, 2008; Fischbacher and Föllmi-Heusi, 2013; Irlenbusch and Villeval, 2015; Mazar, Amir and Ariely, 2008; Shalvi, Dana, Handgraaf and De Dreu, 2011). This could be explained by the Theory of Self-Concept maintenance, developed by Mazar, Amir and Ariely (2008). This theory states that cheating behaviour occurs on the basis of two processes. First of all people want to gain the benefits that arise from cheating, therefore they would be willing to cheat until they have maximized this benefit. Secondly, people want to maintain a positive self-concept; we want to perceive ourselves as good people. Thus explaining that that is why most people cheat, but only partially. However, the degree of partial cheating shows huge heterogeneity among different experiments and participants. So what is it that makes cheating so attractive to human kind? Which features exactly cause us to cheat more or less?

The human tendency to show dishonest behaviour has had huge negative impacts on our society; from theft to fraud (by for example scamming others or evading tax), cheating on exams in universities and schools, cheating on our spouse, or to corruption. Our society revolves around laws that try to prevent and punish these kinds of dishonest behaviour. But what if we could impede these behaviours in other ways?

One feature that has a definite influence on our behaviour is emotion, most of our actions are driven by emotions (Ekman, 1992; Ekman, 1993; Ekman, Levenson and Friesen, 1983). Think for example about ignoring or even becoming angry at somebody when they annoy you, not finishing your work when you feel sad or de-motivated, or going to party when we feel joy. Emotions lead to many different kinds of behaviour and they are not always consistent among people or the behaviour that they lead to. Knowing about the specific effect each emotion has on dishonest behaviour could have a lot of implications. For example, if researchers were to find out that people cheat the least when they feel relaxed and the most when they are angry, teachers could use this to their advantage by avoiding making students feel angry, or comforting them so they do not feel so angry anymore. That way they could curb dishonesty, without setting strict rules.

In order to make one of the first steps towards discovering which emotions lead to which level of dishonest behaviour, this paper's main goal is to find out the effect of anger on cheating behaviour. Thus, answering the following research question: *Does experiencing anger have an effect on cheating behaviour?* In order to answer this question an online experiment was performed in this study, based on two hypotheses. These two hypotheses test whether anger has an effect on cheating behaviour, and whether more angry participants showed more cheating behaviour. After testing for these hypotheses it can be concluded that anger does lead to more cheating behaviour, but that the cheating does not

increase with the intensity of anger felt in that moment, in fact results suggest that cheating decreases with an increase of the intensity of anger.

The participants in this study were divided in a control group and a treatment group, the subjects in the treatment group were primed with the method of Lerner and Keltner (2001), in which they were first ask to name three to five situations that made them angry, after which they were asked to describe the situation described above that has made them feel the most angry. Cheating behaviour was measured with a method similar to the dice rolling method developed by Rosenbaum, Billinger and Stieglitz (2014), with the difference that in this study the dice were rolled in an online environment and the subjects are asked to report the total of the dice roll back in the survey.

This paper is build up as follows: In the next section a literature review will explain why traditional economic approaches are not efficient in interfering with dishonesty, what behavioural economic findings on the topic of dishonesty have discovered so far and how emotions possibly influence our behaviour. An explanation of the methodology used in this paper will follow, discussing the experimental setup but also the participants, the hypothesis and the variables that will be acquired from running the experiment. After explaining the experimental set up, the results will be discussed which is followed by a conclusion. In the final part of this paper there will be a discussion, completed with limitations and implications.

2. LITERATURE REVIEW

In order to determine the effects of anger on cheating behaviour, we must first look at the existing literature on the topic of cheating and emotions, which will be analyzed in this section.

In this paper cheating is defined as acting dishonestly in order to gain an advantage, which would otherwise not be gained. Cheating and dishonesty will be used interchangeably throughout this paper. Under this definition cheating can take many forms, from breaking social norms (e.g. cheating on your partner), cheating on an exam, to violating the law (e.g. fraud or tax evasion). The aim of this paper is not to distinguish between different forms of cheating, but to analyze the effects of anger on cheating behaviour.

In this section it will first be discussed why traditional economic theories fall short when trying to explain cheating behaviour. This is followed by a part explaining why behavioural economic findings can explain various degrees of cheating behaviour. After which there will be a part about emotions and in particular how they influence (dis)honest behaviour.

All things considered, the existing literature falls short on giving an accurate explanation of cheating behaviour; Standard economic theory fails to make the connection between human behaviour and economic outcomes, and even though there has been quite some behavioural research on cheating, by far not all features that could influence of cheating have been considered yet.

2.1 Classical Approaches towards Cheating Behaviour

The classic notion of cheating (or dishonest behaviour) is set by Gary Becker, a Nobel laureate and economist at the University of Chicago and is called the *Simple Model of Rational Crime* (SMORC) (Becker and Landes, 1974). According to Becker people commit crimes based on a rational analysis of the costs and benefits of the situation. According to this cost-benefit calculation we decide whether it might be a good idea to for example, rob a bank. In this case, the benefits would be the cash that you gain after robbing the bank and the costs do not only take the prison sentence into account but also the likelihood of getting caught. Of course, robbing a bank is not the same thing as for example cheating on an exam, but according to Becker all decisions about (dis)honesty are based on a cost benefit analysis (Becker and Landes, 1974).

According to Dan Ariely (2013) in his book *"The (honest) truth about dishonesty"*, if this were the case in the real world, crime would easily be solved through two channels; first by increasing the likelihood of getting caught, and secondly by increasing the severity of the punishment. Therefore, according to the SMORC model, when there would be more surveillance (think of security cameras or extra security men or police) and high enough punishments (for example longer prison sentences or higher fines), society would be able to curb dishonesty. We can see clear implications of this model in today's society, for example; our laws try to prevent or punish dishonesty by setting fines or prison sentences for those who get caught, universities increase surveillance during exams and have rules that leads them to expel students when they cheat, and athletes can be banned from their competition once they have been caught cheating.

However, monetary punishments or prison sentences are not the only consequences cheating might have, the SMORC neglects the mental cost of executing the task itself, for example guilt or social shame (Coricelli, Joffily, Montmarquette and Villeval, 2010). It is hard to imagine a world where all our decisions would be based on a cost-benefit analysis, since many human decisions are based on fundamentals like trust or emotion. Therefore, approaches other than the SMORC might be more effective when dealing with dishonesty, but in order to determine these approaches a lot more research needs to be done on what features actually have an influence on cheating behaviour.

Another traditional economic approach explains cheating by the principal agent theory. In this theory the agent cheats because he or she has different objectives than the principal and, according to this theory, cheating behaviour can simply be solved by increasing incentives (higher wages) for the agent and monitoring him or her (Sappington, 1991). That way, the objectives of the agent and the principal will simply line up.

However, we cannot expect every person to respond similarly to monitoring and incentives. Some people might feel offended or highly pressured when monitored and others simply do not care about money and might respond better to other incentives. Therefore the same methods to counteract cheating might lead to different changes in behaviour for different people. And as mentioned before,

other forces might also be at work, for example, according to Fehr and Gächter (2003, p.159) "many people deviate from purely self interested behaviour in a reciprocal manner. Reciprocity means that in response to friendly actions, people are frequently much nicer and much more cooperative than predicted by the self-interest model; conversely, in response to hostile actions they are frequently much more nasty and even brutal." Therefore, when the principal and the agent have a friendly relationship they might want to show each other reciprocity, rather than focus purely on their own self-interest. Conversely, in the case of ''negative reciprocity'' the objectives might move further apart, and solely incentives and monitoring will not align their interests. However, observing that people show different degrees of reciprocity does not explain its origin. What motivates people to show reciprocity? It could be that emotions play an important role in this behaviour, for example (referring to the quote of Fehr and Gächter (2003, p.159) above) the nasty and brutal response to hostile actions might be a result of feeling anger towards this hostile action of the other person.

These kinds of findings show why it is important for us to enhance our knowledge on the reasons why people cheat before taking measures to counteracting this unwanted behaviour. Only when we know the actual motivation behind someone's behaviour we can determine the best method to act against it.

2.2 Behavioural Economic Approaches to Cheating Behaviour

Thus, according to the traditional economic models, people should show similar cheating behaviour when exposed with the same level of risk and the same prospective punishment. However, even when there is no risk detection and no prospective punishment, people show a big heterogeneity in their decisions to act (dis)honestly (Irlenbusch and Villeval, 2015). Among others, Fischbacher and Föllmi-Heusi (2013) found that while a fraction of the subjects show complete honesty, and another fraction shows full dishonesty, the majority of people cheat, but incompletely. Even under reinforced privacy the subjects exhibit this behaviour (Shalvi, Dana, Handgraaf and De Dreu, 2011).

Mazar, Amir and Ariely (2008) explain partial cheating by the Theory of Self-Concept Maintenance. This theory explains cheating behaviour on the basis of two processes. First of all people want to gain the benefits that arise from cheating, therefore they would be willing to cheat until they have maximized this benefit. Secondly, they want to maintain a positive self-concept; we want to perceive ourselves as good people. Thus explaining that that is why most people cheat, but only partially. According to Mazar, Amir and Ariely (2008) up until what degree of cheating people can maintain a positive self-concept depends on two other features; categorization and attention to standards.

They define categorization as the ability to categorize *"their actions into more compatible terms and find rationalizations for their actions"* (Mazar et al., 2008, p.634). This feature is best explained by an experiment they performed in the same paper, where they compared cheating

behaviour by letting subjects report how many mathematical matrixes they solved correctly (after shredding their answers), while varying the payoff between money or tokens (tokens would afterwards be exchanged for money). It turns out that the subjects cheated on average 6.2 times when solving the questions for money, but 9.4 times when solving the questions for tokens. This strongly indicates that people maintain a better self-concept when they experience more mental distance from the actual goal. This is in line with the Construal Level Theory, which states that an individual's reference point is their here and now and the further away an item is removed from that, the more subjective distance we feel from it, and the less we will be able to imagine it. Therefore, the further away an object is removed from our reference point, the less it will be able to affect our self-concept (Simandan, 2016). For example, intuition tells us it is easier to take a pen from work instead of taking 50 cents from the workplace to buy yourself a pen; in the first case you will probably not feel like you are committing the crime, while in the second case most people will, while there is no difference in the objective between these situations. Certainly there is a limit up to how far people can still maintain a good self-concept while bending the truth of their actions, for example most people would start to feel worse about themselves if they would take a pen home from work every day. Several studies found similar results that people can maintain a good image about themselves while still benefitting from cheating. These studies indicate that people find justifications for their dishonest behaviour and by those means do not negatively update their self-concept (Dana, Weber and Kuang, 2006; Cunha and Cabral-Cardoso, 2006; Schweitzer, Maurice E. and Christopher K. Hsee, 2002)

Mazar et al. (2008), define the attention to standards mechanism as people's own ability to stick to their moral standards. They hypothesize that *"the attention to-standards mechanism predicts that when moral standards are more accessible, people will need to confront the meaning of their actions more readily and therefore be more honest"* Mazar et al. (2008, p.635). They state that when people adhere to their moral standards (are aware of them), a dishonest action will cause them negatively update their self-concept and will make them stricter on themselves in the future. On the other hand when people do not pay enough attention to their moral standards (are unaware of them), a dishonest action will not lead to an update in that person's self-concept and therefore they are more likely to deviate from their standard behaviour. In fact they found that the honesty of their subjects increased when they received a religious reminder, or had to sign an honour code before the start of the experiment (the same results were found for those who were not religious and those who were part of an institution that did not even have an honour code). Therefore it can be concluded that moral reminders cause people to be more aware of their moral standards and accordingly behave more to those standards.

From these findings it could be argued that being part of a group makes moral standards more readily available and therefore causes these people to be more honest. However, Cohen, Gunia, Kim-Jun, and Murnighan (2009) found that people groups tend to lie more than individuals. Shalvi and De

Dreu (2014) found that exposing subjects to oxytocin increases dishonesty that is group serving, providing another indication that being part of a group might not always affect honesty positively. In fact, Gino, Ayal and Ariely (2013) found that people tend to cheat more when their dishonest behaviour becomes beneficial for others and this effect becomes even stronger when subjects cheated for a group they were part of. These findings are another indication that people can create justifications for their dishonest behaviour, and therefore maintain a positive self-concept. Additionally Burks and Krupka (2012) found that when an individual's moral standards do not match with those of the group, they are more likely to show dishonest behaviour; implying that people do not always take over group norms but rather that the group norms have to resemble the individual's personal norms and values.

Ploner and Regner (2013) came to the conclusion that people engage in moral balancing; after cheating, people behave more generous (in their experiment by making higher donations). Gino, Krupka, Weber (2013) found that people do not only behave more generously after engaging in dishonest behaviour, but also that they show more dishonest behaviour once they know they will engage in morally conscious behaviour after they performed the task (in this case, make a donation). According to them, this behaviour arises as a consequence of feeling guilt; they conclude that experiencing the negative emotion guilt increases honesty, since we try to make up for our previous behaviour. However, they also argue that another negative emotion, such as anger, will show similar temporal responses, but instead of becoming more pro-social (in the case of guilt), it could lead to subjects becoming more antisocial. This hypothesis found some support in a study by Mitchell, Baer, Ambrose, Folger, and Palmer (2018), who found that anger motivates more antisocial behaviour. Another paper that relates emotions and immoral behaviour is written by Avramova and Inbar (2013), here they make three claims: "emotions follow from moral judgments", "emotions amplify moral judgments" and "emotions moralize the nonmoral". Especially claim two and three are interesting with regard to this research; they indicate that on the one hand certain emotions might amplify (negative) morality (anger might have this effect, as was previously suggested), but on the other hand emotions might be a means for people to justify their immoral behaviour.

Finally, a paper reporting findings on the relationship between cheating and emotions, by Coricelli, Joffily, Montmarquette, and Villeval (2010), provides evidence that emotional arousal is positively correlated with cheating in a tax evasion context. They found that aroused subjects are more likely to cheat as well as cheat for higher stakes, compared to less aroused subjects. However, emotional arousal only indicates the intensity of the emotions the subject is experiencing. Thus, it is a concept that covers a whole range of emotions, from positive to negative, for example if a person is bored his/her emotional arousal would be very low, whereas for a tensed person this is very high (Ramsøy, 2015), see Figure 1. Anger and guilt are both negative emotions, and as was argued above with the findings of Gino, Krupka, Weber (2013) they both lead to different behaviour; guilt could decrease cheating behaviour, whereas anger could increase cheating behaviour. Combined with the

findings of Coricelli et al. (2010), which state that a higher emotional arousal leads to more cheating, it could be argued that anger has a much higher intensity than guilt (since people often "lose their minds" when angry, but not when guilty). Therefore the combined Gino, Krupka, Weber (2013) findings from Coricelli et al. (2010) could imply that people cheat more when they are angry and less when they feel guilty.

2.3 Emotions

When investigating emotions it is important to first define what we mean by emotions. First of all the distinction between feelings and emotions must be made, since they are not the same; emotions occur involuntarily and you might not always be aware of them, whereas feelings arise once we become aware of our emotions (Ramsoy, 2015). For a long time the prevailing theory of emotions stated that all people have a predefined set of basic emotions and that each of these emotions are independent of each other. "The Theory of Basic Emotions" describes that each emotion occurs through a unique and separate neural pathway in our brain, and also has a unique facial expression or behavioural pattern associated with it (Ekman, 1992; Ekman, 1993; Ekman, Levenson and Friesen, 1983). However, this would imply that for example a smile cannot be associated with different emotions, while in fact we smile when we are happy, proud or sarcastic and some people even smile when they are mad (Posner, Russel and Peterson, 2005). Posner et al. (2005) additionally provide evidence that there are no unique neural foundations for each emotion, and that is why they propose that a more realistic theory of emotions is the circumplex model of affect, first proposed by James A. Russel (1980) in his paper *"A Circumplex Model of Affect"*. The main difference between the two theories is that rather than recognizing emotions as separate entities, they are overlapping and without discrete borders between them, kind of like the spectrum of colours. Indeed, experimental evidence shows that people find it hard to distinguish between emotions and almost always describe having multiple emotions at the same time (Russell and Carroll, 1999; Russell and Fehr,1994; Watson, Wiese, Vaidya and Tellegen, 1999). The circumplex model of affect suggests that all emotional states arise from two independent mechanisms; emotional valence and emotional arousal, the combination of the two can then be interpreted as a specific emotion. Figure 2 shows a visual representation of the circumplex model of affect. In this figure, the horizontal axis represents emotional valence, whereas the vertical axis represents emotional arousal. Emotional valence is thus the range from most positive to most negative emotions, and emotional arousal the intensity of the emotion, ranging from complete deactivation to the highest level of arousal possible. This additionally explains the findings of Coricelli et al. (2010) that a higher emotional arousal leads to more cheating behaviour, since with an increase in emotional arousal, the emotions one is experiencing might change and therefore lead to different forms of behaviour, thus also different levels of cheating behaviour.

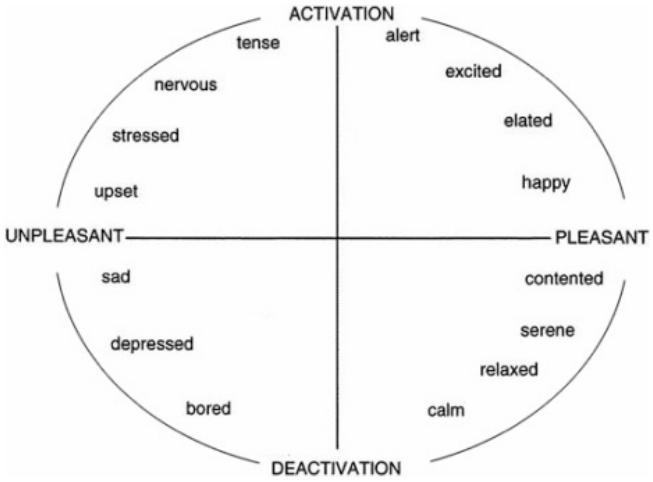

Figure 1, A Graphical Representation of the Circumplex Model of Affect (Posner, Russel and Peterson, 2005)

Unfortunately, not much research has been done yet on the link between emotions and dishonesty and which emotions result in which type of behaviour. Murdock and Anderman (2006) state that even though emotions play a big role in motivational processes and cheating behaviour arises from a motivation to do so, there has been virtually no research as to how emotions regulate decisions around (dis)honesty. In more recent years, research on the relation between emotions and (dis)honesty is gaining popularity. Gaspar and Schweitzer (2013), for example, developed the "Emotion Deception Model" (EDM) by analyzing negotiations. The EDM states that experienced and anticipated emotions influence decisions, but also that these decisions lead to certain emotions. Indicating that emotions can have an influence on cheating behaviour, but that cheating behaviour itself also leads to certain emotions. The Emotion Deception Model could explain, for example, the findings described in the section above stating that people engage in moral balancing; after cheating they might feel an emotion (like guilt), which will withhold them from cheating in the near future.

Krokoszinski and Hosser (2016) also investigated the relation between emotions and dishonesty. They performed an EEG experiment on imprisoned fraudsters, and showed that these women (compared to violent offenders and non-offenders) show no heightened activity in the dorsolateral prefrontal cortex when deceptive responses were recorded, indicating that fraudsters regulate their emotions better (that is, are less likely to feel guilty) than others when making fraudulent decisions. Further research on the relation between specific emotions and cheating has also been conducted by Mitchell et al. (2018). They looked at the relation between pressure, emotions and dishonest behaviour on the work floor and found that heightened work pressure often leads to employees feeling angry, which in turn causes them to show more dishonest behaviour at work. Therefore supporting the notion that anger increases cheating behaviour. However, these findings could also be the result of reciprocity; employees that feel too much pressure might start to dislike their job or their employer and will therefore show dishonest behaviour in return, instead of putting in the effort to deliver good work.

3. RESEARCH METHODOLOGY

As mentioned before, the aim of this research is to investigate whether the negative emotion anger has an influence cheating behaviour. In order to determine these possible effects, participants completed an experiment in the form of an online survey that consists of four parts. An overview of the experiment can be found in Table 1. In this experiment a total of 154 subjects participated, who were divided into two groups. There was one treatment group where the subjects were primed with anger, consisting of 75 participants, and one control group, where no emotion is primed, consisting of 79 participants. First the subjects were asked to answer some questions about demographics. In the second part their initial emotional state was determined, followed by either being primed with anger (treatment group) or no prime (control group). The experiment ended with the actual task that detects cheating (a virtual dice roll). In the following sections I will discuss the hypothesis, the experimental setup, the participants and the variables.

3.1 Hypothesis

The research question this paper tries to answer is "*Does experiencing anger have an effect on cheating behaviour?".* Hypothesis 1 is most directly related to the research question and is therefore the main hypothesis of this paper. After Hypothesis 1, Hypothesis 2 is formed to test the suspicion that emotional intensity amplifies (dis)honest behaviour.

Hypothesis 1: *Subjects that are primed with anger are more likely to cheat compared to subjects that are not primed with anger.*

Hypothesis 2: *Subjects that experience anger at the beginning of the experiment and are subsequently primed with anger will be more likely to cheat, compared to subjects that were only primed with the angry emotion.*

3.2 Experiment Design

In the first part of the experiment the subjects were asked to answer some demographic questions about; gender, age, working/student status, perceived income, religion, nationality, and their relatedness to me. Since they might influence cheating behaviour, it is desirable to control for them. For example, gender is said to have an influence on cheating behaviour; many researchers indicate that men show more dishonest behaviour than women (Conrads et al., 2014; Dreber and Johanneson, 2008; Houser, Vetter and Winter, 2011; Ward and Beck, 1990), and Muehlheusser, Roider and Wallmeier (2015) found that these effects are more profound in male groups versus female groups. However, contradicting evidence that there are no gender differences in honesty also exists (Childs, 2012; Gylfason, Arnardottir, Kristinsson, 2013). Age is also said to have an influence on (dis)honesty, yet these findings are less established than for gender. Conrads et al. (2013) and Ross and Robertson (2000) both found not only women tend to cheat more, but moreover that with higher age people tend

to show less dishonest behaviour. Which could be explained by a linear increase in risk avoidance behaviour in relation to age (Cauffman et al., 2010), or the tendency of relying more on decision rules which reduce cognitive processes (since previous (negative) experiences with cheating may cause older people to unconsciously decide not to cheat) (Johnson, 1990).

The Experimental Setup				
	Part 1 Socio-economic factors	**Part 2** Baseline emotions	**Part 3** Priming Emotions	**Part 4** Cheating Experiment
Treatment Group	Subjects receive questions about the following socio-economic features: Gender , Age, Working/ Student Status, Religion, Nationality and their relatedness to me.	Subjects rate emotional state(s) (1-5) by means of a 20 term mood questionnaire (the "Positive and Negative Affect Schedule")	Subjects receive 2 questions: 1. Briefly describe 3-5 things that make you feel angry. (one sentence per statement) 2. Give a detailed description of time most angry. (max. 300 characters)	Subjects are asked to self-report the total number of rolling two dice.
Control Group	Subjects receive questions about the following socio-economic features: Gender , Age, Working/ Student Status, Religion, Nationality and their relatedness to me.	Subjects rate emotional state(s) (1-5) by means of a 20 term mood questionnaire (the "Positive and Negative Affect Schedule")	Subjects receive the following task: • Describe your typical Monday. (max. 300 characters)	Subjects are asked to self-report the total number of rolling two dice.

Table 1, The Experimental Setup

Subjects are also asked about their perceived income, since in this experiment perceived income might be more informative than actual income. Because in theory no number (exact income) is needed to define how the subject will perceive the incentive, since between people that would earn the same, one could perceive his income as below average and might value that 25 euro incentive more than the other who already perceives his income to be above average. As well as gender and age, religion might have an effect on dishonest behaviour, since moral behaviour is stronger defined if moral standards are more readily available (Mazar et al., 2008). Since religious people are more often confronted with

morality (by regular prayers, reading religious books or by living up to cultural expectations), they are also expected to show less dishonest behaviour. For example, Aveyard (2014) found that performing religious priming on subjects (for example by a call to prayer) will make them behave more honestly; Aveyard explains that this effect can be related to monitoring, since religious people can feel like their actions are now monitored by their god. Furthermore the subjects were asked whether they are employed, unemployed or students, since students and unemployed participants might value money differently than working people, and therefore respond differently to the incentive. Finally, in this section the participants are asked the question how they got in contact with this experiment, since the participants that are personally related to the experimenter might show different behaviour due to social pressure (Ariely, 2013).

In the second part, the subjects were asked to self-report their emotional state according to the Positive and Negative Affect Schedule (PANAS) (Watson, Clark and Tellegen, 1988). The PANAS measures the intensity of twenty emotions ranging from positive to negative emotional valence and arousal, as described in the Circumplex Model of Affect. Watson, Clark and Tellegen developed this 20 term mood questionnaire after having the desire to develop a brief mood questionnaire, for which they took the 60 term method created by Zevon and Tellegen (1982) as a starting point, and cut it down to 20 terms by means of a principal component analysis. The final version of the PANAS developed by Watson et al. (1988) can be found in the Appendix. In this questionnaire participants are asked to rate the intensity of their feelings on a scale from 1 to 5 (where 1 stands for very *slightly or not at all*, and 5 stands for *extremely*). The PANAS scale is divided in 10 terms describing positive affect *(attentive, interested, alert, excited, enthusiastic, inspired, proud, determined, strong and active)* and 10 describe negative affect *(distressed, upset, hostile, irritable, scared, afraid, ashamed, guilty, nervous and jittery)*. Within the negative affect terms *distressed*, *hostile* and *irritable* bundle together to the category *angry*. This categorization is created by Zevon and Tellegen (1982), and is in fact useful for this research; since this experiment aims to clarify the effects of anger, there will be a clear indication from the start of the experiment about how strong these emotions are already present within the subjects. However, to distract the participants from the fact that this research is focused on the effect of anger, all variables of the PANAS-scale were included. As described in the literature review, findings on the topic of cheating and emotions thus far suggest that anger might increase dishonesty (Avramova and Inbar, 2013; Gino et al., 2013; Mitchell et al., 2018). Additionally, it could be argued before that those subjects with higher emotional arousal (intensity) should show an increase in dishonest behaviour (Coricelli et al., 2010). Therefore it could be argued that the subjects that already experience anger at the start of the experiment could show amplified dishonest behaviour when additionally primed with this emotion, assuming that subjects that are already experiencing a certain emotion and are additionally primed with it will likely experience a higher intensity of this emotion. From this it could follow that subjects with a higher intensity of anger will also tend to cheat more. On

the other hand it might be the case that for subjects that are already angry, a prime might have no further effects. That is why it is important to determine the emotional state beforehand.

In the third part, the subjects in the treatment group were primed with either anger and the subjects in the control group were "primed" with no emotion; the priming was done according to the method used by Lerner and Keltner (2001). In their paper called *"Fear, Anger and Risk"*, they primed their subjects by giving them 2 sequential tasks; first they were asked to briefly describe three to five situations which make them feel the most angry or fearful (depending on the treatment group), after which they received the second task to give a detailed description of the situation described above that made them the most angry or fearful. They asked the participants to write the descriptions in such a way that others would also start to feel angry or fearful. After writing down the descriptions they were given several tasks to assess their risk perception; they found that momentary induction of emotions indeed affects risk perception, as well as that anger and fear lead to opposite behaviours, therefore giving strong evidence that this method of priming can indeed induce specific emotions. In fact, many researchers used this method to prime certain emotions in experimental tasks. Additionally by priming the subjects by letting them write their own story about what makes them most angry, a situation where a certain prime would not work on some individuals is avoided, considering that the same situation might lead to different emotions between individuals (Roseman, Spindel and Jose, 1990). Subjects in the treatment group of this experiment thus first received the task to describe three to five situations that make them feel angry and are subsequently asked to describe one of the situations above that has made them feel the most angry. For the second task the limit is set at 300 characters, so the participants do not spend too much time on this question.

Since this part of the experiment is irrelevant for the control group, but has to be included in the survey flow in order to randomize the subjects between the treatment and the control group, a very simple neutral question was chosen instead. That way it was prevented that emotions were provoked and that they spend a lot of time in this (irrelevant, for the control group) part of the survey. Therefore, the participants in the control group received the task to describe their typical Monday, also with a limit of 300 characters.

Finally, participants performed the actual cheating game, this was done in the form of self-reporting a number. This method is based on a popular way of measuring cheating in a lab experiment, by means of rolling a die and self-reporting the rolled number (Rosenbaum, Billinger and Stieglitz, 2014). Subjects were asked to go to an external website[1] where two virtual dice will be rolled for them, after which they go back to the experiment and report the total of the two randomly rolled numbers. Among the ten participants that report to have rolled the highest total number one of them will receive a €25 as a payoff. The winner is determined by a random lottery. This task gives subjects the opportunity to cheat because they are asked to self-report the total number of the dice roll and

[1] https://www.random.org/dice/

truthfulness cannot be checked. Therefore they could report a higher number in order to participate in the lottery to win the €25. Additionally, by rewarding one of the ten participants that reports the highest total, an element of competition is added to this experiment. Rigdon and D'Esterre (2012) found that people are more willing to lie for their own benefit when they find themselves in a competitive environment, therefore this element of competition gives even a stronger incentive to cheat compared to paying out each participant individually. Therefore this approach should strengthen cheating behaviour, if present.

3.3 Participants

The participants of the survey were recruited online, mostly through the social media networks LinkedIn and Facebook. To ensure there is enough heterogeneity among the subjects, the experiment was also be distributed outside of my personal social media network, in for example several LinkedIn and Facebook groups for behavioural economists, students, expats etc. The experiment's design is single blind, which means that the subjects are anonymous to one another, but not towards me, since they will be asked to provide their e-mail address for a possible payoff (those who did not provide their email addresses were also anonymous towards me).

Next, the sample sizes of the groups are very important to give accurate results. When the sample size is too small, extreme behaviours and outliers might have too much impact on the data and therefore lead to skewed results. A bigger sample size increases the accuracy, but only up to a certain amount. When looking at other experiments where subjects have to carry out some task to detect cheating, sample sizes vary from about 70 subjects to 400 (with multiple treatment groups). These findings vary so much that they did not give a clear indication of the minimal sample size required for this experiment; that is why an a priori power analysis is performed in order to determine the minimum required sample size. It was determined that with the data acquired from this experiment, a minimal sample size of 72 (36 for the treatment and 36 for the control group) is required to perform test with 80 percent power. According to established research 80 percent is the minimum power required to get an accurate effect (in this case, of anger on cheating behaviour) (Noordzij, Tripepi, Dekker, Zoccali, Tanck, & Jager, 2010). Therefore with a sample size of 154, the tests were even performed with 95 percent power. More details about the power calculation can be found in Appendix 2.

3.4 Variables

Thus from the previous section we can summarize that in this research, the following variables will be included in the analysis of anger and cheating behaviour:

Dice Roll: The *Dice Roll* is the main variable in this research. This variable measures cheating, which can be determined by comparing the medians of the dice rolls of the two different groups. Since

the median of one dice roll is 3.5, the median of two dice rolls is 7. If a group shows a higher median than 7, this would indicate that the subjects in this group are more likely to misreport their actual throw for a higher number in order to win the €25 incentive.

Group: This dummy variable takes on a value of 0 when the subject is part of the control group, and 1 when the subject is part of the treatment group.

Angry: This dummy variable combines the PANAS-scale emotions distressed, hostile and irritable, which bundle together to angry (as mentioned before), and the variable *Prime*. The subjects that rate experiencing the emotions distressed, hostile or irritable with a 4 (= quite a bit) or a 5 (= extremely) at the start of the experiment, and are subsequently primed with anger (*Prime* = 1) will receive a 1 on the dummy variable *Angry*. The subjects that will receive a 0 for the dummy variable *Angry* were primed with anger, but scored experiencing distressed, hostile and irritable with a value of 3 and lower (hence, did not experience anger at the start of the experiment). The subjects in the control group were left out of this dummy variable, since this variable was only created to see the effect of an increase in the intensity of anger on cheating behaviour. In this way, the subjects that are primed with anger and also experienced anger at the start of the experiment are assumed to feel a higher intensity of anger than the subjects that were primed with anger, but did not experience anger at the start of the experiment.

Angry3: This dummy variable combines the PANAS-scale emotions distressed, hostile and irritable, which bundle together to angry (as mentioned before). The difference with the variable *Angry* above is that *Angry3* does not exclude the control group. This variable adds the values of distressed hostile and irritable. When the total of the three emotions takes on a value of 10 or higher, *Angry3* takes on a value of 1; thus, a subject must report feeling at least one of the emotions distressed, hostile or irritable quite a bit or more (= 4 or 5). If the total of the three emotions is lower than 10, *Angry3* takes on a value of 0.

Distressed: One of the three variables from the PANAS-scale that indicates the subject is feeling some form of anger, in this case feeling distressed. Subjects can indicate the intensity to which they feel this emotion (1= very slightly/not at all, 2 = a little, 3= moderately, 4 = quite a bit, 5 = extremely)

Hostile: One of the three variables from the PANAS-scale that indicates the subject is feeling some form of anger, in this case feeling hostile. Subjects can indicate the intensity to which they feel this emotion (1= very slightly/not at all, 2 = a little, 3= moderately, 4 = quite a bit, 5 = extremely)

Irritable: One of the three variables from the PANAS-scale that indicates the subject is feeling some form of anger, in this case feeling irritable. Subjects can indicate the intensity to which they feel this emotion (1= very slightly/not at all, 2 = a little, 3= moderately, 4 = quite a bit, 5 = extremely)

Gender: This variable records the gender of the subject and consists of three categories (1 = Male, 2 = Female, 3 = Other).

Age: This variable records the age of the respondent in five categories (1 = Below 18, 2 = 18-25, 3 = 26–35, 4 = 36–45, 5 = Above 45)

Occupation: This variable measures the subjects occupation in five categories (1 = Full-time employed, 2 = Part-time employed, 3 = Self-employed, 4 = Unemployed, 5 = Student). The survey contained a 6th category named "Other, namely;", where participant had the option to write down their occupation if it was not in one of the above categories (think about retired subjects or subjects who physically cannot work), however none of the subjects required this option and it was therefore deleted from the results.

Perceived income: This variable asks the subjects to rate their income in one of 5 categories, depending on their own perception of it (1 = Far below average, 2 = Below average, 3 = Average, 4 = Above average, 5 = Far above average).

Country: This variable gives a dropdown list for the subject to select their country of origin.

Religion: This variable asks subjects to provide their religion in 5 categories (1 = Christian, 2 = Muslim, 3= Hindu, 4 = Buddhist, 5 = None). The survey contained a 6th category named "Other, namely;", where participant had the option to write down their religion if it was not in one of the above categories, however none of the subjects required this option and it was therefore deleted from the results.

Relatedness to me: This variable asks subject to rate their relatedness to the experimenter on four different levels (1 = Very Close, 2 = Close, 3= Familiar, 4 = Not).

4. RESULTS

In this section the results of testing the hypotheses described above are discussed.

For this experiment, 154 subjects were recruited, of which 79 were randomly assigned to the control group and 75 to the treatment group. In the treatment group subjects were primed with anger before rolling two virtual dice and reporting the total of the roll back in the survey; in the control group the subjects were not primed with an emotion before reporting the total of the roll. Among all the participants (both treatment groups), 45 were male, 108 were female and one subject identified as "other". Furthermore, most participants were students and therefore aged between 18 and 25 years old. The descriptive statistics of the sample can be found in Table 2. As can be seen there, the subject pool of this experiment does not show as much heterogeneity as desired in order to be representative of the outside world, however since only a small dataset is used for this experiment, it will not be representative of the outside world in the first place and therefore less heterogeneity is preferred as it leads to less noise in the data.

Furthermore, any incomplete responses were deleted from the dataset (initially 168 responses were recorded, but 14 had to be deleted). An exception for this deletion were for the missing responses in part 2 of the experiment (= determining baseline emotions according to the PANAS-scale), seven

responses were missing here and these were filled up with a 3 (= moderately). There were two reasons for choosing to fill the missing values in with this number; first of all filling in a 3 is the most neutral option on a 5-point scale, because a value of 1 indicates that the subject is feeling this specific emotion "not at all" and 5 indicates that the subject is indicating this emotion "extremely", therefore the value of 3 is exactly in the middle between the two extremes. Secondly, there was only one subject with a missing value for an emotion relevant to this research (*Hostile*), while the other missing values were for emotions that are not of importance in this research (= the other variables that do not relate to anger in the PANAS scale) and there were no missing values for the other emotions that could indicate anger (*Distressed* and *Irritable*). Therefore it would be unnecessary to delete responses that only have a missing value for emotions that are not used in the analysis of this paper, for example for the emotion "excited", since these emotions are not taken into further consideration.

Demographic	Category	Number of responses
Gender	*Male*	45
	Female	108
	Other	1
Age	*Below 18*	2
	18-25	114
	26-35	34
	36-45	3
	Above 45	1
Occupation	*Full-time employed*	30
	Part-time employed	11
	Self-employed	4
	Unemployed	3
	Student	106
Income	*Far below average*	41
	Below average	48
	Average	46
	Above average	17
	Far above average	1
Religion	*Christian*	45
	Muslim	7
	Hindu	3
	Buddhist	0
	None	99
Related	*Very close*	4
	Close	9
	Familiar	19
	Not	122

Table 2, Summary of demographic variables.

First of all, the demographics features were tested for their influence on cheating behaviour, throughout all subjects from both groups. Since all of these demographics consist of three categories or more, a Kruskall-Wallis test is performed for each demographic to see if the median dice roll (which measures cheating behaviour) differs per category. It turned out that none of these demographics were found to have an effect on dishonesty. However, this can be explained by the small dataset, since background variables do not easily show significant effects for small sample sizes. Additionally, the demographics were regressed with the dice roll as dependent variable to determine any possible effects and also in this regression no significant effects were found. Outputs from the Kruskall-Wallis tests can be found in Appendix 3, and the output of the regression can be found in Appendix 5.

Now that all demographics and their (unapparent) effects on cheating behaviour have been discussed, the effects of anger on cheating behaviour will be analyzed. Firstly, in Figure 2 the distribution of the total of the dice roll between the two different groups can be seen. For the control group there a distinct peak at 7 and the data looks fairly symmetrically distributed around 7 (except for the higher frequency counts at the totals of 3 and 4, which could be explained by participants not wanting to report the lowest roll). The distribution for the treatment group looks different from the symmetrical distribution of the control group; the frequencies of the total dice rolls seem to increase with a higher total. This is an indication that being angry has an effect on cheating behaviour, since the medians of both groups differ and the median of the treatment group lies higher.

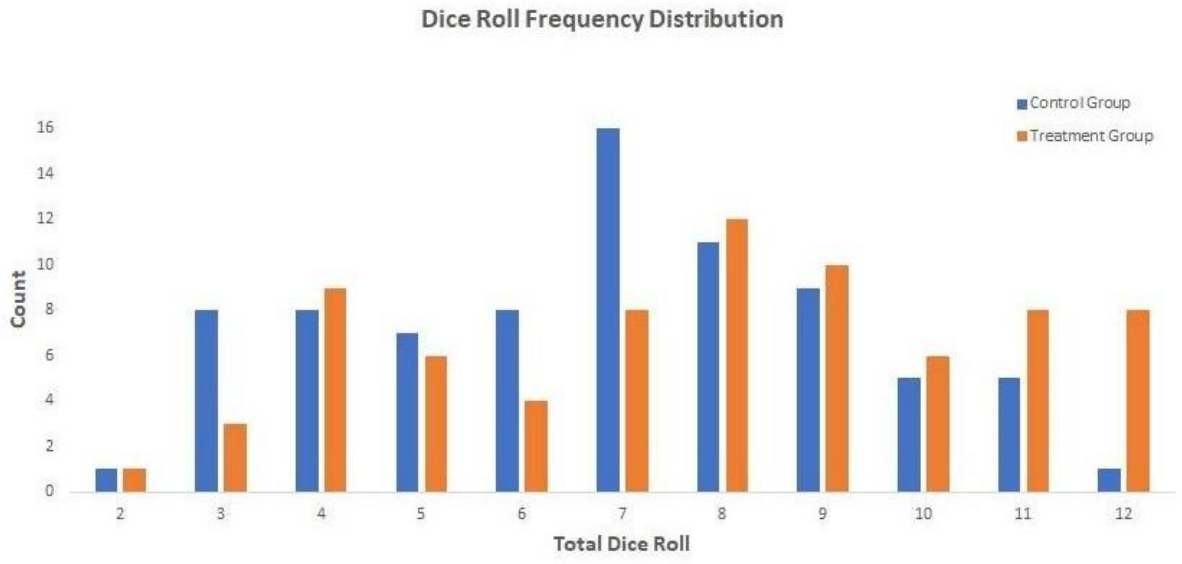

Figure 2, The Dice Roll Frequency Distributions

In order to test whether this difference in medians between the two treatment groups is also significant, a regression is run and a Mann-Whitney U test is performed. Results from the regression with the *Dice Roll* and *Group* indicate that when a subject is part of the treatment group the reported dice roll increases with 1.003882, thus the subjects that are part of the treatment group tend to report throwing a total that is approximately 1 number higher than the subjects in the control group. With a P-value of 0.017, this result is significant on a 5% significance level. In order to confirm these findings, a Mann-Whitney U test is performed. From this test can be concluded that with a P-value of 0.0168 the null-hypothesis that the medians of the two different groups are the same, can be rejected on a 5% significance level.

The regression and the Mann-Whitney U test therefore provide significant results that when subjects are primed with anger, they are more likely to over report the total number of their roll. Thus, confirming Hypothesis 1 that angry people are more likely to cheat, compared to people feeling neutral. Detailed results of the regression can be found in Appendix 5, and for the results for the Mann-Whitney U test can be found in Appendix 4.

In order to test the Hypothesis 2, several regressions and two more Mann-Whitney U tests are performed. The second hypothesis is tested in three different ways; in the first way the effect of the three emotions that bundle together to anger on the *Dice Roll* are evaluated individually, by means of three regressions. In the second way the dummy variable *Angry3*, which indicates that either one of the three emotions must be a 4 or higher, is tested with two regressions and a Mann-Whitney U test. And in the third way the dummy variable *Angry*, which makes a division of the participants in the treatment group, is tested with two regressions and a Mann-Whitney U test.

In the first way, the emotions *Distressed*, *Hostile* and *Irritable* and their influence on the *Dice Roll* are evaluated separately, by means of three regressions. In the first regression the dependent variable *Dice Roll* is regressed with *Group* and *Distressed* , *Hostile* and *Irritable*, the second regression is alike but instead specifies between the different categories of *Distressed, Hostile* and *Irritable* (= 1 until 5) and in the third one the *Dice Roll* is regressed with interaction terms between *Group* and *Distressed*, *Hostile* and *Irritable*. The results for these regressions can be found in Appendix 5.

From the first regression it can be concluded that none of the emotions has a significant effect on the reported *Dice Roll*, whereas the *Group* does have an effect on a 5% significance level (P-value = 0.015); subjects that are primed with anger report a total dice roll that is 1.0328 higher than subjects in the control group. Among the emotions, with a P-value of 0.193 *Irritable* has the most significant effect on the *Dice Roll,* from which it can be suggested that a more irritable subject is more likely to report throwing a lower *Dice Roll*. These findings again provide a confirmation for Hypothesis 1, but not for Hypothesis 2.

From the second regression three significant results are found; firstly, when a subject indicates feeling a little (=2) *Distressed*, the reported *Dice Roll* increases with 0.9201, this result is significant on a 10% level with a P-value of 0.076. Secondly, when a subject indicates feeling quite a bit (=4) *Hostile*, the reported *Dice Roll* decreases with 2.1143, also this result is significant on a 10% level with a P-value of 0.074. Thirdly when a subject indicates feeling quite a bit (=4) *Irritated*, the reported *Dice Roll* decreases with 1.5423, this result is significant on a 5% level with a P-value of 0.025.

In the third regression, where *Dice Roll* is regressed with interaction terms between *Group* and *Distressed*, *Hostile* and *Irritable*, only one significant result is found. When a subject in the treatment group reports feeling extremely (=5) *Hostile*, the reported *Dice Roll* decreases with 7.7048 and with a P-value of 0.080 this result is significant on a 10% level.

In the second way to test Hypothesis 2 the dummy variable *Angry3*, which indicates that either one of the three emotions must be a 4 or higher, is tested with two regressions and a Mann-Whitney U test. Detailed results for the two regressions can be found in Appendix 5, and the result for the Mann-Whitney U test can be found in Appendix 4.

In the first regression *Dice Roll* is regressed with *Group* and *Angry3*. Both *Group* and *Angry3* have a significant result on *Dice Roll*; when a subject is in the treatment group, the reported Dice Roll increases with 1.1550, with a P-value of 0.006 this result is significant on a 1% level. When a subject experiences at least one of the three emotions (*Distressed*, *Hostile*, *Irritable*) quite a bit or more (= 4 or higher), the reported *Dice Roll* decreases with 2.2218, with a P-value of 0.013 this result is significant on a 5% level. Again, providing confirmation for Hypothesis 1, but also indicating that next to the prime, experiencing some form of anger at the start of the experiment already indeed has an effect on the reported *Dice Roll*.

In the second regression *Dice Roll* is regressed with an interaction term between *Group* and *Angry3*, from this regression it can be concluded that when a subject in the treatment group experiences either being *Distressed*, *Hostile* or *Irritable* quite a bit or more (=4 or higher), the reported *Dice Roll* decreases with 3.8124, this result is significant on a 10% significance level (P-value = 0.067). These results indicate that experiencing some form of anger decreases the reported *Dice Roll*.

A Mann-Whitney U test was performed to test whether de medians between *Angry3* = 1 (experiencing *Distressed*, *Hostile* or *Irritable* quite a bit or more (=4 or higher)), and *Angry3* = 0 (*Distressed*, *Hostile* and *Irritable* all have value of 3 or lower) are significantly different. With a P-value of 0.0346, it can be concluded that the medians are significantly different on a 5% level.

Even though the results are significant, these findings indicate that rather than confirming Hypothesis 2, they contradict it. While a positive relationship between anger and the reported total dice roll was expected, these results indicate a negative relationship between the two.

Finally, in the third way another Mann-Whitney U test is performed to test the difference in the medians between *Angry*=1 (the subjects in treatment group that also indicate feeling *Distressed*,

Hostile or *Angry* quite a bit or more (= 4 or higher)) and *Angry* = 0 (the subjects in the treatment group that indicate feeling *Distressed, Hostile* or *Angry* moderately or less (= 3 or lower). As explained before, this test will be performed within the treatment group, subjects from the control group were excluded for this test.

The medians of the *Dice Roll* between subjects in the treatment group that indicated feeling the emotions *Distressed, Hostile* or *Irritable* quite a bit (= 4) or extremely (=5), were compared to subjects that indicated to be experiencing these emotions moderately (=3) or less. Interestingly the median of the subjects that did not experience anger already at the start of the experiment was 9, whereas the group that already experienced anger this was 7.

A Mann-Whitney U test was performed to test the significance of this difference, and with a p-value of 0.0311 the null-hypothesis that the medians of the two groups are the same is rejected on a 5% significance level, indicating that more angry subjects behave differently from less angry (but still primed with anger) subjects. However, these results are again the opposite of what was expected according to Hypothesis 2. More details on this test can be found in Appendix 4.

Almost all these findings from three methods indicate that more distressed, hostile or irritable subjects tend to report a lower total dice roll. This result is the opposite of what was expected in Hypothesis 2 and could be the result of other processes. It could be argued that subjects that were already feeling some form of anger at the start of the experiment were less or not affected by the anger prime. However, this would counteract the significant results found in the second method of testing hypothesis 2. It might also be the case that with an increase in intensity of the angry emotion, dishonesty actually decreases, however this is unlikely when looking at previous research, discussed in the literature review on this topic. Another explanation could be that another scale that focuses on only the level of anger somebody is experiencing could have been better suited to test the level of anger at the start of the experiment. Or, it could simply be the case that the prime was not as effective as it should be, however that would have become apparent in the comparison of the treatment and control group above.

Additionally the correlation between the dice roll, irritable, hostile, distressed and group was performed, which can also be found in Appendix 5. Only weak correlations between the PANAS-scale variables *Distressed, Hostile* and *Irritable* were found. Noteworthy however is that all three emotions have a negative correlation with the total reported *Dice Roll,* again suggesting the opposite effect of what was expected in Hypothesis 2.

Lastly some other regressions were run to control for the effects of all demographic and PANAS scale variables. A regression was run with the *Dice Roll* as the dependent variable, the demographic variables, *Distressed, Hostile, Irritable* and *Group* and here only group has a significant effect on the dice roll, again confirming Hypothesis 1. However this model was not a better fit than regressing the dice roll with only the demographic variables, or only the PANAS-scale variables

hostile irritable and distressed and treatment/control group. Finally, a regression was performed with all the PANAS-scale variables as independent variables and the dice roll as the dependent variable, all variables were found to be insignificant except for the variable inspired. Being inspired has a positive effect on the total reported dice roll on a 5% significance level. These results can again be found in Appendix 5.

Therefore it can be concluded from this study that, dishonesty does not increase with an increase in the intensity of anger, but that being primed with anger does have an effect on cheating behaviour. Thus, Hypothesis 1 is confirmed, whereas Hypothesis 2 is not.

5. CONCLUSION

In this research the effect of anger on cheating behaviour was analyzed with an online experimental setup, in which 154 people participated. More than two-thirds of the subject pool was female, and most of the subjects were students and therefore belonged in the age group 18 to 25. Other demographics that were tested were religion, occupation and perceived income, however none of them were found to have a significant effect on cheating behaviour.

There were two hypothesis that were tested in paper; whether anger has an effect on cheating behaviour and whether more angry subjects also cheated more, thus forming:

Hypothesis 1: *Subjects that are primed with anger are more likely to cheat compared to subjects that are not primed with anger.*

Hypothesis 2: *Subjects that experience anger at the beginning of the experiment and are subsequently primed with anger will be more likely to cheat, compared to subjects that were only primed with the angry emotion.*

In order to analyze the effects of anger, the subjects were divided in a treatment and a control group, in the treatment group the subjects were primed with the angry emotion, and in the control group they were not. The subjects were primed following the method of Lerner and Keltner (2001), first they were asked to name three to five situations that make them angry, after which they had to give a more detailed description of one of those situations that made them most angry. The subjects in the control group received the task to *"Describe your typical Monday"* instead.

Cheating behaviour was measured by asking participants to click on a link to a website where two virtual dice were rolled, of which they had to report the total back in the survey. This method is encouraging for subjects to cheat since the experimenter has no insights on which total number was actually rolled. Additionally, among the ten participants that rolled the highest total number, one of them received a payoff of €25. This payoff serves as an incentive for the subjects to cheat. Cheating behaviour was determined by looking at the differences between the two groups, more specifically the medians of the two groups were compared. The median of the control group was 7, whereas the

median of the treatment group was 8, indicating that the subjects in the treatment group tend to over report their dice roll. This suspicion was confirmed on a 5% significance level by performing a regression and a Mann-Whitney U test. Thus, confirming Hypothesis 1 that angry people are more likely to cheat compared to people feeling neutral.

Testing for the second hypothesis was done with three different procedures. In the first way the effect of the three emotions that bundle together to anger on the *Dice Roll* are evaluated individually, by means of three regressions. In the second way the dummy variable *Angry3*, which indicates that either one of the three emotions must be a 4 or higher, is tested with two regressions and a Mann-Whitney U test. And in the third way the dummy variable *Angry*, which makes a division of the participants in the treatment group, is tested with two regressions and a Mann-Whitney U test. In these tests quite some significant results were found, however almost all of them indicate the reversed of what was predicted in Hypothesis 2, namely that the "more angry" subjects tend to report a lower total dice roll compared to subjects that did not experience some form of anger at the start of the experiment.

Additionally, some other tests were performed to control for the effects of all demographic and PANAS scale variables, here it can be concluded that in these test only the treatment/control group had a significant effect on the total reported dice roll.

6. DISCUSSION, LIMITATIONS AND IMPLICATIONS

6.1 Discussion and Limitations

As with any other research, some elements in this paper are up for discussion. First of all, this research is not an accurate representation of the outside world as there was little heterogeneity among the subjects, by spreading the survey outside of my personal network the aim was to increase heterogeneity. However, most subjects turned out to be female and were students, belonging in the age group 18 to 25.

Following on this, as was discussed in the methodology, there had been quite some research on gender differences and dishonesty that found that men tend to cheat more than women (Conrads et al., 2014; Dreber and Johanneson, 2008; Houser, Vetter and Winter, 2011; Muehlheusser, Roider and Wallmeier, 2015; Ward and Beck, 1990). Considering these findings, stronger cheating behaviour might have been the result of the prime, if it had more men in there (only 28 men were in the treatment group, as opposed to 47 women).

Additionally the results from testing hypothesis 2, showed the opposite result of what was expected in this paper; namely that subjects already experiencing anger at the start of the experiment and are primed with anger tend to report a lower total dice roll, instead of a higher total dice roll. One reason for this could be that there were only 21 participants that felt some form of anger at the start of the experiment and were subsequently primed. In order to get the desired result on this hypothesis it

might help to increase the sample size of the angry and primed group, since other researchers have found that the intensity of an emotion has an effect on cheating behaviour (Coricelli et al., 2010). However, since comparing these groups has lead to significant results, these should be interpreted (since most of the results are significant on a 5% level).

The lower median of the angry and primed group in comparison to the primed group could be explained in several ways. Firstly, since the subject sample is so small for the angry and primed group, it might have been the case that the random dice rolls were just lower. Secondly, it might be the case that subjects that were already angry did not feel any effect from the prime. Thirdly, the subjects that feel already some form of anger at the start of the experiment might be feel angry more often and therefore are less affected by the prime. It would be interesting for future research to look at the question how people who often experience a certain feeling (whether this is anger, guilt or happiness), react to a prime of that feeling. Another reason could be that the intensity of anger indeed has an effect on cheating behaviour, but not in the way that was expected. One explanation could, for example, be that when a subject already feels exhausted or depleted from being angry, he/she might not have the energy to cheat as well and therefore prefers to be honest. Furthermore, another scale that focuses on only the level of anger somebody is experiencing might have been better suited to test the level of anger at the start of the experiment compared to the PANAS-scale, since it is a scale that tests for a whole range of emotions, from positive and negative to low intensity and high intensity. Additionally, as described in the methodology; for some variables in the PANAS-scale a value was missing for a participant, these were filled up with a 3, since that is the neutral value in the 1 to 5 scale that was used. Results could have been more accurate if these responses were deleted. However, since they only arose once in a variable that shows anger, the difference should be minimal.

6.2 Implications

Knowing about the specific effect each emotion has on dishonest behaviour has many implications. For example, if researchers were to find out that people cheat the least when they feel relaxed and the most when they are angry, store owners could take this to their advantage in for example the music they play in their store or the colour scheme use in order to make customers feel the most relaxed. The same goes for teacher-student relationships, when teachers know exactly which emotion will result in the highest likelihood that this student will cheat, they could try to prevent it by making them feel a different emotion instead. Thus, when a teacher can indicate a student is angry, he/she could decide not to let them make the exam or provide extra monitoring. Similarly, these findings could be applied to a principal agent relationship, for example anger could be a reason for employees to shirk, if employers are aware of that they could take countermeasures to diminish this emotion. Furthermore, these findings can be used in negotiations. Once one party knows that the other party is more likely to

cheat when they feel angry, they could use this to their advantage by preventing upsetting the other party and therefore manage a more honest negotiation.

The initial inspiration for this paper was provided by Gino, Krupka, Weber (2013), who discussed the different effects the negative emotions anger and guilt might have, according to them anger would amplify dishonest behaviour, but guilt would diminish it. More details on this research can be found in the literature review. For future research it would be interesting to see if these two negative emotions indeed have opposing effects.

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APPENDIX

Appendix 1 – The PANAS

The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent [INSERT APPROPRIATE TIME INSTRUCTIONS HERE]. Use the following scale to record your answers.

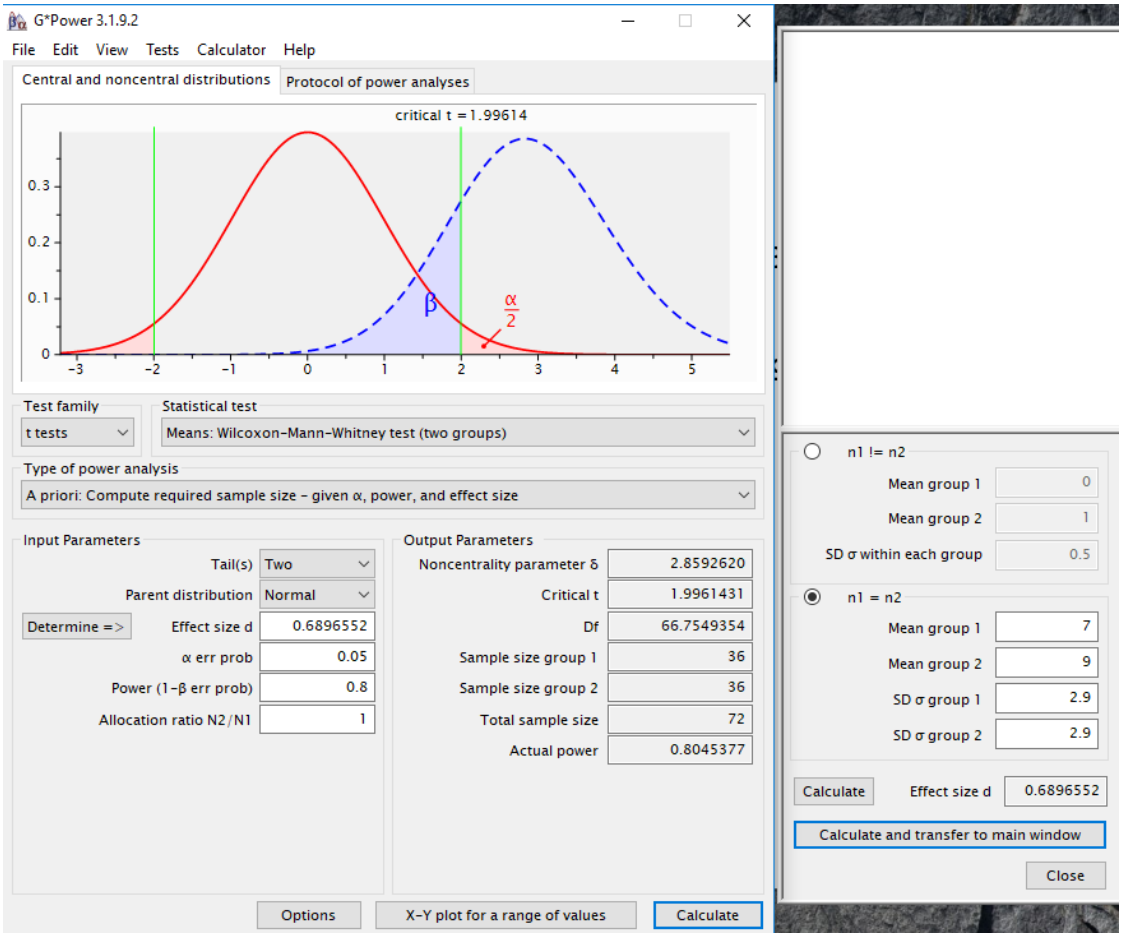
1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

We have used PANAS with the following time instructions:

Moment	(you feel this way right now, that is, at the present moment)
Today	(you have felt this way today)
Past few days	(you have felt this way during the past few days)
Week	(you have felt this way during the past week)
Past few weeks	(you have felt this way during the past few weeks)
Year	(you have felt this way during the past year)
General	(you generally feel this way, that is, how you feel on the average)

Appendix 2 – Power calculation with GPOWER*3.1



For this calculation the input parameters can be found in the image above. To determine the effect size, the mean of the control group (in this window that is group 1) was set equal to 7 (normally distributed). Whereas for the treatment group the mean was set at 9, since it was expected that subjects in the treatment group tend to over report their total dice roll. Additionally, for standard deviations the standard deviation of a dice was used, calculated by the following calculation was used (s is the number of sides on a die, which is 6 in this case):

$$Var[X] = E[X^2] - E[X]^2 = \sum_{k=0}^{n} k^2 \cdot P(X = k) - \left[\sum_{k=0}^{n} k \cdot P(X = k)\right]^2$$

$$Var[X] = \frac{1}{s}\left(1^2 + 2^2 + 3^2 + \ldots s^2\right) - \left(\frac{1}{s}(1 + 2 + 3 + \ldots + s)\right)^2$$

$$Var[X] = \frac{1}{s} \cdot \frac{s(s+1)(2s+1)}{6} - \left(\frac{1}{s} \cdot \frac{s(s+1)}{2}\right)^2$$

$$Var[X] = \frac{s^2 - 1}{12}$$

Appendix 3 – Kruskall-Wallis tests per demographic (*Gender, Age, Occupation, Perceived Income, Religion* and *Relatedness to me*)

```
. kwallis diceroll, by(gender)

Kruskal-Wallis equality-of-populations rank test
```

gender	Obs	Rank Sum
1	45	3639.00
2	108	8205.00
3	1	91.00

```
chi-squared =     0.475 with 2 d.f.
probability =     0.7887

chi-squared with ties =     0.481 with 2 d.f.
probability =     0.7862

. kwallis diceroll, by(age)

Kruskal-Wallis equality-of-populations rank test
```

age	Obs	Rank Sum
2	2	158.50
3	114	8456.00
4	34	3097.50
5	3	186.00
6	1	37.00

```
chi-squared =     4.986 with 4 d.f.
probability =     0.2887

chi-squared with ties =     5.051 with 4 d.f.
probability =     0.2821

.
. kwallis diceroll, by(occupation)

Kruskal-Wallis equality-of-populations rank test
```

occupa~n	Obs	Rank Sum
1	30	2369.00
2	11	746.00
3	4	331.00
4	3	180.50
5	106	8308.50

```
chi-squared =     1.101 with 4 d.f.
probability =     0.8941

chi-squared with ties =     1.115 with 4 d.f.
probability =     0.8919
```

```
.
. kwallis diceroll, by(income)

Kruskal-Wallis equality-of-populations rank test
```

income	Obs	Rank Sum
1	41	2720.50
2	48	3757.50
3	46	4025.50
4	17	1255.50
5	1	22.00

```
chi-squared =     6.621 with 4 d.f.
probability =     0.1573

chi-squared with ties =     6.709 with 4 d.f.
probability =     0.1521

. kwallis diceroll, by(religion)

Kruskal-Wallis equality-of-populations rank test
```

religion	Obs	Rank Sum
1	45	3381.00
2	7	491.00
3	3	306.50
5	99	7756.50

```
chi-squared =     1.271 with 3 d.f.
probability =     0.7361

chi-squared with ties =     1.287 with 3 d.f.
probability =     0.7322

.
. kwallis diceroll, by(related)

Kruskal-Wallis equality-of-populations rank test
```

related	Obs	Rank Sum
1	4	271.50
2	9	696.00
3	19	1649.00
4	122	9318.50

```
chi-squared =     1.087 with 3 d.f.
probability =     0.7801

chi-squared with ties =     1.102 with 3 d.f.
probability =     0.7767
```

Appendix 4 – Mann-Whitney U tests

4.1 Control vs. Treatment group

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

       group |       obs    rank sum    expected
-------------+---------------------------------
           0 |        79      5465.5      6122.5
           1 |        75      6469.5      5812.5
-------------+---------------------------------
    combined |       154       11935       11935

unadjusted variance    76531.25
adjustment for ties     -987.63
                     ----------
adjusted variance      75543.62

Ho: diceroll(group==0) = diceroll(group==1)
             z =  -2.390
    Prob > |z| =   0.0168
```

4.2 Angry vs. not angry

```
. ranksum diceroll, by(angry3)

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

      angry3 |       obs    rank sum    expected
-------------+---------------------------------
           0 |       145       11510     11237.5
           1 |         9         425       697.5
-------------+---------------------------------
    combined |       154       11935       11935

unadjusted variance    16856.25
adjustment for ties     -217.53
                     ----------
adjusted variance      16638.72

Ho: diceroll(angry3==0) = diceroll(angry3==1)
             z =   2.113
    Prob > |z| =   0.0346
```

4.3 Anger primed vs. Anger primed plus Baseline angry

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

       angry |       obs    rank sum    expected
-------------+---------------------------------
           0 |        54      2233.5        2052
           1 |        21       616.5         798
-------------+---------------------------------
    combined |        75        2850        2850

unadjusted variance     7182.00
adjustment for ties      -92.66
                     ----------
adjusted variance       7089.34

Ho: diceroll(angry==0) = diceroll(angry==1)
             z =   2.156
    Prob > |z| =   0.0311
```

Appendix 5 – Regressions & Correlations

5.1 Regression of the *Dice Roll* with the demographics

```
. reg diceroll gender age occupation income country religion related
```

Source	SS	df	MS	Number of obs	=	149
				F(7, 141)	=	0.49
Model	24.1117861	7	3.44454087	Prob > F	=	0.8424
Residual	996.062711	141	7.06427454	R-squared	=	0.0236
				Adj R-squared	=	-0.0248
Total	1020.1745	148	6.89307092	Root MSE	=	2.6579

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gender	-.4126757	.5019987	-0.82	0.412	-1.405093	.5797413
age	.4119864	.4423815	0.93	0.353	-.4625716	1.286544
occupation	.1134848	.1489293	0.76	0.447	-.1809383	.4079078
income	.2359449	.238913	0.99	0.325	-.2363696	.7082594
country	-.0023095	.004603	-0.50	0.617	-.0114093	.0067902
religion	.0774479	.1242938	0.62	0.534	-.1682724	.3231683
related	.0769534	.3161753	0.24	0.808	-.5481035	.7020103
_cons	5.36739	2.391091	2.24	0.026	.6403662	10.09441

5.2 Regression of the *Dice Roll* with the *Group*

```
. reg diceroll group
```

Source	SS	df	MS	Number of obs	=	154
				F(1, 152)	=	5.78
Model	38.773307	1	38.773307	Prob > F	=	0.0174
Residual	1020.26565	152	6.71227404	R-squared	=	0.0366
				Adj R-squared	=	0.0303
Total	1059.03896	153	6.92182327	Root MSE	=	2.5908

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
group	1.003882	.4176871	2.40	0.017	.1786601	1.829104
_cons	6.822785	.2914884	23.41	0.000	6.246893	7.398677

5.3 Regression of the *Dice Roll* with the variables *Distressed*, *Hostile*, *Irritable* and *Group*

```
. reg diceroll distressed hostile irritable group
```

Source	SS	df	MS	Number of obs	=	153
				F(4, 148)	=	1.98
Model	53.614756	4	13.403689	Prob > F	=	0.1010
Residual	1003.69243	148	6.78170563	R-squared	=	0.0507
				Adj R-squared	=	0.0251
Total	1057.30719	152	6.95596835	Root MSE	=	2.6042

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
distressed	.006305	.1883772	0.03	0.973	-.3659515	.3785614
hostile	-.0134111	.2507884	-0.05	0.957	-.5089997	.4821775
irritable	-.2601073	.1988992	-1.31	0.193	-.6531564	.1329418
group	1.032773	.4217117	2.45	0.015	.199419	1.866127
_cons	7.414884	.6124641	12.11	0.000	6.20458	8.625188

5.4 Correlation between the *Dice roll*, *Distressed*, *Hostile*, *Irritable* and *Group*

```
. corr diceroll distressed hostile irritable group
(obs=153)
```

	diceroll	distre~d	hostile	irrita~e	group
diceroll	1.0000				
distressed	-0.0215	1.0000			
hostile	-0.0282	0.2620	1.0000		
irritable	-0.1101	0.2847	0.2504	1.0000	
group	0.1955	0.0436	0.0174	0.0076	1.0000

5.5 Regression of the *Dice Roll* with interaction terms between *Group* and *Hostile*, *Group* and *Irritable* and *Group* and *Distressed*

```
. reg diceroll group##hostile group##distressed group##irritable
```

Source	SS	df	MS	Number of obs	=	153
				F(25, 127)	=	2.24
Model	323.473143	25	12.9389257	Prob > F	=	0.0019
Residual	733.834047	127	5.77822084	R-squared	=	0.3059
				Adj R-squared	=	0.1693
Total	1057.30719	152	6.95596835	Root MSE	=	2.4038

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
1.group	1.253356	.8333474	1.50	0.135	-.3956879	2.902401
hostile						
2	1.457449	.8906596	1.64	0.104	-.3050054	3.219904
3	1.358561	.9398889	1.45	0.151	-.5013099	3.218431
4	-2.691378	2.477801	-1.09	0.279	-7.594499	2.211743
5	.6344879	2.537272	0.25	0.803	-4.386315	5.655291
group#hostile						
1 2	-2.356871	1.263909	-1.86	0.065	-4.85792	.1441774
1 3	.1660262	1.57002	0.11	0.916	-2.940761	3.272813
1 4	-.1014507	2.870647	-0.04	0.972	-5.781943	5.579042
1 5	-7.70475	4.368204	-1.76	0.080	-16.34864	.9391384
distressed						
2	.2232244	.7539052	0.30	0.768	-1.268618	1.715067
3	.1206303	.9045339	0.13	0.894	-1.669279	1.91054
4	-1.129067	.9073449	-1.24	0.216	-2.924539	.6664045
5	.7032854	1.55602	0.45	0.652	-2.375797	3.782368
group#distressed						
1 2	.659864	1.060514	0.62	0.535	-1.438703	2.758431
1 3	-.0036044	1.318464	-0.00	0.998	-2.612607	2.605398
1 4	.6623124	1.326298	0.50	0.618	-1.962193	3.286818
1 5	2.229018	2.476584	0.90	0.370	-2.671695	7.129731
irritable						
2	-.3056577	.7733271	-0.40	0.693	-1.835932	1.224617
3	.4509097	.9115953	0.49	0.622	-1.352973	2.254792
4	-.7992462	.9627136	-0.83	0.408	-2.704283	1.10579
5	-.691378	2.477801	-0.28	0.781	-5.594499	4.211743
group#irritable						
1 2	-.7902472	1.079236	-0.73	0.465	-2.92586	1.345366
1 3	1.164179	1.252319	0.93	0.354	-1.313935	3.642293
1 4	-1.383511	1.461818	-0.95	0.346	-4.276185	1.509163
1 5	1.884602	3.199874	0.59	0.557	-4.44737	8.216575
_cons	6.691378	.6010623	11.13	0.000	5.501984	7.880772

5.6 Regression of the *Dice Roll* with each category of the variables *Distressed, Hostile* and *Irritable*.

```
. reg diceroll i.distressed i.hostile i.irritable
```

Source	SS	df	MS	Number of obs	=	153
				F(12, 140)	=	3.16
Model	225.258102	12	18.7715085	Prob > F	=	0.0005
Residual	832.049088	140	5.94320777	R-squared	=	0.2130
				Adj R-squared	=	0.1456
Total	1057.30719	152	6.95596835	Root MSE	=	2.4379

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
distressed						
2	.9201051	.5148076	1.79	0.076	-.0976972	1.937907
3	.6402617	.6334725	1.01	0.314	-.6121474	1.892671
4	-.6465711	.6545868	-0.99	0.325	-1.940724	.6475822
5	1.516273	1.132026	1.34	0.183	-.7218039	3.75435
hostile						
2	.1948453	.6036296	0.32	0.747	-.9985628	1.388253
3	1.091942	.7392135	1.48	0.142	-.3695225	2.553407
4	-2.1143	1.174044	-1.80	0.074	-4.435449	.2068482
5	-2.392745	1.950122	-1.23	0.222	-6.248241	1.462751
irritable						
2	-.8053917	.5217074	-1.54	0.125	-1.836835	.2260518
3	.9918118	.6049037	1.64	0.103	-.2041153	2.187739
4	-1.54234	.6785277	-2.27	0.025	-2.883826	-.2008542
5	-.0961037	1.412241	-0.07	0.946	-2.88818	2.695972
_cons	7.226702	.4067928	17.77	0.000	6.422451	8.030953

5.7 Regression of the *Dice Roll* with *Group* and *Angry3*

```
. reg diceroll group angry3
```

Source	SS	df	MS	Number of obs	=	154
				F(2, 151)	=	6.15
Model	79.7262907	2	39.8631453	Prob > F	=	0.0027
Residual	979.31267	151	6.48551437	R-squared	=	0.0753
				Adj R-squared	=	0.0630
Total	1059.03896	153	6.92182327	Root MSE	=	2.5467

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
group	1.155003	.4149522	2.78	0.006	.3351406	1.974865
angry3	-2.221813	.8841724	-2.51	0.013	-3.96876	-.4748662
_cons	6.879033	.2873955	23.94	0.000	6.311198	7.446869

5.8 Regression of the *Dice Roll* with *Angry3*

```
. reg diceroll angry3
```

Source	SS	df	MS	Number of obs	=	154
				F(1, 152)	=	4.35
Model	29.4788078	1	29.4788078	Prob > F	=	0.0386
Residual	1029.56015	152	6.77342206	R-squared	=	0.0278
				Adj R-squared	=	0.0214
Total	1059.03896	153	6.92182327	Root MSE	=	2.6026

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
angry3	-1.865134	.8940446	-2.09	0.039	-3.631493	-.0987757
_cons	7.42069	.2161325	34.33	0.000	6.993678	7.847701

5. 9 Regression of the *Dice Roll* with an interaction term between *Group* and *Angry3*

```
. reg diceroll group##angry3
```

Source	SS	df	MS	Number of obs	=	154
				F(3, 150)	=	5.29
Model	101.402215	3	33.8007385	Prob > F	=	0.0017
Residual	957.636746	150	6.38424497	R-squared	=	0.0957
				Adj R-squared	=	0.0777
Total	1059.03896	153	6.92182327	Root MSE	=	2.5267

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
1.group	1.312452	.4204738	3.12	0.002	.4816358	2.143269
1.angry3	.6948052	1.809706	0.38	0.702	-2.881002	4.270612
group#angry3						
1 1	-3.812452	2.069047	-1.84	0.067	-7.900693	.2757888
_cons	6.805195	.2879449	23.63	0.000	6.236243	7.374147

5.10 Regression of the *Dice Roll* with the demographic variables, *Distressed*, *Hostile*, *Irritable* and *Group*

```
. reg diceroll gender age occupation income country religion related distressed hostile irritable group
```

Source	SS	df	MS	Number of obs	=	148
				F(11, 136)	=	1.03
Model	78.4443457	11	7.13130416	Prob > F	=	0.4221
Residual	939.988087	136	6.91167711	R-squared	=	0.0770
				Adj R-squared	=	0.0024
Total	1018.43243	147	6.92811179	Root MSE	=	2.629

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gender	-.1525862	.508006	-0.30	0.764	-1.157199	.8520267
age	.4307005	.443166	0.97	0.333	-.4456872	1.307088
occupation	.0791984	.1492645	0.53	0.597	-.2159813	.3743781
income	.1913393	.2400207	0.80	0.427	-.2833162	.6659947
country	-.002469	.0045837	-0.54	0.591	-.0115335	.0065955
religion	.0867313	.1235498	0.70	0.484	-.1575959	.3310586
related	.0076125	.3208359	0.02	0.981	-.62686	.6420849
distressed	.0391493	.1960878	0.20	0.842	-.3486263	.426925
hostile	.1217042	.2803261	0.43	0.665	-.4326577	.6760662
irritable	-.1599576	.2047559	-0.78	0.436	-.5648749	.2449597
group	1.180125	.4425547	2.67	0.009	.3049457	2.055303
_cons	4.868354	2.557409	1.90	0.059	-.1890769	9.925786

5.11 Regression with the *Dice Roll* and all PANAS-scale variables

```
. reg diceroll afraid active jittery attentive determined nervous inspired ashamed alert irritable proud enthousiastic
> ty strong upset excited distressed interested
```

Source	SS	df	MS		
				Number of obs	= 149
				F(20, 128)	= 1.18
Model	161.629812	20	8.08149061	Prob > F	= 0.2795
Residual	874.531262	128	6.83227548	R-squared	= 0.1560
				Adj R-squared	= 0.0241
Total	1036.16107	148	7.00108834	Root MSE	= 2.6139

diceroll	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
afraid	.143622	.4423094	0.32	0.746	-.7315626	1.018807
active	.1568368	.259484	0.60	0.547	-.3565966	.6702702
jittery	-.4839539	.2627369	-1.84	0.068	-1.003824	.0359161
attentive	.3185217	.2484279	1.28	0.202	-.1730354	.8100788
determined	-.225203	.2483278	-0.91	0.366	-.716562	.266156
nervous	-.0587186	.2391734	-0.25	0.806	-.531964	.4145268
inspired	.7795386	.2691976	2.90	0.004	.2468851	1.312192
ashamed	-.0889405	.3732785	-0.24	0.812	-.8275358	.6496547
alert	-.1489267	.2239469	-0.67	0.507	-.5920439	.2941904
irritable	-.0205478	.2523693	-0.08	0.935	-.5199036	.478808
proud	.1811389	.2443452	0.74	0.460	-.3023399	.6646177
enthousiastic	-.1719646	.3575769	-0.48	0.631	-.8794916	.5355623
hostile	-.0177124	.2902162	-0.06	0.951	-.5919548	.55653
scared	-.4881436	.3344357	-1.46	0.147	-1.149882	.1735946
guilty	.1291965	.3100368	0.42	0.678	-.4842642	.7426572
strong	.0325984	.2615429	0.12	0.901	-.4849089	.5501057
upset	.3327862	.3155053	1.05	0.294	-.2914948	.9570673
excited	-.4847956	.3104361	-1.56	0.121	-1.099046	.1294552
distressed	.2667687	.234957	1.14	0.258	-.1981338	.7316713
interested	-.0764641	.288654	-0.26	0.792	-.6476154	.4946872
_cons	6.775166	1.095923	6.18	0.000	4.606696	8.943636