Social Ties and Preferences for Competition*

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Abstract

We conduct a laboratory experiment to examine the causal impact of social ties on the preference for competition. Participants are asked to decide whether to engage in a competition or not. Across four treatment groups, potential competitors vary based on their relationship with the decision-maker: whether they have a conversation with the decision-maker prior to the competition, if they are expected to chat after the competition, or both, or neither. We find that the process of chatting promotes social closeness. This increase in social closeness tends to reduce the preference for competition if participants are expected to meet again after the competition. However, it does not change the likelihood of opting for competition if there is no anticipated further interaction. Through this, we thus identify previously undiscovered potential implications of managerial practices that promote social tie formation, like team-building exercises and options for remote work.

Keywords: competition, social ties, closeness, experiment.

JEL: C91, C92, D71, J22, M51.

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1 Introduction

"At some point my friends became my competitors. I did not like it at all."
(Gerlinde Kaltenbrunner, Austrian mountaineer.)

Not willing to compete against friends, to the extent of dropping a promising career that involves such competitions, might be something very peculiar about Gerlinde Kaltenbrunner.[1] However, it might also well be that such discomfort is a more general pattern. Understanding how friendships or other forms of social ties influence the willingness to compete can be important in workplace settings, where social ties are a crucial determinant of the team atmosphere and company culture.

Workplace atmosphere and incentive structures are fundamental to modern organizations and are widely considered key drivers of organizational success (Dahlin et al., 2008; Graham et al., 2017; Alan et al., 2021; Erkut and Reuben, 2023). Even though the importance of both is widely documented, less is known about the interplay between social tie formation and competitive incentive structures. First, it is difficult to isolate determinants of workplace atmosphere, and second, the direction of causality between incentive structure and workplace atmosphere can be ambiguous (Guiso et al., 2015). Consider team managers and leaders who wish to improve company performance by fostering social ties among employees. In the company, effort is incentivized via a competitive end-of-the-year bonus to the best performing team member. To inform managers about well-suited approaches in this context, our paper offers a more detailed understanding of the connection between social ties and individual's willingness to compete. We provide causal evidence of how social ties affect the willingness to compete.[2]

To test whether and how social ties influence one's willingness to compete, we run a laboratory experiment that allows us to manipulate the strength and future expectation of social ties between individuals. In contrast to the prior field and laboratory work on the effects of social ties, we specifically design our experiment to disentangle two dimensions of social ties, following Granovetter (1973): knowing each other (reduced social distance) and expecting to encounter the other person again. Both of these channels play an important role in designing workplace policies.

We design our experiment over three main stages. In the first stage (Chat I), subjects engage in a chat. Afterwards, in the Competition stage, we measure the willingness to compete by offering

[1] Gerlinde Kaltenbrunner used to participate in competitive alpine skiing races during her teenage years. Although her ski racing career was promising, she stopped participating in competitions and focused on alpine climbing. In a 2020 interview, where the above quotation is taken from, she explained her switch of careers with the experienced discomfort of having to compete against her friends when being a ski racer. By now, Gerlinde Kaltenbrunner had climbed all fourteen eight-thousander mountains and was awarded the National Geographic Explorer of the Year 2012 award.

[2] The importance of social ties for understanding social decision-making has been widely recognized (Akerlof, 1997; Becker, 1974; Coleman, 1984). There is also substantial experimental literature on the importance of social ties for economic behavior, for example, related to cooperation (Apicella et al., 2012), coordination and conflict (Reuben and van Winden, 2008), trust and trustworthiness (Glaeser et al., 2000), and norm enforcement (Goette et al., 2012). Social ties have also been shown to matter in various contexts, such as regional growth (Burchardi and Hassan, 2013), neighborhoods, and professional relationships within and outside organizations (Sonnemans et al., 2006).

a choice between a competitive incentive scheme and an incentive scheme based on individual performance. Afterwards, subjects engage in another chat (Chat II). We vary the matching between the stages in two dimensions: 1) whether the Competition stage is played with the same group composition as the Chat I stage, and 2) whether the Competition stage is played with the same group composition as the Chat II stage. In total, this results in four different treatments: (i) a setting where subjects choose whether to compete against unknown subjects that they will also not meet again (*No-Ties*); (ii) a setting where subjects choose whether to compete against individuals they previously met in the Chat I stage of the experiment, but will not encounter again in the Chat II stage (*Weak-Ties*); (iii) a setting in which subjects choose whether to compete against unknown subjects, they will interact with afterwards (*Future-Ties*); (iv) a setting in which subjects choose whether to compete against subjects they previously met and will encounter again in the subsequent chat (*Strong-Ties*).

We find that, compared to anonymous strangers, subjects with high closeness who expect to encounter each other again reduce their willingness to compete. When investigating the mechanisms of this effect, we find that neither meeting after the competition (*Future-Ties*) nor reduced social distance (*Weak-Ties*) separately explain the observed effect. Instead, we find that reduced social distance only reduces individuals' willingness to compete against each other if subjects expect to meet each other again after the competition. Thus, our findings support the hypothesis of the importance of maintaining social ties in explaining the willingness to compete.

We further investigate whether social ties are an accelerating (or mitigating) factor for the well-documented gender difference in preferences for competition (Niederle and Vesterlund, 2007). Several studies from the social cognition literature provide potential grounds for a gender difference in the effect of social ties (Hall et al., 2016; Thomas and Fletcher, 2003; Schulte-Rüther et al., 2008; Costa et al., 2001; Chapman et al., 2007; Weisberg et al., 2011; Friebel et al., 2021). While our findings in the treatments without previous interaction show a significantly higher willingness to compete for men, which is consistent with the seminal study of Niederle and Vesterlund (2007) and many subsequent studies, we do not find any significant gender differences in the treatments where subjects interacted before choosing the incentive scheme (*Weak-Ties* or *Strong-Ties*).

We broaden the existing literature in various subfields. First, we contribute to the extensive literature investigating the effects of workplace atmosphere on organizational success. A positive workplace atmosphere is mainly associated with benefits for workers and organizational success (Boyce et al., 2015; Martinez et al., 2015; Gartenberg et al., 2019; Guiso et al., 2015). Less is known about the underlying mechanisms and how the atmosphere interacts with intra-organizational formal institutions (Graham et al., 2017; Erkut and Reuben, 2023). First, because of the difficulty to isolate the factors that determine workplace atmosphere, and second, because of reverse causality concerns. It is well established that social ties among co-workers are a fundamental part of the workplace atmosphere. We contribute to understanding how social ties interact with competitive incentive structures by providing causal evidence of the effect of social ties on the willingness to compete against each other. Since competitive incentive structures are common elements of or-

ganizations, understanding how social ties and preferences for competition interact is crucial for designing efficient workplace policies (Graham et al., 2017).

Second, we contribute to the literature on the importance of social ties for understanding social decision-making beyond the intra-organizational context. Social ties can be important drivers of economic behavior (Reuben and van Winden, 2008; Abbink et al., 2006). An extensive literature provides evidence that social ties matter in various contexts such as resource sharing, collective action, fair business dealings, and venture building (Akerlof, 1982, 1983; Becker, 1974; Granovetter, 1985; Coleman, 1984; Uzzi, 1999; Roberts and Sterling, 2012). In addition, studies using lab and field experiments have analyzed the role of social ties for economic behavior such as cooperation, coordination, or conflict and norm enforcement (Apicella et al., 2012; Goette et al., 2012; Harrison et al., 2011; Reuben and van Winden, 2008). We extend this literature by investigating the role of social ties in shaping willingness to compete.

There is limited evidence on this intersection to date. In an early adolescent sample, Schneider et al. (2005) find descriptive evidence for a negative relationship between friendship and competition. They show that boys exhibit stronger preferences for competition against their peers than girls. Meanwhile, the focus of adult studies in the context of friendships and competition has often been on the competition for romantic partners in particular (Hibbard and Walton, 2016, for a review).

Studies within the behavioral economics literature closest to ours are Munoz-Herrera and Reuben (2023), Cornaglia et al. (2019), and Mill and Morgan (2022). Munoz-Herrera and Reuben (2023) study the choice of a partner in a trust game after different forms of communication and differently competitive environments. They find that a more personal relationship (formed in a free form chat) leads to inefficiencies in competitive environments. The strong bonds that subjects form in their experiment lead to sustaining inefficient trading-partners, undermining the potential efficiency gains of competition. Cornaglia et al. (2019) examines the effect of group identity on individual behavior, examining the effect of group membership on competition preferences. They find that group membership stimulates pro-social attitudes towards other group members, in line with a large literature (Chapman et al., 2007; Chen and Li, 2009). They also find that group membership amplifies competitive behavior within the group without affecting preferences for competition against out-group members. In contrast to this paper we abstract from group membership and focus on the effect of social ties for willingness to compete. The treatment in Cornaglia et al. (2019) includes three elements: manipulation of group identity, interaction in a chat, and cooperation on a joint task. We focus exclusively on the chat and vary whether the groups come together again after the competition, addressing the underlying mechanisms in more detail. Mill and Morgan (2022) investigates auction bidding behavior in the lab between subjects describing themselves as either Republican or Democrat in the context of the US political system. They find more aggressive bidding behavior against out-group members compared to in-group members. In contrast to Mill and Morgan (2022), we focus on the willingness to compete instead of competitive behavior in auction bidding. Furthermore, our paper explicitly focuses on the effect of social ties by also measuring the

closeness between subjects. Our findings complement all three of these studies by highlighting the extensive margin effects of social ties on competitiveness. In contrast to the existing studies, we provide causal evidence for the underlying mechanisms of social ties by highlighting the crucial role of future interactions.

Third, we contribute to the extensive literature on preferences for competition. Personality traits or non-cognitive skills have often been shown to be stable predictors of education and labor market outcomes. Among those traits, competitiveness has received considerable attention following the seminal studies by Gneezy et al. (2003) and Niederle and Vesterlund (2007). Several studies have shown a positive correlation between measures of competitiveness and labor market performance (Buser et al., 2014; Niederle, 2017), while other still-growing literature investigates the drivers of competitiveness. Numerous lab and field studies have discussed the role of demographic factors (e.g., gender[3]) as well as socio-economic factors and socio-environmental factors (Gneezy et al., 2009; Cornaglia et al., 2019; Booth et al., 2019). We contribute to this literature by exploring the relationship between social ties and willingness to compete. Most experimental lab studies on the determinants of willingness to compete take place between anonymous agents. However, several studies following Bohnet and Frey (1999) have demonstrated the importance of relaxing this assumption for studying social-decision making. We identify closeness and social ties as causal drivers of individual's willingness to compete.

Our results have important implications for managers who seek to design efficient work processes. Consider a manager who is concerned that competitive reward structures result in unproductive competition between co-workers instead of collaborative work in the interests of the company's success. Our results demonstrate potential positive returns on investment in tie-forming activities such as team-building events, on-premise work schemes and other office policies (Yang et al., 2022). Now consider another manager who rather cares whether her employees will participate in a promotion tournament for a leading role. She is interested in maximizing participation in the tournament. Our results suggest that social ties among employees may have an undesirable effect for the manager. By designing office policies and organizing team-building events, she can affect social tie formation among co-workers and, in turn, the willingness of her workers to compete against each other. By making sure there is no interaction between the potential contestants after the competition, she can avoid reduced willingness to compete. Benson et al. (2019) provide suggestive evidence in line with our results. They examine data from 131 U.S.-based firms with over 38 thousand sales workers, of whom more than one thousand were promoted to managerial roles. They argue that "promotions can be considered a tournament" (p. 2103) and observe that the promoted sales workers in the data tend to get rotated away to manage a different team than the one they were in before the promotion (this fits 76% of the examined promotions). Thus, companies strategically use cross-department promotion schemes to avoid potentially harmful co-worker encounters.

This paper proceeds as follows. In section 2, we outline our experimental design. In section

[3]For an overview of gender differences in willingness to compete and potential mitigating factors, see Niederle (2017).

3, we present our main results. Section 4 provides additional results and robustness checks. We conclude and discuss the implications of our results for designing workplace policies in section 5.

2 Experimental Design and Procedure

Studying the causal impact of existing and future social ties is challenging with real-world data for at least two reasons. First, whether interactions between individuals in the real world take place or not is usually not randomly assigned but endogenous. Second, whether interactions persist or are broken up is also selective in real-world interactions. Examining the causal impact of the effect of such forms of social ties on any outcome is, therefore, almost impossible without exogenous manipulation. A highly controlled environment like an (online-)experiment where we, as the experimenters, randomly allocate participants in different treatments can solve many of these endogeneity concerns. As previously shown, laboratory experiments are also a reasonable approach to measure our outcome variable: the willingness to enter a competition (see e.g. Gneezy et al., 2003; Niederle and Vesterlund, 2007). In the following, we lay out the details of the experimental protocol.

Timeline. The experiment consists of one round with multiple stages. The timeline of the experiment looks as follows.

Stage 0 Subjects declare their gender and receive a randomly chosen nickname.

Chat I Subjects chat in groups of three. Before and after Chat I, subjects declare the closeness to each of the two other Chat I group members on the IOS scale.

Matching Subjects learn about the group composition in the subsequent stages and the nicknames of the other subjects in Task stage and Chat II stage. This stage determines the differences between treatments.

Task Subjects choose whether to play a letter grid task individually against the clock or against up to two competitors. Afterward, each subject plays the letter grid game according to her choice.

Chat II Subjects chat in groups of three. Before and after Chat II, subjects declare the closeness to each of the two other Chat II group members on the IOS scale.

Covariates Subjects perform a risk task, answer CRT questions, guess the performance of others in the CRT questions, and fill out a non-incentivized post-experimental questionnaire.

At the beginning of the experiment, before reading the instructions, subjects state their gender.[4] Afterwards, a nickname is randomly allocated to each subject. This nickname guarantees that anonymity is preserved, but individuals are still recognizable to each other within the experiment. This nickname consists of the prefix *Mr.* or *Ms.* and the name of an animal.[5] Subjects in

[4] We only invited individuals who stated to be either male or female in our database. Therefore, we only allowed the choice between male and female.

[5] The name of the animal is randomly chosen from the list of 60 *Anonymous Animals* of Google Docs. It is ensured that each name is unique within a matching group. The gender of the subjects determines the prefix.

the experiment learn their nickname and the nicknames of the two other subjects they chat with during Chat I stage. After showing only the nicknames of the two other chat partners in Chat I, we elicit subjects' closeness to each of the other two group members using the Inclusion of Others in the Self scale (IOS).[6] On this scale, subjects indicate how close they feel towards each of the two other subjects on a 7-point scale represented by overlapping circles. In Chat I, subjects chat within groups of three for 10 minutes. There are no restrictions on what people can write, except that subjects are not allowed to reveal their real-world identities. Thirty seconds into the chat, a topic to discuss is proposed. After three and six minutes, another topic is proposed. The topics to discuss that appear on the screen are taken from Aron et al. (1997) and are part of the validated method to increase interpersonal closeness.[7] After 10 minutes, the chat closes automatically, and subjects are again asked to fill out the IOS scale measuring the closeness to each of the other two subjects of Chat I.

In the Matching stage, the treatment variation takes place. Subjects learn the instructions for the subsequent stages. In particular, they learn the nicknames of the other two group members in the Task stage and Chat II stage. Depending on the treatment, these are familiar or unknown group members. Further, they learn that they can choose whether to play the task competitively or individually alongside the resulting payoff rule of each option.

The Task stage elicits the main outcome variable: subjects choose whether to play the stage competitively or individually. On the choice screen, subjects learn the payoff rules of playing individually and in competition. Playing the task individually leads to the following payoff:

$$\Pi_{Individual}(s_i) = 3€ + 10€ - (0.05€ \times s_i)$$

where s_i determines the number of seconds the individual needs to solve the task. If one does not solve it before, after 200 seconds, the task ends. Not solving it, therefore, leads to a payoff of 3€ in this stage. In case one chooses competition, the payoff is calculated as

$$\Pi_{Competition}(s_i, s_{-i}) = \begin{cases} 3€ + n \times (10€ - (0.05€ \times s_i)) & if \quad s_i < s_{-i} \\ 3€ & if \quad s_i > s_{-i} \end{cases}$$

where s_i determines the number of seconds the individual needs to solve the task and s_{-i} the number of seconds the fastest other subject who chose competition needs to solve the task. n depicts the number of players who chose competition within one group of three.[8] The Task stage ends for a subject when the task is solved or after 200 seconds. The task does not end for each group member if one competitor has already solved it. For that reason, we also obtain data on the performance of the losing subject and ensure that no information about the competitors' performance can be inferred while solving the task. In our design, subjects cannot force others into the competition,

[6] The IOS scale originates from the psychology literature (Aron et al., 1992) and has been validated by economists for the closeness of individuals and groups (Gächter et al., 2015, 2021).

[7] In Chat I, the topics are: *1) If you could choose among all the people in the world, who would you like to invite for dinner?, 2) What would you like to ask an omniscient crystal ball?, 3) How would you continue the following sentence: 'I wish I had someone with whom I ...'.*

[8] The options are neutrally labeled as option A and option B. The options' labels and order of appearance are randomized on the matching group level.

as each participant can choose to play individually instead. When choosing competition, subjects indicate being willing to compete against those players in the group who also chose competition. Further, by choosing to compete, subjects also increase the size of the prize accordingly, such that the others' expected payoffs remain the same when choosing competition or individual incentives.

This design limits the externalities individuals impose on others when choosing competition. Although many real-world examples might also include externalities, the resulting effect represents a lower bound on the overall effect. From the social preference literature, it is natural to assume that social ties matter for the willingness to impose a burden on other individuals. By excluding these kinds of externalities by design, we can focus on the true change in willingness to compete more cleanly.
On the decision screen, subjects can also click on an example and see a letter grid task similar to the one in the Task stage. Further, subjects are reminded again with whom they are matched in the Task and Chat II stages. On the next screen, after choosing the payment scheme, subjects are asked to indicate their belief about the likelihood that the potential competitors choose to compete. Each subject chooses an answer on a six-point Likert scale from very unlikely to very likely for each of the two potential competitors (unincentivized).

While a timer runs down until the start of the letter grid task, subjects are either reminded that they play individually or informed about the nicknames of the other subjects in their three-person group who also chose competition. Afterward, the task starts: a letter grid with 10x10 letters is shown. Three German words are hidden and have to be found. We created four different letter grids, and it is randomized on the session level what letter grid is played. Subjects who chose to play individually are informed about their payoff afterward. Subjects who chose the competition are informed about their payoff and the nickname of who won/lost the competition.

The IOS scale is again repeated in the Chat II stage. Each subject is now asked to state the level of interpersonal closeness towards the two subjects they will be matched with in Chat II. Chat II lasts 10 minutes, and three new suggested topics are shown after 30 seconds, three minutes, and six minutes respectively.[9] After Chat II, subjects are again asked to fill out the IOS questions towards the other players in Chat II.

To elicit risk preferences, subjects then play the *bomb task* (Crosetto and Filippin, 2013) in the Covariates stage, where 25 boxes are shown, and subjects must tag boxes. One box contains the *bomb*, and selecting this bomb leads to zero payoffs in this task. If the *bomb* box is not selected, subjects receive 20 Eurocents for every box selected. Feedback for the bomb task is provided immediately afterward. Subsequently, subjects individually answer seven questions related to cognitive ability. The questions are based on the cognitive reflection task of Toplak et al. (2014). As we ran the experiment online, we changed the wording of the questions slightly to reduce the possibility of finding the answers through online search engines. Each correctly answered question leads to a payoff of 50 Eurocent. Afterward, subjects are incentivized to correctly guess how many questions

[9] The three questions in Chat II are *1) What corresponds to a perfect day in your opinion?, 2) Is there something you dreamt about for a long time? Why didn't you put it into practice?, 3) Provide truthful 'we' statements. e.g. 'We in this chat feel ...'.* These questions are again modified versions of the questions in Aron et al. (1997).

		Chat before Task stage	
		No	Yes
Chat after	No	**No-Ties**	**Weak-Ties**
Task stage	Yes	**Future-Ties**	**Strong-Ties**

Table 1: Treatment overview

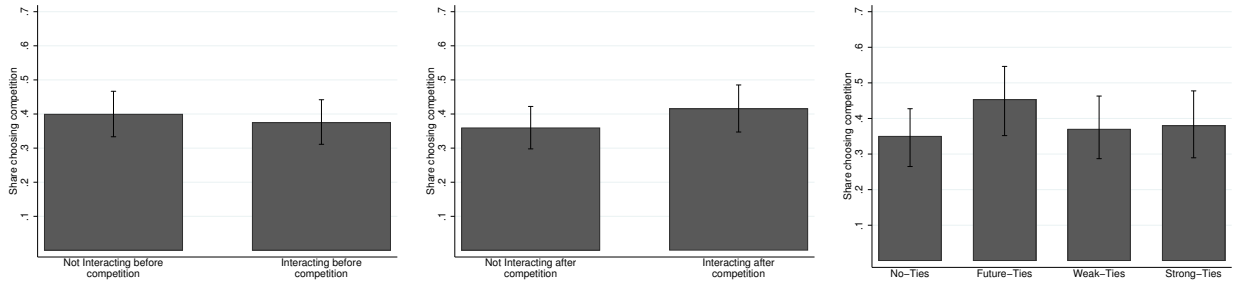
they answered correctly (receive 1 Euro in case of a correct guess), and subjects have to guess the rounded-up average of the number of correct questions of every other subject in the same session (subjects earn 1 Euro in case of a correct answer). At the end of the experiment, subjects see an overall feedback of their earnings.

After the feedback screen, subjects are asked to answer a non-incentivized post-experimental questionnaire, including socio-economic questions, a short Big 5 questionnaire (Gosling et al., 2003), and open questions about the behavior in the experiment. Details on instructions and Decision-Screens can be found in Appendix B.

Treatments. The treatments differ in the matching between Chat I, the Task stage that is either played individually or in competition, and Chat II. The two dimensions of the 2x2 factorial design are whether the groups of three are 1) identical in Chat I and the Task and 2) identical in the Task and Chat II. The *Strong-Ties* treatment has the same three group members in all stages. The *No-Ties* treatment has different group members in the Chat I, the Task and the Chat II stages. The other two interim treatments, *Weak-Ties* [*Future-Ties*] have the same group composition in Chat I and the Task [the Task and Chat II]. Table 1 provides a treatment overview. Treatments are varied between sessions.

Procedure. The experimental sessions were run between March and September 2021. Due to the Covid-19 pandemic, the laboratory was closed, and the sessions were run online with zTree unleashed (Fischbacher, 2007; Duch et al., 2020). Fluently German-speaking subjects were recruited from the standard student subject pool of the University of Konstanz via hroot (Bock et al., 2014). In total, 446 Subjects participated (63.45 % female, 36.55 % male) in 25 sessions with usually 18 subjects per session.[10] The experiment lasted on average 60 minutes, including the online welcoming introduction and the post-experimental questionnaire. Subjects earned on average 13.82 Euros (sd = 5.38), including a show-up fee of 3.00 Euros. Participants entered their IBAN at the end of the experiment and received their earnings via bank transfer within the following days after the session. To guarantee anonymity, the IBAN and the name needed for the payment were never stored in the same place as the experimental data. Matching groups were randomly formed with nine subjects in the treatments *No-Ties*, *Future-Ties*, and *Weak-Ties*. The *Strong-Ties* treatment had a matching group size of three.

[10] *No-Ties* is the treatment with the lowest share of male subjects (33.3 %), and *Strong-Ties* the treatment with the highest share of males (40.7 %).



(a) Interacting prior to competition (b) Interacting after competition (c) All treatments

Figure 1: Share of competition choices in the different treatments.

Notes: Interacting before competition combines treatments *Weak-Ties* and *Strong-Ties*, interacting after competition combines treatments *Future-Ties* and *Strong-Ties*. Whiskers represent 95% confidence intervals based on bootstrapped standard-errors (10000 repetitions with clustering at the matching-group level).

3 Results

In the following, we present the results of the experiment. This section focuses on the main outcome variable: the choice to play the task in competition as opposed to individually. After giving a brief overview of the competition rates in all treatments, subsection 3.1 explores the relevance of closeness within the group of players in more detail for each treatment. Subsequently, to get a deeper understanding of the relevance of the strength of ties, subsection 3.2 presents the difference between strong and weak ties. Further results on the social tie formation, task performance, and gender differences are presented in section 4. Robustness checks for the results presented in this section are subsumed in subsection 4.5. If not otherwise reported, all standard errors reported or depicted in this section are clustered at the matching group level.

We first demonstrate why closeness measures are an integral part of the analysis. Figure 1 plots the share of subjects choosing to compete in the different treatments, without taking into account the heterogeneity in interpersonal closeness. Panel 1a reveals the overall effect of interacting before the task. On average, 37.5% of the subjects who had to choose whether or not to compete against the participants they interacted with in Chat I chose to play the task in competition. Among those who had to choose whether to compete against participants they had not interacted with before, 40% of the participants chose to do so. This difference, however, is not significant. Similarly, comparing the shares of subjects choosing competition between those who meet again after competition and those who do not also does not turn out to be significant. As panel 1b shows, 36% of the subjects who did not interact with the potential competitors prior to the task choose competition, and 41.6% of those who do interact with the potential competitors prior to the task choose competition. Figure 1c splits the data in more detail and reports the share of subjects choosing competition in each of the four treatments. Subjects interact before the task with the potential competitors in treatments *Weak-Ties* and *Strong-Ties*, and after the task in treatments *Future-Ties* and *Strong-Ties*. Over all the treatments, the share of subjects choosing competition is between 35% and 46%. When conducting a t-test clustered at the matching group level, none of the pairwise comparisons of the treatments show significant differences at the 5% level. We can, therefore, not

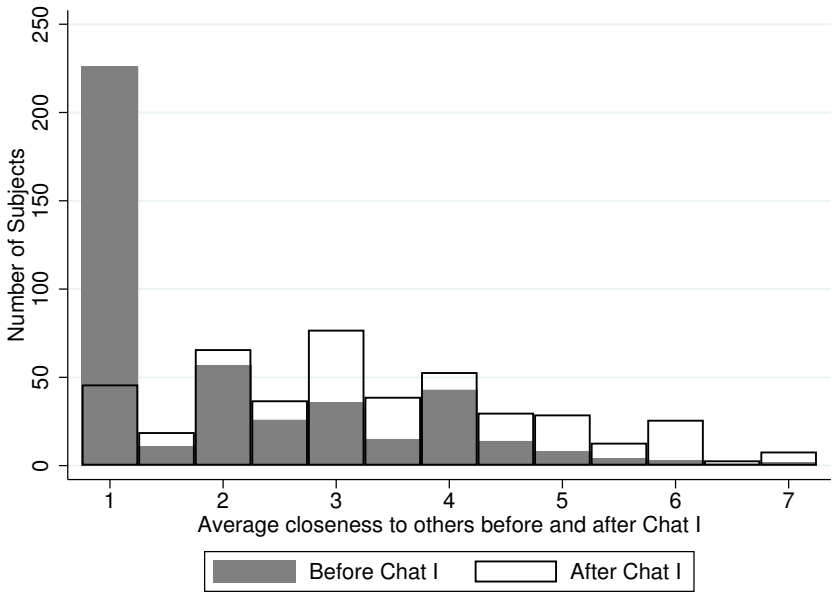


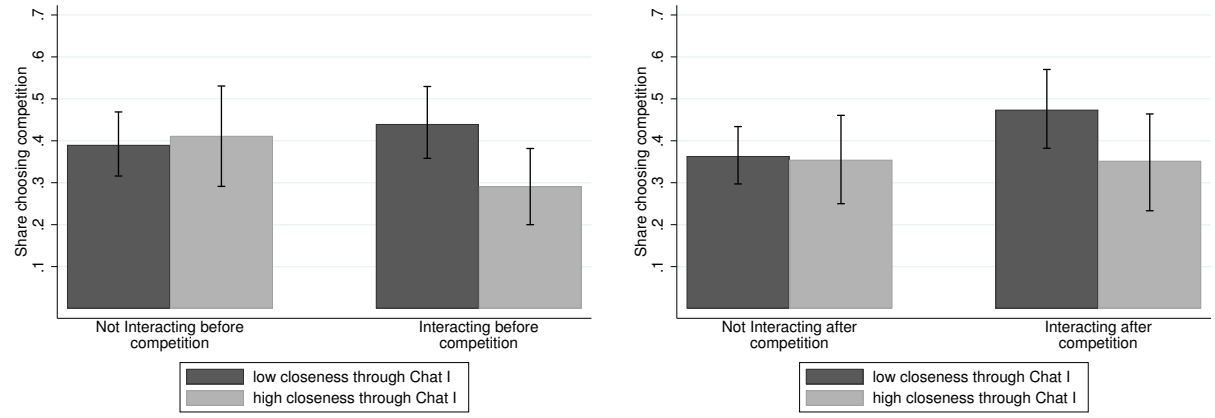
Figure 2: Distribution of closeness to other two players right before and right after Chat I, measured using the seven-point IOS scale, with 1 as lowest and 7 as highest.

reject the null hypothesis that there are no overall differences in the competition choices between the different treatments. One clear reason for this could be that the different treatments did not directly translate into differences in social closeness for all subjects in the same way. It is thus important to take into account the heterogeneity in interpersonal closeness when making treatment comparisons.

3.1 The effect of interpersonal closeness

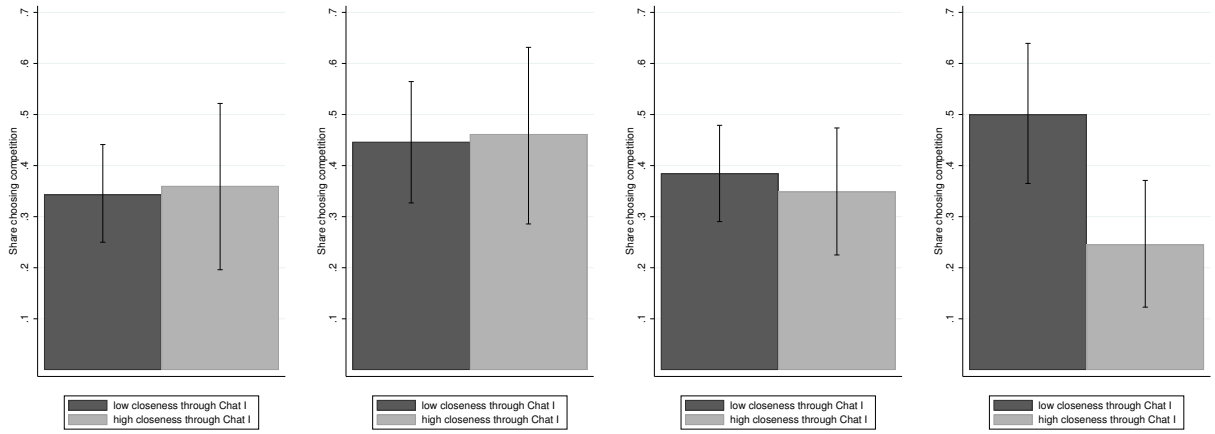
By allowing subjects to chat, we allow for the possibility of increasing the subjective closeness between the participants. According to Kranton and Sanders (2017) who uses an in-group out-group design, there is large heterogeneity between subjects with respect to identification towards the in-group. While some individuals seem to react strongly to the treatment, others do not treat in- or out-group differently. For that reason, and because some are more active or meaningful than others, we use the answers subjects gave on the IOS scale to differentiate between a high and low level of closeness towards the other two subjects in the chat.

We now show that the treatment worked well to increase interpersonal closeness. Figure 2 shows the distribution of answers on the 7-point IOS scale directly before and right after Chat I. The distributions show that before Chat I, most subjects pick the lowest possible closeness (coded as 1 in the data and the figure) to both other participants in the group of three (leading to an average answer of 1). After Chat I, however, only a minority of participants selects the lowest point on the scale. On average, Chat I increased the answer subjects gave on the IOS scale by 1.22 points on the 7-point scale (this increase is highly significant; for details and covariates of the increase in closeness, see section 4.1). Using the difference between the average indication on the IOS scale



(a) Interacting prior to competition

(b) Interacting after competition



(c) Treatment No-Ties (d) Treatment Future-Ties (e) Treatment Weak-Ties (f) Treatment Strong-Ties

Figure 3: Effect of closeness difference via Chat I on the willingness to compete.

Notes: Low closeness is defined as a difference in average closeness ≤ 1, high closeness as a difference in average closeness > 1 (below and above average). Whiskers represent 95% confidence intervals based on bootstrapped standard-errors (10000 repetitions with clustering at the matching-group level).

right after Chat I and the average indication on the IOS scale right before Chat I allows interpreting our results based on how much Chat I increased the closeness towards the other group members. Using the difference of tie formation through Chat I also cancels out interpersonal differences on how individuals might interpret the scale for the given baseline of not knowing the other subjects at the beginning of the experiment. Therefore, for this subsection, we split the data into two groups. Using a median split (equals a mean split in our data) to create a binary variable for increasing the closeness through Chat I strongly or not.[11]

Like Figure 1, also Figure 3 plots the share of subjects choosing competition in the different treatments, but now split by above- and below-average increase of closeness through Chat I. Panel 3a reveals that there is no relevant difference in choices to compete between subjects who formed

[11]This median split also allows representing the findings in the figures in a straightforward way. As outlined in section 4.5, all our main findings hold when using a continuous measure of the increase in closeness instead. Section 4.5 further shows that the findings are insensitive to different definitions of increased closeness.

below- and above-average closeness through Chat I to other participants they could not choose to compete against. Among those who have to choose whether to compete against the participants they interacted with in the previous Chat I, however, one can see a difference between those who increased their closeness above average and those who did not. A similar picture arises when looking at the subjects who will reencounter the potential competitors after the competition (Figure 3b). The figure shows no relevant differences in shares of subjects choosing competition between those who increased their closeness above average and those who did not, in case the participants do not have to reencounter the potential competitors in Chat II after the task. However, for those who interact again after the competition, the closeness through Chat I seems to matter for the willingness to compete. Table A.1 in the Appendix reports the regression results on the differences between high and low closeness difference through Chat I on the willingness to compete. The regressions show that among the four comparisons from Figures 3a and 3b, the increase in closeness to the other players in the Chat I group significantly correlates with the willingness to compete only for those who interact before the competition.

To look in more detail at these findings, panels 3c to 3f plot the effect of closeness on willingness to compete for each of the four treatments. The Figures reveal that the difference between high and low closeness increase through Chat I is largest in the *Strong-Ties* treatment. The regressions reported in Table 2 confirm this. As various research has shown a connection between willingness to compete and gender, and the treatments are not perfectly counterbalanced on gender, we also include a gender dummy to the regressions reported in Table 2 (for more details on the role of gender in our setting, see subsection 4.3). To control for potential differences in the initially indicated level of closeness before Chat I, columns (2), (4), (6) and (8) include it as a control. Columns (1), (2), (5) and (6) show that the difference between above- and below-average increase in closeness through Chat I in the *No-Ties* and *Future-Ties* treatments is insignificant and close to zero. This is reassuring, as there is no reason to expect a direct effect in these two treatments: the increase in closeness is measured to the two participants in Chat I, but the potential competitors in the task are other participants that the subjects did not interact with before.
In general, one could still argue for a correlation between our measure of the increase in closeness on the willingness to compete in these treatments. One could imagine, for example, that subjects who increase their closeness to each other via a 10-minute chat are, in general, more or less willing to compete. As the coefficient of closeness is close to zero and insignificant, this does not seem to be of concern. Panel 3d and columns (3) and (4) in Table 2 show the effect of closeness on the willingness to compete in the *Weak-Ties* treatment. In this treatment, groups in Chat I and the task stage remain unchanged; subjects are matched to new participants only after the task in Chat II. Here, one could expect that increased closeness towards the other participants through Chat I influences the willingness to compete against these participants. The figure (and the regression), however, shows this does not seem to be true. The share choosing competition of subjects who increased closeness via Chat I (38.5%) is almost equal and not significantly different from those who did not increase their closeness above average via Chat I (34.9%). The only difference between the *Weak-Ties* and the *Strong-Ties* treatment at the moment of competition choice is the knowledge that one will meet the same participants of the Chat I stage and the task stage again in Chat II

(*Strong-Ties*) or not (*Weak-Ties*). Figure 3f and columns (7) and (8) in table 2 reveal that the increase of closeness in Chat I correlates strongly and significantly with the willingness to compete against the other participants of Chat I, the task stage and, Chat II. While 50% of those who did not strongly increase their closeness via Chat I chose competition in the *Strong-Ties* treatment, only 24.5% of those who increased their closeness via Chat I strongly did so. This finding shows that subjects who feel close to other participants, and know that they will interact with those participants again later, are less willing to enter a competition against them than subjects who do not feel very close to the other participants.

Table 2: Choosing competition over the four treatments

	No-Ties		Weak-Ties		Future-Ties		Strong-Ties	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High diff. closeness	0.017	0.024	-0.036	-0.021	0.015	0.041	-0.255***	-0.238**
	(0.108)	(0.113)	(0.062)	(0.068)	(0.117)	(0.122)	(0.094)	(0.094)
Closeness before		0.011		0.020		0.045		0.025
Chat I		(0.048)		(0.036)		(0.040)		(0.030)
Male		0.125		0.024		0.117		0.025
		(0.094)		(0.085)		(0.105)		(0.083)
Constant	0.343***	0.276**	0.385***	0.328**	0.446***	0.298**	0.500***	0.434***
	(0.050)	(0.125)	(0.051)	(0.116)	(0.064)	(0.105)	(0.071)	(0.093)
Obs.	117	117	108	108	108	108	113	113
Clusters	13	13	12	12	12	12	38	38
R^2	0.000	0.017	0.001	0.004	0.000	0.041	0.069	0.074

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data of the *No-Ties* and the *Future-Ties* treatments. Columns (3) and (4) contain data of the *Strong-Ties* and the *Weak-Ties* treatments. Columns (5) and (6) contain data of the *No-Ties* and the *Weak-Ties* treatments. Columns (7) and (8) contain data of the *Strong-Ties* and the *Future-Ties* treatments. *high diff. closeness* has a value of 1 if the average difference in closeness after and before Chat I is above average, and 0 otherwise. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

The findings of the *Strong-Ties* treatment are in line with previous findings in the literature that friendships decrease the willingness to compete against each other. Mill and Morgan (2022) describe a connection between social ties, closeness, and competition behavior. They find that subjects behave less competitively toward others who identify with the same political party as themselves. The downside of such a social tie identification is similar to identification by inviting real friends and strangers to the laboratory (as done with another outcome in several experiments, e.g. Reuben and van Winden (2008); Cochard et al. (2016)). As an experimenter can not break up the friendship after the experiment, the data cannot inform about the driving factor of the finding.

3.2 Strong-Ties compared to Weak-Ties

As real friends will meet each other in the future outside of the experimenter's control, one cannot rule out that this anticipated later interaction is necessary for finding a difference between the willingness to compete between friends and strangers. We circumvent this problem by exogenously determining the strength of social ties by varying interactions before and after the competition. By

comparing the data of the *Weak-Ties* and the *Strong-Ties* treatments in the following subsection, we can, therefore, also add to explaining the mechanism behind the observed difference between *strangers* (or *enemies* in the literature) and *friends* (or *partisans*).

In case the connection between closeness and willingness to compete in the *Strong-Ties* treatment is solely driven by the effect of existing social ties, we would expect to find the same pattern in the *Weak-Ties* treatment. In the *Weak-Ties* treatment, subjects also indicate their closeness to the other group members right before and right after Chat I on the IOS scale. Importantly, this elicitation occurs before the treatment differences are communicated. After completing the IOS scale, subjects learn about the group compositions in the subsequent stages. While choosing whether or not to compete against the subjects they interacted with in Chat I, the only difference between the *Weak-Ties* and the *Strong-Ties* treatment is the anticipation of future interaction with the potential competitors. In the *Strong-Ties* treatment, subjects know that they will stay in the same group composition in Chat II, while in the *Weak-Ties* treatment, they are informed that they will not interact within the same group after the task stage.

We now further show that weak ties are not sufficient to reduce willingness to compete. Figures 3c, 3e and 3f plot the shares of subjects choosing competition in the *No-Ties*, *Weak-Ties* and *Strong-Ties* treatments split by whether the subjects increased their closeness above average or not in Chat I. As outlined in the previous subsection, there seems to be only a minor, insignificant effect of closeness on the willingness to compete in the *No-Ties* and the *Weak-Ties* treatments. However, this difference is quite large in the *Strong-Ties* treatment. Columns (1) to (3) of Table 3 report the regression results of the difference in the effect of closeness between the *No-Ties* and the *Strong-Ties* treatment. The regressions show that being in the *Strong-Ties* treatment in general increases the willingness to compete. For those who managed to increase their level of closeness above average, however, the share choosing competition is (weakly) significantly lower. The idea that the correlation of high closeness and competition in the strong-ties treatment is only driven by self-selection effects – subjects who generally increase their closeness faster, are less competitive – can be ruled out with the regressions in Table 3. As we also measure participants' closeness in the *No-Ties* treatment (just towards participants they cannot choose whether to compete against), we use this regression to show that such an effect does not seem to be relevant in our setting.

Columns (4) to (6) of table 3 report the regression results of the difference of the influence in closeness on competition choice in the case of *Strong-Ties* and *Weak-Ties*. The influence of increased closeness to the potential competitors on competition choice in the *Weak-Ties* treatment is (weakly) significantly lower than in the *Strong-Ties* treatment. As the treatment difference came into play after subjects filled out the IOS scale that we used to calculate the difference in closeness, this comparison in the effect of *closeness* between *Weak-Ties* and *Strong-Ties* can be considered causal.

Table 3: Probability of choosing competition

	Treatment Strong-Ties and Treatment No-Ties			Treatment Strong-Ties and Treatment Weak-Ties		
	(1)	(2)	(3)	(4)	(5)	(6)
High diff. closeness	0.017	0.025	0.026	-0.036	-0.021	-0.019
	(0.105)	(0.110)	(0.108)	(0.060)	(0.061)	(0.062)
Strong-Ties	0.157*	0.156*	0.149*	0.115	0.119	0.118
	(0.086)	(0.087)	(0.088)	(0.086)	(0.087)	(0.086)
High diff. closeness	-0.271*	-0.268*	-0.263*	-0.219*	-0.221*	-0.220*
× *Strong-Ties*	(0.141)	(0.142)	(0.140)	(0.111)	(0.111)	(0.112)
Closeness before		0.022	0.018		0.022	0.022
Chat I		(0.027)	(0.027)		(0.022)	(0.022)
Male			0.073			0.025
			(0.063)			(0.058)
Constant	0.343***	0.295***	0.277***	0.385***	0.331***	0.322***
	(0.049)	(0.084)	(0.082)	(0.049)	(0.077)	(0.079)
Obs.	230	230	230	221	221	221
Clusters	51	51	51	50	50	50
R^2	0.035	0.039	0.044	0.036	0.039	0.040

Notes: OLS regression on choosing competition. Data of the *No-Ties* and the *Strong-Ties* treatment included in columns (1) to (3). Data of the *Weak-Ties* and the *Strong-Ties* treatment included in columns (4) to (6).*high diff. closeness* represents an above average difference in average closeness to the other two group members between directly after and directly before Chat I. *Strong-Ties* is a dummy variable that has the value 1 if the *Strong-Ties* treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. Std. errors clustered at the matching-group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

This result holds after adding further controls to the regression. To show that potential differences in the initial level of closeness do not matter for the result (as we investigate the influence of the difference in closeness through Chat I), we include the answer to the IOS scale before Chat I into the regression of column (5). As gender is not perfectly balanced among treatments, and previous literature showed gender to influence the willingness to compete, we control for gender in column (6). Further controls are added to a regression in the appendix in Table A.2. Depth of reasoning and (over-)confidence might also explain the willingness to compete, so we include our incentivized measures of cognitive reflection, the incentivized belief about the performance in the cognitive reflection task, as well as the incentivized belief about performance of others in the cognitive reflection task.[12] Finally, we include our non-incentivized Big-Five personality trait measures (Gosling et al.,

[12]Our measure of cognitive reflection consists of answering seven questions that need some understanding of

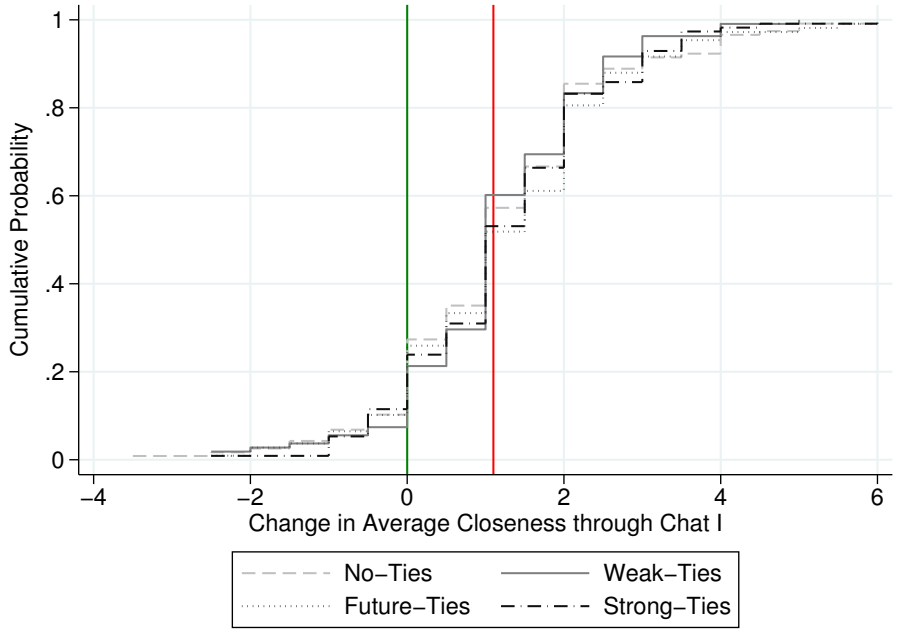


Figure 4: c.d.f. of difference in average closeness before and after Chat I, separated by treatment. The red vertical line indicates the median split for *high difference in closeness*.

2003). Table A.2 shows that among those only the level of Conscientiousness significantly correlates with the choice to compete in these two treatments. Throughout all columns, table A.2 shows the finding that an increase in the difference in closeness decreases the competition choices more in the *Strong-Ties* treatment remains weakly significant, even after including all the controls mentioned above. This reconfirms that potentially non-random treatment allocations cannot explain the effect of interest. As section 4.5 shows, the finding is also robust to a more detailed measure of closeness instead of the binary one used in this section 3.

4 Further results

This section reports results beyond the outcome variable choosing to compete in the task stage. In subsection 4.1, we examine the formation of closeness via the 10 minutes chats in more detail. Subsection 4.2 provides more information and results on the performance in the letter grid task. Subsection 4.3 explores the role of gender in our setting and connects to the existing results in the literature. Subsection 4.4 deals with the role of beliefs about the choices of other group members. Subsection 4.5 provides robustness checks of our results in section 3.

4.1 Increasing Closeness through Chat I

To find out how social ties within a group influence the willingness to compete against the group members, we exogenously vary whether individuals encounter potential competitors in Chat I and/

complex reasoning. As argued in Toplak et al. (2014), performance in such a task serves as a proxy for intelligence and executive functioning. The questions can be found on the screenshots B.23 to B.29.

or Chat II. To induce closeness between the players, we let subjects chat in groups of three. As a manipulation check, to see whether the chatting indeed increased the closeness among individuals, we use the data from the IOS measure of social ties (Gächter et al., 2015). Each subject indicates how close they feel to the two other chat partners of Chat I right before and right after Chat I. The second elicitation was conducted before the treatment differences were announced. We can therefore combine the data from all treatments to test and validate the induced social ties via the Chat I stage.

To use as a dependent variable, we calculate the difference in the average closeness between the two other group members right after and right before the chat. Figure 4 plots the distribution of the difference in average closeness for each treatment.[13] Reassuringly, we can see that the difference in the average closeness is positive for a large majority of subjects and that the random allocation to treatments also worked in this dimension. There are no meaningful treatment differences in the impact of Chat I on the difference in the closeness of the group members.

To get a better understanding of predictors of closeness formation, Table 4 reports the results of OLS regressions of correlates with the difference in closeness across all treatments. The OLS regression in column (1) shows that the chat increases the stated closeness by 1.22 units on the 7-point IOS scale. As this increase significantly differs from zero, our manipulation check is fulfilled. The regression analyses in Table 4 further reveal that the intensity of the chat positively correlates with the increase in closeness towards the other two group members of the chat. Looking at the effect of the answers in the Big 5 questionnaire taken from (Gosling et al., 2003), we can see in column (3) of Table 4 that individuals who score higher on *Agreeableness* increase the stated closeness to the two others in Chat I significantly more. In column (4), we take the other's Big 5 scores into consideration. Including the stated closeness before Chat I as a control removes the significant correlation with the Big 5 measures. The regressions in columns (4) and (5) show that individuals do not change their closeness differently depending on the Big 5 personality traits of the other person.

[13] Subsection 4.5 shows that the main results of this paper are unaffected by different aggregation mechanisms of the closeness to the group.

Table 4: Change of closeness through Chat I

	Δ Average closeness				Δ Individual closeness	
	(1)	(2)	(3)	(4)	(5)	(6)
Male		-0.187	0.004			-0.035
		(0.136)	(0.138)			(0.127)
# Messages of others		0.016	0.019*			
		(0.011)	(0.010)			
# Messages of oneself		0.038**	0.038**			
		(0.017)	(0.016)			
Agreeableness (Big 5)			0.124**	0.088		
			(0.062)	(0.059)		
Conscientiousness (Big 5)			0.051	0.007		
			(0.055)	(0.051)		
Extraversion (Big 5)			0.022	0.021		
			(0.047)	(0.047)		
Openess (Big 5)			-0.070	-0.049		
			(0.061)	(0.056)		
Emotionalstability (Big 5)			-0.022	0.018		
			(0.050)	(0.053)		
Agreeableness (Big 5) (of other person)					-0.048	-0.025
					(0.053)	(0.048)
Conscientiousness (Big 5) (of other person)					-0.021	-0.017
					(0.049)	(0.043)
Extraversion (Big 5) (of other person)					-0.062	-0.031
					(0.042)	(0.036)
Openess (Big 5) (of other person)					0.031	0.016
					(0.059)	(0.054)
Emotionalstability (Big 5) (of other person)					0.010	-0.005
					(0.043)	(0.037)
Closeness before Chat I				-0.413***		-0.498***
				(0.051)		(0.048)
Constant	1.220***	0.484*	0.671	0.803	1.631***	2.544***
	(0.075)	(0.266)	(0.492)	(0.513)	(0.393)	(0.339)
Obs.	446	446	443	443	886	886
Clusters	149	149	149	149	149	149
R^2	0.000	0.034	0.014	0.199	0.004	0.213

Notes: OLS regression of the difference in stated closeness to the two other group members (columns (1) to (4)) or each other group member (columns (4) and (6)) after and before Chat I. *# Messages of others* counts the number of messages sent by the other two group members in Chat I. *# Messages of*

To explore whether the endogenous content of Chat I correlates with the social tie formation, we also classified the conversations in each chat on multiple dimensions.[14] Table A.11 reports the results and shows that the difference in closeness positively correlates with answering the proposed questions by Aron et al. (1997). So do other chat content dimensions such as positive sentiment, positive emotions, lack of negative emotions, and expression of agreement.

4.2 Performance in task

Table 5: Performance in letter grid task: Time needed to solve

	All subjects				Subjects who choose to compete			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Competition	-6.003		-7.511	-8.431				
	(8.226)		(8.193)	(8.188)				
Male		-8.332	2.055	1.764	7.673	7.342	23.615*	23.086
		(8.381)	(8.915)	(8.923)	(13.035)	(13.049)	(13.794)	(13.981)
Diff. closeness			-1.391	-0.068		2.120	2.512	3.132
			(2.904)	(3.083)		(4.575)	(4.466)	(4.726)
Born in Germany			-3.029	-1.294				
			(15.154)	(15.161)				
CRT			-7.223***	-7.161***			-10.369***	-10.243***
			(2.137)	(2.135)			(3.403)	(3.437)
Constant	96.748***	97.726***	123.408***	127.437***	93.835***	95.875***	123.114***	127.080***
	(9.373)	(9.424)	(18.257)	(20.065)	(15.333)	(15.948)	(17.981)	(22.471)
Obs.	446	446	443	443	173	173	173	173
Letter Grid F.E.	yes	yes	yes	yes	yes	yes	yes	yes
Treatment F.E.	no	no	no	yes	no	no	no	yes

Notes: Tobit regression on the number of seconds needed to solve the letter grid task. The number is capped at 200 seconds. Columns (1) - (4) contain data of all subjects. Columns (5) - (8) contain data of the sub-sample of subjects who choose competition. *competition* is a dummy variable with value 1 if the subject played the task in competition. *CRT* represents the number of correctly answered questions in the cognitive reflection task ($\in \{0, 1, .., 7\}$). *born in Germany* is a dummy variable that equals one if the subject indicated being born in Germany in the post experimental questionnaire. One of four letter grids was randomly chosen to be played in a session. Fixed effects for the letter grid that is played are included in all columns, and columns (4) and (8) also contain treatment fixed effects.

***(**/*) significant at the 1 (5/10) percent level.

In the experiment, subjects were asked to solve a letter grid task. To solve the task, subjects had to find three words hidden in a 10x10 letter matrix. We chose this task for multiple reasons. First, we could not use the number-adding task used in most of the related experimental economics literature, as we did our experiment online via zTree unleashed instead of in the laboratory. Therefore, we could not credibly prevent subjects from using a calculator. Trivia questions would have posed a similar problem, as we cannot restrict subjects' use of online search engines. The letter grid task, however, makes cheating close to impossible. Second, we did not want gender stereotypes or traits one could easily learn about others through the chat to correlate with performance strongly. Table 5 reports the results of regressions on the number of seconds needed to solve the task. One of four letter grids was randomly drawn on the session level. As some were more difficult to solve,

[14] Two research assistants, unaware of the treatment difference or any focus of the project, classified Chat I on various dimensions. We use the average report of both research assistants for each dimension we report in Table A.11.

we included letter-grid fixed effects in the regressions. The table suggests that the level of cognitive reflection, measured by the 7-item cognitive reflection task (Toplak et al., 2014), strongly predicts performance. Subjects who score higher on the cognitive reflection task also perform significantly better in the letter grid task.[15] The regressions reveal that there is no significant effect. Columns (1), (3), and (4) also regress the performance on the choice to compete. If better-performing subjects choose competition more often, or if choosing competition leads to better performance in the task, we would expect a negative effect here. Although the coefficient's sign is negative, the standard errors show that this correlation is far from significant. Due to our incentive scheme, one could imagine that participants who feel very close to the other group members choose competition and perform badly on purpose to increase the payoff of the other players. As the coefficient of the difference in the closeness variable is small and close to zero, this motivation does not seem to be a relevant mechanism in our setting.

Before subjects could choose whether to play the letter grid task individually or competitively, they could look at an example of the game on two consecutive screens. This was meant to reduce the ambiguity for the subjects about what to expect. We stored the extensive margin (whether and how often subjects checked out the example screen) and the intensive margin (how many seconds this screen was opened). Subjects clicked, on average, 1.08 times to view the example, and the example screen was opened in total for an average of 14.03 seconds. Between the treatments, there is no significant difference between these numbers ($p > 0.1$ for all comparisons).[16]

4.3 The role of gender

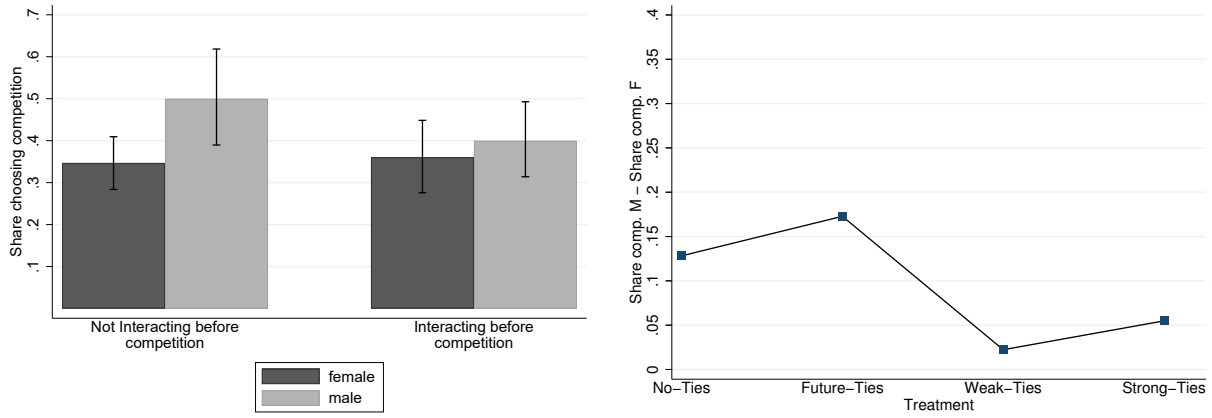
A vast literature following the seminal work by Niederle and Vesterlund (2007) has documented a substantial gender difference in preferences for competition.[17] In the classical design, strangers can choose whether to compete in solving mathematical tasks. Following Niederle and Vesterlund (2007), a body of literature has started investigating how social and environmental factors affect the observed gender gap. Markowsky and Beblo (2022) shows that the gender gap in choosing competition is negligible in verbal tasks. Hanek et al. (2016) has investigated the size of the competition, and Ifcher and Zarghamee (2016) has investigated the role of the performance measure in finding a gender difference. We build on that idea and relax an important assumption behind the previous lab results – the degree of connection between the subjects. As we vary whether potential competitors are random strangers or people one interacted with before, as well as whether or not one will interact with the potential competitors afterward, our data can contribute to the understanding of which environmental factors mitigate the gender gap in preferences for competition.

For each treatment $i \in \{\textit{No-Ties}, \textit{Future-Ties}, \textit{Weak-Ties}, \textit{Strong-Ties}\}$ and gender $j \in \{M, F\}$ we denote the share of subjects choosing competition as x_i^j. The difference in shares between male

[15] As the task was solved when three German words were found in the letter grid, we also controlled for a dummy variable for being born in Germany or not.

[16] Table A.3 in Appendix A shows that neither the summed-up time nor the number of times subjects viewed the examples correlates with the choice to compete or not. Further, the time subjects needed to solve the task does not correlate with the time or number of times subjects viewed the example. Though one has to caution about endogeneity issues in this statement, this is a sign that the task was straightforward to understand.

[17] See also a recent meta-analysis by Markowsky and Beblo (2022).



(a) Comparison between treatments with known and unknown competitors

(b) All treatments

Figure 5: Gender difference in choice to compete for different treatments

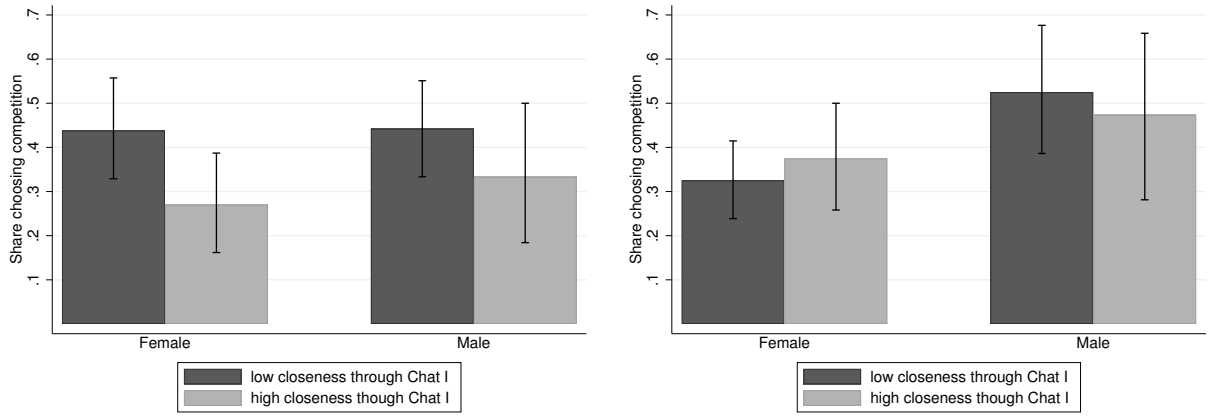
Notes: The difference between male and female subjects choosing competition for each treatment. Panel (a) combines treatments where the potential competitors are (not) known via Chat I. (b) plots the gender difference in share of competition for each treatment. Whiskers represent the 95% confidence intervals.

and female participants is denoted as $y_i = x_i^M - x_i^F$.[18] Figure 5a shows an interesting pattern. For the *Not Interacting before competition* treatments, we find a significant gender difference in preferences for competition. This is in line with the previous literature. However, this is not the case in the *Not Interacting before competition* treatments.[19] This is in line with our pre-registered hypothesis. However, as the sample size does not allow to make strong claims about this difference, and the difference in the gender differences between the treatments is not statistically significant, we caution to interpret this result too much. Figure 5b plots the differences for each treatment. We show that the results in Figure 5a are not driven by one particular treatment. We also show that meeting after the competition does not affect the gender difference in preferences for competition in any meaningful way.

In the same way as in section 3, we now extend our analysis by the closeness dimension. We provide three main results. First, we separately investigate the responses of male and female subjects to increased closeness. In Figure 6, we show the difference in preferences for competition between subjects that report low changes in closeness and subjects that report high changes in closeness separately for both genders. In the *Not Interacting before competition* treatments, neither male nor female subjects show any difference in preferences for competition between both groups. In the *Interacting before competition* treatments, we find a significant difference between the groups for female participants, while the effect for male participants is also negative but smaller. The within-gender change in preferences for competition across treatments is also significant for females (p-value = 0.07), while highly insignificant for males. Second, the decreased gender difference in

[18] In a pre-analysis plan (AEARCTR-0007319), we originally hypothesized a difference in gender difference in preference for competition for varying possibilities to form social ties ($y_{No-Ties} \neq y_{Weak-Ties}$; $y_{No-Ties} \neq y_{Future-Ties}$; $y_{No-Ties}, y_{Weak-Ties}, y_{Future-Ties} \neq y_{Strong-Ties}$).

[19] Interacting before competition combines treatments No-Ties and Future-Ties, while *Interacting before competition* combines treatments Weak-Ties and Strong-Ties.



(a) Meeting before competition (*Strong-Ties* and *Weak-Ties*)

(b) Not Meeting before competition (*No-Ties* and *Future-Ties*)

Figure 6: Gender difference in choice to compete for different treatments

Notes: The difference between male and female subjects choosing competition for each treatment. Panel (a) plots the gender difference in share of competition for each treatment (b) combines treatments where the potential competitors are (not) known via Chat I. Whiskers represent the 95% confidence intervals.

preferences for competition observed in Figure 5 is attributable to a decrease in willingness to compete for male subjects. Third, in Figure A.1, we show that our main result from the previous section, the decrease in competition choice as a response to meeting after the competition, is not a gender-driven effect.

4.4 Beliefs about Competition Choices

We chose a setting without exposing externalities to the other players by choosing to compete. Therefore, subjects could only opt into the competition but not force others to compete against them. If one knew that the other two group members chose not to compete, one would be indifferent between competing and playing individually, as competition without an opponent is equal to the individual incentive scheme in our design. To rule out indifference, we asked subjects to indicate on a scale from 1 to 5 for each of the two other subjects how likely they believe the other chose competition (non-incentivized). We use this data in several ways. First, we test whether subjects are indeed indifferent between choosing choose competition or not. Second, we investigate the role of meeting after the competition for belief formation. Third, we investigate the role of closeness for belief formation. Fourth, we can use our treatment variation and the beliefs data to see whether subjects hold more accurate beliefs about the willingness to compete of others who they met in Chat I compared to others they did not meet before.

In Figure A.2 we investigate the relationship between belief formation and closeness across treatments. There are three intersting results. First, in all treatments subjects are not indifferent between choosing competition and playing alone. In all treatments, subject indicate a probability that other subjects chose competition that is significantly different from the lowest two categories. Second, when comparing the *Weak-Ties* and *Strong-Ties* treatment, we find that subjects are significantly less likely to believe that the other subjects enter the competition if they meet again

after the competition (p-value= 0.012). Third, we do not find any correlation between closeness and belief about competition choices of other subjects in the *No-Ties* and *Future-Ties* treatments. However, we find that in the *Weak-Ties* and *Strong-Ties* treatment, higher closeness is negatively related to beliefs about the other subjects competition choices. This is in line with our findings from Section 3.[20]

Figure A.3 informs about the accuracy of the beliefs. There is no positive correlation between the belief about the other player's competition choice and the other player's actual competition choice in the No-ties and Future-ties treatments. In the *Weak-Ties* and *Strong-Ties* treatments, however, there is a positive correlation between belief and the actual outcome. Although this correlation is not extremely strong, this implies that subjects might have learned something about the willingness to compete with the other players through Chat I. This is particularly interesting, as no one was informed about the subsequent stages of the game during Chat I. Therefore no one specifically talked about the willingness to compete, competitiveness, or skills in a letter grid task.

4.5 Robustness checks

The regression results reported in section 3.1 and 3.2 rely on median splits of the change in closeness. One concern could be that the results are sensitive to how we define the closeness change. We provide several tests for the robustness of the result. First, we visually investigate the robustness of our result for different thresholds. Figure A.4 reveals that although the number of observations with high closeness becomes quite small by increasing the threshold, the general picture stays the same: the difference in the share of subjects choosing competition between low closeness and high closeness is the largest in the *Strong-Ties* treatment.[21] Second, in Table A.4 we re-estimate Table 2 using the average difference in closeness on a continuous scale. We also show results for the differential effect of closeness between the *Strong-Ties* and *Weak-Ties* treatment in Table A.5. Our conclusions remain unchanged. Third, another concern could be that subjects who report a very high initial closeness suffer from a ceiling effect and are unlikely to be classified as having high difference in closeness according to our median split. While we do control for the initial level of closeness when reporting our results in section 3, we provide a robustness check in which we drop all subjects that report an initial level of average closeness above 4.5. Excluding these subjects also does not change the results qualitatively (see Table A.6 and Table A.7).

Up to now, we defined the increase in social ties through Chat I as the difference between the average category on the IOS scale after Chat I and the average category on the IOS scale before Chat I. When choosing whether to compete, subjects do not know whether each of the other subjects in the group chooses competition. The potential competitors can be one of the other two or both group members. Therefore, the relevant metric seems to be the average of the closeness to the each other person. Gächter et al. (2021) also looks at closeness within a group via the IOS scale.

[20] Adding the belief about the probability of entering competition to our main result from Section 3.2 does not qualitatively change the result.

[21] A complete overview is given in Table A.4.

They define closeness as the weakest link among all the links in the group. To see how far our results are robust to different definitions of closeness, we replace the dependent variable *difference in average closeness* with i) *lower value of the difference in closeness* and ii) *higher value of the difference in closeness* and rerun the regressions. Table A.8 shows that the main result is qualitatively unaffected even though the estimated coefficients are slightly smaller. To further investigate this issue, we distinguish between subjects reporting a similar change in closeness to both group members and those reporting different changes. We classify a change in closeness between the two subjects as similar if the difference in the change is within one on the seven-point scale. In Table A.9 and Table A.10, we show that our results in section 3 are mostly driven by subjects that report similar changes to both group members.

5 Discussion and Conclusion

This paper studies the relationship between social ties and the individuals' willingness to compete. Anecdotal evidence suggests that individuals are less willing to compete against their friends. We conduct a laboratory experiment to (i) test whether there is a causal relationship between social ties and willingness to compete and (ii) understand the underlying mechanisms behind the effect to extract relevant implications for designing workplace policies.

Most studies on individuals' willingness to compete have been conducted in a laboratory setting between two anonymous agents. Since real-world interactions often occur between individuals who know each other and/or frequently interact with each other, complete anonymity is a strong assumption. Furthermore, several studies have shown that relaxing the anonymity assumption largely affects social decision-making (e.g. Bohnet and Frey, 1999). We use a purposefully tailored experimental design to manipulate social ties between individuals. In contrast to the previous literature, we design our experiment to allow us to isolate two important mechanisms behind the effect of social ties. Following the seminal study by Granovetter (1973), we differentiate between the reduced social distance between agents and repeatedly interacting with each other.

We find that social ties matter for willingness to compete. Compared with an anonymous setting, we find that social ties lead to a reduced willingness to compete. The reduced social distance between the subjects and the interaction after the competition in combination drive this effect. Neither social distance nor interacting again after the competition in isolation significantly affect the willingness to compete. However, we find that subjects with reduced social distance who also have to interact after the competition show a significantly lower willingness to compete, compared with subjects with reduced social distance alone. Strategic monetary considerations do not drive this effect since the interaction after the competition is unincentivized. We also rule out ambiguity aversion to explain the effect since the potential competitors are known in both settings. We further find that reduced social distance can be associated with a decrease in the gender gap in the willingness to compete. This finding is in line with several studies from the social cognition literature provding grounds for social connections affecting gender differences in preferencs competition

(Costa et al., 2001; Chapman et al., 2007; Schulte-Rüther et al., 2008; Weisberg et al., 2011; Friebel et al., 2021).

Our results have important implications for managers who seek to design efficient workplace policies. Social ties can be used in at least two-fold ways: On the one hand, company policies can be tailored to strengthen social ties among co-workers, e.g., via team events, office policies, and remote work to influence social ties among co-workers (Yang et al., 2022). This can lead to less competitive behavior between employees. On the other hand, company policies are often set to prevent that promoted workers get a leading position in the same team they formed social ties with (Benson et al., 2019). This can lead to more competitive behavior among employees in promotion tournaments.

Our results also contribute to a broader understanding of how social ties affect economic decision-making (Buser et al., 2014, among others). Social ties matter for social decision-making by affecting how much individuals care about others' behavior and well-being (Uzzi, 1999; Akerlof, 1997). So far, the importance of social ties for economic behavior has been shown, for example, in the context of cooperation (Apicella et al., 2012; Harrison et al., 2011), trust and trustworthiness (Abbink et al., 2006), and norm enforcement (Goette et al., 2012). We add willingness to compete as an outcome variable to this literature.

Our findings point to exciting avenues for future research. Several studies suggest that competitive incentive schemes can have adverse effects. We propose social ties as a way to mitigate the effect by reducing preferences for competition. However, future research could seek a direct test by investigating whether social ties reduce the chances of engaging in sabotage behavior, which is welfare-harming, different from our zero-sum competition. Furthermore, it would be interesting to see whether social ties affect the extensive margin of willingness to compete and the intensive margin of competitiveness within a tournament. Another promising avenue could explore whether a causal relationship also exists the other way around. Several studies point to the importance of social networks for career success. If competitive incentive structures impact social tie formation, this could have practical implications for designing workplace policies.

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A Further Experimental Results

Table A.1: Choosing competition when interacting before and interacting after competition

	Not interacting before competition		Interacting before competition		Not interacting after competition		Interacting after competition	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High diff. closeness	0.022	0.034	-0.148**	-0.133**	-0.009	0.004	-0.122	-0.097
	(0.079)	(0.081)	(0.058)	(0.060)	(0.063)	(0.068)	(0.078)	(0.079)
Closeness before Chat I		0.030		0.021		0.018		0.036
		(0.028)		(0.023)		(0.029)		(0.024)
Male		0.129*		0.028		0.075		0.083
		(0.063)		(0.058)		(0.063)		(0.065)
Constant	0.390***	0.278***	0.440***	0.380***	0.364***	0.295***	0.474***	0.358***
	(0.040)	(0.075)	(0.043)	(0.070)	(0.035)	(0.084)	(0.047)	(0.066)
Obs.	225	225	221	221	225	225	221	221
Clusters	25	25	50	50	25	25	50	50
R^2	0.000	0.028	0.023	0.027	0.000	0.008	0.015	0.036

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data of the *No-Ties* and the *Future-Ties* treatments. Columns (3) and (4) contain data of the *Strong-Ties* and the *Weak-Ties* treatments. Columns (5) and (6) contain data of the *No-Ties* and the *Weak-Ties* treatments. Columns (7) and (8) contain data of the *Strong-Ties* and the *Future-Ties* treatments. *High diff. closeness* has a value of 1 if the average difference in closeness after and before Chat I is above average, and 0 otherwise. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.2: Probability of choosing competition

	Treatment Strong-Ties and Treatment Weak-Ties							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High diff. closeness	-0.036	-0.021	-0.019	-0.019	-0.021	-0.021	-0.020	-0.006
	(0.060)	(0.061)	(0.062)	(0.063)	(0.064)	(0.064)	(0.064)	(0.070)
Strong-Ties	0.115	0.119	0.118	0.118	0.118	0.116	0.113	0.110
	(0.086)	(0.087)	(0.086)	(0.086)	(0.087)	(0.087)	(0.090)	(0.089)
High diff. closeness	-0.219*	-0.221*	-0.220*	-0.221*	-0.221*	-0.224*	-0.221*	-0.209*
× *Strong-Ties*	(0.111)	(0.111)	(0.112)	(0.113)	(0.113)	(0.114)	(0.115)	(0.119)
Closeness before		0.022	0.022	0.022	0.022	0.022	0.022	0.018
Chat I		(0.022)	(0.022)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Male			0.025	0.026	0.031	0.034	0.031	-0.029
			(0.058)	(0.063)	(0.065)	(0.065)	(0.064)	(0.072)
CRT				-0.001	0.006	0.005	0.005	0.001
				(0.015)	(0.020)	(0.020)	(0.021)	(0.021)
Belief own CRT					-0.014	-0.005	-0.008	-0.001
					(0.027)	(0.030)	(0.034)	(0.033)
Belief others CRT						-0.031	-0.030	-0.025
						(0.052)	(0.051)	(0.051)
Number boxes opened							0.004	0.002
(risk-loving)							(0.009)	(0.009)
Extraversion (Big 5)								0.000
								(0.024)
Neuroticism (Big 5)								0.020
								(0.025)
Openness (Big 5)								-0.009
								(0.025)
Agreeableness (Big 5)								-0.035
								(0.034)
Conscientiousness (Big 5)								-0.046**
								(0.022)
Constant	0.385***	0.331***	0.322***	0.324***	0.366**	0.459**	0.426**	0.804***
	(0.049)	(0.077)	(0.079)	(0.081)	(0.137)	(0.215)	(0.199)	(0.299)
Obs.	221	221	221	221	221	221	221	221
Clusters	50	50	50	50	50	50	50	50
R^2	0.036	0.039	0.040	0.040	0.041	0.043	0.044	0.068

Notes: OLS regression on choosing competition. Data of the *Weak-Ties* and the *Strong-Ties* treatment included. *high diff. closeness* represents an above average difference in average closeness to the other two group members between directly after and directly before Chat I. *Strong-Ties* is a dummy variable that has the value 1 if the *Strong-Ties* treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. *Boxes opened* $\in \{0, 1, ..., 25\}$ represents the number of boxes opened in the bomb-task to measure risk-loving behavior. *CRT* is measured on a scale from 0 to 7 and depicts the number of correct answers in the Cognitive Reflection Task. *Belief CRT of others* is measured on a scale from 0 to 7 and depicts the incentivized belief about the average number of correct answers of the other subjects in the session in the CRT. All Big 5 traits are values $\in (1, 7)$ and measured via the short Big 5 questionnaire (Gosling et al., 2003). Std. errors clustered at the matching-group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.3: Informing oneself about task

	# example viewed			# seconds example viewed		
	(1)	(2)	(3)	(4)	(5)	(6)
Male	0.012			0.243		
	(0.044)			(0.843)		
Competition		-0.015			-0.291	
		(0.043)			(0.833)	
Task-performance			-0.000			-0.003
			(0.000)			(0.007)
Constant	1.074***	1.084***	1.049***	14.213***	14.415***	13.858***
	(0.027)	(0.027)	(0.057)	(0.510)	(0.519)	(1.099)
Obs.	446	446	446	446	446	446
Letter Grid F.E.	no	no	yes	no	no	yes
R^2	0.000	0.000	0.017	0.000	0.000	0.008

Notes: Columns (1) - (3) report the results of OLS regressions on the number of times the example is viewed. Columns (4) - (6) report the results of OLS regressions on the accumulated number of seconds the example is viewed. *competition* is a dummy variable with value 1 if the subject played the task in competition. *task-performance* represents the number of seconds needed to solve the task (capped at 200). One of four letter grids was randomly chosen to be played in a session. The regressions in columns (3) and (6) include Fixed effects for the letter grid that is played.
***(**/*) significant at the 1 (5/10) percent level.

Table A.4: Choosing competition in different treatments - continuous closeness measure

	No-Ties		Weak-Ties		Future-Ties		Strong-Ties	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Diff. closeness	-0.036	-0.038	-0.024	-0.017	0.007	0.039	-0.095***	-0.089**
	(0.033)	(0.035)	(0.021)	(0.026)	(0.040)	(0.046)	(0.033)	(0.034)
Closeness before Chat I		-0.008		0.015		0.059		0.017
		(0.048)		(0.039)		(0.045)		(0.033)
Male		0.129		0.022		0.117		0.004
		(0.093)		(0.082)		(0.106)		(0.087)
Constant	0.393***	0.369***	0.398***	0.350**	0.444***	0.238	0.500***	0.458***
	(0.048)	(0.118)	(0.045)	(0.119)	(0.071)	(0.136)	(0.075)	(0.104)
Obs.	117	117	108	108	108	108	113	113
Clusters	13	13	12	12	12	12	38	38
R^2	0.013	0.029	0.004	0.005	0.000	0.050	0.066	0.068

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data of the *No-Ties* and the *Future-Ties* treatments. Columns (3) and (4) contain data of the *Strong-Ties* and the *Weak-Ties* treatments. Columns (5) and (6) contain data of the *No-Ties* and the *Weak-Ties* treatments. Columns (7) and (8) contain data of the *Strong-Ties* and the *Future-Ties* treatments. *diff. closeness* is the average change in closeness reported to both other subjects. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.5: Probability of choosing competition - continuous closeness measure

	Treatment Strong-Ties and Treatment Weak-Ties		
	(1)	(2)	(3)
Diff. closeness	-0.024	-0.017	-0.016
	(0.021)	(0.023)	(0.023)
Strong-Ties	0.102	0.106	0.105
	(0.087)	(0.087)	(0.088)
Diff. closeness	-0.071*	-0.073*	-0.072*
× *Strong-Ties*	(0.039)	(0.040)	(0.040)
Closeness before Chat I		0.016	0.016
		(0.025)	(0.025)
Male			0.013
			(0.058)
Constant	0.398***	0.356***	0.351***
	(0.044)	(0.080)	(0.079)
Obs.	221	221	221
Clusters	50	50	50
R^2	0.036	0.037	0.038

Notes: OLS regression on choosing competition. Data of the *Weak-Ties* and the *Strong-Ties* treatment included. *diff. closeness* is the average change in closeness reported to both other subjects. *Strong-Ties* is a dummy variable that has the value 1 if the *Strong-Ties* treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. Std. errors clustered at the matching-group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.6: Choosing competition in different treatments - initial closeness ≤ 4.5

	No-Ties		Weak-Ties		Future-Ties		Strong-Ties	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High diff. closeness	0.037	0.035	-0.028	-0.020	0.059	0.064	-0.223**	-0.218**
	(0.103)	(0.108)	(0.063)	(0.069)	(0.125)	(0.114)	(0.095)	(0.094)
Closeness before Chat I		-0.013		0.016		0.045		0.001
		(0.041)		(0.041)		(0.043)		(0.042)
Male		0.128		0.004		0.134		0.037
		(0.094)		(0.082)		(0.105)		(0.090)
Constant	0.323***	0.308**	0.377***	0.341**	0.412***	0.280**	0.473***	0.454***
	(0.050)	(0.117)	(0.055)	(0.114)	(0.074)	(0.105)	(0.069)	(0.102)
Obs.	115	115	104	104	102	102	107	107
Clusters	13	13	12	12	12	12	38	38
R^2	0.001	0.018	0.001	0.002	0.004	0.038	0.053	0.055

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data of the *No-Ties* and the *Future-Ties* treatments. Columns (3) and (4) contain data of the *Strong-Ties* and the *Weak-Ties* treatments. Columns (5) and (6) contain data of the *No-Ties* and the *Weak-Ties* treatments. Columns (7) and (8) contain data of the *Strong-Ties* and the *Future-Ties* treatments. *high diff. closeness* has a value of 1 if the average difference in closeness after and before Chat I is above average, and 0 otherwise. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. The sample is restricted to subjects that report a equal or lower initial closeness than 4.5. Std. errors clustered at the matching group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.7: Probability of choosing competition - initial closeness ≤ 4.5

	Treatment Strong-Ties and Treatment Weak-Ties		
	(1)	(2)	(3)
High diff. closeness	-0.028	-0.023	-0.022
	(0.061)	(0.063)	(0.064)
Strong-Ties	0.096	0.098	0.097
	(0.087)	(0.088)	(0.087)
High diff. closeness	-0.195*	-0.196*	-0.195*
$\times$ *Strong-Ties*	(0.113)	(0.114)	(0.114)
Closeness before Chat I		0.010	0.009
		(0.028)	(0.029)
Male			0.019
			(0.060)
Constant	0.377***	0.355***	0.349***
	(0.053)	(0.084)	(0.085)
Obs.	211	211	211
Clusters	50	50	50
R^2	0.028	0.028	0.028

Notes: OLS regression on choosing competition. Data of the *Weak-Ties* and the *Strong-Ties* treatment included. *diff. closeness* is the average change in closeness reported to both other subjects. *Strong-Ties* is a dummy variable that has the value 1 if the *Strong-Ties* Treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. The sample is restricted to subjects that report a equal or lower initial closeness than 4.5. Std. errors clustered at the matching-group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.8: Competition Choice and minimum/maximum difference in closeness

	Stranger		Past-Partner		Future-Partner		Partner	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Min diff. closeness	-0.041		-0.016		0.032		-0.065**	
	(0.031)		(0.027)		(0.036)		(0.031)	
Closeness before Chat I	-0.018	0.004	0.012	0.020	0.061	0.047	0.013	0.035
	(0.045)	(0.048)	(0.039)	(0.037)	(0.044)	(0.042)	(0.036)	(0.034)
Male	0.136	0.124	0.021	0.024	0.116	0.122	0.009	0.020
	(0.098)	(0.092)	(0.080)	(0.085)	(0.105)	(0.105)	(0.086)	(0.090)
Max diff. closeness		-0.019		-0.009		0.027		-0.065**
		(0.032)		(0.023)		(0.040)		(0.030)
Constant	0.369***	0.332**	0.348***	0.334**	0.262**	0.258*	0.400***	0.418***
	(0.101)	(0.131)	(0.107)	(0.126)	(0.108)	(0.140)	(0.095)	(0.108)
Obs.	117	117	108	108	108	108	113	113
Clusters	39	39	36	36	36	36	38	38
R^2	0.035	0.020	0.006	0.004	0.049	0.046	0.054	0.054

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data of the *Stranger* treatment. Columns (3) and (4) contain data of the *Past-Partner* treatment. Columns (5) and (6) contain data of the *Future-Partner* treatment. Columns (7) and (8) contain data of the *Partner* treatment. *min diff. closeness* represents the minimum of the difference in closeness to each of the other two group members between directly after and directly before Chat I. *max diff. closeness* represents the maximum of the difference in closeness to each of the other two group members between directly after and directly before Chat I. Std. errors clustered at the level of Chat I groups and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.9: Competition Choice for heterogeneous and homogeneous closeness changes

	Stranger		Past-Partner		Future-Partner		Partner	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Diff. closeness	-0.027	0.183	0.052	-0.180	0.076	-0.062	-0.260**	-0.098
	(0.094)	(0.249)	(0.119)	(0.288)	(0.138)	(0.227)	(0.103)	(0.279)
Closeness before Chat I	-0.014	0.089	-0.037	0.089	0.002	0.083	0.012	0.071
	(0.048)	(0.068)	(0.036)	(0.058)	(0.051)	(0.066)	(0.033)	(0.076)
Male	0.185	-0.089	0.053	-0.044	0.276	-0.098	0.012	0.036
	(0.129)	(0.208)	(0.113)	(0.168)	(0.193)	(0.134)	(0.100)	(0.181)
Constant	0.320**	0.053	0.391***	0.245	0.295**	0.356	0.461***	0.282
	(0.116)	(0.210)	(0.118)	(0.231)	(0.112)	(0.233)	(0.103)	(0.285)
Obs.	86	31	81	27	72	36	85	28
Clusters	13	13	12	11	12	11	38	20
R^2	0.034	0.065	0.015	0.165	0.083	0.073	0.076	0.081

Notes: OLS regression on choosing competition. Columns (1) and (2) contain data of the *Stranger* treatment. Columns (3) and (4) contain data of the *Past-Partner* treatment. Columns (5) and (6) contain data of the *Future-Partner* treatment. Columns (7) and (8) contain data of the *Partner* treatment. In columns (1), (3), (5) and (7) the sample consists of subjects that report a similar closeness change to both subjects. (Difference in closeness change between both subjects $< |1|$) Columns (2), (4), (6) and (8) include the remaining subjects. Std. errors clustered at the level of Chat I groups and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.10: Probability of choosing competition - homogeneous closeness changes

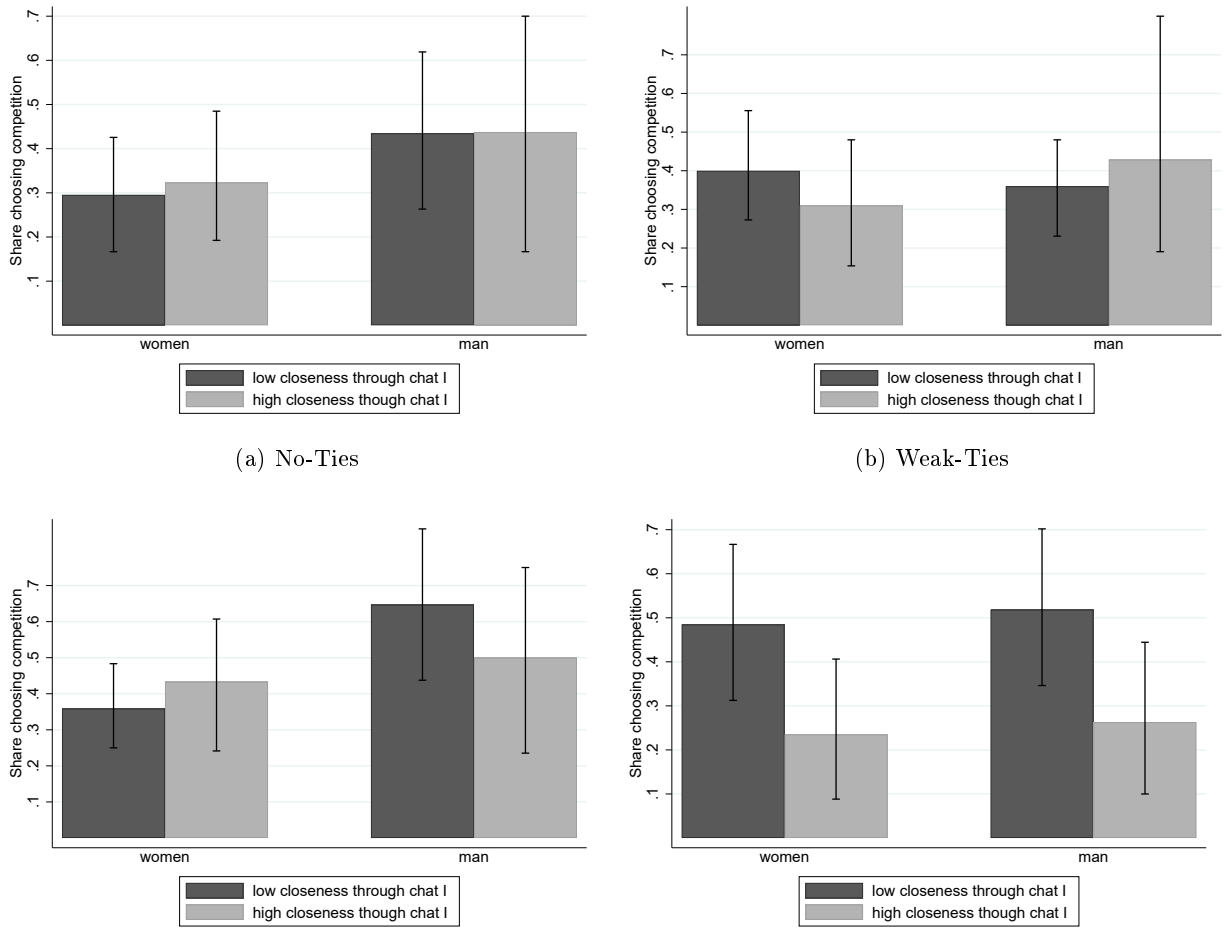
	Treatment Strong-Ties and Treatment Weak-Ties		
	(1)	(2)	(3)
Diff. closeness	0.061	0.057	0.060
	(0.111)	(0.112)	(0.113)
Strong ties	0.156	0.153	0.151
	(0.111)	(0.110)	(0.110)
Diff. closeness	-0.324**	-0.323**	-0.321**
× *Strong-Ties*	(0.150)	(0.150)	(0.151)
Closeness before Chat I		-0.011	-0.011
		(0.024)	(0.024)
Male			0.036
			(0.073)
Constant	0.333***	0.355***	0.342***
	(0.079)	(0.088)	(0.094)
Obs.	166	166	166
Clusters	50	50	50
R^2	0.040	0.041	0.042

Notes: OLS regression on choosing competition. Data of the *Weak-Ties* and the *Strong-Ties* treatment included. *high diff. closeness* represents an above average difference in average closeness to the other two group members between directly after and directly before Chat I. *Strong-Ties* is a dummy variable that has the value 1 if the *Strong-Ties* treatment is played and 0 if the *Weak-Ties* treatment is played. *Closeness before Chat I* depicts the average level of closeness indicated on the IOS scale before Chat I. The sample is restricted to subjects that report similar closeness changes to both subjects in their group. (Difference in closeness change between both subjects $< |1|$) Std. errors clustered at the matching-group level and depicted in parentheses. ***(**/*) significant at the 1 (5/10) percent level.

Table A.11: Change of average Closeness through Chat I

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sentiment	0.475***						
	(0.133)						
Pos. emotions		0.358***					
		(0.131)					
Neg. emotions			-0.258**				
			(0.126)				
Disagreement				-0.196			
				(0.166)			
Agreement					0.213**		
					(0.101)		
Questions						0.268**	
						(0.118)	
Personal info							0.323
							(0.196)
Constant	-0.436	0.0575	1.673***	1.475***	0.490	0.226	0.817***
	(0.468)	(0.435)	(0.234)	(0.220)	(0.353)	(0.461)	(0.242)
Observations	428	428	428	428	428	428	428
Clusters	143	143	143	143	143	143	143
R^2	0.035	0.028	0.011	0.005	0.011	0.016	0.011

Notes: OLS regression of the difference in average stated closeness to the two other group members after and before Chat I. The variables are the classifications of each chat according to the descriptions provided in subsection 3.1. Standard errors (in parentheses) are clustered at the Chat I-group level.
***(**/*) significant at the 1 (5/10) percent level.



(a) No-Ties

(b) Weak-Ties

(c) Future-Ties

(d) Strong-Ties

Figure A.1: Gender difference in choice to compete in different treatments

Notes: The difference between male and female subjects choosing competition for each treatment. Panel (a) plots the gender difference in share of competition for each treatment (b) combines treatments where the potential competitors are (not) known via Chat I. Whiskers represent the 95% confidence intervals.

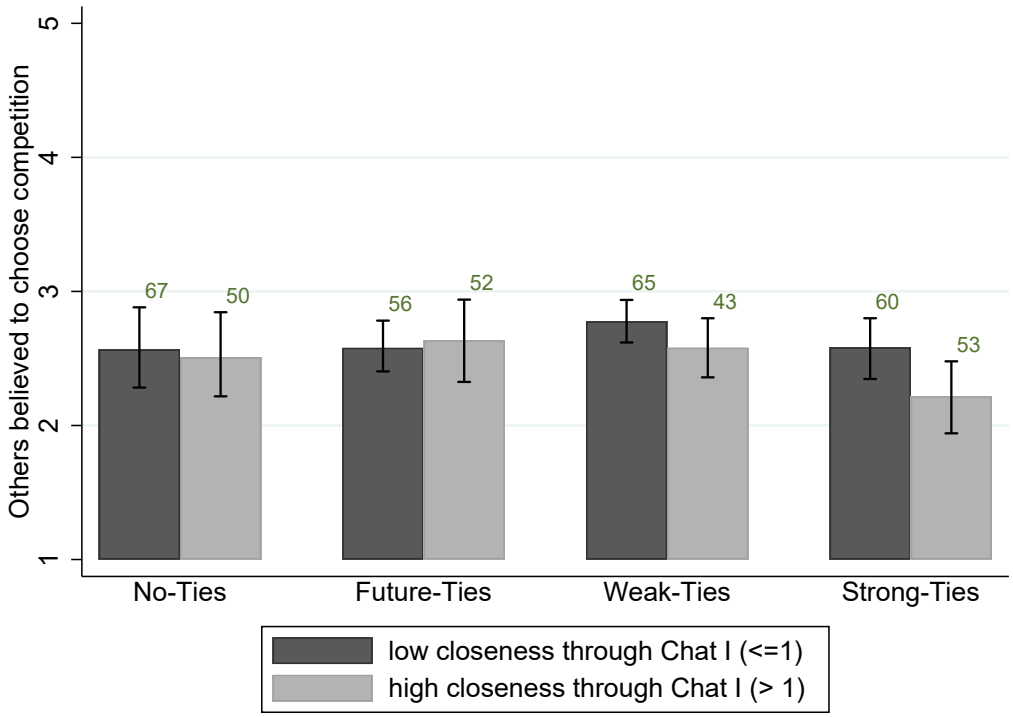
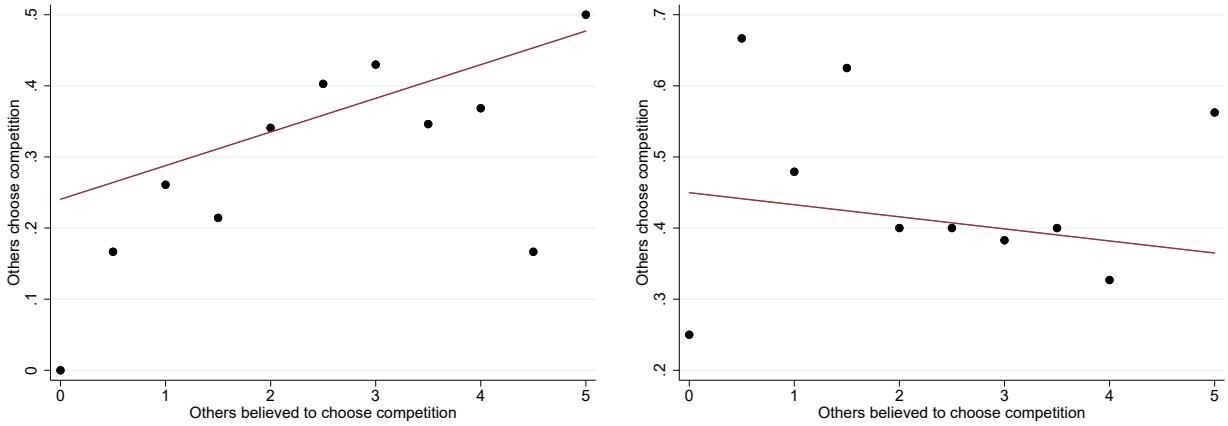


Figure A.2: Beliefs about competition choices by treatment and closeness change



(a) Meeting before competition (*Strong-Ties* and *Weak-Ties*)

(b) Not Meeting before competition (*No-Ties* and *Future-Ties*)

Figure A.3: Accuracy of beliefs about the competition choices of other subjects

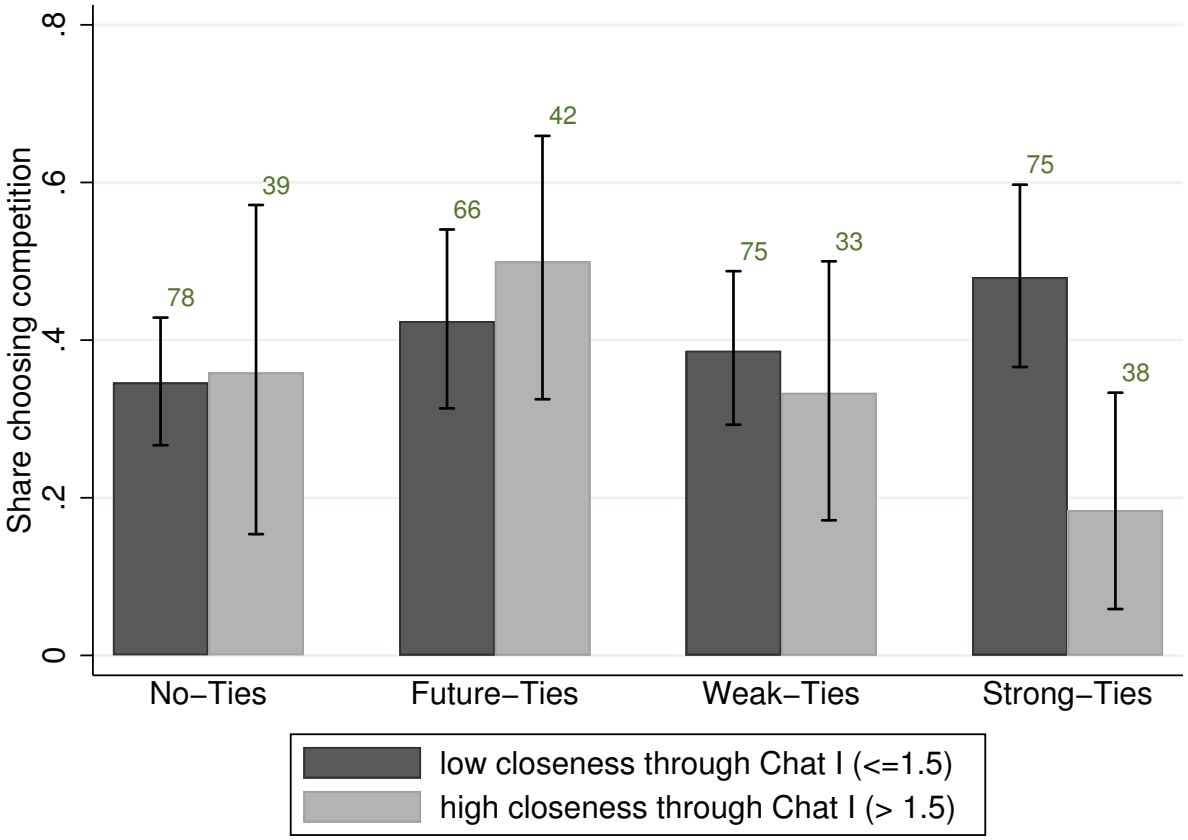


Figure A.4: Effect of closeness difference via Chat I on choice to compete in different treatments.

Notes: Low closeness is defined as a difference in average closeness ≤ 1.5, high closeness as a difference in average closeness > 1.5. Whiskers represent 95% confidence intervals based on bootstrapped standard-errors (10000 repetitions with clustering at the matching-group level).

B Decision Screens including Instructions

Examples of the Decision Screens (in German) are provided. The translation of the decision screens (from top to bottom) is provided in the figure notes of each screenshot.

Figure B.1: Gender elicitation, all treatments.

Notes: 'Assignment of the nickname Please enter your gender. This information is required to randomly assign you a nickname in the next step. The random assignment of a nickname ensures that anonymity in the experiment is guaranteed. Male / Female. Please click Continue when you have made your selection. "

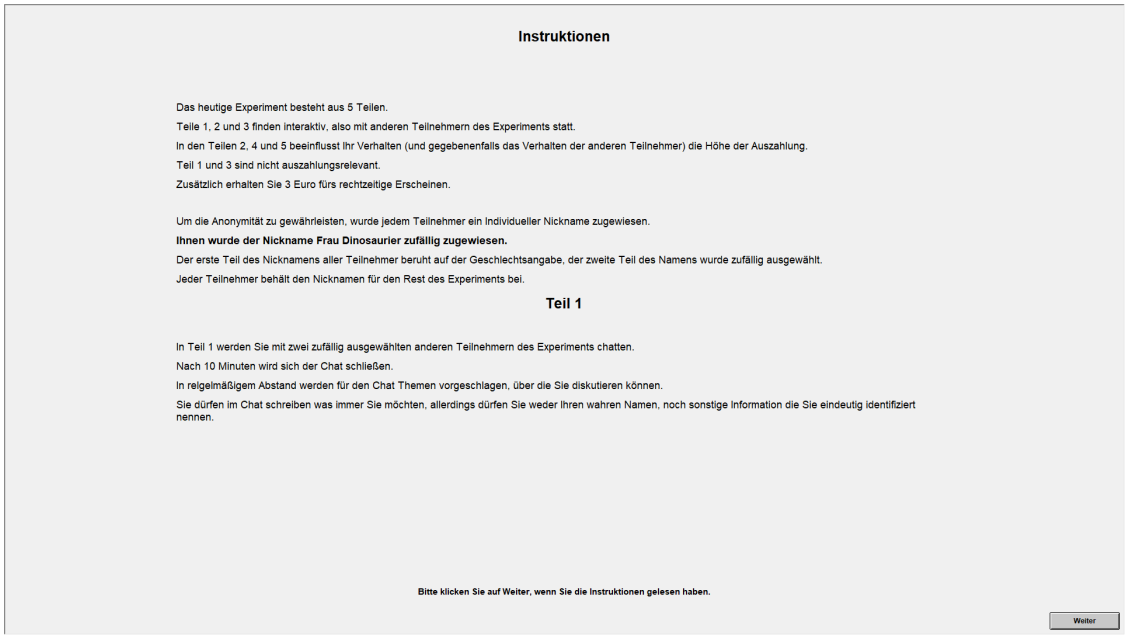


Figure B.2: Instructions part I, all treatments.

Notes: 'Instructions. Today's experiment consists of 5 parts. Parts 1, 2 and 3 take place interactively, i.e. with other participants in the experiment. In parts 2, 4 and 5 your behavior (and possibly the behavior of the other participants) influences the amount of the payout. Parts 1 and 3 are not relevant for payment. In addition, you will receive 3 euros for appearing on time. To ensure anonymity, each participant was assigned an individual nickname. You were randomly assigned the nickname Mrs. Dinosaur. The first part of the nickname of all participants is based on the gender, the second part of the name was chosen at random. Each participant keeps the nickname for the rest of the experiment. Part 1. In Part 1, you will chat with two other randomly selected participants in the experiment. After 10 minutes the chat will close. Topics that you can discuss are suggested for the chat at regular intervals. You may write whatever you want in the chat, but you may not give your real name or any other information that clearly identifies you. Please click Continue when you have read the instructions."

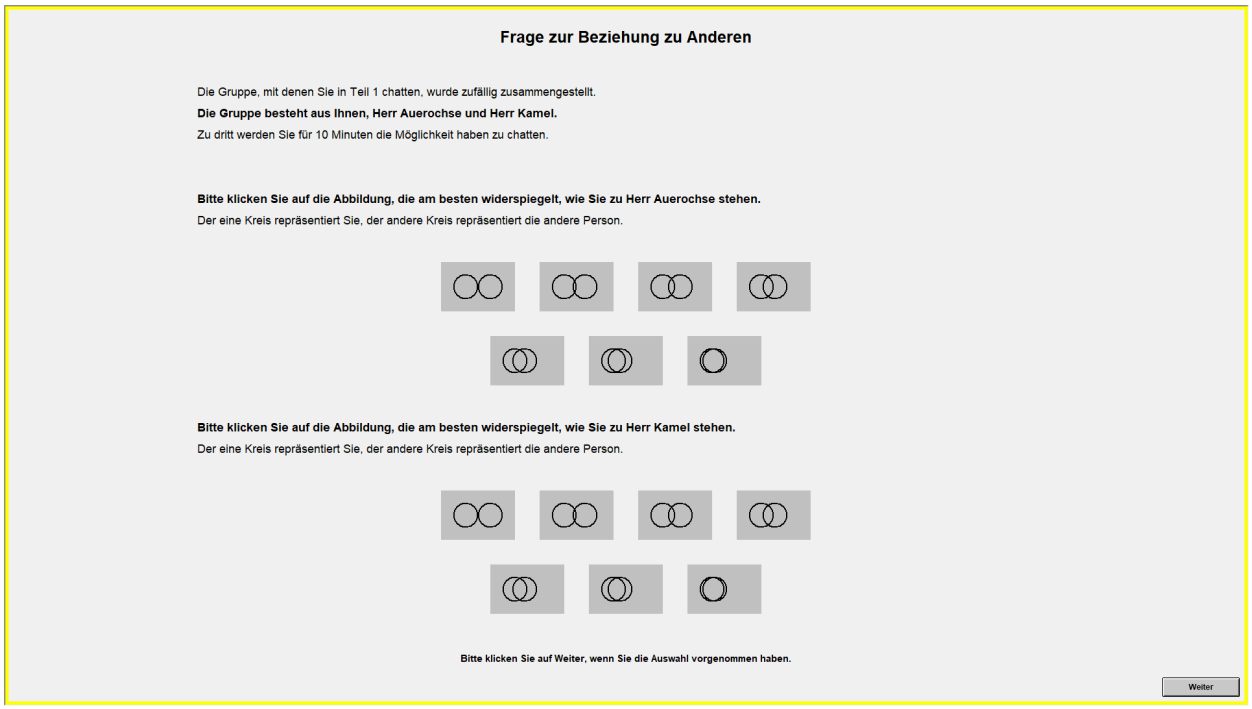


Figure B.3: Closeness elicitation I, all treatments.

Notes: 'Question about relationships with others. The group you chat with in Part 1 was randomly selected. The group consists of you, Mr. Aurochs and Mr. Camel. The three of you will have the opportunity to chat for 10 minutes. Please click on the image that best reflects how you feel about Mr. Aurochs. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Mr. Aurochs. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection."

Figure B.4: Chat I, all treatments.

Notes: 'Part 1 (Chat). Current topic: If you could choose from everyone in the world, who would you invite to dinner? You have been given the nickname Mister Crow. You chat with Ms. Armadillo and Ms. Buffalo. Time left in this chat: less than 9 minutes."

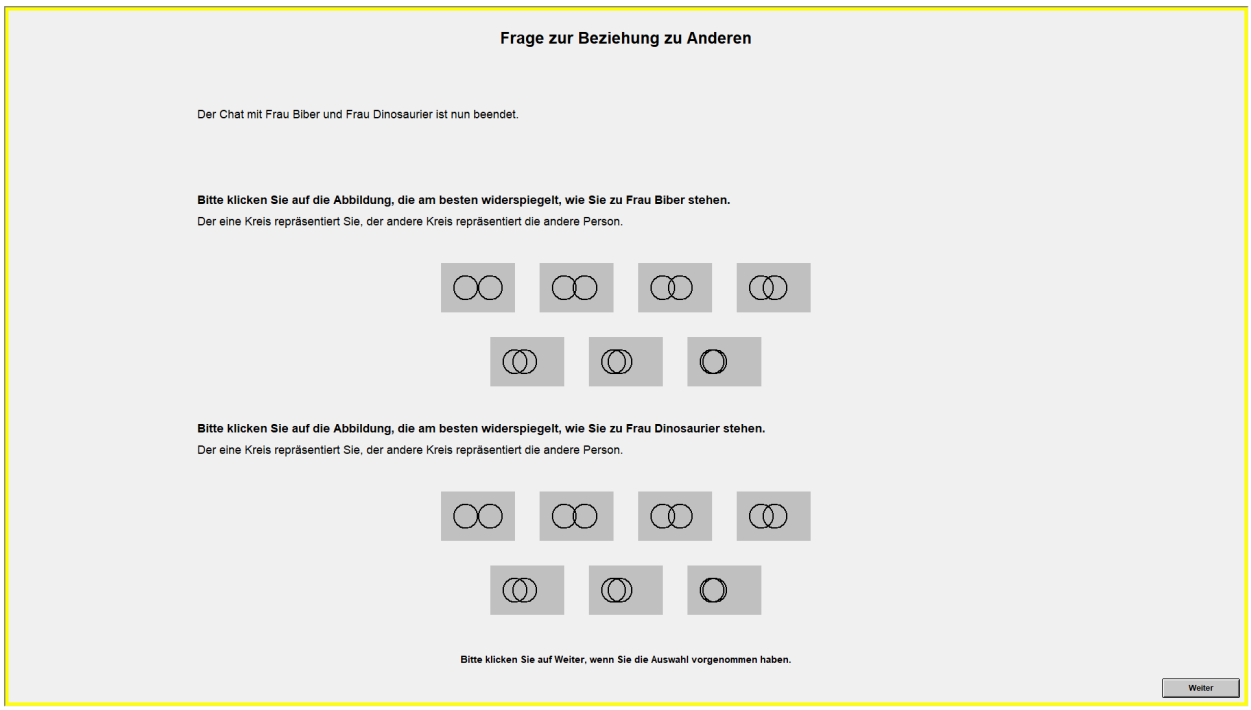


Figure B.5: Closeness elicitation II, all treatments.

Notes: 'Question about relationships with others. The chat with Ms. Beaver and Ms. Dinosaurs is now over. Please click on the image that best reflects how you feel about Mr. Beaver. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Ms. Dinosaur. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection."

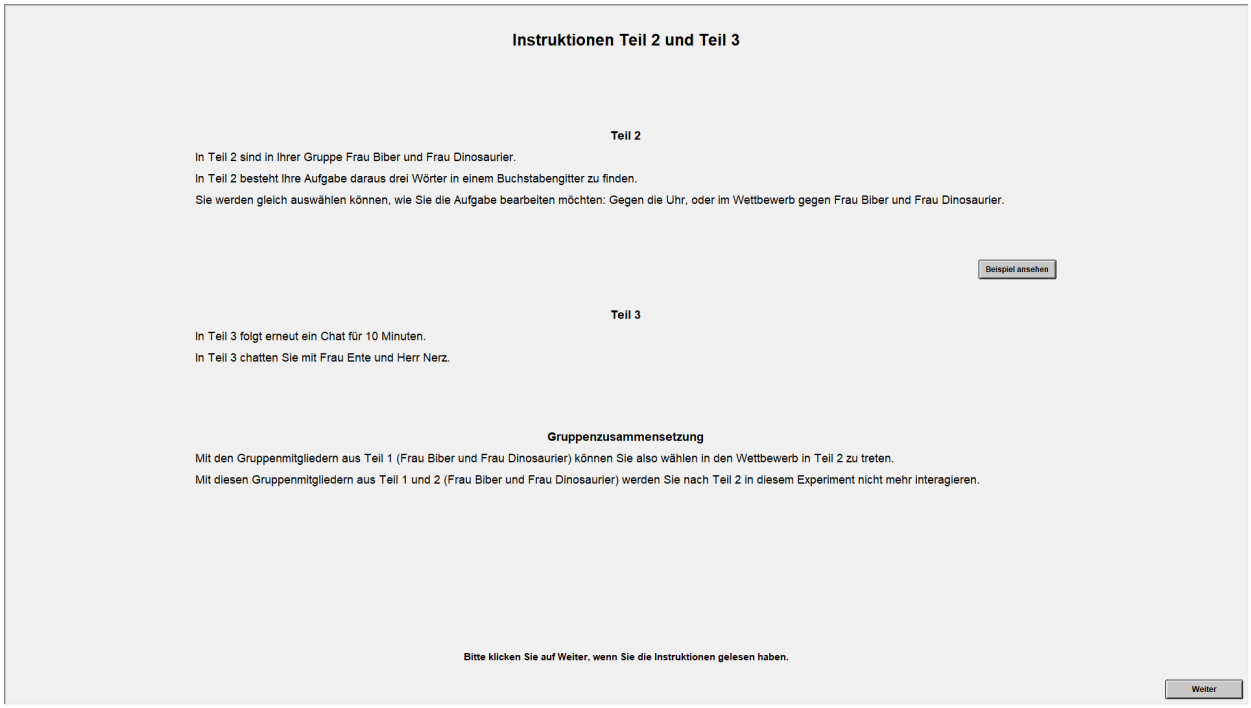


Figure B.6: Instructions part 2 and 3, treatment 2

Notes: 'Instructions part 2 and part 3. Part 2. In Part 2, your group includes Mrs. Beaver and Mrs. Dinosaur. In part 2 your task is to find three words in a grid of letters. You'll be able to choose how you want to complete the task: against the clock, or compete against Mrs. Beaver and Mrs. Dinosaur. See Example. Part 3. In part 3 there will be a 10 minute chat again. In part 3 you chat with Ms. Duck and Mr. Mink. Group composition. With the group members from Part 1 (Mrs. Beaver and Mrs. Dinosaur) you can choose to compete in Part 2. You will no longer interact with these group members from Parts 1 and 2 (Mrs. Beaver and Mrs. Dinosaur) after Part 2 of this experiment. Please click Continue when you have read the instructions."

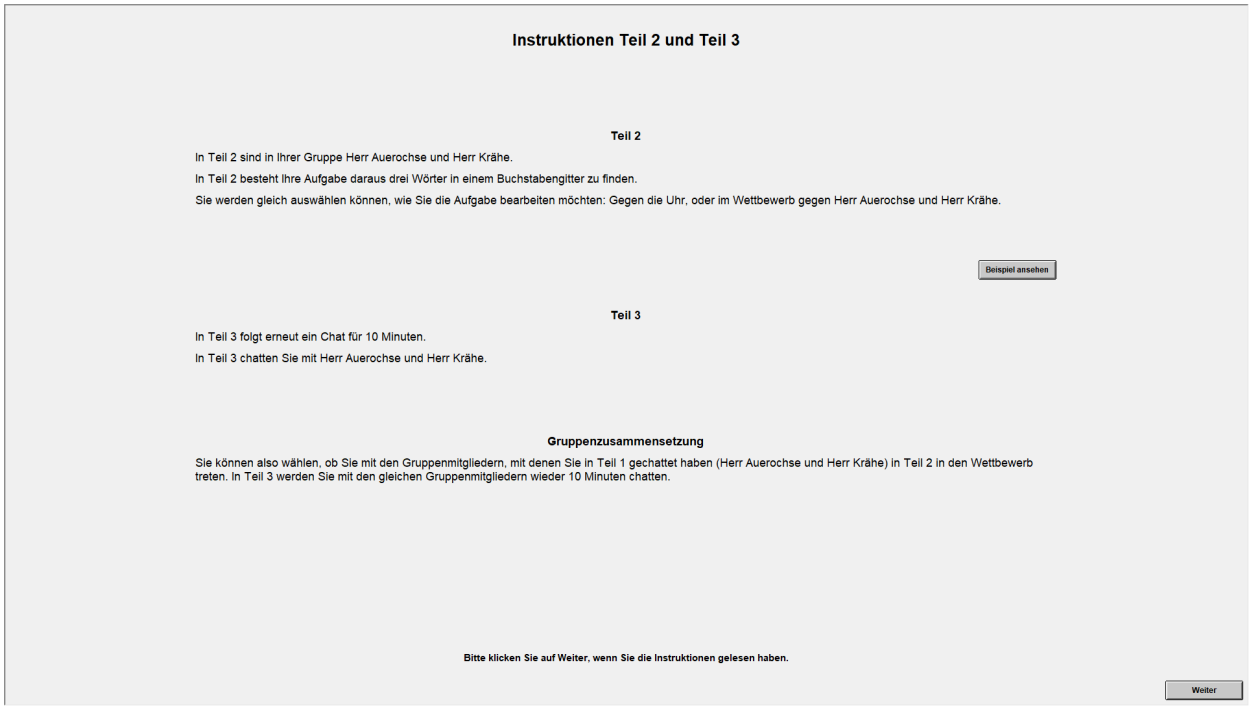


Figure B.7: Instructions part 2 and 3, treatment 4

Notes: 'Instructions part 2 and part 3 Part 2. In Part 2, your group includes Mr. Aurochs and Mr. Crow. In part 2 your task is to find three words in a grid of letters. You'll be able to choose how you want to complete the task: against the clock, or compete against Mr. Aurochs and Mr. Crow. See Example. Part 3. In part 3 there will be a 10 minute chat again. In part 3 you chat with Mr. Aurochs and Mr. Crow. Group composition. With the group members from Part 1 (Mr. Aurochs and Mr. Crow.) you can choose to compete in Part 2. In Part 3 you will chat with the same group members again for 10 minutes. Please click Continue when you have read the instructions."

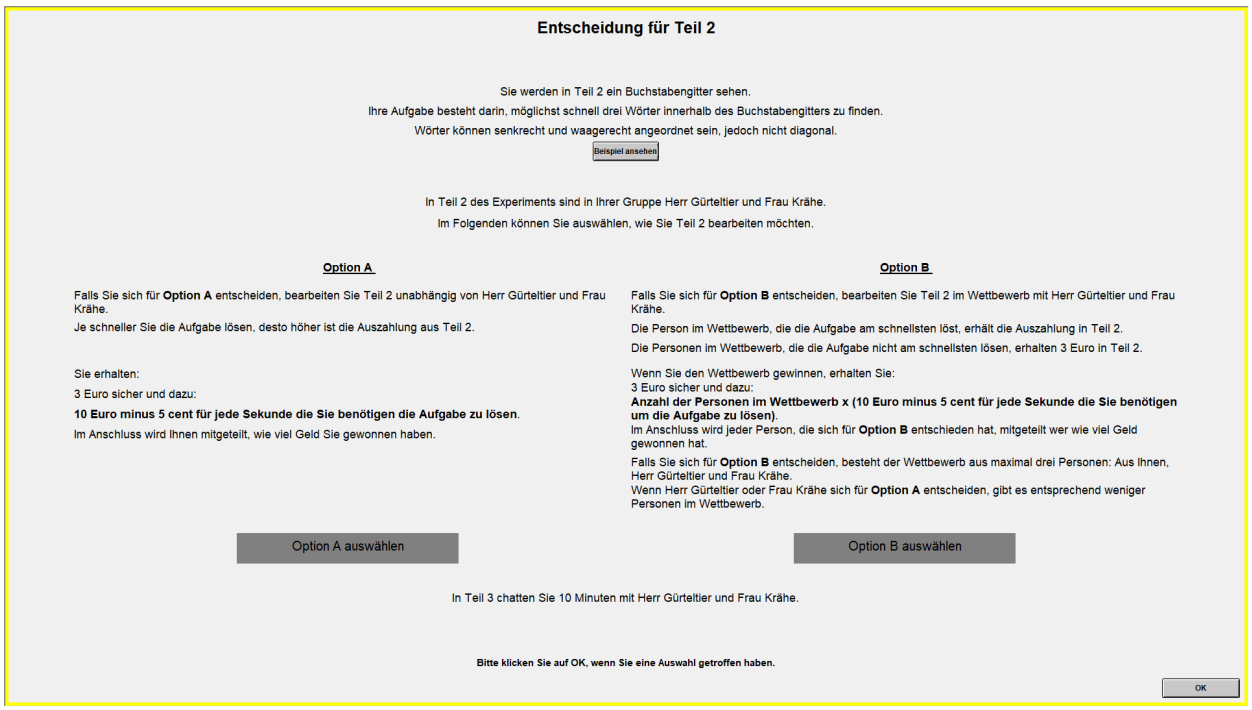


Figure B.8: Competition choice, matching between parts depends on treatment. Option A and B randomly counterbalanced.

Notes: 'Decision for part 2. You will see a grid of letters in Part 2. Your task is to find three words within the grid of letters as quickly as possible. Words can be arranged vertically and horizontally, but not diagonally. see example. In Part 2 of the experiment, your group includes Mr. Armadillo and Mrs. Crow. Below you can choose how you want to work in Part 2. Option A. If you choose option A, complete Part 2 independently from Mr. Armadillo and Mrs. Crow. The faster you solve the task, the higher the payout from Part 2. You receive: 3 euros for sure: 10 euros minus 5 cents for every second you need to solve the task. You will then be told how much money you have won. Choose option A. Option B. If you choose option B, complete part 2 in competition with Mr. Armadillo and Mrs. Crow. The person in the competition who solves the task the fastest gets the payout in Part 2. The people in the competition who do not solve the task the fastest receive 3 euros in part 2. If you win the competition you will receive: 3 euros for sure: Number of people in the competition x (10 euros minus 5 cents for each second you need to solve the task). Afterwards, each person who has chosen option B will be told who won how much money. If you choose option B, the competition consists of a maximum of three people: you, Mr. Armadillo and Mrs. Crow. If Mr. Armadillo or Mrs. Crow choose option A, there will be correspondingly fewer people in the competition. Choose option B. In part 3 you chat with Mr. Armadillo and Mrs. Crow. Please click OK when you have made a selection."

Figure B.9: Beliefs about competition choice of others, all treatments.

Notes: 'Assessment of the behavior of others. Please rate how likely you think it is that the group members selected option B from Part 2. How likely do you think it is that Mrs. Beaver chose option B (very unlikely - very likely) How likely do you think it is that Mrs. Dinosaur chose option B (very unlikely - very likely) Please click Continue when you have answered the questions."

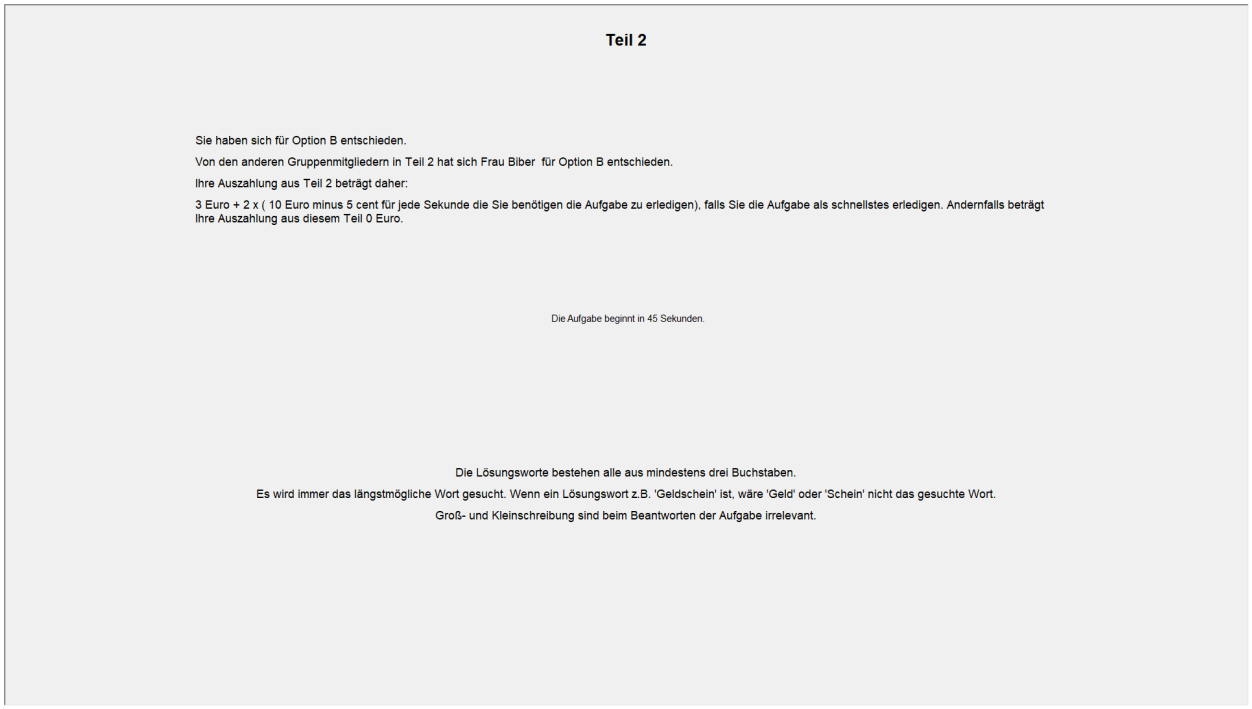


Figure B.10: Announcement task. Subject chose competition. All treatments.

Notes: 'Part 2 You have chosen option B. From the other group members in part 2, Ms. Beaver chose option B. Your payout from Part 2 is therefore: 3 euros + 2 x (10 euros minus 5 cents for each second you need to complete the task) if you complete the task as the fastest. Otherwise, your payout from this part is 0 euros. The task starts in 45 seconds. The solution words consist of at least 3 letters. The longest possible word is always searched for. For example, if a solution word is 'banknote', 'bank' or 'note' would not be the searched word. Upper and lower case are irrelevant when answering the task."

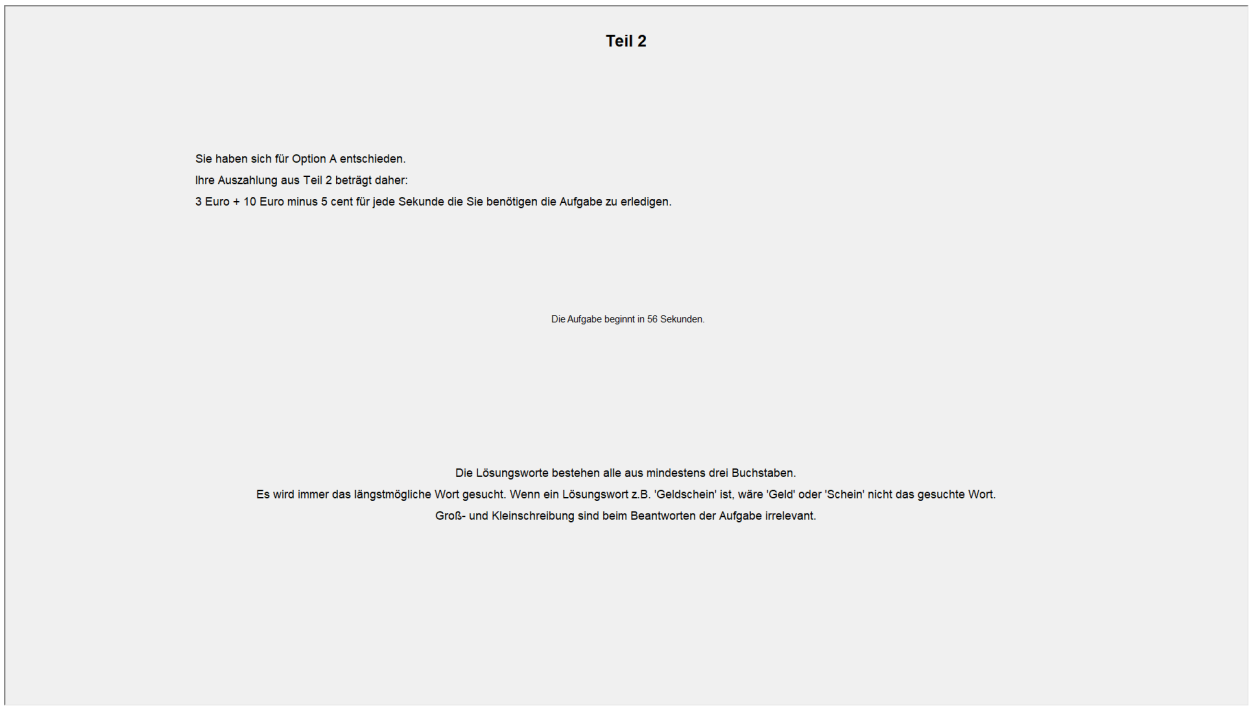


Figure B.11: Announcement task. Subject did not choose competition. All treatments.

Notes: 'Part 2 You have chosen option A. Your payout from Part 2 is therefore: 3 euros + 10 euros minus 5 cents for each second it takes you to complete the task. The task starts in 56 seconds. The solution words consist of at least 3 letters. The longest possible word is always searched for. For example, if a solution word is 'banknote', 'bank' or 'note' would not be the searched word. Upper and lower case are irrelevant when answering the task."

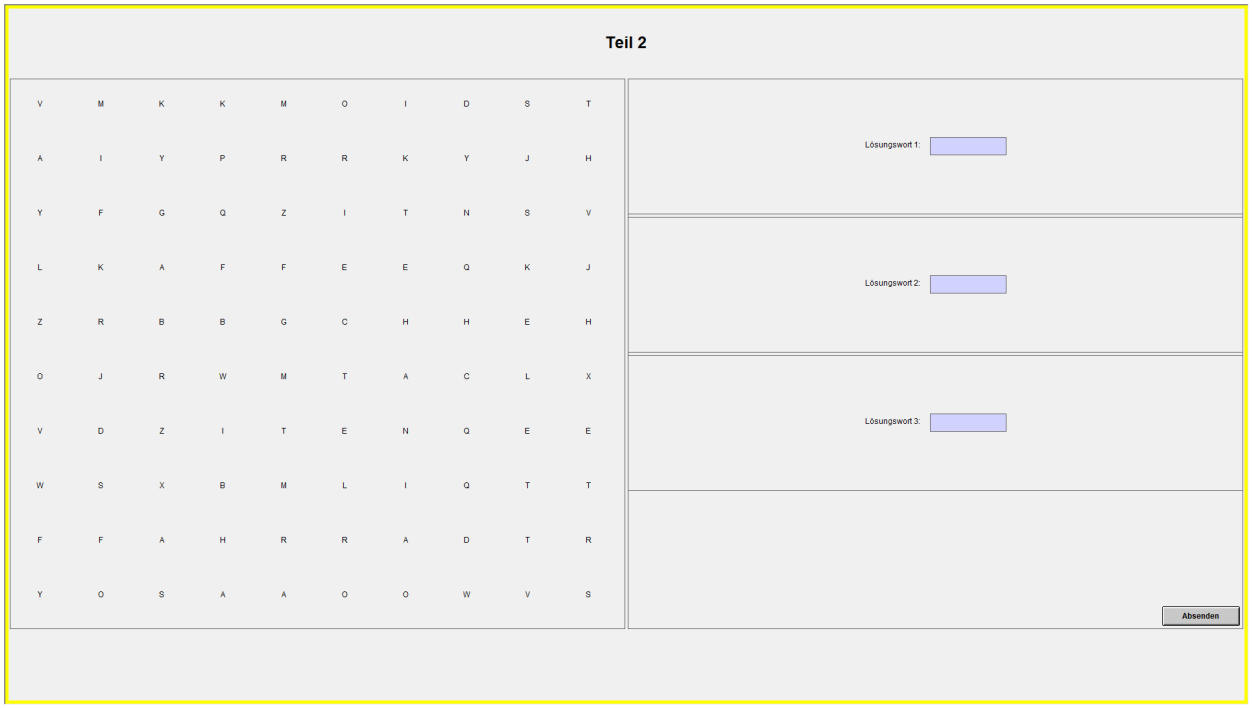


Figure B.12: Task, all treatments.

Notes: 'Solution word 1. Solution word 2. Solution word 3."

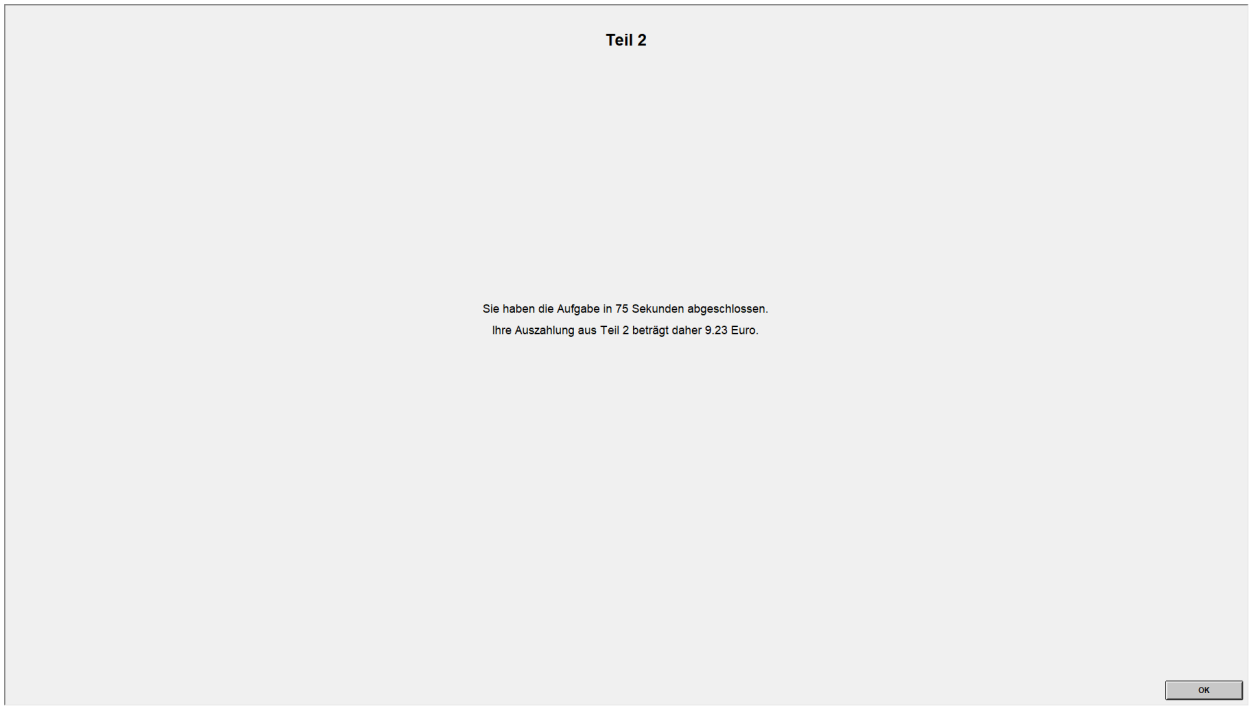


Figure B.13: Feedback of subject who did not choose competition, all treatments.

Notes: 'Part 2. You completed the task in 75 seconds. Your payout from part 2 is therefore 9.23 euros."

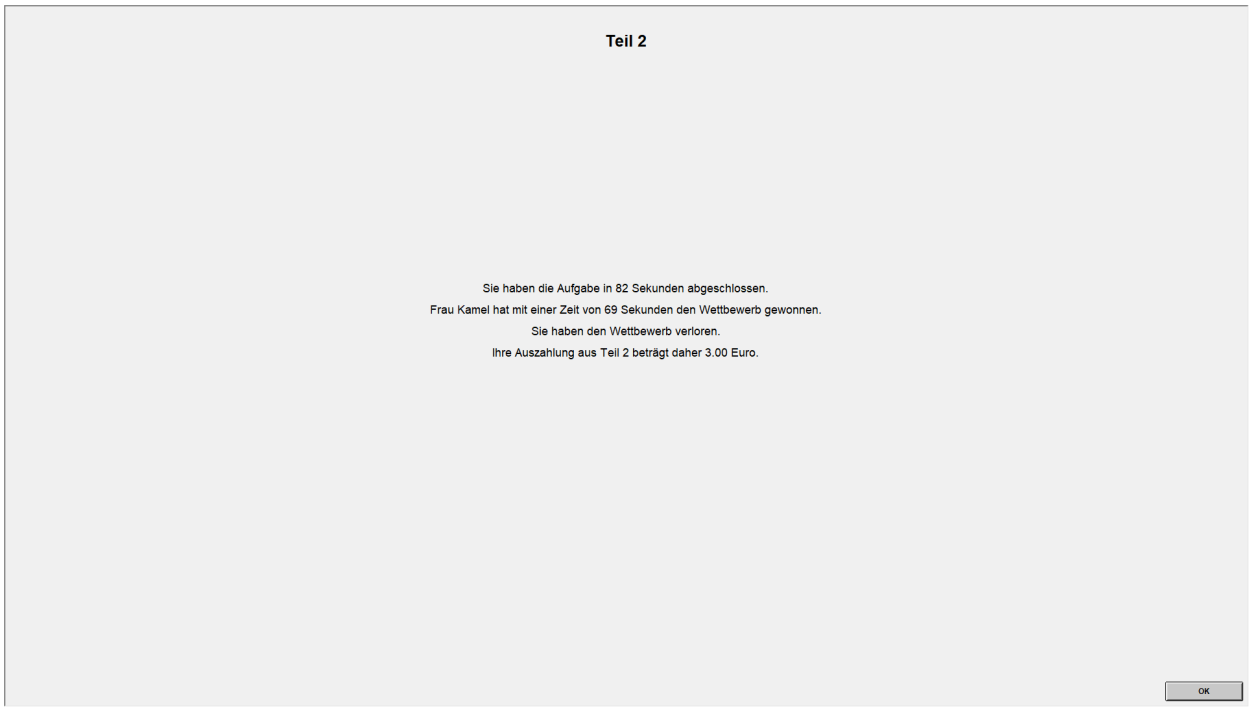


Figure B.14: Feedback of subject who chose competition and lost, all treatments.

Notes: 'Part 2 You completed the task in 82 seconds. Mrs. Kamel won the competition with a time of 69 seconds. You lost the competition. Your payout from part 2 is therefore 3 euros."

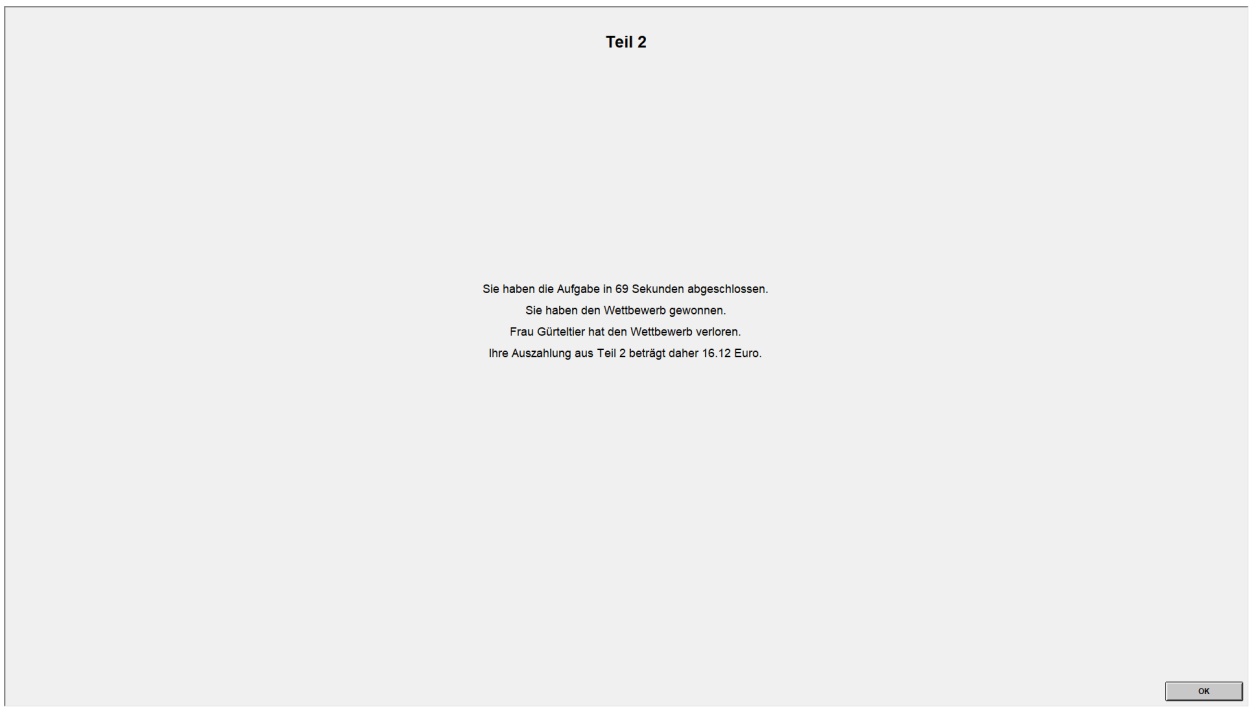


Figure B.15: Feedback of subject who chose competition and won, all treatments.

Notes: 'Part 2. You completed the task in 69 seconds. You won the competition. Ms. Armadillo lost the competition. Your payout from part 2 is therefore 16.12 euros."

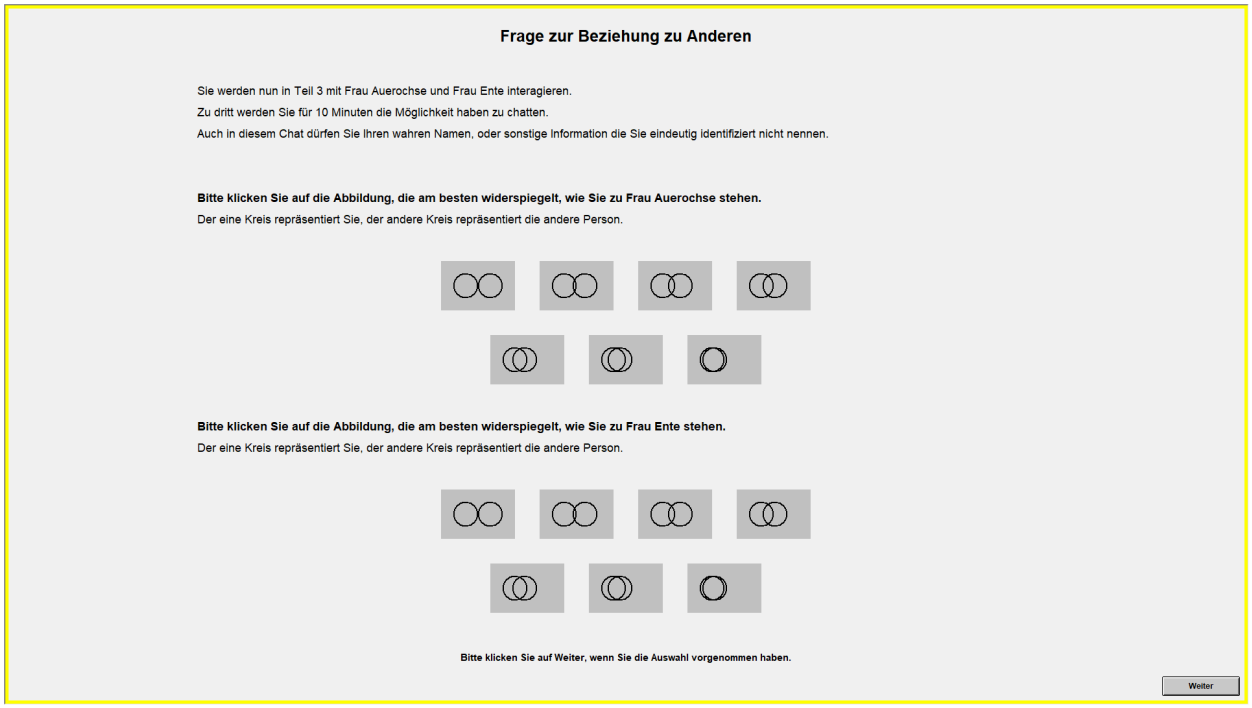


Figure B.16: Closeness elicitation III, all treatments.

Notes: 'Question about relationships with others. You will now interact with Ms. Aurochs and Ms. Duck in Part 3. The three of you will have the opportunity to chat for 10 minutes. In this chat, too, you are not allowed to give your real name or any other information that clearly identifies you. Please click on the image that best reflects how you feel about Ms. Aurochs. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Ms. Duck. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection."

Figure B.17: Chat II, all treatments.

Notes: 'Part 3 (Chat) Current topic: no topic yet. They were given the nickname Mr. Crow. They chat with Mr. Aurochs and Mr. Camel. Time left in this chat: 599 seconds."

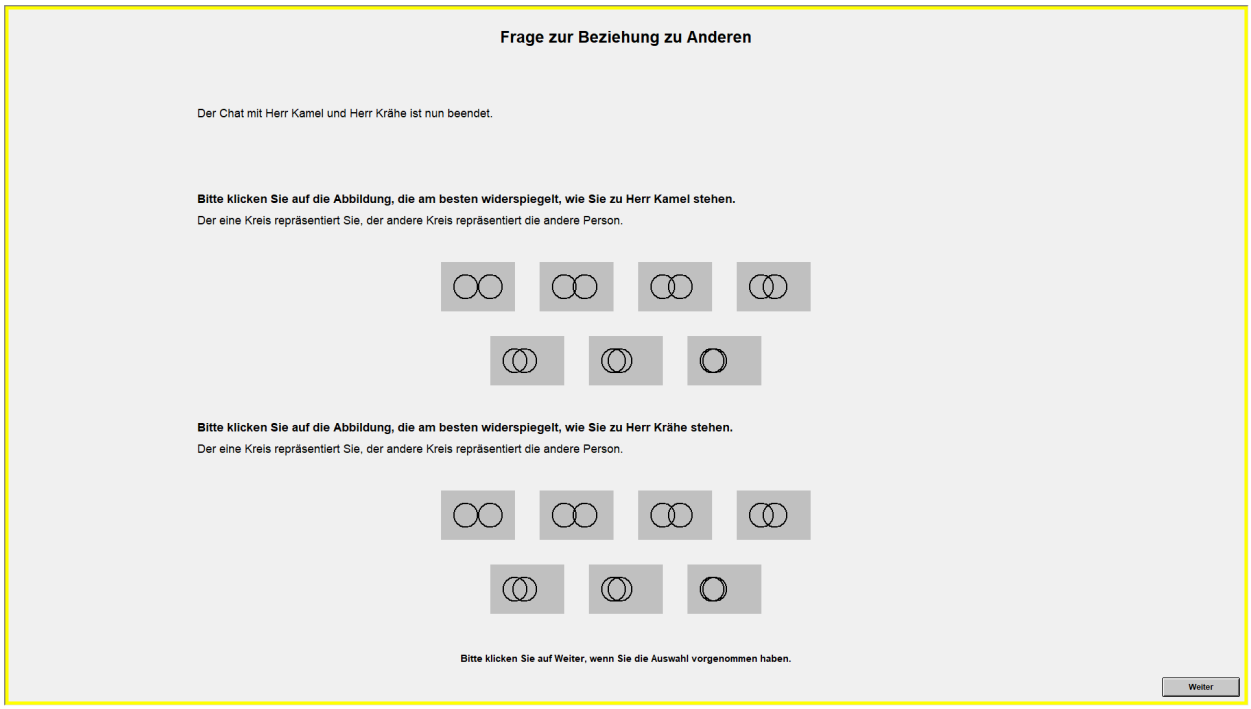


Figure B.18: Closeness elicitation IV, all treatments.

Notes: 'Question about relationship with others. The chat with Mr. Camel and Mr. Crow is now over. Please click on the image that best reflects how you feel about Mr. Camel. One circle represents you, the other circle represents the other person. Please click on the image that best reflects how you feel about Mr. Crow. One circle represents you, the other circle represents the other person. Please click Continue when you have made your selection. Continue."

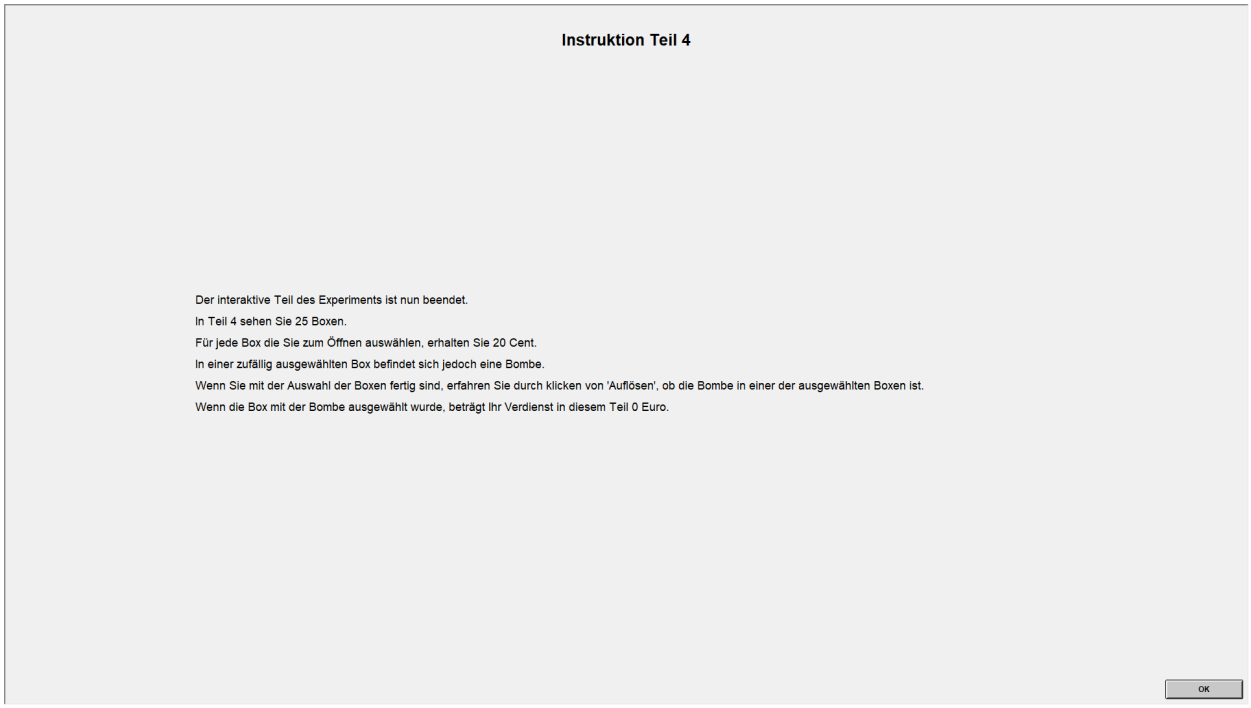


Figure B.19: Risk elicitation task, instructions. All treatments.

Notes: 'Instruction part 4. The interactive part of the experiment is now over. In part 4 you see 25 boxes. You get 20 cents for each box that you select to open. But one randomly selected box contains a bomb. After you finished the selection of the boxes, you learn through clicking on "Solve" whether one of the selected boxes contains a bomb. If the box with the bomb was selected, you get a payout of 0 euros in this part. Ok."

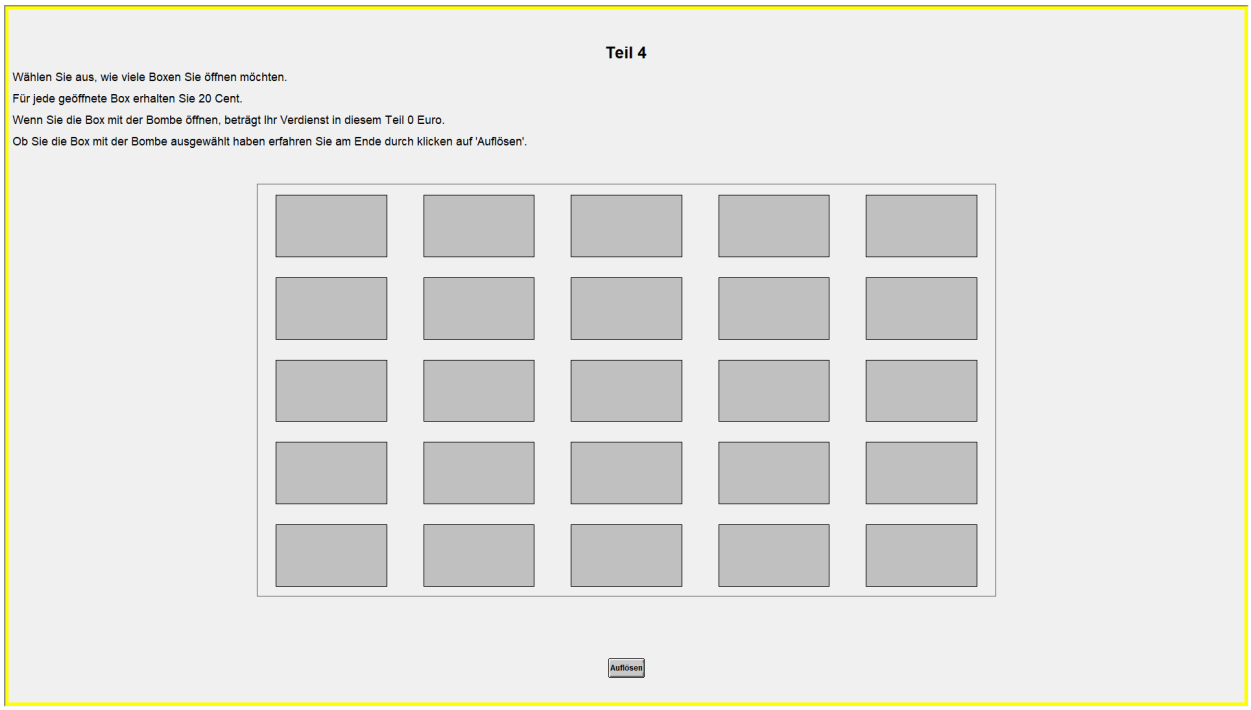


Figure B.20: Risk elicitation task, screen. All treatments.

Notes: 'Part 4. Choose how many boxes you want to open. You get 20 cents for every box you open. If you open the box with the bomb, your payout in this part will be 0 euros. You learn whether you have selected the box with the bomb by clicking on "Solve" at the end. Solve. "

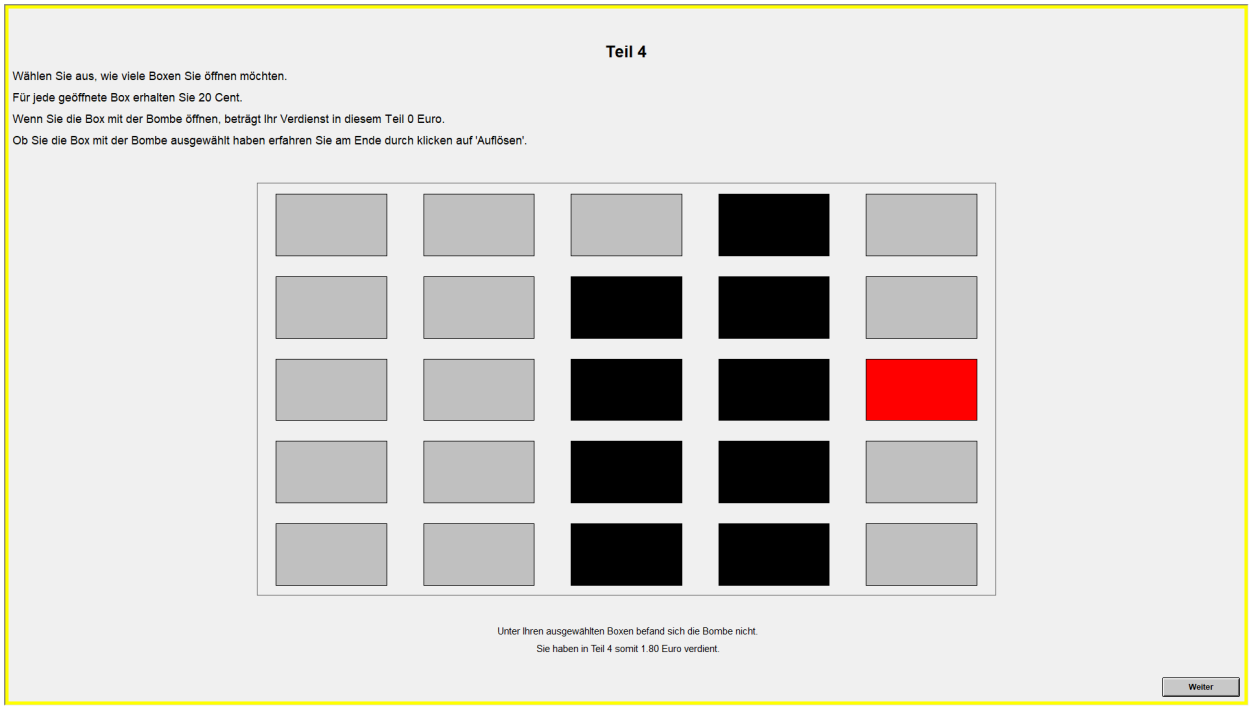


Figure B.21: Risk elicitation task, feedback. All treatments.

Notes: 'Part 4. Choose how many boxes you want to open. You get 20 cents for every box you open. If you open the box with the bomb, your earnings in this part will be 0 euros. You learn whether you have selected the box with the bomb by clicking on "Solve" at the end. The bomb was not among your selected boxes. Therefore, your payoff is 1.8 euros in this part. Continue."

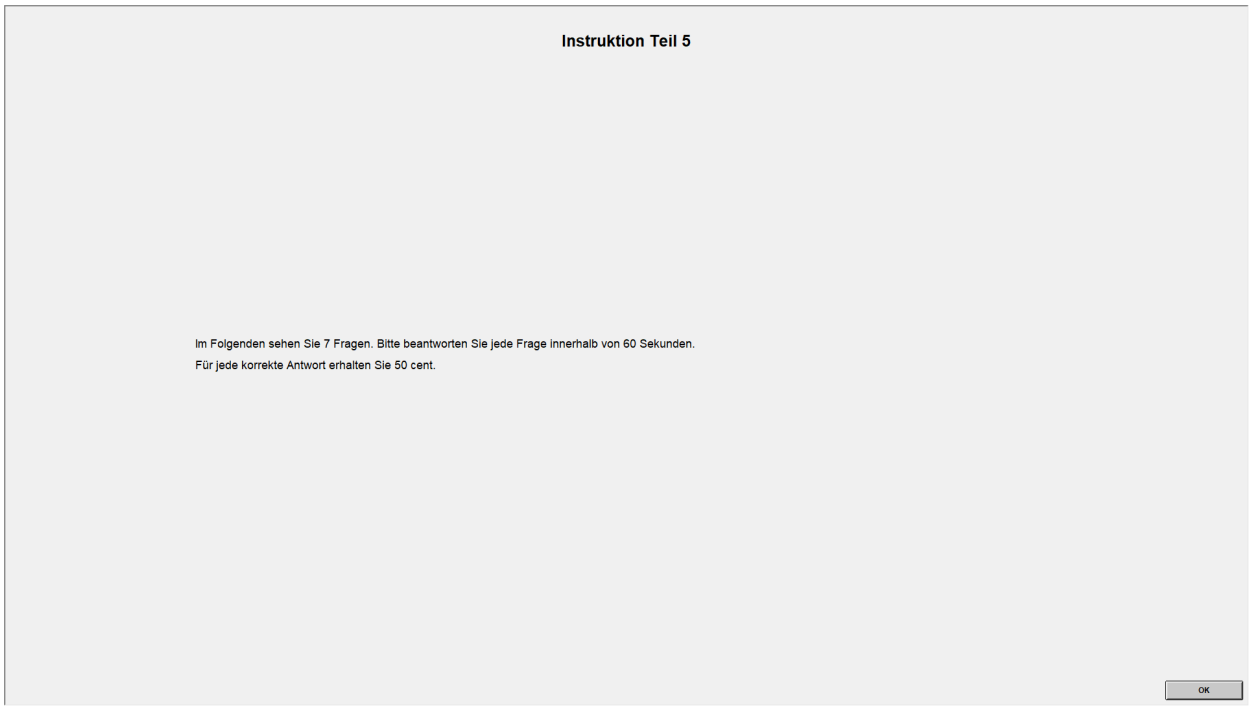


Figure B.22: CRT Instructions, all treatments.

Notes: 'Instruction part 5. You will see 7 questions. Please answer every question within 60 seconds. You get 50 cents for every correct answer. Ok."

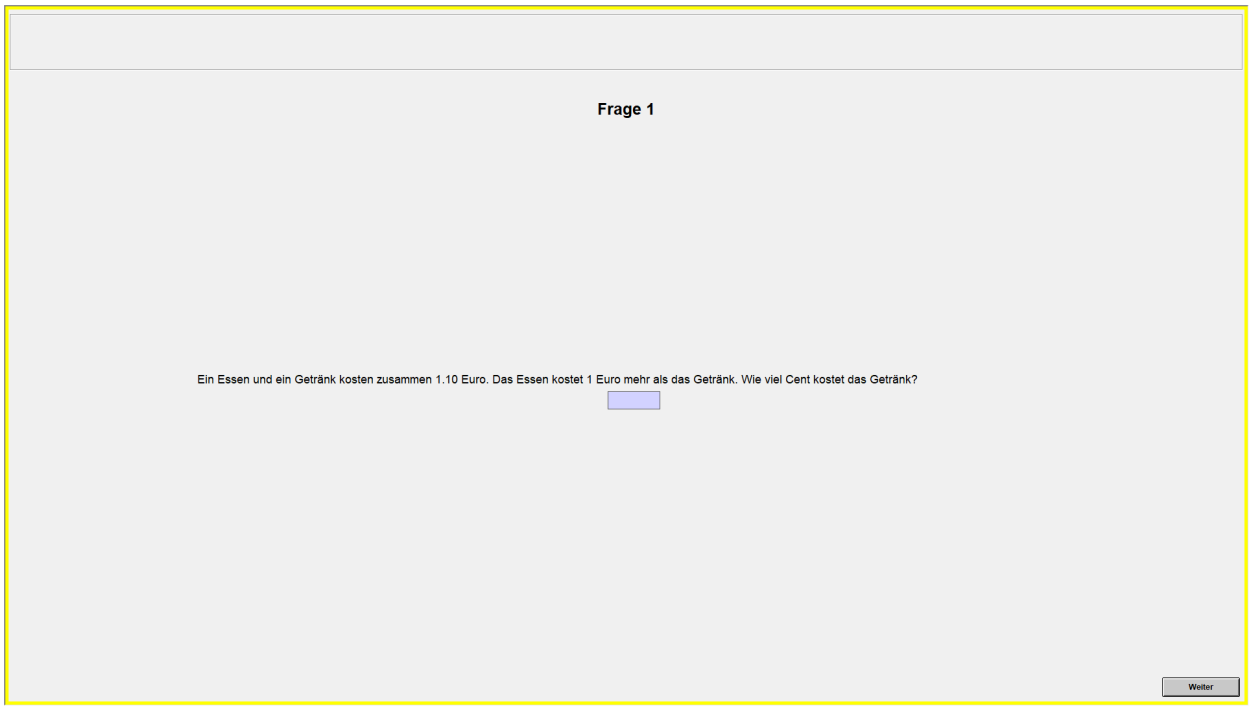


Figure B.23: CRT Question 1, all treatments.

Notes: 'Question 1. One meal and one drink cost 1.1 euros together. The meal costs 1 euro more than the drink. How many cents does the drink cost? Continue."

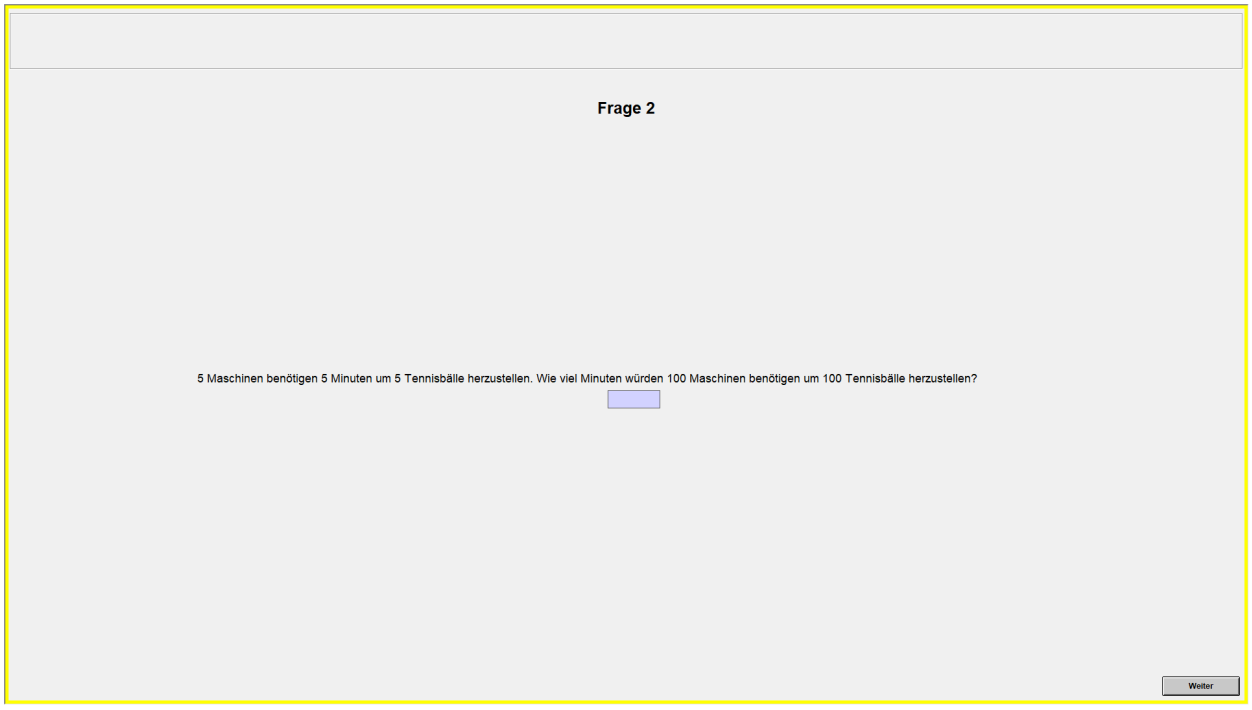


Figure B.24: CRT Question 2, all treatments.

Notes: 'Question 2. 5 machines need 5 minutes to make 5 tennis balls. How many minutes would 100 machines need to make 100 tennis balls? Continue."

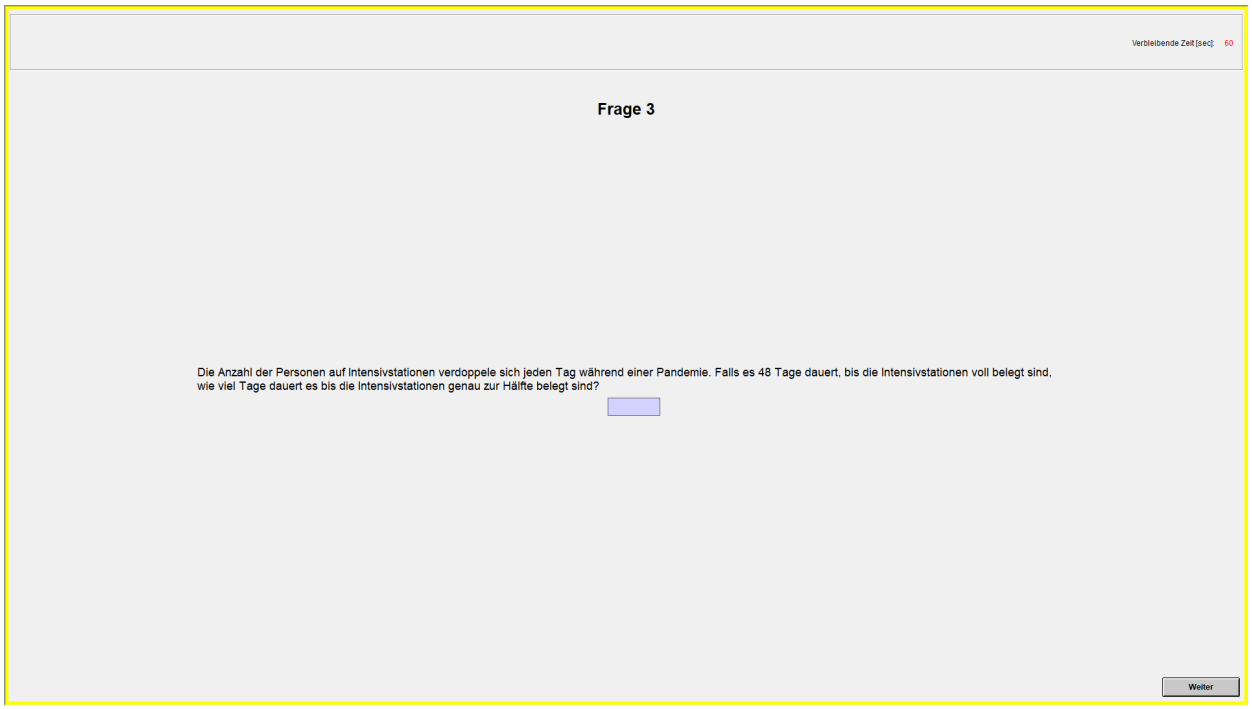


Figure B.25: CRT Question 3, all treatments.

Notes: 'Question 3. The number of people in intensive care units doubles every day during a pandemic. If it takes 48 days for intensive care units to be full, how many days does it take for intensive care units to be exactly half full? Continue."

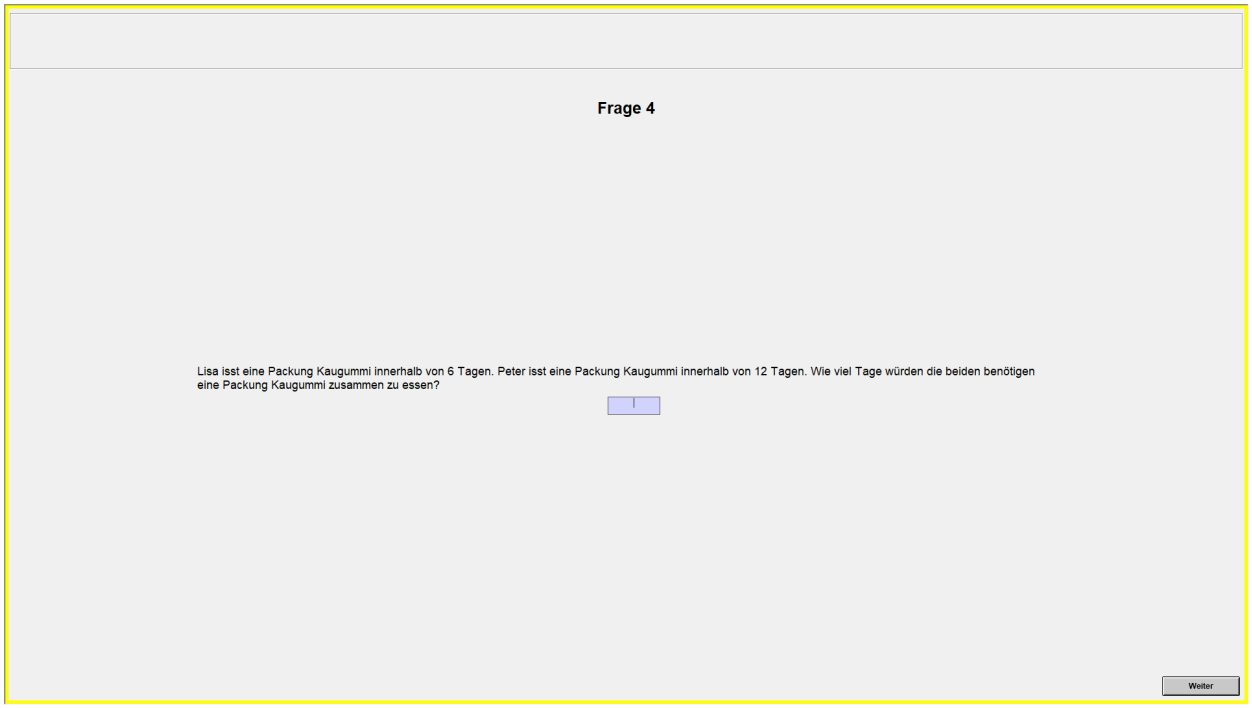


Figure B.26: CRT Question 4, all treatments.

Notes: 'Question 4. Lisa eats a pack of chewing gum within 6 days. Peter eats a pack of chewing gum within 12 days. How many days would it take the two of them to eat a pack of chewing gum together? Continue."

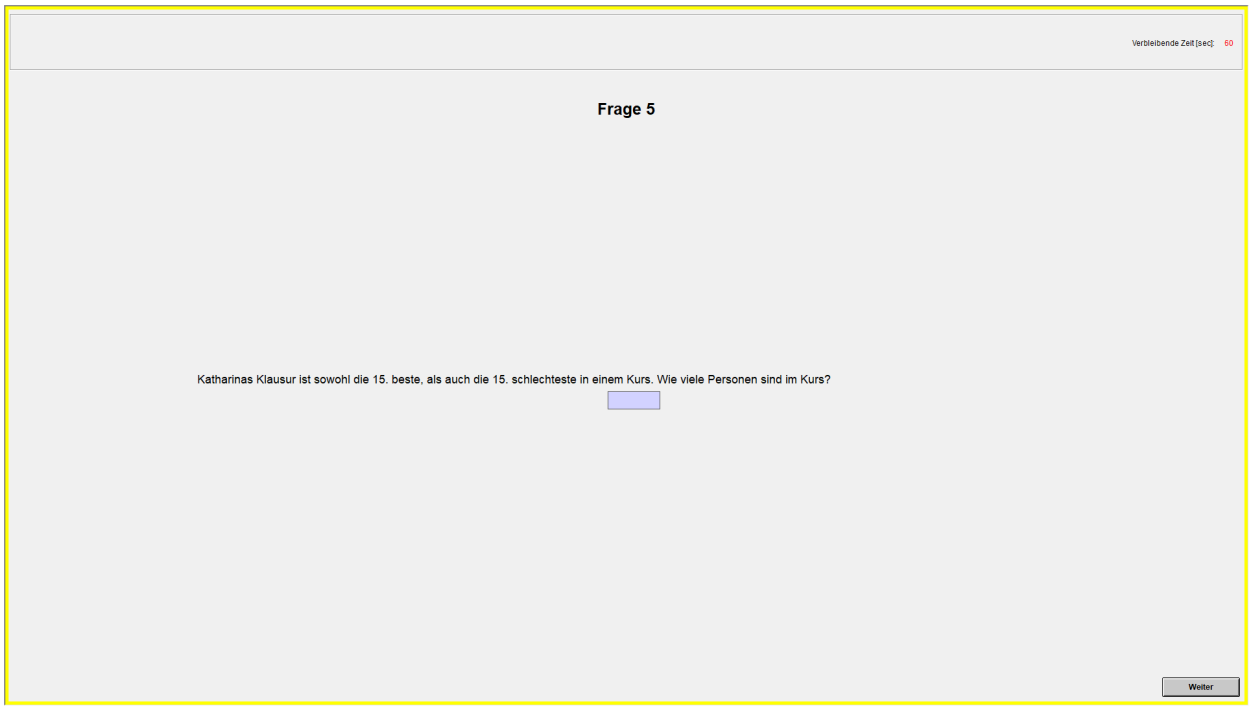


Figure B.27: CRT Question 5, all treatments.

Notes: 'Question 5. Katharina's exam is both the 15th best and the 15th worst in a course. How many people are in the course? Continue."

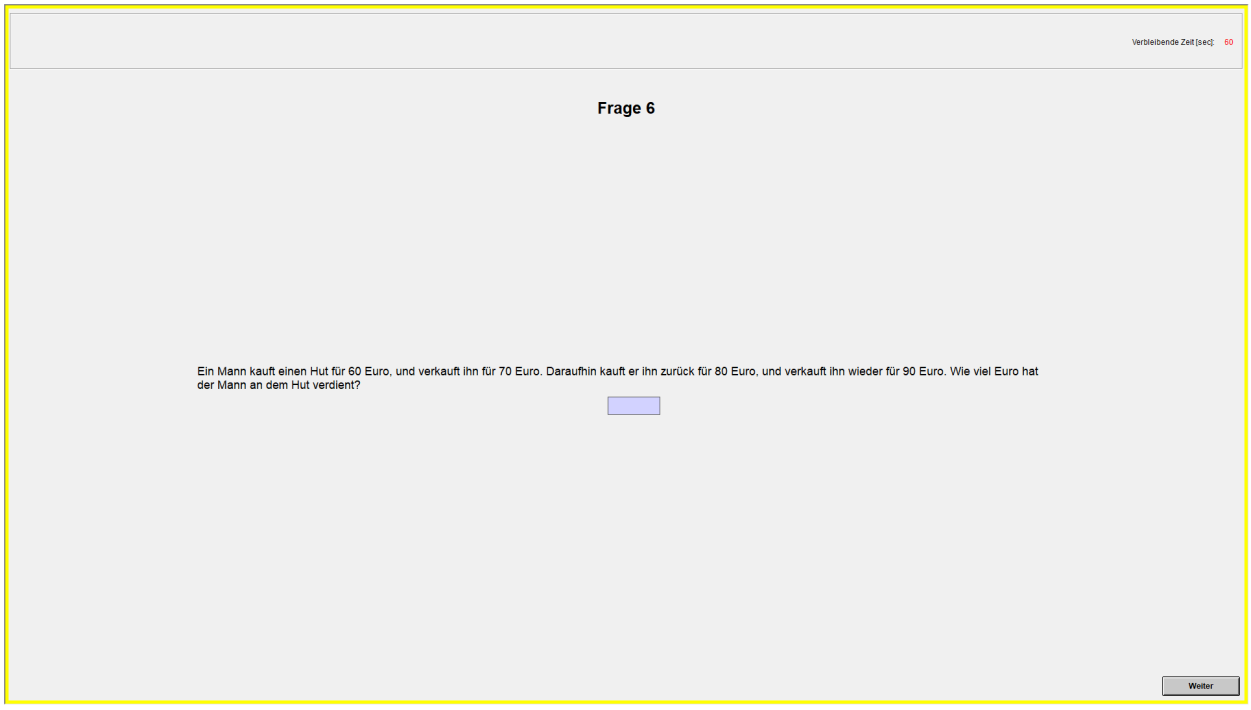


Figure B.28: CRT Question 6, all treatments.

Notes: 'Question 6. A man buys a hat for 60 euros and sells it for 70 euros. He then buys it back for 80 euros and sells it again for 90 euros. How much money did the man in the hat earn? Continue."

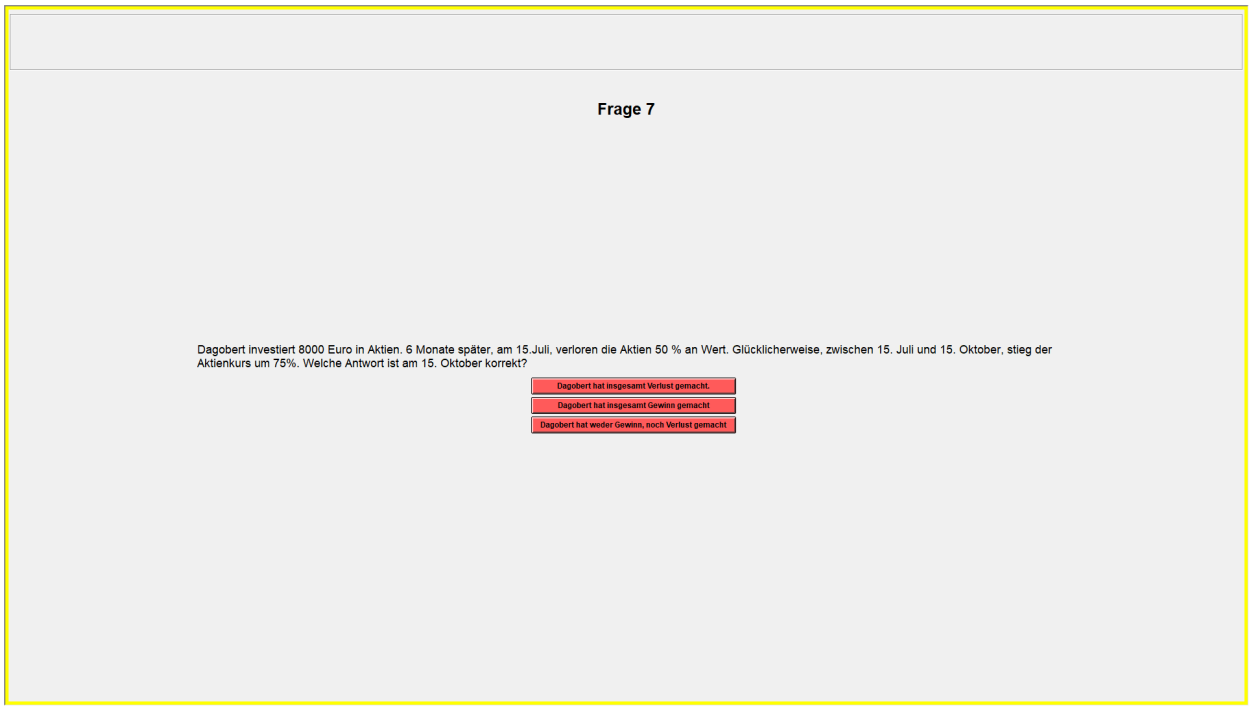


Figure B.29: CRT Question 7, all treatments.

Notes: 'Question 7. Dagobert invests 8000 euros in shares. 6 months later, on July 15, the shares had lost 50% of their value. Fortunately, between July 15th and October 15th, the stock price rose by 75%. Which answer is correct on October 15? Dagobert made a loss overall. Dagobert made a profit overall. Dagobert did neither profit nor loss."

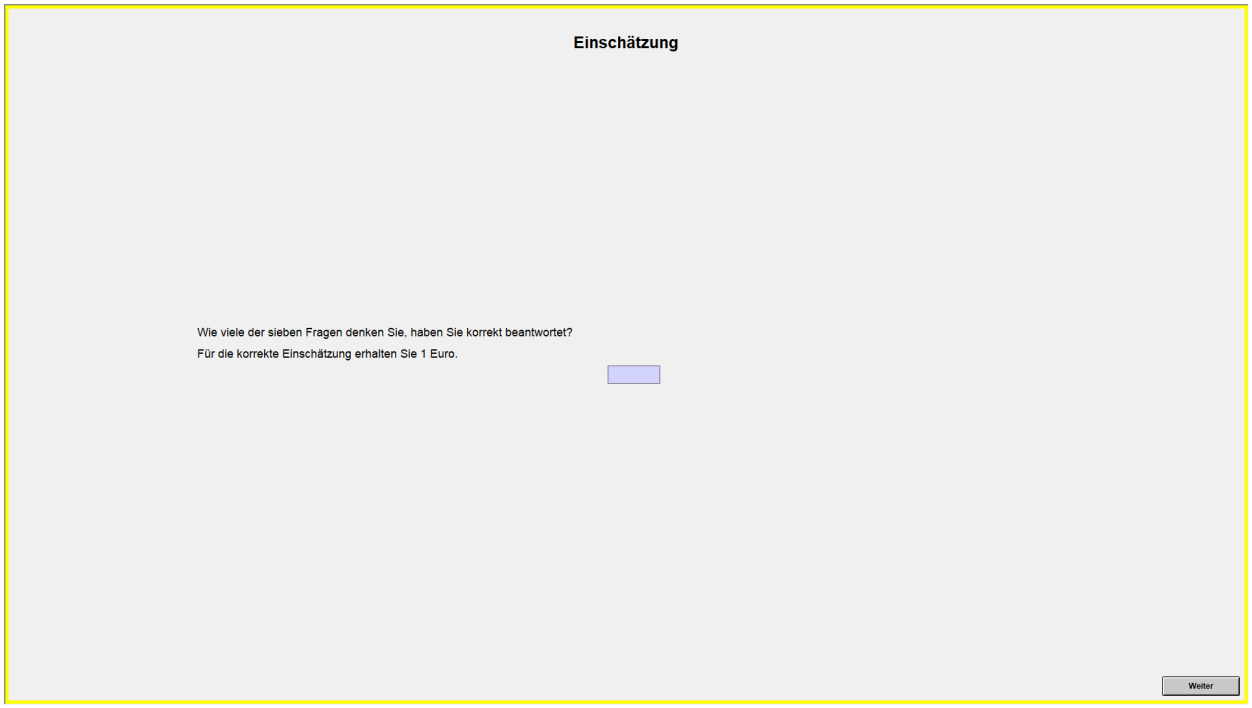


Figure B.30: CRT self evaluation, all treatments.

Notes: 'Assessment. How many of the seven questions do you think you answered correctly? You will receive 1 euro for the correct assessment. Continue."

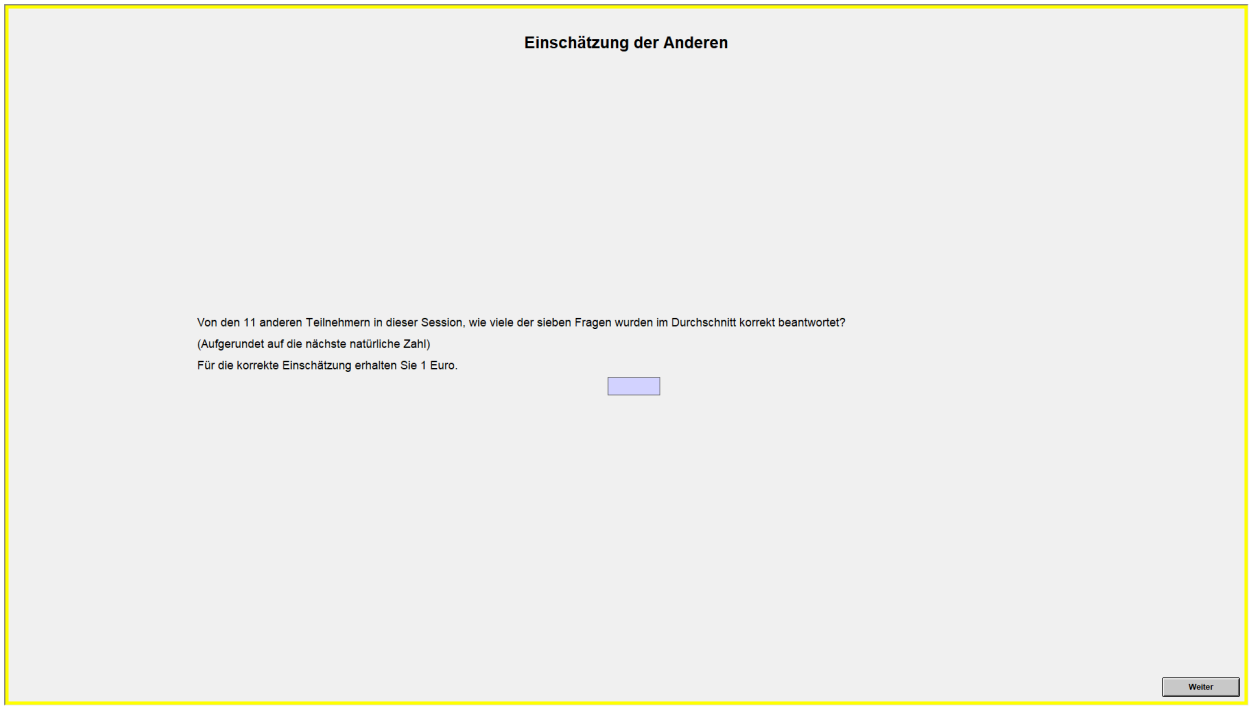


Figure B.31: CRT belief about others, all treatments.

Notes: 'Assessment of the others. Of the 11 other participants in this session, on average, how many of the seven questions were answered correctly? (Round up to the next natural number). You will receive 1 euro for the correct assessment. Continue."

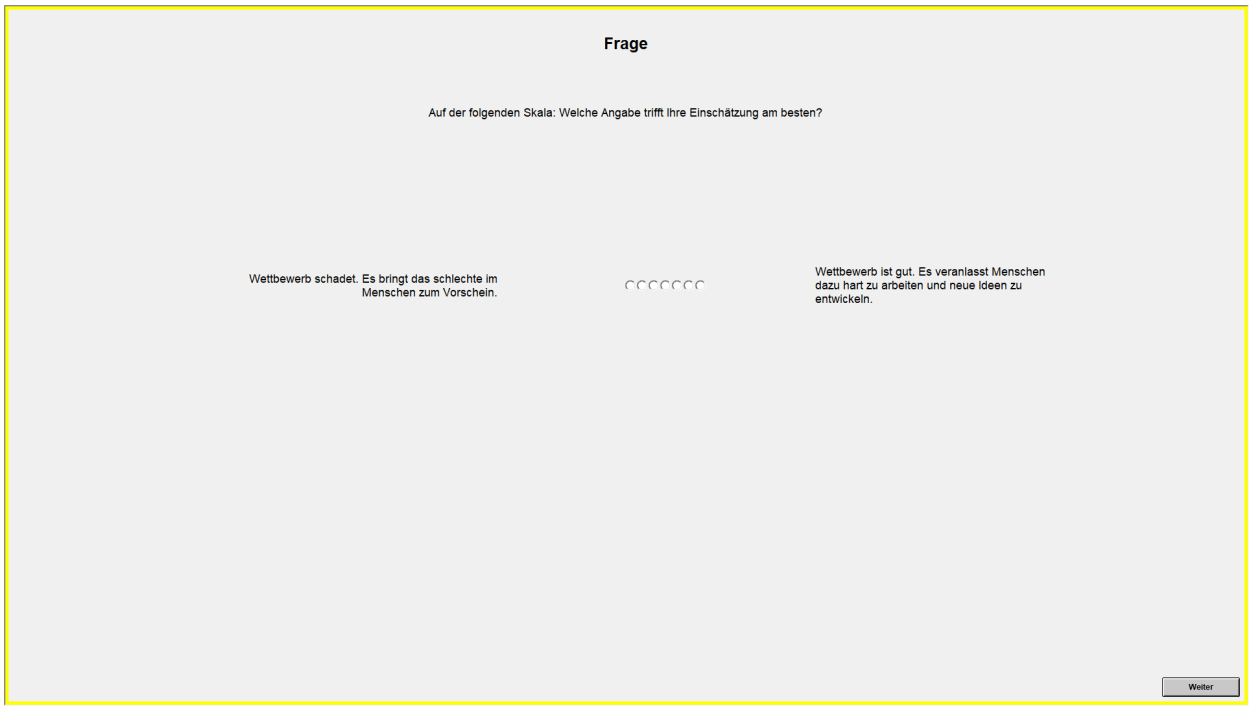


Figure B.32: Preference for competition question, all treatments.

Notes: 'Question. On the following scale: Which statement best describes your assessment? Competition hurts. It brings out the bad in people. Competition is good. It makes people work hard and come up with new ideas. Continue."

Figure B.33: Final Feedback, all treatments.

Notes: 'Payout. Part 2. Your payout from Part 2 is 10.84 euros. Part 4. Your payout from Part 4 is 1 euro. Part 5. You answered 6 of the 7 questions correctly. Your payment for this is 3 euros. You were correct in your assessment. Therefore, you will receive an additional 1 euro. The other participants in the session answered on average 4 questions correctly. You were correct in your assessment. Therefore, you will receive an additional 1 euro. You have thus earned a total of 16.84 euros. Including the 3 euros show-up fee you get 19.84 euros. This amount will be transferred to you in the next few days. OK."