Cooling Off in Negotiations: Does it Work?

by

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Negotiations frequently end in conflict after one party rejects a final offer. In a large-scale Internet experiment, we investigate whether a 24-hour cooling-off period leads to fewer rejections in ultimatum bargaining. We conduct a standard cash treatment and a lottery treatment, where subjects receive lottery tickets for several large prizes. In the lottery treatment, unfair offers are less frequently rejected, and cooling off reduces the rejection rate further. In the cash treatment, rejections are more frequent and remain so after cooling off. We also study the effect of subjects’ degree of “cognitive reflection” on their behavior. (JEL: C78, C99, D8)

1 Introduction

This study investigates the stability of emotional influences on economic decision-making. While standard economic theory has emphasized the rationality of economic agents, dual-system models of decision-making argue that human behavior can be viewed as the outcome of the interaction between a (fast) affective system that reacts to emotions and motivational drives and a (slower) goal-based cognitive system. Prior evidence indicates that the affective system tends to react first and to initially hold sway over the cognitive system (see, e.g., Zajonc, 1984).

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1 Such dual perspectives on decision-making are ubiquitous in psychology (see, e.g., Kahneman, 2003; Chaiken and Trope, 1999). Dual-system models have also been employed by economic theorists having rediscovered Adam Smith’s (1790) insight that human behavior frequently emerges as the outcome of a struggle between “passions” and an “impartial spectator” (see, e.g., Fudenberg and Levine, 2006; Camerer, 2003).
Indeed, in the context of negotiations, recent neuroeconomic evidence (see, e.g., Koenigs and Tranel, 2007; Sanfey et al., 2003) shows that negative emotions, like anger, play an important role in subjects’ decisions to reject offers that are deemed unfair (even though subjects forgo money by doing so). At the same time, it has long been argued by practitioners (see, e.g., Adler, Rosen, and Silverstein, 1998) that cooling-off periods (where negotiations are temporarily halted) might be successful in lessening anger and help to avoid a breakdown of negotiations. This raises the question whether after some time the deliberative system indeed prevails and leads parties participating in negotiations to accept offers that, while being perceived as unfair, have some monetary value nevertheless. Put differently, does anger really subside with one night’s sleep?

Investigating this issue may shed light on three questions. First, it may help to understand why bargaining frequently breaks down. Do negotiations break down due to subjects’ stable preferences for equitable outcomes, as suggested by fairness theories (see, e.g., Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999), or due to hot emotional states that are, however, transient and lose importance over time? Second, more generally, how robust are results of economic experiments where emotions might play a role? Third, if cooling off plays a role, under which circumstances is it more likely to be relevant? For example, does the effect of cooling off (or, more generally, the effect of emotions) depend on whether what is at stake is a certain or an uncertain outcome?

To examine these questions, we study behavior in a particularly one-sided and unfair bargaining environment, the well-known ultimatum game (Güth, Schmittberger, and Schwarze, 1982; Nowak, Page, and Sigmund, 2000; and many others). Abundant experimental evidence documents that in the ultimatum game unfair offers from proposers are frequently rejected by responders, even though responders forgo money by doing so (for surveys, see, e.g., Camerer, 2003; Roth, 1995). This suggests that rejection rates in the ultimatum game might fall if a cooling-off period is imposed.

In our experiment, responders get the (unanticipated) chance for revising their original decision after a 24-hour cooling-off period. We explore the question whether cooling off works in an experiment conducted on the Internet with 1250 participants. Subjects play a mini-ultimatum game, in which proposers can make only two different offers about how to divide 10 lotto-euros, an 8 : 2 split or a 5 : 5 split. Re-
sponders can then accept or reject the offer. If they reject, both subjects get nothing. If they accept, the amount is divided as suggested by the proposer, namely, 8 lotto-euros for the proposer and 2 for the responder, or 5 for both, respectively. All responders receive an email 24 hours after their initial decision that gives them the opportunity to reconsider their decision. Responders learn of this possibility only after having made their initial decision. We make it clear that (i) every responder, independently of his initial decision, would be given this opportunity, and (ii) the proposer would only be informed about the responder’s final decision.

Alternatively, one could imagine a scenario where there is no initial decision, but proceedings are simply halted for the duration of the cooling-off period, after which a (final) decision is made. This scenario has been studied experimentally by Bosman, Sonnemans, and Zeelenberg (2001) and Grimm and Mengel (2011), which are discussed in more detail in section 2. We would like to argue that both scenarios are of empirical relevance. For example, in negotiations, a party may initially reject a deal, but may be able to come back later (if there is still time before any deal would need to be implemented). Also, consider the example of online shopping where some (monopolistic) seller offers a given product at a fixed price. While a potential buyer may initially decide against the offer (perhaps because he deems the price to be unfair), he may still decide to purchase later on if there is some time left before he would actually need the product. Interestingly, even if the buyer initially decides to buy, in Germany consumer law provides buyers with the unconditional right to return any online purchase and to get fully refunded (i.e., to finally reject the deal) within a 14-day window after the initial purchase. Similar provisions apply to doorstep selling.

We implement two different ways of paying subjects. In the cash treatment subjects receive their payoffs (2, 5, or 8 lotto-euros, exchanged one-to-one into actual euros) in the mail as cash. In the lottery treatment subjects receive the corresponding number of lottery tickets, of which each has an equal chance of winning one out of six large prizes of 500 euros each. In both the cash treatment and the lottery treatment, the expected monetary value of one lotto-euro is the same and equal to one euro, and this is known to subjects (see section 3.3 for a more detailed discussion of how this was achieved in the lottery treatment).

Our results provide only partial support for the idea that cooling off works. In the lottery treatment there is a drop in the rejection rate of unfair offers by 25 percent, which is, however, only weakly statistically significant. In the cash treatment, rejection rates are high initially (as has previously been found in many other experiments) and remain so after the 24-hour cooling-off period.

Personality traits, such as impulsiveness, may also play an important role for negotiation tactics. To potentially identify different behavioral types, in the post-experimental questionnaire, we conduct the Cognitive Reflection Test (CRT), which has been put forward by Frederick (2005). This simple three-item test is designed to differentiate between impulsive and reflective decision-makers, who, arguably, may behave differently in negotiations. By now, this test is widely employed, since Frederick (2005) documented that the CRT score compares very favorably with
substantially more complex personality tests in correlating strongly with various decision-making characteristics. We show that there is a relationship between the CRT score and behavior also in our experiment. In particular, while we find that the initial rejection rate is significantly higher in the cash treatment than in the lottery treatment, this difference is almost exclusively driven by differences in scoring on the CRT, i.e., only impulsive decision-makers seem to attach a higher value to the chance of winning a large prize.

The remainder of the paper is structured as follows. In section 2, we discuss how our paper contributes to the existing literature. In section 3, we introduce the experimental design and implementation, and we provide a more detailed discussion of the Cognitive Reflection Test. Section 4 contains our results, and section 5 concludes.

2 Contribution to the Literature

The present paper contributes to two strands of the literature. First, there is an empirical literature on the effects of cooling-off periods. For example, Lee (2013) studies compulsory cooling-off periods after divorce filings in South Korea and finds them to significantly decrease divorce rates. More closely related, Cramton, Gunderson, and Tracy (1999) investigate the effects of mandatory cooling-off periods in wage negotiations between unions and firms. In a Canadian sample, they find that cooling-off periods were associated with lower strike incidence and shorter strike durations, but these differences were not statistically significant (for similar findings, see Gunderson, Kervin, and Reid, 1989). We complement this literature by providing evidence on the effects of cooling-off periods under the controlled conditions of an experiment.

Second, we contribute to an emerging experimental literature on the effects of cooling off in negotiations. In particular, our paper is most closely related to work by Bosman, Sonnemans, and Zeelenberg (2001) (which precedes our work) and Grimm and Mengel (2011) (whose experiment was run after we conducted our study). Bosman, Sonnemans, and Zeelenberg (2001) consider an (unrestricted) ultimatum game where a proposer and a responder freely divide 20 Dutch guilders (approximately 9 euros). They compare a basic treatment and a cooling-off treatment where, after learning the offer, responders have to wait one hour before being able to decide. During this one-hour break, subjects participate in an unrelated individual decision-making experiment. In their study, cooling off leads to a drop in rejection rates, which, however, is not statistically significant. Grimm and Mengel (2011) also run an unrestricted ultimatum game (where proposers have to split a pie of 10 euros). Their experiment has the same basic structure as the experiment.

There is also (less closely related) experimental work on the effects of cooling-off periods in settings other than negotiations. For example, Cardella and Chiu (2012) show that a 10-minute cooling-off period has little effect on second-mover behavior in a Stackelberg duopoly game. See also Normann, Requate, and Waichman (2014).
in Bosman, Sonnemans, and Zeelenberg (2001), but Grimm and Mengel (2011) consider a somewhat shorter cooling-off period of approximately 10 minutes, after which responders are allowed to make a decision. In the 10-minute break, responders have to fill in a questionnaire. Grimm and Mengel (2011) find that acceptance rates of offers of 20% or less of the pie are significantly higher with cooling off than in a treatment without delay (60–80% versus 0–15%). Grimm and Mengel (2011) also conduct a third treatment where, similarly to our experiment, each responder makes some initial decision upon receiving the offer, which he may revise after the 10-minute delay. There, Grimm and Mengel (2011) find a final acceptance rate of low offers of about 20%, which closely corresponds to their treatment without delay and is lower than in their treatment with cooling off.

Our experiment differs from Bosman, Sonnemans, and Zeelenberg (2001) and Grimm and Mengel (2011) in various ways. First, in contrast to both of these studies (which study unrestricted ultimatum games), we conduct a mini-ultimatum game, which was chosen to facilitate collecting more data on the rejection rates for particular offers. In the unrestricted ultimatum game, the frequency of very unequal offers is relatively low, while offers close to the equal split are accepted with high frequency even without a cooling-off period. Both of these features make it difficult to identify (potentially differential) cooling-off effects at such offers. In our mini-ultimatum-game design, the only option of proposers who do not want to offer an equal split is to suggest:

\[ \frac{2}{5} \] (which above 30% of proposers in our experiment did).

Second, both of the above two papers consider relatively short cooling-off periods. Notions like “sleeping on it” suggest that emotional cooling off may become more effective over time. Hence, we study a 24-hour delay before subjects can make their final decision to see whether this is indeed the case.

Third, while in Grimm and Mengel’s (2011) third treatment responders also make an initial decision that can be revised after a cooling-off period to arrive at a final decision, Grimm and Mengel (2011) only report final rejection rates. By observing each responder’s initial decision and final decision, we are the first to document that some (albeit few) subjects switch from accepting to rejecting unequal offers, which

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5 In contrast to Bosman, Sonnemans, and Zeelenberg (2001), Grimm and Mengel (2011), and the present paper, Neo et al. (2013) focus on cooling off in an asymmetric ultimatum game, where a proposer and a responder bargain over 100 chips that are worth $0.30 to the proposer and $0.10 to the responder. In a delay treatment, responders have to wait 15 minutes prior to making their decisions. Similar to Grimm and Mengel (2011), they find that delay leads to fewer rejections.

6 A low number of observations might, in principle, be an issue in Bosman, Sonnemans, and Zeelenberg (2001), where in their cooling-off treatment the rejection rate of offers of 25% or less of the pie drops to 33% (from 43% without a cooling-off period). The fact that this difference is insignificant might be driven by the fact that few such offers are observed.

7 One might hypothesize that the effect of cooling off is larger for mildly unfair offers than for starkly unfair offers. To what degree this is indeed the case would be an interesting topic for future research.
may reduce the effectiveness of cooling-off periods in achieving more agreements in negotiations. Also, we find that both the initial rejection rate and the effects of the cooling-off period are affected, depending on whether the parties bargain under certainty or under uncertainty, which has not been studied before.

Finally, we go beyond Bosman, Sonnemans, and Zeelenberg (2001) and Grimm and Mengel (2011) by documenting that responders’ behavior in the negotiations correlates in interesting ways with their score in the Cognitive Reflection Test.

3 Experimental Design

In this section, we first discuss how we recruited subjects, how the experiment was implemented, and why conducting the experiment on the Internet is especially suited to address our research questions. We then introduce the Cognitive Reflection Test, and finally describe how we paid subjects.

3.1 Recruiting, Implementation, and Design Choices

In total, 1250 participants took part in our online, Web-based experiment. Subjects were recruited via email. Email addresses were obtained from the economic experimental laboratories in Bonn, Cologne, and Mannheim (excluding students who had already participated in bargaining experiments). All those contacted had indicated their interest in participating in economic experiments. Of the participants, 90% were university students, 25% studied economics or business, and 46% were female. The average age of participants was 24 years.

The timing of the experiment is illustrated in Figure 1. After logging in on our website and providing some personal background information, subjects played a one-shot mini-ultimatum game between a proposer and a responder, where the proposer could make one out of two possible offers to divide a cake of 10 lotto-euros (our experimental currency). The website was linked to the Laboratory for Experimental Research in Economics at the University of Bonn to demonstrate that the experiment had a proper scientific background and that the promised financial rewards were credible. Each subject played one of our treatments once (see the appendix for a translation of the instructions).

The proposer could either make the offer 5 : 5 (leaving both with the same number of lotto-euros) or the offer 8 : 2 (leaving the proposer (responder) with 8 (2) lotto-euros). After having read a description of the ultimatum game, each responder was told which offer the (randomly assigned, anonymous) proposer had made. Afterwards, the responder was asked to either reject or accept this offer (initial decision). Immediately after having made his choice, each responder was told that regardless of his decision, every responder would have the opportunity to change his decision. That is, responders learned of this possibility only after having made the initial decision. 24 hours (the cooling-off period) after his initial decision, every responder received an automatic email containing a link redirecting him to the
Figure 1
Timing of the Experiment

Proposer:
- Offer 5:5 or 8:2 split
- Questionnaire: CRT, emotions, & more

Responder:
- Initial decision: accept or reject
- Notice: final decision in 24 hours
- After 24 hours: email to ask for final decision
- Final decision: accept or reject

decision page. Only after this second (and final) decision was the proposer notified whether his offer had been accepted, and responders knew that the proposer would learn their final decision only. Proposers were unaware of the existence of a cooling-off period, as they were told only that they would be notified about the responder’s decision within the next couple of days.

The ultimatum game lends itself to studying the effects of a cooling-off period, because unequal offers generate negative emotions. Moreover, the ultimatum game is very easy to explain to subjects. Thus, there is little danger that any difference between the initial decision and the final decision is due to the fact that subjects understood the rules only after the cooling-off period. Conducting the experiment on the Internet allowed us to generate a high number of observations at reasonable cost. Also, a (pronounced) cooling-off period is easier to implement on the Internet than in the lab. While conducting the experiment over the Internet implies a certain loss of control relative to the laboratory, we had several measures in place to alleviate this problem. First, to prevent subjects from playing multiple times, each name–postal-code combination (winners were notified via ordinary mail) and each email address were only allowed to play once. Second, immediately after having entered their personal data, subjects received an email containing a link that allowed them to continue the experiment (see Figure 1). Thereby, we made sure that for each subject we had a valid email address, which was necessary to inform responders of the end of the cooling-off period.\(^8\) Finally, to reduce the possibility of different

\(^8\) Of the responders who initially accepted and who initially rejected the unequal offer, equally high fractions actually took the opportunity to return to the final decision screen after the cooling-off period (93.3\% and 93.0\%, respectively). That is, there was no differential attrition. If a responder did not actually take a final decision, we assumed that he meant to stay at his initial decision.
responders making each other aware of the cooling-off period prematurely, participants logging in on our website and having an IP address similar to the IP address of an earlier participant (who had played within the last 30 minutes) were assigned to be a proposer.

3.2 Cognitive Reflection Test

In the postexperimental questionnaire (see Figure 1), we administered Frederick’s (2005) Cognitive Reflection Test (CRT), which is a quick and simple personality test that consists of just three questions (see Table 1 below).

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct answer</th>
<th>Impulsive answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A bat and a ball cost 110 cents in total. The bat costs 100 cents more than the ball. How much does the ball cost?</td>
<td>5 (52.56%)</td>
<td>10 (43.34%)</td>
</tr>
<tr>
<td>If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?</td>
<td>5 (68.35%)</td>
<td>100 (23.29%)</td>
</tr>
<tr>
<td>In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?</td>
<td>47 (75.34%)</td>
<td>24 (15.02%)</td>
</tr>
</tbody>
</table>

Notes: The total number of observations is 1172. In parentheses, we report the relative frequency of the respective response in our data.

In particular, the CRT aims to differentiate between impulsive and reflective decision-makers, who might behave differently in negotiations. That is, the CRT does not aim to measure cognitive abilities per se, but rather “the ability or disposition to resist the response that first comes to mind” (Frederick, 2005, p. 35). To achieve this, each of the three questions of the CRT has a seemingly intuitive (but incorrect) answer that quickly springs to mind. To see this, consider the “bat-and-ball” question, which asks “A bat and a ball cost 110 cents in total. The bat costs 100 cents more than the ball. How much does the ball cost?” Subjects might be tempted to answer 10 cents, which, however, is not correct (and the same holds true for the impulsive answers 100 and 24 in the second and third questions, respectively).

At the same time, the CRT is, arguably, not a test of cognitive abilities per se: First, if a solution springs to mind, it is rather easy for subjects to verify whether
their response is indeed correct (for example, in the case of the impulsive answer to the first question, 10 cents plus 110 cents would yield a total price of 120 cents, which differs from the total of 110 cents stated in the question). Second, the correct solution is easily understood when explained to subjects. Finally, subjects rarely make mistakes other than to provide the impulsive response (either the correct or the impulsive answer is provided by 95.90%, 91.64%, and 90.36% of subjects in the first, second, and third questions, respectively).9

Overall, 1172 subjects completed the CRT, and 39.16% answered all three questions correctly. 30.20% of subjects answered two questions correctly, 18.34% answered one question correctly, and 12.29% answered none of the questions correctly.10

Frederick (2005) shows that the CRT score correlates strongly with subjects’ time preferences and risk preferences (and, in this respect, compares very favorably with substantially more complex personality tests). For example, reflective decision-makers seem to be significantly more patient. Oechssler, Roider, and Schmitz (2009) replicate Frederick’s (2005) results on time and risk preferences. They find that the CRT score also correlates strongly with a number of behavioral biases, such as base-rate neglect or conservatism. Hence, it is interesting to what degree a subject’s CRT score also affects behavior in negotiations (and the potential effects of cooling off).

3.3 Treatments and Payment

For the mini-ultimatum game, subjects were paid as follows. In the lottery treatment, at the end of the experiment we conducted a lottery with six prizes of 500 euros each. Lotto-euros of subjects were converted 1 : 1 into lottery tickets. Each lottery ticket had an equal chance of winning. Importantly, the expected value of a lottery ticket was fixed in advance and equal to one (actual) euro, and this was known to subjects. In particular, in the experimental instructions, subjects were informed that, in total, 3000 lottery tickets would be distributed. As subjects did not participate

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9 Frederick (2005, pp. 33ff.) discusses in greater detail to what degree the CRT might also measure cognitive ability in general. To this end, he compares subjects’ performance on the CRT with their performance on other personality tests (such as the Wonderlic Personnel Test (WPT), which aims to measure general cognitive ability, and the Need For Cognition (NFC) scale, which aims to measure subjects’ inclination to “think”) and with self-reported scores on the two most common college entrance examinations in the U.S. (the Scholastic Achievement Test (SAT) and the American College Test (ACT)), which aim to measure academic achievement. The correlations of these cognitive measures with subjects’ CRT scores vary between 0.46 and 0.22. That is, while the various tests indeed seem to measure different characteristics, general abilities (such as reading comprehension or mathematical skills) will very likely contribute to a higher CRT score (see also Campitelli and Gerrans, 2014).

10 Although the CRT was administered at the very end of the experiment (see Figure 1), we would not expect subjects’ performance in the ultimatum game to have a substantial effect on their performance on the CRT. In particular, it is not clear why such an effect would differ across treatments.
simultaneously, the Web-based experiment was programmed so that further subjects could participate if and only if tickets were remaining (for similar procedures, see Drehmann, Oechssler, and Roider, 2005, 2007). Winners were notified by mail, and their prize money was transferred electronically to their bank account. In the cash treatment, each lotto-euro was converted 1 : 1 into euros. Payoffs (in cash) were sent to subjects by mail.

After the ultimatum-game decisions were taken, subjects were asked to fill in the postexperimental questionnaire. In the cash treatment, they were told that 6 of the participating subjects would be drawn at random and paid according to the following rules: Each drawn subject would receive a lump-sum payment of 60 euros for filling in questions about their emotions. Furthermore, they would receive 5 euros for each correct answer on the CRT questions. There were also some more questions, which were used for a different experiment. In the lottery treatment, the questionnaire was unpaid. The results with respect to the CRT scores, however, do not differ between treatments. In both treatments, the average CRT score (i.e., the average number of correct questions) was 2.05, which places our subjects between subjects from MIT (2.18) and Princeton (1.63) in Frederick’s (2005) study.

4 Results

In a first step, we look at responder behavior in the initial decision. Recall that, in the lottery treatment, each lottery ticket has an expected value of one euro. Hence, if responders were to base their initial decision solely on expected values, rejection rates should not differ across treatments. However, one might suspect that how subjects are paid might affect their behavior. For example, Tversky and Kahneman (1992, p. 298) point out that “people often prefer a small probability of winning a large prize over the expected value of that prospect.” As a consequence, responders might be more reluctant to reject 8:2 offers in the lottery treatment than in the cash treatment. Table 2 reports the rejection rates for the initial decision (right after responders received the 8:2 offer) across our two treatments.

In the (standard) cash treatment, which has frequently been employed in the previous literature, the initial rejection rate is 42.55%, which is in line with earlier findings (see, e.g., Falk, Fehr, and Fischbacher, 2003). In the lottery treatment, Cappelen et al. (2013) experimentally study subjects’ fairness views on lotteries. They provide evidence that many subjects base their judgment solely on ex ante opportunities of the lottery rather than on ex post outcomes.

Such a preference might, for example, be driven by nonlinear probability weighting, where a decision-maker overweights small probabilities and underweights high probabilities (for a more detailed discussion of nonlinear probability weighting, see, e.g., Prelec, 1998). Such behavior might also emerge if the decision-maker were to obtain some utility from gambling (see, e.g., Conlisk, 1993).

In both treatments, the 5:5 offer was rejected by less than 2.5% of responders.

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13 In both treatments, the 5:5 offer was rejected by less than 2.5% of responders.
Table 2
Offers and Rejections

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Lottery</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offered</td>
<td>5 : 5</td>
<td>213</td>
</tr>
<tr>
<td>Split</td>
<td>8 : 2</td>
<td>112</td>
</tr>
<tr>
<td>Rejections of 5 : 5 offer initial decision</td>
<td>5</td>
<td>(2.35%)</td>
</tr>
<tr>
<td>Rejections of 8 : 2 offer initial decision</td>
<td>31</td>
<td>(27.68%)</td>
</tr>
<tr>
<td>Rejections final decision</td>
<td>2</td>
<td>(0.94%)</td>
</tr>
<tr>
<td>Rejections final decision</td>
<td>23</td>
<td>(20.54%)</td>
</tr>
</tbody>
</table>

Notes: Shown are the absolute numbers of offers and rejections in the lottery treatment (left column) and the cash treatment (right column), both for the initial decision (right after responders received the offer) and for the final decision (after a 24-hour cooling-off period). The percentages of offers and rejection frequencies are reported in parentheses.

however, initial rejection rates are significantly lower at 27.68\% (Fisher exact test, two-tailed, $P = 0.036$). This indicates that subjects found the (small) prospect of winning a large prize more acceptable than the (small) expected value of this gamble.

In a next step, we study the effects of the cooling-off period. Table 3 shows a cross-tabulation of responders’ decisions after receiving the 8 : 2 offer. In the cash treatment, out of the 40 responders who had rejected the 8 : 2 split initially, 9 accepted it after the 24-hour cooling-off period (which corresponds to 22.50\%). In the lottery treatment, 11 out of 31 responders who had rejected initially switched to acceptance after the cooling-off period (corresponding to 35.48\%). However, in both treatments there were also some subjects who switched from acceptance to rejection.

Table 3
Counts of Responders’ Decisions Following an 8 : 2 Offer

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Lottery</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial decision</td>
<td>Final decision</td>
<td>Initial decision</td>
</tr>
<tr>
<td>accept</td>
<td>78</td>
<td>48</td>
</tr>
<tr>
<td>reject</td>
<td>11</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: Cross-tabulation of absolute counts of responders’ decisions after receiving the 8 : 2 offer.
after the cooling-off period.\textsuperscript{14} As a consequence, the (net) effect of the cooling-off period on the rejection rates of the 8 : 2 offer is a minor drop from 42.55% to 39.36% in the cash treatment, but a drop by more than a quarter to 20.54% in the lottery treatment. In fact, in the lottery treatment, the hypothesis that responders are equally likely to accept unfair offers in both decision periods is (weakly) rejected by a two-tailed nonparametric McNemar change test ($P = 0.058$).\textsuperscript{15} To summarize, relative to the initial rejection rate in the (standard) cash treatment, by paying subjects through a lottery and by additionally allowing for cooling off, the rejection rate drops significantly, by more than half, from 42.55% to 20.54% (Fisher exact test, two-tailed, $P < 0.002$).

To learn more about why subjects decided the way they did, we asked subjects about their motivations in a free-format question of the postexperimental questionnaire. Interesting for our purposes are, in particular, the answers of those responders who changed their mind during the cooling-off period. In the lottery treatment, 9 out of the 11 responders who changed their mind from rejection to acceptance of the offer stated something like “two lottery tickets are better than none.” At the same time, the 8 : 2 offer seems to have aroused similar (negative) emotions in both the cash treatment and the lottery treatment. In the postexperimental questionnaire, we asked subjects to recall what they felt at the moment they made their final decision. On a 7-point scale, subjects had to rate their emotions for “anger,” “envy,” “surprise,” and “gratefulness.” As expected, responders who received the unfair offer felt significantly more anger, more envy, and less gratefulness than responders who received the 5 : 5 offer (pairwise Mann–Whitney $U$-tests, two-tailed, $P < 0.002$). They also felt significantly less surprise, which indicates that the majority of responders expected the unfair offer. However, the reported emotion levels do not differ significantly between the cash treatment and the lottery treatments. Hence, in the lottery treatment, subjects apparently were more tempted to contemplate accepting the proposal during the cooling-off period. This is exemplified by some of the answers to the above free-format question: “The initial rejection resulted from my desire to pay player A back. In the end, reason implied my change of mind.” “This time [i.e., at the final decision] I thought less about player A and he ripping me off, instead I thought of nothing but myself.”\textsuperscript{16}

As discussed above, in order to possibly identify distinct behavioral types that may drive the difference in behavior in our two treatments, we administered Frederick’s (2005) CRT. Splitting the sample of subjects into those that get two or three

\textsuperscript{14} Their potential motivations will be discussed below.

\textsuperscript{15} On the McNemar change test, see, e.g., Siegel and Castellan (1988).

\textsuperscript{16} Of the (few) responders who switched from acceptance to rejection, only one provided a reason for changing his mind, saying “First I thought that, most likely, everybody will propose 8 : 2 and that, in principle, I should not care if the other player gets more than I do. Later on, I realized that not getting the 2 euros does not hurt me much and that I prefer to see justice win ...”. Given the low number of responders who displayed this kind of reversal, such behavior might very well just be noise. Alternatively, it might suggest that for some responders a cooling-off period makes acceptance less likely (e.g., due to the longer time to reflect on the unfairness of the offer).
questions right in the CRT (reflective decision-makers) and those that get less than two questions right (impulsive decision-makers), we can observe an interesting phenomenon that may explain part of the difference between the standard cash treatment and the lottery treatment. Figure 2 below depicts mean rejection rates for the initial decision split according to CRT performance.

Figure 2
Average Rejection Rates of Responders when Receiving the 8 : 2 Offer in the Lottery Treatment (black bars) and the Cash Treatment (white bars) for Subjects with a CRT Score of 0 or 1 and a CRT Score of 2 or 3, Respectively

While reflective decision-makers show no difference in mean rejection rates between treatments, impulsive decision-makers have a lower rejection rate in the lottery treatment but a higher rejection rate in the cash treatment. To investigate this further, we estimate a linear probability model that investigates how the propensity to reject an 8 : 2 offer at the initial decision \( d_{\text{reject}} = 1 \) in case of a rejection, and 0 otherwise) is influenced by the treatment \( d_{\text{cash}} = 1 \) in the cash treatment, and 0 otherwise), the respective responder’s CRT score \( d_{\text{CRT} \geq 2} = 1 \) in case of a CRT score of 2 or 3, and 0 otherwise), and the interaction between the two:

\[
d_{\text{reject}} = f(\text{constant}, \ d_{\text{cash}}, \ d_{\text{CRT} \geq 2}, \ d_{\text{cash}} \cdot d_{\text{CRT} \geq 2})
\]

\[
\begin{array}{lcccc}
17.241^{**} & 30.378^{**} & 18.053^{*} & -30.672^{*} \\
(0.050) & (0.026) & (0.086) & (0.055)
\end{array}
\]

\[17\] If, as a robustness check, one splits the sample into those subjects that get all questions right and those subjects that make at least one mistake, qualitatively similar but statistically weaker results obtain. This is not surprising, given that a CRT score of 2 is already quite high, and, arguably, it might not be justified to classify those subjects as being impulsive. For example, in a sample of MIT students, Frederick (2005) finds an average CRT score of 2.18. Details are available upon request.

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where numbers in parentheses denote $p$-values, where $^*$ and $^*$ denote significance at the 5% and 10% level, respectively, and where $R^2 = 0.031$. For subjects with a high CRT score, there is no difference between the lottery and the cash treatment, as witnessed by the fact that the coefficients for $d_{\text{cash}}$ and the interaction term almost cancel each other perfectly. In contrast, for subjects with low CRT scores, there is a big difference in rejection rates between the cash and the lottery treatments (significant at the 5% level).\textsuperscript{18} It seems that impulsive decision-makers are particularly tempted by the chance of winning a large prize, while reflective responders seem to base their initial decision on the expected value of the gamble.

With respect to cooling off, it turns out that, if one considers subjects who initially rejected the 8 : 2 offer, then, pooled over both treatments, subjects who stick with their initial decision have an average CRT score of 2.12, while subjects who change their mind and accept at the final decision have a lower average CRT score of 1.79. That is, while this difference is not statistically significant (Mann–Whitney $U$-test, two-tailed, $P = 0.284$), it suggests that the effects of cooling off might be more pronounced for impulsive decision-makers.

Reflective and impulsive responders also differ in an instructive way in the time it takes them to form their initial decisions.\textsuperscript{19} While in both the lottery treatment and the cash treatment it takes reflective decision-makers almost exactly the same time to either accept or reject an (unfair) 8 : 2 offer (see panel B of Figure 3), the picture looks markedly different for impulsive decision-makers (see panel A of Figure 3).

In the lottery treatment, the median time it takes impulsive decision-makers to reject an 8 : 2 offer is 114 seconds, whereas in the cash treatment, it is only 56 seconds (Mann–Whitney $U$-test, two-tailed, $P = 0.072$). In contrast, accepting the (unfair) offer requires shorter median decision times in the lottery treatment. This seems to indicate that, for impulsive responders, in the lottery (cash) treatment the impulsive way to react is to accept (reject) the unequal offer, and it seems to take time to overcome this initial impulse.

Finally, we briefly discuss two issues related to the robustness of our results. First, in order to rule out a possible alternative explanation for lower rejection rates at the final decision, in the postexperimental questionnaire we asked responders whether they had talked about the experiment with third parties during the cooling-off period. This might be important because there is evidence that groups are more willing to accept unequal offers in the ultimatum game (see, e.g., Bornstein and Yaniv, 1998). However, only one of the responders who had changed his mind reported having talked to someone (and at the same time he stated that this had not influenced his decision). Second, despite the fact that subjects were recruited via official mailing lists of established experimental laboratories, one might wonder whether subjects

\textsuperscript{18} Similarly to Frederick (2005), we find that the CRT score differs significantly between men and women. However, the CRT score does not proxy for gender, as the above CRT effects emerge separately for both men and women. Also, repeating the above regression for the final decision yields qualitatively the same results.

\textsuperscript{19} For other studies on decision times in the context of the ultimatum game, see, e.g., Knoch et al. (2006) and Rubinstein (2007).
found our promise of later payment credible. This might be a concern because there is evidence indicating that rejection rates are higher for hypothetical payoffs than for real payoffs (see, e.g., Cameron, 1999). However, payment via a lottery is arguably less credible than payment in cash, which, contrary to what we find, would predict higher rejection rates in the lottery treatment. Hence, in a similar vein to the above, if credibility was an issue at all, it would lead us to underestimate the effect of the lottery treatment on the initial rejection rate.

5 Conclusion

In our experiment, we find that a 24-hour cooling-off period has only a weak effect on rejection rates in negotiations. We consider a setting where after some initial decision there is a cooling-off period, after which a final decision is made. As argued in the introduction, this within-subject design is empirically relevant, and it also has some methodological advantages. It allows us to control for unobserved heterogeneity and to obtain more power in statistical tests. In addition, the design allows for observation of whether a time delay only leads to reversals of decisions from reject to accept or also to reversals in the opposite direction, from accept to reject (which, to a certain degree, we indeed observe in the experiment). A potential drawback of the design is that subjects might be reluctant to change their initial decision.
decisions, due to cognitive dissonance. This would imply that our above results provide only a lower bound on the potential effects of a 24-hour cooling-off period, and that actual effects might be larger if no initial decision were made. It would be an interesting topic for future research to investigate this issue and to study in more detail how the effects of a time delay vary with the length of the cooling-off period.

We also find a relationship between subjects’ performance in the Cognitive Reflection Test and their behavior in our experiment. The difference in initial rejection rates between the cash treatment and the lottery treatment is almost exclusively driven by subjects scoring low in the CRT. This suggests that impulsive decision-makers attach a higher value to the chance of winning a large prize.

Appendix: Instructions

In the following we present an English translation of the German instructions. Each centered subheading represents a distinct page of our website or an email we sent to participants (see Figure 1 above). With respect to the postexperimental questionnaire we focus on questions posed to responders. The translation of the instructions below relates to the lottery treatment. Different formulations in the cash treatment are indicated in parentheses.

Introduction

Experiments on the Internet

With the help of experiments on the Internet the Universities of Bonn, Heidelberg, and Cologne want to verify various scientific theories. Further information about experimental economic research can be found here [hyperlink].

By participating in this experiment you support our scientific work. At the same time, you have the chance to earn some money within the experiment.

This experiment is about the division of 10 “lotto-euros” between two anonymous participants. The other participant with whom you play is randomly chosen.

We would be greatly pleased if you answered a few questions at the end of the experiment. Hence, in case you decide to participate, please play until the end of the experiment. The answers will take a few minutes only.

Upon conclusion of the experiment, your earned lotto-euros are exchanged for lottery tickets. Every lotto-euro is worth one ticket. In total, there will be 3000 tickets, and 6 participants will win 500 euros each. Every ticket has the same chance of winning. Thus, the more lotto-euros you have, the better is your chance of winning. Winners will be notified by regular mail.
(In the cash treatment, the above paragraph was replaced by the following text: Upon completion of the experiment, we will send each of the 600 participants the earned lotto-euros – exchanged one-to-one into actual euros – in cash by regular mail.)

Personal Data

Your Data

Welcome to our online experiment!

Please note that each player can participate in the experiment only once.

Before you start with the game, we would like to ask you for some personal data. The outcomes of the game will be analyzed in an anonymous way, clearly separated from your personal data. The address will be used only to notify the winners. The data regarding field of study, age, and gender will serve only the scientific analysis.

Important: Please make sure that you enter a valid e-mail address, because you will receive e-mail from us within the experiment. Of course, we will treat also your e-mail address confidentially.

You can find further information regarding data security in the data protection declaration [hyperlink].

Surname: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
First name: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
Street: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
Street number: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
Zip code: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
City: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
E-mail: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
Confirm e-mail: [ _ _ _ _ _ _ _ _ _ _ _ _ ]
Do you attend university? [ pulldown menu ]
Field of study: [ pulldown menu ]
If you attend university: for how many terms have you been studying? [ pulldown menu ]
If you have graduated already: are you a Ph.D. student? [ pulldown menu ]

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E-Mail Notice

How to Carry On

Thank you for entering your data.
Now you will receive an e-mail in which there will be a link to continue the experiment.
The e-mail should arrive in your in box right now.
Thank you very much for supporting our project!

Immediate E-Mail

Dear participant:
Once again, thank you very much for your participation!
Please click on the following link to continue with the experiment: [hyperlink]

Proposer: Decision Screen

The Experiment

This experiment is about the one-time division of 10 lotto-euros between you and another randomly chosen participant. Anonymity is guaranteed; this means that none of the participants will find out with whom he or she has played. Also, the decisions you make will be treated confidentially.

How many lotto-euros you and the other participant will earn depends on the decisions that both of you will make.

The two participants that have been assigned to each other are each allocated to one of two possible roles, respectively: the role of player A or the role of player B. Which participant is allocated to which role is again randomly chosen.

Player A proposes how the 10 lotto-euros should be split. Player A has two possibilities. He or she can make the offer “5 : 5” or the offer “8 : 2.”
The offer that player A has made will be transmitted to player B. Player B can either accept or reject the offer.

Assume that player A has made the offer 5:5. If player B accepts, each participant will receive 5 lotto-euros.

Assume that player A has made the offer 8:2. If player B accepts, player A will receive 8 lotto-euros and player B will receive 2 lotto-euros.

If player B rejects the offer, then both participants receive 0 lotto-euros.

These rules are known to both participants.

Your Decision

Your role is the one of player A.

Which offer do you make? [ 5 : 5 / 8 : 2 ]

Responder: Initial Decision Screen

The Experiment

This experiment is about the one-time division of 10 lotto-euros between you and another randomly chosen participant. Anonymity is guaranteed; this means that none of the participants will find out with whom he or she has played. Also, the decisions you make will be treated confidentially.

How many lotto-euros you and the other participant will earn depends on the decisions that both of you will make.

The two participants that have been assigned to each other are each allocated to one of two possible roles: the role of player A or the role of player B. Which participant is allocated to which role is again randomly chosen.

Player A proposes how the 10 lotto-euros should be split. Player A has two possibilities. He or she can make the offer “5:5” or the offer “8:2.”

The offer that player A has made will be transmitted to player B. Player B can either accept or reject the offer.

Assume that player A has made the offer 5:5. If player B accepts, each participant will receive 5 lotto-euros.

Assume that player A has made the offer 8:2. If player B accepts, player A will receive 8 lotto-euros and player B will receive 2 lotto-euros.
If player B rejects the offer, then both participants receive 0 lotto-euros. These rules are known to both participants.

**Your Decision**

Your role is the one of player B. Player A has made the offer 5 : 5. Do you accept the offer? [yes / no]

**Responder: Notice**

Thank you for your entry.

**How to Carry On**

Independent of the decision made, each player B gets the opportunity to change his or her decision. For this purpose, you will automatically receive an e-mail after 24 hours. The e-mail will contain a link with which you will be able to return to the decision page and to the postexperimental questionnaire. Only after that will the experiment end, and only then will we let player A know whether you have accepted or rejected his or her offer. Thank you very much for participating!

**Responder: E-Mail after 24 Hours**

Dear participant:

Once again, thank you very much for your participation!

Please make now your final decision with regard to player A’s offer. Please click on the following link to do so: [hyperlink]

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Cooling Off in Negotiations

Responder: Final Decision Screen

Your Final Decision

As you already know, you have the role of player B. If you want to have another look at the basic structure of the game, please click here [hyperlink].

Player A made the offer 5 : 5.

If you accept, you will receive 5 lotto-euros and player A will receive 5 lotto-euros. If you reject, both of you will receive 0 lotto-euros.

Do you accept the offer? [yes / no]

Responder: Postexperimental Questionnaire

Questions relating to the mini-ultimatum game:

- Did you expect a different offer from player A? [yes / no]
- Did you know this game before? [yes / no]
- Had you talked to somebody else about this game before you made your initial decision? [yes / no]
- If so, was your initial decision influenced by that; i.e., did it make a difference with regard to your initial decision? [yes / no]
- Did you talk to somebody else about this game after you made your initial decision? [yes / no]
- If so, was your final decision influenced by that; i.e., did it make a difference with regard to your final decision? [yes / no]
- Why did you change your decision, or why did you stick to your decision? [____________]

Questions relating to emotions experienced:

Please enter for each of the emotions that are listed below the extent to which you felt that emotion at the time of the final decision that you have just made.

To do so, please click each time on one of the seven boxes, where 1 = “emotion was not felt” and
emotion was felt very strongly.

emotional values: 1 2 3 4 5 6 7

envy
anger
joy
surprise
gratefulness

CRT questions:

- A bat and a ball together cost 110 cents. The bat costs 100 cents more than the ball. How much does the ball cost? [ _ _ _ _ _ cents ]

- If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? [ _ _ _ _ minutes ]

- In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? [ _ _ _ _ days ]

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