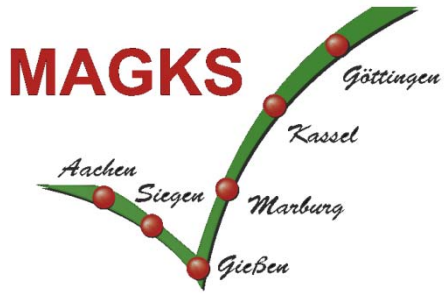

Joint Discussion Paper Series in Economics

by the Universities of

Aachen · Gießen · Göttingen
Kassel · Marburg · Siegen

ISSN 1867-3678

No. 30-2015

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Money priming and social behavior of natural groups in simple bargaining and dilemma experiments

Julija Michailova[1] and Christoph Bühren[2]

Abstract

We examine the effects of money priming and solidarity on individual behavior in three simple experiments: dictator game, ultimatum game, and prisoner's dilemma. Our study comprises two money treatments and two neutral (control) treatments. Additionally, we control for the strength of social ties between experimental participants. Although our priming procedure is sufficient to remind people of the concept of money, it is not sufficient to induce systematically different behavior of the treatment groups compared to the control groups. Moreover, we do not find any significant differences between groups with strong vs. weak social ties. Since our findings contradict previous research, it calls for further investigation on the topic of how money priming influences economic behavior.

JEL: C78, C9, D36

PsycINFO: 3020

Keywords: money priming; bargaining; dilemma; social behavior; natural groups; economic experiment

Acknowledgements

We want to express our gratitude to Kathleen D. Vohs and Agata Gąsiorowska for valuable comments. We thank Katharina Gangl for helping with manipulation check.

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1. Introduction and motivation

Money is an essential part of our everyday life and occupies our minds on a daily basis. Desire to obtain money is one of the strongest motivators of the modern world (Lea and Webley, 2006). What is the psychological impact of this attraction to money on human beings? Experimental findings suggest that even subtle reminders of money change individual behavior. The concept of money stimulates propensity for autonomy (Liu, Smeesters and Vohs, 2010), people prefer to be free of dependency and become less helpful and less sensitive to the needs of others, i.e., money activates a self-sufficient orientation (Vohs, Mead and Coode, 2006, 2008). A great part of studying economics deals with concepts of money which may act as priming[3]. Indeed, experiments with students of economics show that they are more corrupt (Frank and Schulze 2000) and convinced that their competitors will take self-interested moves, i.e., they distrust other individuals (Carter and Irons, 1991; Frank et al., 1993; Wang et al. 2011).[4] Thus, one can conclude that money priming could bring about negative changes in social behavior by diminishing subjects' concerns about social goals and by increasing concentration on their private goals (Piff et al., 2012). This could negatively influence interpersonal ties and group formation, e.g. by decreasing trust and altruism. Therefore, socially beneficial outcomes might not be achieved - especially when cooperation is needed (e.g., for providing public goods).

Findings from experimental literature suggest that the feeling of belonging to a group has a positive impact on pro-social behavior. Experiments utilizing arbitrarily created experimental groups revealed increased cooperation within the group in the prisoner's dilemma (Charness, Rigotti and Rustichini, 2007), more trust in the trust game (Hargreaves Heap and Zizzo, 2009), and higher contributions to the group account in the public goods game (Koopmans and Rebers, 2009). In experiments utilizing real groups, social ties lead to an even stronger increase in cooperation within the group (Goette et al., 2006, 2012).

Thus, money priming is expected to have a negative impact on pro-social behavior; however, the feeling of belonging to a group should have a positive impact on pro-social behavior. Which effect dominates in a natural group[5] when the idea of money is activated? In this

[3] Priming is a method developed in (social) psychology to activate mental representations without drawing participants' attention to this activation (Matthey, 2010:35).

[4] Of course these specific characteristics might not necessarily occur due to indoctrination, but rather as a result of self-selection (cf. Frank and Schulze 2000).

[5] By natural group we describe people that institutionally or sociologically belong to each other, e. g., teammates, colleagues, soldiers etc.

paper, we want to quantify the effect of money priming on pro-social behavior within natural groups with differing strengths of social ties: namely civilian students (weak social ties) and military students, who also work as soldiers at the same time (strong social ties). We are especially interested in examining which of the two effects – solidarity or money priming – dominates in the group with strong social ties.

We apply four treatments in our experiment: two money and two neutral control treatments. In the former, subjects are reminded of money (primed) with the help of a picture with Euros on it (see Figure 1a) or with the descrambling task by Vohs et al. (2006, 2008), respectively. In the latter, subjects are confronted with a neutral picture (see Figure 1b) or with neutral sentences in the descrambling task (see Appendix A). After seeing a presentation with the pictures of Figure 1 as a background or completing the descrambling task respectively, participants play three simple economic games: the dictator game, the ultimatum game, and the prisoner's dilemma. The dictator game is used to assess differences between the two treatments concerning altruistic behavior, the ultimatum game to examine differences in the size and in the perceived fairness of the offers,[6] and the prisoner's dilemma game to test for differences in the propensity to cooperate. Additionally, we control for risk aversion and assess the influence of money priming on individual psychological variables, e.g., via PANAS (Watson and Clark, 1988).

In our experiment, we test the following *hypotheses*:

Dictator game: Previous research revealed that money priming makes subjects less sensitive to the needs of others (Vohs et al., 2006, 2008). Thus, we expect money-primed individuals to be more concentrated on maximizing their own monetary reward and to pass significantly less money to the recipient in comparison to the control group (neutral treatment).

Ultimatum game - proposer: The strategic possibility of rejecting the first mover's offer in the ultimatum game makes self-interested choices less frequent in the ultimatum game in comparison to the dictator game (Burnham et al., 2000). Thus, although we expect offers to become more generous in comparison to the dictator game, we still expect the money-primed individuals to be less generous to the second-mover than in the neutral condition.

Ultimatum game - responder: According to Matthey (2010), individuals who are not presented with a high emphasis on material achievements have, on average, lower reference states and attain a specific level of utility with less material achievement; e.g., they accept

[6] Satisfaction with the offer.

lower levels of consumption. Based on that, we expect subjects in the neutral group to accept lower offers from senders than in the money-primed group.

Prisoner's dilemma: Based on previous research which found that subjects reminded of money wish to be free from dependency and dependents (Vohs et al., 2006, 2008), we expect individuals in the money treatment to engage less in cooperative behavior than subjects in the neutral treatment.

Our paper proceeds as follows. Section 2 reviews the related research in money priming and socio-economic group effects. It also presents one of the experimental groups, namely student soldiers. Sections 3, 4, and 5 describe the three experiments and present their results. In the first experiment, we used priming via a picture procedure and in the second and third priming via a descrambling procedure. The third experiment focuses on gender effects. In Section 6, our findings are discussed. Section 7 concludes.

2. Related research

2.1. Money priming

Previous research testing the psychological consequences of money priming has typically been non-economic (Vohs et al., 2006, 2008; Zhou et al., 2009; Vohs and Baumeister, 2011; Caruso et al., 2013).

Vohs et al. (2006, 2008) ran several experiments to test the hypothesis that activating the concept of money leads to people behaving self-sufficiently, i.e., that they want to be independent from others and want others not to depend on them. In all their experiments, subjects were first reminded of money (primed group) or neutral (control group) concepts and then asked to complete simple experimental tasks, e.g., filling out some questionnaires or helping the experimenter with the data coding. The authors used different methods of priming, namely a descrambling task[7], reading a text about growing up in a wealthy family (high money priming) or in a poor family (low money priming), screensavers that depicted currency (money priming) or fish (neutral priming) or a poster on the wall depicting currency (money priming) or flowers (neutral priming). Vohs et al. (2006, 2008) found that participants reminded of monetary concepts were less helpful and less socially sensitive, they preferred solitary activities and expressed the desire for less physical intimacy; however, they also

[7] See section "Method and procedure" for the explanation of the priming procedure.

worked harder on demanding tasks and were eager to take on more work in comparison to the control group.

Of the few experiments which tried to analyze the influence of money (or material) priming on economic decisions those closest to ours are the papers by Gąsiorowska and Hełka (2012), Wang et al. (2011), Matthey (2010), and Yang et al. (2013).

Gąsiorowska and Hełka (2012) studied the effect of money priming on giving behavior in the context of a dictator game. To prime their subjects, they used a counting task: Subjects had to count small items shown to them on the computer screen among which there were coins in the money condition and round candies of a similar size in the neutral condition. In the money condition, subjects transferred smaller amounts to the other party than subjects in the neutral condition. Moreover, participants in the neutral condition experienced more negative emotions while sending lower amounts to the other party in comparison to those who sent a substantial amount. In contrast, this effect did not occur in the money-primed group, in which subjects were generally less satisfied with any amount sent to the other party. The authors suggest this happens due to a change from the social norm "fairly is equally" (p. 25) in the neutral group to a self-sufficient orientation in the money group.

Wang, et al. (2011) studied the existence of a positive relationship between economic education and greed. Participants took part in two dictator games. In the first one, subjects could split the amount of ten dollars between them and the other player according to their own desire. In the second game, they had to choose between two options: a 50/50 split or a 90/10 split. Subjects who majored in economics or took many economic courses kept more money in the first game and chose the 90/10 split more often in the second game. Furthermore, Wang et al. (2011) detected a positive relationship between a positive view towards one's own greed and exposure to multiple economic courses. In general, the authors conclude that "economic education might have serious […] consequence[s] on student's attitudes towards greed" (Wang et al., 2011:643).

Matthey (2010) studied the influence of priming on reference states (and hence utility). In her experiment, subjects were primed and had to make an economic decision afterwards: They could invest (a part of) their endowment in a lottery and had to state the minimum amount of money they would be eager to receive instead of participating in the lottery. To prime individuals, three different treatments were used: material, social, and neutral. Subjects in each treatment were given 20 groups of five words and had to sort them into phrases of four words. In the material treatment, half of the phrases referred to material achievements

(the other half to neutral content), in the social treatment all sentences referred to social achievements, and in the neutral treatment all phrases were of neutral content. Experimental results showed that both, investments in the lottery and the minimum amount (that subjects asked as a compensation for not playing the lottery), were significantly higher in the material treatment, suggesting that subjects in this treatment were willing to take a higher risk. Mathey (2010) concludes that reference states can quite easily be manipulated (by priming) and individuals are not even aware of the manipulation.

Yang et al. (2013) studied the influence of money and dirt on interpersonal behavior under economic conditions. They assume that dirty money evokes negative associations like greed, exploitation, or corruption and results in antisocial actions. In contrast, they suppose that clean money evokes positive emotions like fair trade, philanthropy, or provision of social goods and results in prosocial behavior. To prime subjects, the authors used the following treatments: dirty money, clean money, dirty paper and clean paper. Experimental hypotheses were tested both in field and laboratory experiments. In the field experiments, the behavior of market vendors was observed after they had been paid with dirty or clean money. In the laboratory experiments, subjects counted clean versus dirty money (or paper) or read about the cleanliness or dirtiness of a nation's money supply in circulation. Afterwards, they participated in simple experiments: prisoner's dilemma, trust, ultimatum, and dictator game. Their experimental results support the hypothesis that dirty money reduces fairness and increases selfish behavior, whereas clean money "seemed to elicit thoughts and actions consistent with a high standard for fairness" (Yang et al., 2013:487).

2.2. Group effects, solidarity

Economists are increasingly interested in how group membership affects individual behavior (Goette et al., 2012). The dominant approach of assigning subjects to groups in economic experiments is the minimal group paradigm stemming from the field of social psychology and developed by Tajfel et al. (1971). Based on this approach, group identity is induced by assigning subjects to artificial groups, differentiated by arbitrary labels, e.g. Yellow and Green group. Tajfel's study demonstrated that even such simple categorization is sufficient to evoke favoritism of the own group members in comparison to members of the other group; a phenomenon which is called in-group bias or in-group favoritism (Taylor and Doria, 1981; Goette et al., 2006). Economic experiments, implemented in minimal group settings reveal that in-group favoritism can manifest itself through increased reward and decreased punishment for the in-group member in dictator games with third party punishment

(Chen and Li, 2009), increased cooperation in the prisoner's dilemma (Kiyonari and Yamagishi, 2004; Charness, Rigotti and Rustichini, 2007), or higher contributions to the group account in public good games (Eckel and Grossman, 2005; Tan and Bolle, 2007; Koopmans and Rebers, 2009; Böhm and Rockenbach, 2013).

Previous research revealed that peoples' degree of altruism expressed towards friends is significantly higher than that towards unknown persons, even in the case that interactions are relatively anonymous and reciprocity effects can be excluded (Leider et al., 2009; Goeree et al., 2012). Van Winden et al. (2008) claim that social ties in such groups should lead to even stronger in-group favoritism in comparison to minimal groups. Some field experiments investigate real-life groups characterized by active social interactions: Bernhard, Fehr and Fischbacher (2006) sample people from different ethno-linguistic groups in Papua New Guinea, and Tanaka and Camerer (2010) from different ethnic groups in Vietnamese villages to play dictator games with third party punishment. Their findings support the existence of in-group favoritism in real groups, which manifested itself in higher altruism towards in-group members, and harsher punishment if the "victim" of unfair behavior was of the same ethnicity rather than of another.

Goette, Huffman and Meier (2006; 2012) conducted experiments that are similar to our design. They studied whether belonging to a real social group promotes cooperation within the group and results in punishment after norm violations. Swiss army recruits were invited to be participants in the experiments, and soldiers who were members of the same platoon comprised the real group. Goette et al. (2006; 2012) conducted a simple prisoner's dilemma (PD) and a PD with third party punishment. Additionally, they compared in-group favoritism in the minimal vs. the real group. Recruits were assigned to the groups (platoons) only three weeks prior to the experiment and these platoons were dissolved one week after the experiment. Nevertheless, significantly more cooperation in the PD was found when subjects played against a member of their own platoon, and more defection was found when they played against a member of another platoon. Moreover, within groups cooperation was significantly higher when interacting with members of their own platoon than with members of their minimal group. Goette et al. (2006; 2012) also found that punishment after norm violations was higher in the real group compared to the minimal group.

2.2.1. HSU soldiers as a natural group

The majority of students at the HSU (Helmut-Schmidt-University, Hamburg) are soldiers of the German army, who are either officer candidates or officers. Prior to their

acceptance to the university, candidates engage in 15 months of military training ("In 15 Monaten", 2006). First, they participate in the basic training for officer candidates. This training lasts six months and is conducted separately for each branch of service. During basic training, candidates obtain military skills and competences required for every soldier. After the first basic training, three other training modules follow, each lasting three months ("In 15 Monaten", 2006), until the studies at one of the two military universities begin. From this point on, all branches of service study together.

At the HSU, the majority of students live on campus in buildings similar to dormitories, which are divided into living areas. Every living area (which is a whole floor of a building) consists of separate rooms for each student, a joint kitchen, and a living room. Different living areas are inhabited by students of the same study discipline. In this way, there is opportunity to build up study groups; moreover students, who are more advanced with their studies, can help their younger colleagues. This concept is supposed to ensure that everybody knows each other and is not some "anonymous matriculation number" (Bundeswehr, n.d.:5). Although during their pre-university training soldiers wear their military uniforms, students at the HSU usually wear civil clothes. Thus, they cannot identify each others' branch of service, unless they know some of the peers personally.

One of the important targets of the 15 months of pre-university military training is the integration of separate soldiers in the military organization and creating a feeling of unity (Apelt, 2005). An important mechanism of inclusion of members in the military organization, and at the same time an important aspect of the organization's culture, is *Kameradschaft* (camaraderie) (Apelt, 2010). Camaraderie describes a feeling of belonging together, irrespective of the feeling of getting on well together or liking each other, or being befriended (Kuehne, 1996). In the course of studies at the university, the feeling of camaraderie is further developed. The concept of camaraderie is included in the German law of soldiers and is an obligatory part of being a German soldier (cf. Soldatengesetz of 1956, 2015).

3. First experiment: Priming via picture

3.1. Procedure

3.1.1. Subjects

Experimental sessions were conducted at the *Military University (Helmut-Schmidt University [HSU])* and the *Civilian University (Kassel University [Kassel])* in the period from March to April, 2013. We collected our data from 70 students of the HSU: 8 females and 62 males with

a mean age of 23.40 years (SD = 1.61). On average, they had studied 7.16 trimesters (SD = 1.28). 42 Students took part in the money treatment and 28 in the neutral treatment.

In Kassel, we collected data from 35 master students: 20 females and 13 males,[8] with a mean age of 25.42 (SD = 1.82). On average, they had studied 2.38 semesters (SD = 0.78); this would correspond to around 8 semesters in total (bachelor + master), or, in terms of trimesters, around 11 trimesters. 17 Students took part in the money treatment and 18 in the neutral treatment.

3.1.2. Design

In order not to prime the participants with the expectation of a monetary reward, we decided to organize our sessions as a classroom experiment. It is important to mention that prior to the experimental session participants had no knowledge that an experiment would take place. At the beginning or at the end of the lecture, the lecturer announced that for the first (last) 30 to 40 minutes students would take part in an experiment. After the announcement, subjects were handed experimental instructions.

We ran two treatments during the experiment:

1) In the money treatment, subjects were reminded of money (primed) by experimental instructions with a picture of Euros on the background of each page (see Figure 1a).

2) In the neutral treatment, instructions were printed on a blurred background, with the same color array as in the money treatment (see Figure 1b).

Since the difference of our pictures can easily be detected, the two treatments were run in separate sessions.

a b

Figure 1: a: background with Euros; b: neutral background.

[8] Two subjects did not report their gender.

After reading the experimental instructions, subjects played three simple bargaining and dilemma games in the following order: dictator game, ultimatum game, and prisoner's dilemma. These decision games were followed by the risk aversion measurement of Holt and Laury (2002). Additionally, we assessed the influence of money priming on individual psychological characteristics with a questionnaire including items that measure concepts such as: assertion of autonomy, distrust towards others, empathy, interpersonal sensitivity and self-sufficiency. From the collected data in the first experiment, we created the final questionnaire, which is described in section 3.1.3. To control whether the priming procedure had any influence on the participants' mood, they completed a mood measure (Brief Measures of Positive and Negative Affect Scale [PANAS], Watson, Clark and Tellegen, 1988). For the second experiment, we created a shorter version of the PANAS Brief Measures (see section 3.1.3). At the end of the experimental sessions, participants were debriefed using the contingency funnel procedure (Bargh and Chartrand, 2000): Subjects were asked about their awareness of the purpose of the experiment and of the link between the prime and subsequent economic behavior, i.e. whether they could connect the background picture in the money priming treatment to their subsequent economic decisions.

3.1.3. Psychological characteristics & PANAS Brief Measures

Our preliminary questionnaire consisted of 19 items (statements) from established psychological scales. These statements referred to a group of thoughts, feelings, and behavioral patterns that allow grouping experimental subjects based on the following five concepts: assertion of autonomy, distrust towards others, empathy, interpersonal sensitivity and self-sufficiency (available on request). This questionnaire was administered to students from the HSU. We carried out the item factor analysis upon a correlations matrix of 19-item responses for the 70 subjects, using a principal component method; a varimax rotation was performed. From the analysis, two factors emerged with eigenvalues of 1.0 or above, accounting for 56.1% of the total variance in the matrix. The suggested factor names and the items correlated with each factor are: Factor 1 "Interpersonal sensitivity [IS]" – 4 items (Cronbach's alpha = 0.81); Factor 2 "Assertion of autonomy [A]" – 4 items (Cronbach's alpha = 0.56). We decided, however, to retain two of the three items measuring empathy [E].[9] These two items were not treated as an aggregated measure but as separate items (see Appendix B for a list of the items).

[9] Based on the scale validity analysis, one of the items which had previously been assigned to the Empathy group was removed.

We also created a shorter version of the PANAS Brief Measures (Watson et al., 1988). From the initial 20 items (ten items measuring negative affect and ten measuring positive affect), we chose six items for each affect based on the scale validity analysis. Assessed validity of the scales is: $PA_{alpha} = 0.82$; $NA_{alpha} = 0.62$. See Appendix C for the final items. We tested the adapted scale with students of the University of Kassel and obtained the following validity measures: $PA_{alpha} = 0.76$; $NA_{alpha} = 0.78$.

3.1.4. Payment procedure

We chose a random payment procedure, which has been successfully applied in numerous economic experiments (Camerer and Ho, 1994; Matthey, 2010; Armantier, 2006; Stahl and Haruvy, 2006; Kritikos and Bolle, 2001; Shunk and Betsch, 2006). A note of concern is that the behavior of subjects in random incentive schemes might be different in comparison to the situation where each participant is paid (Sefton, 1992). However, we were not interested in comparing the two groups under different payment schemes, but rather in the relative differences between the two groups (money vs. neutral) under the same payment condition. In each session, we selected one matched couple for each experimental game and two persons for the lottery game for payment. Each person could only be selected once for the payment.

Throughout the experiment, we used "Gulden" as the experimental currency unit. At the military university, students earn about 2000 € monthly net income whereas the available income of Kassel students is about half that much. Therefore, we decided to use different exchange rates: In HSU, the exchange rate was 2 € for 1 Gulden and in Kassel it was 1 € for 1 Gulden.

3.2. Results

Average experimental outcomes per university and treatment are listed in Appendix D1; Figure 2 depicts the main results.

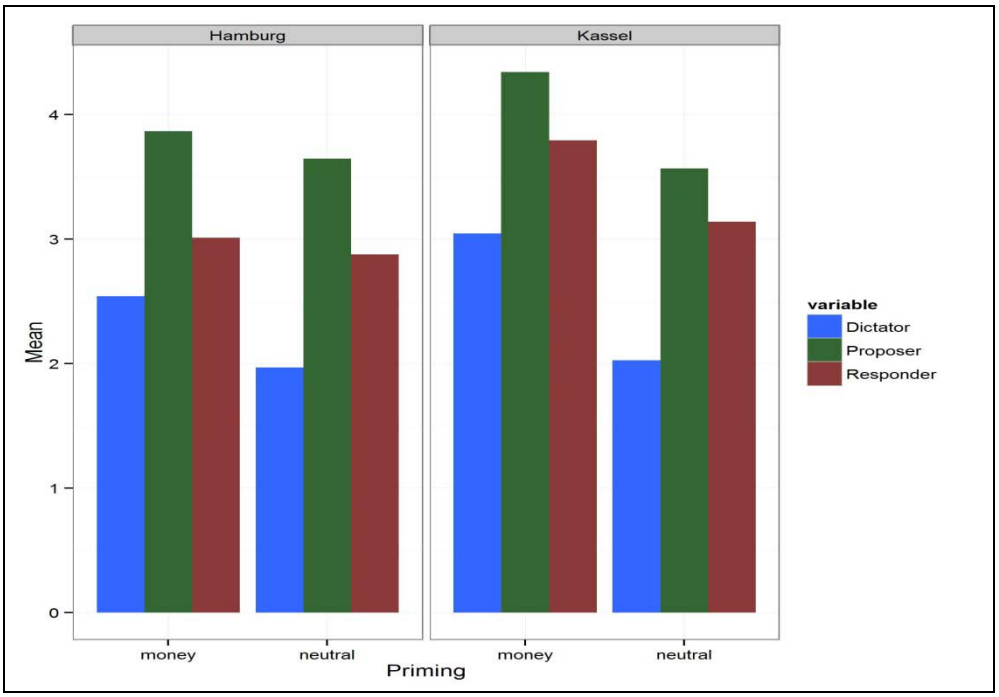

Figure 2: Summary of picture priming results

3.2.1. Military University (HSU)

Two sided Mann-Whitney U tests[10] do not point to any significant differences between the money and the neutral treatment with regard to the amount sent in the dictator game, the amount sent to the responder and the minimum acceptable amount in the ultimatum game, and the degree of cooperation in the prisoner's dilemma. Additionally, we tested for the difference in the number of subjects who decided to keep the whole endowment in the dictator game. Again, there was no statistical difference between the treatments. However, the money-primed group was significantly more risk loving than the neutral group ($Z = -2.05$, $p = 0.04$). We did not find any significant differences of the positive (PA) or negative affect (NA) measures between the money and the neutral treatment.

3.2.2. Civilian University (Kassel University)

Comparable to HSU, we did not find any significant differences in the dictator or ultimatum game by treatment. Yet cooperation in the prisoner's dilemma game was higher in the money compared to the neutral treatment (47% vs. 11%, $p = 0.03$, Fisher exact test) – which is contrary to our expectation. Risk aversion and moods did not differ by treatment.

3.2.3. Military vs. Civilian University

[10] All our tests are two-sided. If not explicitly stated otherwise, we use Mann-Whitney U tests throughout the paper. All values of the tests can be found in Appendix F.

Comparing HSU to Kassel, we did not find any significant differences – neither in the money nor in the neutral treatment.

3.2.4. Conclusion

To summarize our first experiment: We do not find evidence that priming via money picture is able to induce systematic behavioral changes in economic decision making. Furthermore, we cannot support the hypothesis that groups with different social ties behave differently in bargaining and dilemma games.

4. Second Experiment: Priming via descrambling task

4.1. Procedure

4.1.1. Subjects

Experimental sessions were conducted in December, 2013. We collected data from 38 students of the HSU: 2 females and 36 males with a mean age of 21.71 years (SD = 1.83). All participants had only been studying for one trimester and had no previous experience with similar experiments. 19 Students took part in the money treatment and 19 in the neutral treatment.

In Kassel, data was collected from 67 students: 46 females and 19 males,[11] with a mean age of 20.69 (SD = 2.96). All of them had only been studying for one semester and had no previous experience with similar experiments. 32 students took part in the money treatment and 35 in the neutral treatment.

4.1.2. Method and procedure

To remind subjects of money, we used the descrambling task by Vohs et al. (2006, 2008). We presented 30 sets of five words to the participants, who had to sort these words into meaningful sentences of four words each (see Appendix A). In the neutral treatment, all 30 items were of neutral content, e.g. “The sweater is green”. In the money treatment, 15 items were of neutral content (same phrases as in the neutral treatment), and 15 phrases primed money concepts e.g. “One hundred euro bill”.[12] Afterwards, our experiment proceeded in the same manner as the first experiment. For the post-experimental questionnaire, we used the

[11] Two subjects did not report their gender.

[12] See Appendix F for the manipulation check.

validated instrument measuring only assertion of autonomy, interpersonal sensitivity and empathy (Appendix B) and the adapted version of PANAS Brief Measures (Appendix C). Since differences in the experimental instructions could not be easily identified by participants anymore, the two treatments were conducted in the same sessions.

4.2. Results

Average experimental outcomes per university and treatment are listed in Appendix D2; Figure 3 depicts the main results.

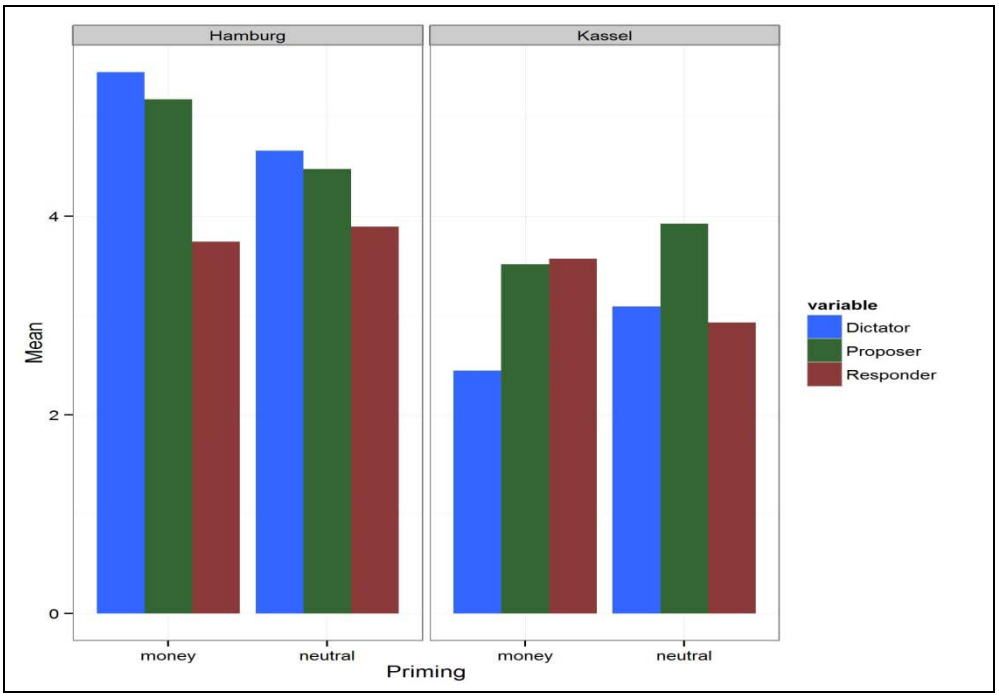

Figure 3: Summary of descrambling priming results

4.2.1. Military University (HSU)

We did not find any significant differences between the two treatments, except that in the money treatment proposers sent significantly more money to the responders in the ultimatum game compared to the neutral treatment ($Z = -2.26$, $p = 0.02$). This finding contradicts our hypothesis.

4.2.2. *Civilian University (Kassel University)*

We did not find any significant differences between the two treatments with regard to the amount sent in the dictator game, the amount sent to the responder and the minimum acceptable amount in the ultimatum game. However, the share of dictators who kept the whole endowment was higher in the money compared to the neutral treatment (31% vs. 13%,

p = 0.08, Fisher exact test). Cooperation in the prisoner's dilemma was also significantly higher in the money than in the neutral treatment (40% vs. 19%, p = 0.07, Fisher exact test). Both findings speak against our hypotheses.

4.2.3. Military vs. Civilian University

In the money treatment, the amount sent both in the dictator and in the ultimatum game was significantly higher at the HSU compared to Kassel (Z = -4.70, p < 0.01 and Z = -4.21, p < 0.01, respectively). Furthermore, dictators in Kassel kept the whole endowment (31% vs. 16%, p < 0.01, Fisher exact test) significantly more often. These observations speak for a higher degree of altruism in groups with strong social ties. The minimum acceptable amount in the ultimatum game was not different across universities (Z = -0.73, p = 0.47). Differences between other variables of interest, including psychological measures, were also statistically insignificant.

In the neutral treatment, the only value that differed significantly across universities was the minimum acceptable amount in the ultimatum game, which was slightly higher in Hamburg than in Kassel (on average 3.90 vs. 2.93 Gulden, Z = -1.84, p = 0.07).

4.2.4. Conclusion

To conclude the findings of experiment two: Also with priming via a descrambling task, we are unable to induce systematic behavioral change in economic decision making. Students of the HSU (a group with strong social ties) seem to be more altruistic to their colleagues than students of the University of Kassel (a group with weaker social ties). However, we only observe this pattern in the giving behavior in the money treatment.

5. Third experiment: Does gender composition matter?

In our second experiment (see Section 4), 71% of the participants in Kassel were females and 29% were males whereas at the HSU our sample was predominantly male (only 5% females). We suspected that the difference in gender composition had an influence on the experimental results. Indeed, experimental literature suggests that gender composition has an important impact on bargaining results (see Eckel and Grossman, 2008 for an overview), e.g. Eckel and Grossman (2001) as well as Solnick (2001) find that proposers in ultimatum games offer more to males than to females. To check whether playing against a partner of your own gender has an influence on behavior, we re-run the second experiment in same gender groups. Since at the HSU 95% of the participants were male, we rerun the experiment at the civil university with pure male (and female) groups.

5.1. Procedure

5.1.1. Subjects

We conducted the replication in November 2014 and February 2015. We collected data from 51 males with a mean age of 21.66 years (SD = 2.71). All had only been studying for one semester and had no previous experience with similar experiments. 24 males took part in the money treatment and 27 males in the neutral treatment.[13]

5.1.2. Method and procedure

The method and procedure were the same as before in the descrambling priming experiment (section 4.1.2.). The only difference was that we explicitly announced that male subjects were playing with male subjects and female subjects with female subjects. This was also made salient in the experimental instructions.

5.2. Results

In this section, we analyze differences between male groups from Kassel (*Kassel male*) and our previously collected data from HSU males and of the mixed gender group from Kassel (*Kassel mixed*) separately for each treatment. Average experimental outcomes per treatment are presented in the Appendix D3.

5.2.1. Money treatment

On average, the amount sent in the dictator game and the amount sent to the responder was significantly higher in the HSU group compared to the *Kassel male* group (dictator: 5.45 vs. 3.55, Gulden, $Z = -3.18$, $p = 0.00$; 5.18 vs. 4.60, ultimatum proposer: $Z = -1.88$, $p = 0.06$). We did not find any significant differences between the two groups in the minimum acceptable amount and cooperation in the prisoner's dilemma.

The average amount sent in the dictator game and the amount sent to the responder in the ultimatum game was significantly higher in the *Kassel male* group compared to the *Kassel mixed* group (dictator: 3.55 vs. 2.45 Gulden, $Z = -2.23$, $p < 0.05$; ultimatum-proposer: 4.60 vs. 3.51 Gulden, Mann-Whitney $Z = -3.13$, $p = 0.00$). This confirms that gender constellation can have an impact on social preferences. Yet, we find no significant difference between the two groups in the minimum acceptable amount (3.72 vs. 3.57 Gulden). Moreover, the degree of

[13] 25 and 21 females respectively.

cooperation in the prisoner's dilemma is not affected by subjects knowing that they played against a partner of the same gender.

5.2.2. Neutral treatment

In the neutral treatment, there were no significant differences in the variables of interest between the HSU group and the *Kassel male* group.

We did not observe great differences between the *Kassel male* group and the *Kassel mixed* group. The minimum acceptable amount was significantly higher in the *Kassel male* group compared to the *Kassel mixed* group (3.88 v. 2.93 Gulden; Mann-Whitney $Z = -1.90$, $p = 0.06$). We also observed a slight increase in cooperation in the *Kassel male* group compared to the *Kassel mixed* group in the prisoner's dilemma ($p = 0.09$, two-sided Fisher's exact test). Other variables of interest were not significantly different.

5.2.3. Conclusion

To summarize our replication: The results of the second experiment do not change if we compare the HSU group (which consists nearly only of men) to the *Kassel male* group rather than the *Kassel mixed* group. Thus, our results are consistent although we do find hints that gender constellation matters in the bargaining and dilemma games.

6. Discussion

Results presented in this paper do not support the findings of previously published research. We have some thoughts on why, contrary to Gąsiorowska and Hełka (2012), we do not find that money priming á la Vohs et al. (2006) systematically changes economic behavior.

First of all, what if money priming has an influence on giving activities through decreasing trust towards other participants? In the experiment of Gąsiorowska and Hełka (2012), the expectation of mutual reciprocity between the participants might have arisen. Namely, participants played two dictator games with two different partners, and they adopted a different role in each game. Since it is not clearly stated in the article, there are some questions that arise: 1) were subjects fully aware that they played two games with different partners, or might they have not been sure that the partner was different, and 2) did they know their pairing procedure for payment? We suspect that expectation of mutual reciprocity between participants could be an issue since subjects played the role of a dictator and recipient subsequently. For the first mover, trust towards the other player allows acting in accordance with mutual reciprocity expectations (cf. Cox, 2004; p. 263). We suggest that

differences in behavior of money primed and neutrally primed players in Gąsiorowska and Hełka (2012) are mediated through changes in trust levels towards co-players. In our experimental design, there was no opportunity for building mutual expectations and thus we do not observe this effect. This premise is in line with the findings of Kuzminska et al. (2015, May) who found that there is significantly less trust in subjects who have been money primed in comparison to neutrally primed subjects.

Our second thought about why we do not obtain behavior in accordance to money priming is based on the concept of *chronic activation of money*, developed by Kuzminska et al. (2015, May). This concept suggests that money priming is ineffective with subjects who are accustomed to the concept of money due to their profession (e.g. bankers, investors) or studies (e.g. economics and business administration students). In the experiment of Gąsiorowska and Hełka (2012), not much is reported about their sample composition. However, in the experiments by Vohs et al. (2006) subjects were psychology students. This might partially explain why money priming was ineffective in our subjects, who were all students of either business administration or economics.

A third possible explanation for different results in comparison to previous publications might stem from the problem of false positive effects and a publication bias (see Shanks et al. (2013) for a discussion). Shanks et al. (2013) were unable to replicate a well-documented intelligence priming effect in a sample of 475 participants (9 experiments). An even bigger replication project by Klein et al. (2014)[14] presents some alerting findings concerning previously reported priming effects. With 36 independent samples and altogether 6,344 participants, this project tried to replicate various psychological effects (classic and contemporary). Whereas anchoring effects (Jacowitz and Kahneman, 1995) were found to be systematically underestimated, the money priming effect, as presented in Caruso et al. (2013), could not be replicated: the priming effect size (Cohen's d) in the replication by Klein et al. (2014) was 0, while it had been 0.8 in the original study.

Finally, we want to address the missing group effect in our experimental results. We believe that to receive significant group effects, merely inviting members of one group is not enough and the idea of group affiliation is not automatic even in soldiers and has to be additionally activated. For example, in the experiments by Goette et al. (2006, 2012) subjects were implicitly informed in the instructions that they played against members either of their own group (platoon) or of another group (platoon). Moreover, each platoon was seated apart from

[14] See also Open Science Collaboration (2015).

each other[15]. In our experiment, HSU students were not in any way reminded that they belonged to the same professional group of soldiers, neither in the experimental instructions nor by wearing uniforms, thus subjects could have lost sight of the concept of camaraderie.

7. Conclusion

In this experiment, our aim was to quantify the effect of money priming on subjects' economic behavior in simple experiments: dictator game, ultimatum game, and prisoner's dilemma. Additionally, we controlled for the strength of social ties between experimental participants: We conducted the experiment with a group defined by strong social ties, student soldiers of the military university, and a group defined by weak social ties, namely students from a civil university.

Although our manipulation check demonstrated that our priming procedure was sufficient to remind people of the concept of money, our experimental results are inconclusive: In most of the cases, we do not observe significant treatment effects although we implemented two different priming procedures in two different universities, and replicated our second experiment with a pure male group. Altogether, we ran 7 sessions with 307 subjects. Compared to sample sizes from previous experiments, our sample is more than large enough to detect treatment effects. In comparison, Gąsiorowska and Hełka (2012) report one experiment with 67 participants, and Vohs et al. (2006) report 9 experiments with an average sample size of 42 subjects. In the rare cases in which we observe significant results, they point in the opposite direction of our hypotheses. This finding could be explained by a reverse priming effect that occurs when subjects consciously or unconsciously behave in the opposite direction the (subtle) prime was trying to direct them (cf. Glaser and Banaji, 1999; Laran et al., 2011); however, this effect is not stable and we cannot draw any affirmative conclusion on it.

We also do not find any stable significant group effects. In the money treatment, there are significant differences in some variables of interest between the HSU group and the *Kassel male* group; however, there are no differences in the neutral treatment. Still, we find some support that money priming affects the HSU group less than Kassel males: In the money treatment, the HSU group gives more in the dictator and ultimatum game than the *Kassel male* group.

[15] We have no information whether uniforms of participants' differed between the platoons.

In general, our results demonstrate that money priming is not sufficient to induce systematically different behavior in the group that is faced with this kind of manipulation, compared to the control group. This is consistent with the findings of Klein et al. (2014) and Shanks et al. (2014), who demonstrated that priming works only in very specific circumstances. Thus it is important to understand mechanisms through which money priming effects influence economic behavior.

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Appendix A: Descrambling Tasks (German)

Bilde sinnvolle Sätze!

Bitte schreibe für jede Zeile einen korrekten Satz mit jeweils NUR VIER Wörtern. Falls Du glaubst, dass es mehrere Möglichkeiten gibt, suche Dir bitte eine aus. Bitte lasse Dir pro Zeile nicht mehr als 20 Sekunden Zeit.

Beispiel:
verschieden / benutzen / Farbe / Hund / Maler = Maler benutzen verschiedene Farben

a. Neutral priming

gehen / Wort / sie / vorher / schwimmen

trinken / Müsli / schmecken / Frühstück / zum

Blätter / Baum / haben / grün / Lächeln

oft / Süßes / Treppe / Kinder / mögen

Stuhl / trinken / gut / Büro / benötigen

manchmal / bringen / essen / Wolke / Regen

zehn / haben / Buch / grillen / Jungs

Dorf / der / du / halten / Bleistift

Berg/ lesen/ wir/ später/ werden

Blume / grün / bekommen / sie / ein

schreiben / Brief / ich / Metall / der

Anzug / sein / schwarz / der / hart

Becher / zerbrechen / er / der/ sehr

Magen / grau / der / sein / Himmel

blau / Buch / haben / sie / Augen

zu / Hause / arbeiten / er / Apfel

lang / sein / Aufsatz / der / gelb

draußen / sein / kalt / es / Tisch

im / Seide/ spazieren / Wald / wir

er / Glass / ein/ nehmen / Erde

unser / Tür/ öffnen /wir / Abend

Plastik / mögen / ihre / sie / Bluse

wir / springen / brauchen / Feuerzeug / ein

Stadt / sein / die / schön / Stadium

lila / Milch / Kaffee / trinken / wir

Blume / ausschalten / Licht / er/ das

essen / Banane/ die / sie / Sonne

hinter / die / lustig / Party / sein

der / ausführen / wir / gelb / Hund

Rhabarber / mögen / Musik/ klassisch / sie

b. Money priming

ich / Scheck / ein / einlösen / Kugelschreiber

Linie / Geldmittel / er / die / haben

machen / hoch / Gewinne / sie / Himmel

Einkommen / steigen / unser / ständig / Buch

der / hundert / Flasche / Schein / Euro

erhalten / eine / Lohnerhöhung / sie / blau

grün / Lotto / im / gewinnen / ich

gesichert / ich / Wörter / sein / finanziell

leisten / sich / viel / hoch / er

bezahlen / können / Tasse / wir / das

Locher / ausgeben / sie / Geld / freizügig

Job / gut / bezahlter / ein / Pfeil

sehr / reich / Tag / sein / er

Finanzen / er/ verwaltet / Maus / gut

Gehalt / verdienen / hohes / Schreibtisch / ein

Appendix B: Items from the final questionnaire of the individual psychological characteristics

	Statement
A	I don’t need other people to make me feel good.
A	I rely only on myself.
A	When I am sick, I prefer that my friends leave me alone.
A	I don’t expect much from other people.
IS	I do not feel happy unless people I know admire me.
IS	I am afraid about being criticized for things I have said or done.
IS	I worry about the effect I have on other people.
IS	I worry what others think of me.
E_1	I can easily put myself in somebody else’s shoes.
E_2	I am quick to notice when someone in a group is feeling uncomfortable.

Appendix C: Adapted PANAS Brief Measure

Positive Affect		Negative Affect	
P	interested	**N**	distressed
P	excited	**N**	afraid
P	strong	**N**	nervous
P	proud	**N**	irritable
P	enthusiastic	**N**	jittery
P	inspired	**N**	guilty

Appendix D: Experimental outcomes by treatment and university

1. First Experiment

Kassel

	Neutral			Money		
	N	M	SD	N	M	SD
Dictator's choice (DG)	18	2.03	1.60	17	3.04	2.70
Proposer’s offer (UG)	18	3.57	1.43	17	4.34	1.44
Responder's choice (UG)	18	3.14	1.45	17	3.79	1.88
Cooperative strategy (PD)	18	0.89	0.32	17	0.53	0.52
Safe choices (HL)	18	4.67	1.75	17	4.24	1.56
Age	17	25.18	1.85	16	25.69	1.82

HSU

	Neutral			Money		
	N	M	SD	N	M	SD
Dictator's choice (DG)	28	1.97	2.59	42	2.54	2.07
Proposer’s offer (UG)	28	3.65	1.60	42	3.87	1.49
Responder's choice (UG)	28	2.88	2.16	42	3.01	1.81
Cooperative strategy (PD)	28	0.68	0.48	33	0.70	0.47
Safe choices (HL)	28	5.36	1.57	42	4.55	2.06
Age	28	23.29	1.65	42	23.47	1.60

2. Second Experiment

Kassel

	Neutral			Money		
	N	M	SD	N	M	SD
Dictator's choice (DG)	32	3.09	1.69	35	2.45	2.03
Proposer’s offer (UG)	32	3.93	1.37	35	3.51	1.48
Responder's choice (UG)	32	2.93	1.97	35	3.57	1.89
Cooperative strategy (PD)	32	0.81	0.40	35	0.60	0.50
Safe choices (HL)	32	4.72	1.42	35	4.51	2.04
Age	32	19.59	1.43	33	21.76	3.63
HSU						
	Neutral			Money		
	N	M	SD	N	M	SD
Dictator's choice (DG)	19	4.66	2.08	19	5.45	1.23
Proposer’s offer (UG)	19	4.47	1.90	19	5.18	1.23
Responder's choice (UG)	19	3.90	2.21	19	3.74	1.97
Cooperative strategy (PD)	19	0.63	0.50	19	0.42	0.51
Safe choices (HL)	19	4.32	2.03	19	5.47	2.34
Age	19	21.74	1.70	19	21.68	2.00

Appendix D: continuation

3. Third experiment

Kassel

	Neutral			Money		
	N	M	SD	N	M	SD
Dictator's choice (DG)	27	3.36	2.82	23	3.55	1.87
Proposer's offer (UG)	27	4.31	2.11	23	4.60	1.16
Responder's choice (UG)	27	3.88	2.39	23	3.72	1.71
Cooperative strategy (PD)	27	0.59	0.50	23	0.65	0.49
Safe choices (HL)	27	3.89	2.08	23	4.39	2.50
Age	27	22.11	2.28	23	21.35	3.64

Appendix E: Statistical tests *(if not stated otherwise, all tests are two-sided)*

First experiment: Priming via Picture

	Test	*Money vs. Neutral*		*HSU vs. Kassel*	
		HSU	Kassel	Money	Neutral
Dictator	Mann-Whitney	Z=-1.39, p=0.17	Z=-1.14, p=0.27	Z=-0.27, p=0.79	Z=-0.69, p=0.50
Dictator: all money	Fisher's exact	p=0.12	p=0.71	p=0.74	p=0.21
Ultimatum: proposer	Mann-Whitney	Z=-0.32, p=0.75	Z=-1.63, p=0.12	Z=-0.55, p=0.58	Z=-0.73, p=0.47
Ultimatum: responder	Mann-Whitney	Z=-0.33, p=0.74	Z=-1.12, p=0.27	Z=-1.17, p=0.24	Z=-0.05, p=0.97
Prisoner's dilemma	Fisher's exact	p=0.88	p=0.03	p=0.35	p=0.16
Risk aversion	Mann-Whitney	Z=-2.05, p<0.05	Z=-2.32, p=0.68	Z=-0.33, p=0.74	Z=-1.55, p=0.12
PA	Mann-Whitney	Z=-0.92, p=0.36	Z=-0.36, p=0.72	Z=-0.08, p=0.94	Z=-0.34, p=0.74
NA	Mann-Whitney	Z=-1.42, p=0.16	Z=-0.89, p=0.37	Z=-0.77, p=0.45	Z=-1.07, p=0.29

Second Experiment: Priming via Descrambling Task

	Test	*HSU vs. Kassel*		*Money vs. Neutral*	
		Money	Neutral	HSU	Kassel
Dictator	Mann-Whitney	Z=-4.70, p=0.00	Z=-2.94, p=0.00	Z=-1.31, p=0.22	Z=-1.20, p=0.23
Dictator: all money	Fisher's exact	p=0.01	p=0.64	p=1.00	p=0.08
Ultimatum: proposer	Mann-Whitney	Z=-4.21, p=0.00	Z=-1.32, p=0.19	Z=-2.26, p<0.05	Z=-0.92, p=0.36

Ultimatum: responder	Mann-Whitney	Z=-0.73, p=0.47	Z=-1.84, p=0.07	Z=-0.25, p=0.82	Z=-1.60, p=0.11
Prisoner's dilemma	Fisher's exact	p=0.26	p=0.19	p=0.33	p=0.07
Risk aversion	Mann-Whitney	Z=-1.42, p=0.16	Z=-1.25, p=0.21	Z=-1.62, p=0.12	Z=-0.88, p=0.38
PA	Mann-Whitney	Z=-0.05, p=0.96	Z=-0.84, p=0.40	Z=-0.23, p=0.82	Z=-0.28, p=0.78
NA	Mann-Whitney	Z=-1.50, p=0.13	Z=-0.02, p=0.98	Z=0.87, p=0.89	Z=-1.24, p=0.22
Interpersonal sensitivity	Mann-Whitney	Z=-1.03, p=0.30	Z=-2.00, p<0.05	Z=-0.65, p=0.53	Z=-0.02, p=0.98
Autonomy	Mann-Whitney	Z=-0.06, p=0.96	Z=-0.75, p=0.45	Z=-1.80, p=0.07	Z=-1.40, p=0.16
Empathy: E_1	Mann-Whitney	Z=-1.43, p=0.15	Z=-0.15, p=0.88	Z=-0.55, p=0.64	Z=-1.10, p=0.27
Empathy: E_2	Mann-Whitney	Z=-0.33, p=0.74	Z=-1.75, p=0.08	Z=-1.08, p=0.33	Z=-0.17, p=0.86

Third Experiment: Gender effects

	Test	*HSU all vs. Kassel males*		*Kassel mixed vs. Kassel males*	
		Money	Neutral	Money	Neutral
Dictator	Mann-Whitney	Z=-3.18, p=0.00	Z=-1.66, p=0.10	Z=-2.23, p<0.05	Z=-0.45, p=0.65
Ultimatum: proposer	Mann-Whitney	Z=-1.88, p=0.06	Z=-0.28, p=0.78	Z=-3.13, p=0.00	Z=-0.80, p=0.43
Ultimatum: responder	Mann-Whitney	Z=-0.22, p=0.83	Z=-0.06, p=0.95	Z=-0.86, p=0.39	Z=-1.90, p=0.06
Prisoner's dilemma	Fisher's exact	p=0.21	p=1.00	p=0.79	p=0.09

Appendix F. Manipulation Check

We based the manipulation check on a procedure similar to the one developed by Szkudlarek (as cited in Gąsiorowska, 2014). Subjects first filled out the word descrambling task (see Appendix A). Afterwards, they completed a task which consisted of filling in missing letters in 35 words, of which 21 could be completed either as words connected to the concept of money or as neutral words (e.g. Ges_ _ _ _ _: Geschäft/Gespräch); the other 14 words could only be completed as neutral words. All words (in German language) used in the manipulation check can be obtained on request.

A group of 46 subjects took part in the manipulation check: 20 subjects in the neutral and 26 in the money treatment. Most of the participants were psychology students at the University of Vienna.

Money primed subjects wrote on average 2.50 words connected to the concept of money (SD = 1.30) compared to only 1.45 words in the neutrally primed group (SD = 1.15). The difference in the number of words connected to money in the experimental and control group was significant, $F(1,44) = 8.13$; $p = 0.01$; Eta-squared = 0.16. This suggests that our priming procedure was successful.