



# Do self-talk phrases affect behavior in ultimatum games?

Vincenz Frey<sup>1</sup> · Hannah N. M. De Mulder<sup>2</sup> · Marlijn ter Bekke<sup>3,4</sup> ·  
Marijn E. Struiksmā<sup>5</sup> · Jos J. A. van Berkum<sup>5</sup> · Vincent Buskens<sup>6</sup>

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## Abstract

The current study investigates whether self-talk phrases can influence behavior in Ultimatum Games. In our three self-talk treatments, participants were instructed to tell themselves (*i*) to keep their own interests in mind, (*ii*) to also think of the other person, or (*iii*) to take some time to contemplate their decision. We investigate how such so-called experimenter-determined strategic self-talk phrases affect behavior and emotions in comparison to a control treatment without instructed self-talk. The results demonstrate that other-focused self-talk can nudge proposers towards fair behavior, as offers were higher in this group than in the other conditions. For responders, self-talk tended to increase acceptance rates of unfair offers as compared to the condition without self-talk. This effect is significant for both other-focused and contemplation-inducing self-talk but not for self-focused self-talk. In the self-focused condition, responders were most dissatisfied with unfair offers. These findings suggest that use of self-talk can increase acceptance rates in responders, and that focusing on personal interests can undermine this effect as it negatively impacts the responders' emotional experience. In sum, our study shows that strategic self-talk interventions can be used to affect behavior in bargaining situations.

**Keywords** Self-talk · Ultimatum bargaining · Emotion regulation · Fairness · Experiment

## 1 Introduction

It is 2015 in Beijing and Usain Bolt is quick off the starting blocks in the world championship finals of the 100-m race. “Yo, this is good”, he says to himself, “just drive through your drive phases, drive through, drive through.” At 80 m, he gets a

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✉ Vincenz Frey  
v.c.frey@rug.nl

✉ Hannah N. M. De Mulder  
h.n.m.de.mulder@hum.leidenuniv.nl

Extended author information available on the last page of the article

bit worried as he sees his main competitor, Justin Gatlin, already dipping forward towards the finish line. “Listen, do not panic”, he admonishes himself, “yo, just time this dip perfectly. Do not dip, do not dip!” He takes his own advice seriously and prolongs his title as the 100-m sprint world champion.<sup>1</sup>

This example illustrates how people can try to control their thought patterns and actions through ‘self-talk’, i.e. by saying things to themselves either out loud or as a small voice inside their head (Theodorakis et al. 2000, p. 254). While this anecdote may not accurately reflect Bolt’s real-life self-talk during the race (Bolt would be hard pushed to utter the last sentence in the 2 s in which he sprints the last 20 m), there is a considerable body of literature to suggest that self-talk does affect athletes’ performance (see Hatzigeorgiadis et al., 2011, and Tod et al. 2011 for reviews and Mallett and Hanrahan 1997, for a study that demonstrates the effectiveness of self-talk for elite sprinters).

In the more recent sports psychology literature, a distinction is made between two different self-talk entities: organic self-talk and strategic self-talk (Latinjak et al. 2019; Latinjak and Hatzigeorgiadis 2020). Organic self-talk is exemplified in the anecdote above: it refers to ‘inherent thoughts and self-statements athletes address to themselves’ (Latinjak et al. 2019, p. 354) and it reflects ongoing cognitive processes (Hase et al. 2019). Strategic self-talk, on the other hand, is developed in interventions and requires its practitioners to use pre-specified cue words or phrases in order to change outcomes (usually with the goal of enhancing performance). Self-talk interventions rest on the assumption that strategic self-talk can alter performance by affecting attentional and appraisal processes, which can affect behavior. That is, self-talk interventions are used in an attempt to enhance attentional focus, increase confidence, regulate effort, control cognitive and emotional reactions and trigger automatic execution (Hardy 2006; Hatzigeorgiadis et al. 2011).

An alternative characterization of the different kinds of self-talk is provided in Van Raalte et al. (2016). This framework builds on Kahneman’s dual processing theory (2011) in which a faster and more intuitive System 1 processing mode is distinguished from a slower and more rational System 2 processing mode. In terms of self-talk, a distinction is made between self-talk that originates from System 1 and self-talk that originates from System 2. System 1 self-talk represents an immediate emotionally-charged reaction to a situation (e.g. ‘Good shot!’ or ‘You idiot!’).

System 2 self-talk, on the other hand, involves reasoning and may lead to self-talk being consciously applied in a particular situation (e.g. ‘Move your feet faster’ or ‘Calm down, things like this can happen’). System 2 self-talk can be useful, but as this type of self-talk requires mental effort, extended use of System 2 self-talk can deplete mental resources and, in turn, decrease performance. However, well-practiced self-talk may not require resources and thus would not be expected to lead to performance detriments.

The current study builds on this sports psychology theoretical background in which self-talk is already studied extensively. However, we think these insights can be used much more broadly, and we investigate effects of self-talk interventions in a totally different domain than sports, namely ultimatum bargaining. The central

<sup>1</sup> Usain Bolt’s quotes come from the film “I am Bolt” (2016).

question underlying this study is whether strategic self-talk can change people's behavior and emotional experience during bargaining interactions. If two individuals or firms have to strike a deal and one can make a proposal, the chances of a successful deal might be higher if the proposer reflects on what the reaction of the other might be and that a completely unfair proposal might jeopardize the deal. On the other hand, if a proposal is made, responders have to reflect on their own and the other person's position in the deal. This might make them realize that a somewhat unfair deal might be acceptable if the partner is in an advantaged position and if having a somewhat unfair deal is still better than no deal. We address the following questions: Can strategic self-talk phrases promote fair behavior? And can responses to unfair treatment by others be modulated by means of such self-talk phrases? We investigate these questions experimentally by applying a self-talk manipulation to proposers and responders in the Ultimatum Game.

The Ultimatum Game (UG; Güth et al. 1982) is one of the classic games for studying human behavior in interdependent situations. It is used to distill human motives such as fairness in such situations (Camerer 2003; Sanfey 2009) and to study how these might differ between societies (Henrich et al. 2001). In the UG, the proposer is endowed with an amount of money by the experimenter and chooses how much of this money to offer to the responder and how much to keep to himself/herself. If the responder accepts the offer, the responder gets the offered amount while the proposer keeps the remainder. If the responder rejects it, neither of the participants gets anything. In the game-theoretic equilibrium, the proposer offers the minimum possible amount because the responder should accept any positive offer. However, empirical studies show that responders normally reject offers smaller than 20% and proposers offer on average 40% (Camerer 2003; Güth and Kocher 2014; Tisserand et al. 2015; van Damme et al. 2014).

The rejection of an offer comes at a cost to the responder and is commonly attributed to social preferences such as inequality aversion (Fehr and Schmidt 1999; see also Binmore 2010) or willingness to punish unfair behavior (Rabin 1993; Fehr and Gächter 1998, 2000) in combination with the negative emotions triggered by such an unfair offer (Pillutla and Murnighan 1996; Sanfey et al. 2003; Tabibnia et al. 2008; Srivastava et al. 2009; van't Wout et al. 2006; Yamagishi et al. 2009). There is an ongoing discussion in the literature as to whether the rejection of unfair offers is a spontaneous reaction to negative emotions that is not reflected on (Bieleke et al. 2017; Calvillo and Burgeno 2015; Cappelletti et al. 2011; Halali et al. 2014; Jäger et al. 2017; Morewedge et al. 2014). The current research aims to investigate whether the use of strategic self-talk phrases enables responders to regulate negative emotions triggered by unfair offers and thus whether acceptance rates and the level of responder dissatisfaction can be influenced by using this cognitive strategy. While it has been observed that athletes use *organic* self-talk in an attempt to achieve cognitive restructuring when they find themselves in a difficult situation (Latinjak et al. 2020), it is yet unknown whether cognitive restructuring (i.e. viewing the situation in a different light and altering one's response on that basis) can be achieved by the use of *strategic* self-talk phrases. Additionally, we also studied whether such self-talk phrases could influence the offers that proposers make. In a situation without self-talk instructions, proposers tend to offer around 40% of the pie, but perhaps the

use of strategic self-talk can change the thought patterns of proposers and nudge them to display fairer behavior or push them towards less fair choices, depending on the content of the self-talk phrase.

Although we are not aware of economic game experiments with strategic, experimenter-determined self-talk, our study relates to two strands of research that focus on what can change the mindsets of participants in economic games. In the first place, various studies have considered to what extent the particular verbal framing of an economic game setting affects players' behavior (e.g. Cubitt et al. 2011; Dreber et al. 2013; Dufwenberg et al. 2011; Ellingsen et al. 2012). For instance, in the Dictator Game (in which an allocator splits a sum of money and a recipient receives whatever the allocator has given to him) allocators can be nudged towards more generous giving behavior if the phrase "note that your recipient relies on you" is added to the instructions to the allocator (Brañas-Garza 2007). For the UG, Sarlo et al. (2013) demonstrate that use of a gain or a loss frame ("I give you..." and "I take...", respectively) affects the rates at which responders accept offers (with the gain frame leading to higher acceptance rates than the loss frame).

Aside from studies investigating framing effects, studies that apply 'cognitive reappraisal' as a mindset changing strategy also suggest that self-talk may be an effective strategy people can use to guide their behavior in the UG. Cognitive reappraisal is a cognitive, verbally-mediated, emotion regulation strategy that modifies the emotional response to a stimulus by formulating alternative interpretations of an event (Goldin et al. 2008). Individuals engaging in cognitive reappraisal focus on assigning a particular personal meaning to a situation and thereby influence which experiential, behavioral, and physiological response tendencies will be generated in that particular situation (Gross 2002). The emotional response can thus be altered as it unfolds by changing the interpretation of a situation. Depending on the particular nature of the reappraisal, emotions can be either intensified or weakened. If responders are told to reappraise a negative offer in such a way that they feel less negative about it (e.g. by trying to convince themselves that the offer was the best that that particular proposer could do in the circumstances), they are more likely to accept the offer, whereas a reappraisal that involves a focus on the proposer's selfish behavior leads to lower acceptance rates (Grecucci et al. 2013; van 't Wout et al. 2010). Given that such reappraisal instructions enable participants to up- or down-regulate certain emotions (Kross et al. 2014), related effects can be expected from strategic self-talk interventions as they similarly involve attempts at cognitive restructuring by focusing on particular cue words or phrases.

Although results from the sports psychology literature and framing and reappraisal studies suggest that self-talk might well affect responder behavior in the UG, this remains to be tested. We therefore combine insights from these separate domains and explore how behavior and emotions can be influenced in the context of an economic game. Our experiment investigates whether the behavior of both responders and proposers changes in the UG depending on the specific content of the self-talk phrase they are asked to use. In choosing the various self-talk phrases that our participants had to engage in, we focused on a key element in any bargaining interaction: striking a balance between your own interests and those of the other party. One group of participants was nudged towards focusing on their own interests.

Prior to making their decision, these participants were instructed to say to themselves “Let me keep my own interests in mind”. In contrast to this focus on the participant’s own interest, a second group of participants were nudged towards thinking of the other party in the interaction. They were instructed to say to themselves “Let me also think of the other person” before they made their decision. In addition to these two groups that were nudged to focus on either their own interests or on the interests of the other party, a third group of participants was instructed to tell themselves to take the time to contemplate their decision. These participants were asked to use the self-talk phrase “Let me take some time to think calmly”. This phrase was included to assess what the effect would be if people take the time to regulate their emotions. In this way, responders might be able to down-regulate negative emotions that occur on viewing a low offer and make the economically rational decision to accept any positive amount (instead of being left with nothing). Proposers, on the other hand, could realize that although the prospect of gaining a large amount of the pie is exciting, the chances of actually getting anything are larger when the offer is likely to be perceived as reasonable by the other party. Finally, a fourth group of participants did not receive any self-talk instructions. (Table 1 in Sect. 2 provides an overview of the self-talk phrases and the original Dutch self-talk phrases used in the experiment.) On the basis of previous research in the sports psychology, framing and reappraisal domain, we predicted that other-focused self-talk would lead to higher offers from proposers and more acceptance and less negative emotions from responders as compared to the other conditions. For the self-focused and contemplation-inducing self-talk conditions our aim was more exploratory in nature: would participants’ decisions differ in these conditions as compared to the other self-talk conditions or the condition without instructed self-talk? What effects does it have for proposers and responders to be nudged to focus on their own interests or to be prompted to think over their decision first?

Regarding proposer behavior, our study adds to Brañas-Garza (2007), because we do not only impose thinking more about the other participant, but also have a condition that is focused on the self. Moreover, we employ the UG rather than the Dictator Game. In this way, we investigate whether a similar nudge can be induced as in the Dictator Game by focusing on the other participant, and whether a different shift in behavior can be observed when participants focus on themselves. We also investigate to what extent additional contemplation regarding the offer affects the decisions that proposers make.

For responders, we explore whether our different self-talk phrases can affect acceptance rates as well as levels of satisfaction. Our self-talk phrases may push responders to evaluate something that just happened in the interaction under a specific perspective, as in the reappraisal studies. While in the studies of Grecucci et al. (2013) and van ’t Wout et al. (2010) participants are instructed, for example, to suppress negative emotions, our self-talk phrases do not explicitly ask participants to handle their emotions but instead asked participants to think of themselves or of the other. In this way we try to affect participants’ emotions using different self-talk formulations without referring to emotions or desired behaviors explicitly. In addition, our design was different in several other respects, for instance, our participants played incentivized games with actual other participants, while interaction

partners in the studies of Greccucci et al. (2013) and van 't Wout et al. (2010) were preprogrammed.<sup>2</sup>

## 2 The experiment

In each session of our experiment participants played two sequences of 10 Ultimatum Games (UGs). Proposers were never informed about whether their offers were accepted and within each sequence of 10 UGs everyone played with a new anonymous partner on every round. A participant was in one role – proposer or responder – in the first sequence and in the other role in the second sequence, while remaining in the same self-talk condition throughout. Each proposer was endowed with 20 points at the beginning of every round and the points that participants earned over the rounds were exchanged to euros and paid out privately in cash (20 points = 1 euro) at the end of the session.

At the beginning of their session, all participants read the same printed instructions (see Appendix C). Then, each participant was assigned a role (proposer or responder) and a self-talk condition. Additional instructions regarding the self-talk manipulation were given on the computer screen exclusively to those assigned to a condition with self-talk. Participants in the self-talk conditions were informed that during the games they were going to play they would be asked to covertly say a phrase to themselves and that they should try to internalize the meaning of this phrase (see Fig. 5 in Appendix C). The instructions were silent about the self-talk condition of the partner.

Each Ultimatum Game proceeded as follows. The proposer was endowed with 20 points and asked to propose a division of this endowment. Proposers in the No self-talk condition could make their choice immediately. Proposers in the self-talk conditions first read on the screen “Before you make your choice, covertly say twice to yourself:”. Two seconds later, at  $t + 2$  s, the self-talk phrase appeared (see Table 1 for the phrases). At  $t + 4$  s, the phrase appeared a second time a line below the first phrase, and at  $t + 6$  s a button appeared that allowed the participant to move to the screen on which the offer could be submitted (see Appendix C, Fig. 6 for an example of a proposer's screen after  $t + 6$  s).

The offers were shown to the responders and the responders were asked to accept or reject them. Responders in the condition without instructed self-talk could again choose immediately, whereas those in the self-talk conditions received self-talk instructions following the same procedure as the proposers. Finally, responders had to rate how they felt about (i) the offer of X points and (ii) the proposer with whom they had just interacted, using a 7-point scale ranging from very negative to very positive.

We conducted eight experimental sessions. Per session, all participants starting as responders were in the same self-talk condition while those starting as proposers

<sup>2</sup> This study was conducted in a lab in which deception does not occur. We assume that this enhances validity for studies conducted in this lab in a general sense (see e.g. Jamison et al. 2008), but we have no reason to believe that this has specific effects on our current outcomes.

**Table 1** Self-talk conditions

Condition	Label	Phrase (original Dutch text)
Self-focused phrase	Self	Let me keep my own interests in mind (Laat ik mijn eigen belang voor ogen houden)
Other-focused phrase	Other	Let me also think of the other person (Laat ik ook aan de ander denken)
Contemplation phrase	Contemplate	Let me take some time to think calmly (Laat ik even rustig nadenken)
No self-talk	No	–

were randomly assigned to a condition in a manner that assured an approximately equal number of starting proposers per condition. Over the entire experiment, responders in the different self-talk conditions were thus exposed to a similar mix of proposers in terms of their self-talk condition, assuring that responders in different conditions would receive similar offers. We conducted two sessions per self-talk condition for the starting responders. With 20 to 26 participants per session, a total of 188 participants took part in the experiment, between 46 and 48 per self-talk condition.

The experiment was conducted at the ELSE laboratory at Utrecht University and programmed in *z-Tree* (Fischbacher 2007). The vast majority of participants was recruited from the participant databases of the Utrecht Institute of Linguistics and the ELSE laboratory, using ORSEE (Greiner 2015), and a few additional participants were recruited via flyers and social media from University College Utrecht and advertisement on [www.proefbunny.nl](http://www.proefbunny.nl). Only native Dutch speakers were eligible for participation. In a questionnaire, five participants indicated that they were not native Dutch speakers. We excluded these participants from the analyses. Participants were mostly university students and on average 23 years old (s.d. = 6.0). The sessions lasted about 35 to 50 min and participants earned on average 9.5 euro (s.d. = 1.3), including a 2.5 euro show-up fee.

Although participants played UGs in both roles in subsequent sequences, the analyses in Sect. 3 are based exclusively on data from the first sequence.<sup>3</sup> Additional analyses show that effects of the different self-talk phrases were small in the second sequence (Appendix B). In fact, treatment effects tended to diminish already over the first sequence (see Appendix B, Fig. 4), suggesting that self-talk may become less effective over time, in line with the idea that System 2 self-talk depletes mental resources when used extensively (van Raalte et al. 2016). We will return to this issue in the discussion. In addition, in the second sequence—after the role change—participants might have been affected by their experiences in the other role or have developed assumptions on the self-talk condition of their partner. In Appendix B we show that these factors have significant effects on behavior and undermine treatment

<sup>3</sup> After exclusion of non-native speakers and restricting the focus to the first sequence of 10 UGs, we have 21 to 25 participants per role and condition.



effects in the second sequence (cf. Sanfey 2009). This implies that focusing on the first sequence provides a cleaner test of the effect of the self-talk conditions.

To assess participants' compliance with the self-talk instructions we administered a small questionnaire at the end of the experiment. Participants were asked to reproduce the phrase that they had been instructed to say to themselves. All participants demonstrated accurate memory of their self-talk phrase, although participants did not always reproduce it literally. The general meaning of the phrase was maintained in all cases (e.g. 'take a moment to think about it' instead of 'let me take some time to think calmly'). We also let participants indicate (1) how difficult they found it to stay concentrated while repeatedly saying the self-talk phrase to themselves and (2) how annoying they found it to repeat the self-talk phrase. On 6-point scales ranging from 1 "not at all difficult / annoying" to 6 "very difficult / annoying", the average answer scores were 2.1 and 2.9, respectively, which indicates that the majority of participants experienced little discomfort adhering to the self-talk instructions. When asked whether they were merely rattling off the self-talk phrase or whether they felt they could really get into it, only 24% of participants gave an answer that clearly indicated that they were just rattling off their self-talk phrase, whereas about 44% of participants gave answers that indicated that they could get into it well. Another 19% of participants indicated that they felt they could get into it well at first but that they began rattling off their self-talk phrases after a while. The remaining 13% gave answers that were mixed (e.g., 'sometimes I could get into it, sometimes I couldn't') or that could not easily be categorized (e.g., just answering 'yes' without clarifying whether that referred to rattling off the sentence or getting into it). Overall, these outcomes suggest that the majority of participants followed the self-talk instructions well and did not find it particularly cumbersome to follow the self-talk instructions, especially during the first sequence of 10 UG's that we analyze in the next section.

### 3 Results

#### 3.1 Offers

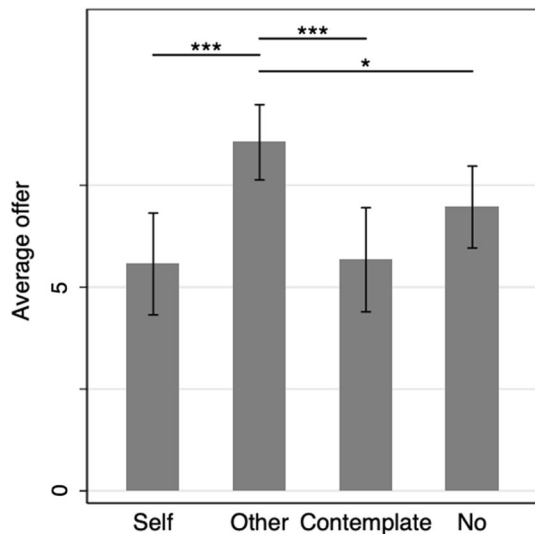
Proposers offered on average 6.7 of their 20 points to the responder (s.d.=3.2). Fig. 1 shows our main result concerning offers: Offers are significantly higher in Other (mean=8.6) than in Self (mean=5.6;  $p < 0.001$ ), Contemplate (mean=5.7;  $p < 0.001$ ), and No (mean=7.0,  $p = 0.016$ ). Offers are furthermore lower in Self and in Contemplate than in No but these differences fall short of statistical significance at the 5% level ( $p = 0.070$  and  $0.097$ , respectively; significance levels obtained from a linear regression of offers on dummy variables for the self-talk conditions; standard errors are adjusted for the ten repeated measures for each proposer and Wald



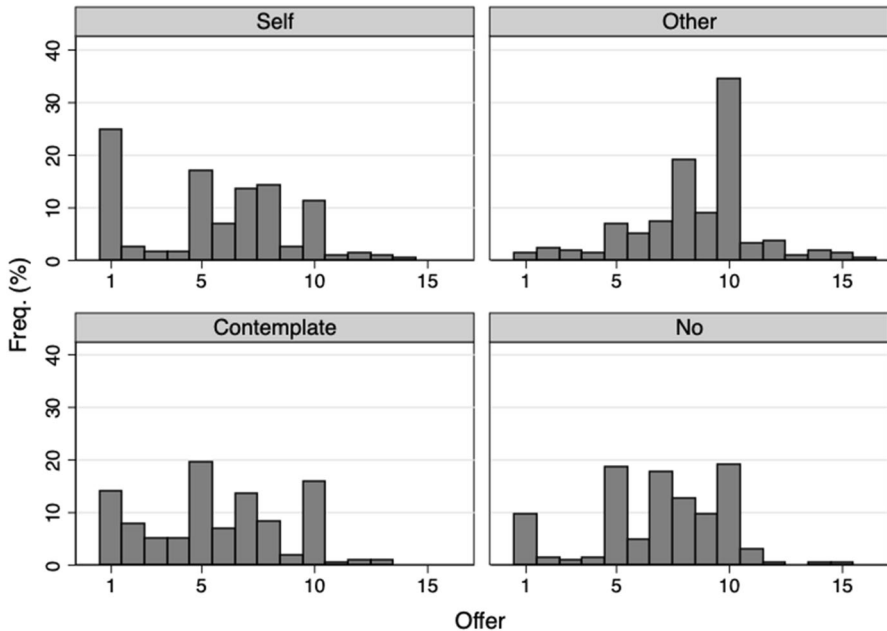
tests are used for comparisons between self-talk conditions that are not directly tested in the regression; see Model A in Table 2 in Appendix A).<sup>4</sup>

Figure 2 shows the distribution of offers for each condition and provides some information on how the treatment effects shown in Fig. 1 came about. In line with higher average offers in the condition with the other-focused phrase, Fig. 2 shows that offers of 10 or more points are most frequent in Other, where the equal-split is the modal offer (35% of all offers). A logistic regression demonstrates that proposers were significantly more likely to offer 10 or more points in Other (46%) than in Self (15%), Contemplate (18%), and No (23%;  $p=0.006$ , 0.014, and 0.019, respectively), while the likelihood of such generous offers does not differ significantly between Self, Contemplate, and No (Table 2, Model E in Appendix A). Proposers' tendency towards making intermediate offers—offers of 6 to 9 points—did not vary significantly between conditions (Table 2, Model D). However, aside from inducing proposers to make very generous offers, other-focused self-talk also inhibited proposers from making very low offers. While minimum offers of just 1 point make up only 1% of the offers by proposers in Other, minimum offers make up 10% and 14% in No and Contemplate, respectively, and minimum offers were even the modal offer in Self, accounting for 25% of the offers. A logistic regression shows that proposers were significantly less likely to offer just 1 point in Other than in Self ( $p=0.004$ )

**Fig. 1** Average number of points offered in the different self-talk conditions (with 95% CIs). Significance of pairwise treatment differences: \*  $p < 0.05$ ; \*\*\*  $p < 0.001$



<sup>4</sup> For analyses with cluster robust standard errors we used the clustered sandwich estimator of standard errors as implemented in STATA (version 13, StataCorp LP, College Station, TX). Furthermore, all reported effects were tested for robustness to the inclusion of several control variables—namely, sex, age, being a student, having had game theory courses, the number of fellow players a participant knows by name, round (1, 2, ..., 10), and decision time. The treatment effects shown in Fig. 1 are robust to the inclusion of these variables and none of these variables has a significant effect on offers at the 5% level. If not otherwise mentioned, reported effects do not change substantially upon the inclusion of these control variables.



**Fig. 2** Distribution of points offered in each self-talk condition

and Contemplate ( $p=0.034$ ; Table 2, Model B). More generally, proposers in Other were less inclined to make low offers—offers of 5 or less points—compared to proposers in Self, Contemplate, and No ( $p=0.001$ ,  $0.001$ , and  $0.041$ ), while the proposers’ propensity to make low offers did not vary significantly between the latter conditions (Appendix A, Table 2, Model C). In sum, these observations suggest that the use of the other-focused phrase leads to higher average offers because it inhibits very low offers and promotes very generous offers. In addition, the tendency for average offers to be lowest in Self appears to be because the self-focused phrase leads many proposers to offer only 1 point.

### 3.2 Responder Behavior and satisfaction

We restrict the analysis for responders to reactions to “low offers”—offers of up to 5 points (37% of all offers). Offers of 6 or 7 points are accepted 94% of the time and offers of 8 or more points are virtually always accepted (see Table 3 in Appendix A for a summary of the responders’ acceptance decisions and their reported satisfaction by condition and offer size). We analyze treatment effects on acceptance choices and satisfaction in regressions with dummy variables for the self-talk conditions and dummy variables to control for the number of points offered. Error terms for acceptance and satisfaction could be correlated. For example, a responder who accepts a very low offer that would normally be rejected might also report above-average satisfaction with the offer. To allow for correlation of error terms, as in

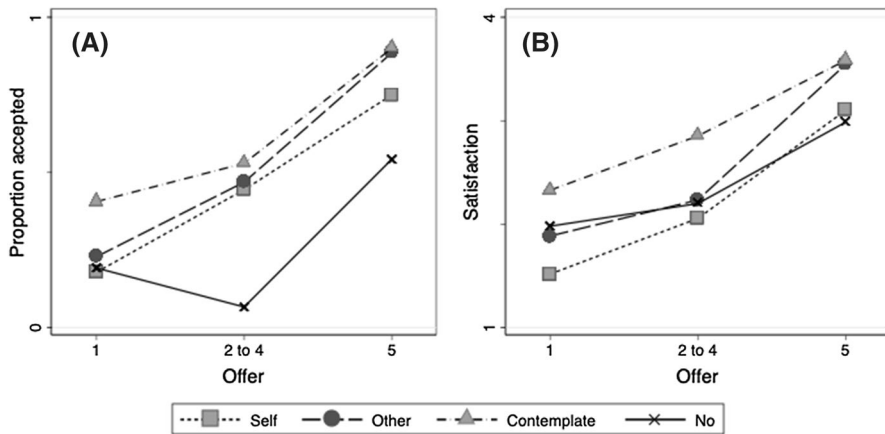
seemingly unrelated regression (Zellner 1962), we use a structural equation model with a probit regression for acceptance, a linear regression for satisfaction, and estimating the correlation in the error terms of both dependent variables. The results of this model are reported in Table 4 in Appendix A, with standard errors adjusted for the repeated measures within individual responders and Wald tests for treatment comparisons that are not tested directly in the regressions.

Responders' inclination to accept a low offer increased with the number of points offered and they tended to accept low offers more often in the conditions with self-talk than in No self-talk (Fig. 3A and Appendix A, Table 4). Specifically, responders' propensity to accept low offers was higher in Other and in Contemplate than in No ( $p=0.007$  and  $0.001$ , respectively), while the difference with the condition with the self-focused phrase is not significant ( $p=0.128$ ). Across the three self-talk conditions, the acceptance rate is highest in Contemplate and lowest in Self, but this difference is not statistically significant ( $p=0.122$ ), nor were any of the other comparisons between the conditions with self-talk (Table 4). Thus, the other-focused and contemplation-inducing self-talk phrases promote the acceptance of low offers compared to the situation without self-talk, and there are no significant differences in the acceptance rates between the conditions with different self-talk phrases. We note that the tendency for higher acceptance rates in the self-talk conditions could reflect that responders were forced to wait at least six seconds before entering their choice in these conditions, whereas in the condition without instructed self-talk they could enter and submit their choice immediately (cf. Cappelletti et al. 2011; Cardella and Chiu 2012; Grimm and Mengel 2011; Oechssler et al. 2008). We return to this issue in the discussion.

Figure 3B shows how the responders' level of satisfaction with low offers varied across the self-talk conditions. After making their decision, responders indicated their satisfaction with (i) the offer and (ii) the proposer on 7-point scales. Because we find no systematic differences in the two aspects of satisfaction we focus on "(average) satisfaction". Responders' satisfaction increased with the number of points offered. Furthermore, responders tended to be least satisfied with low offers in the condition with the self-focused phrase while they were most satisfied in the condition with the contemplation-inducing phrase (Fig. 3B and Appendix A, Table 4). The difference in satisfaction between Self and Contemplate is statistically significant ( $p=0.025$ ), while none of the other differences in satisfaction between self-talk conditions is significant (Appendix A, Table 4).

Furthermore, the simultaneous estimation of treatment effects on acceptance and satisfaction in a structural equation model shows that acceptance and satisfaction are strongly related. Specifically, we find a strong, significant correlation between the error terms of both variables ( $\text{corr}=0.265$ ,  $p<0.001$ ), suggesting that there are unmeasured individual characteristics that influence acceptance and satisfaction in a similar manner.

In sum, the use of strategic self-talk phrases tends to increase the rate at which low offers are accepted as compared to the situation without instructed self-talk; this effect is statistically significant for contemplation-inducing and other-focused self-talk but not for self-focused self-talk. In the condition with the self-focused phrase, responders



**Fig. 3** Reactions to low offers: (A) acceptance rates, (B) responder satisfaction. (Offers of 2 to 4 points are taken together because of the limited number of cases.)

also reported particularly low satisfaction levels, suggesting that self-focused self-talk increases negative emotional reactions to unfair offers.

### 3.3 Payoffs

We investigate effects of our self-talk phrases on proposer and responder payoffs in regressions of payoffs on dummy variables for the condition of the proposer and the condition of the responder. Payoffs in one game may correlate with payoffs in another game in which the same proposer or responder was involved. We control for these two non-nested ways of clustering using cross-classified multilevel regressions with random effects for the individual proposers and responders (see Table 5). Proposers' earnings did not depend on their own self-talk condition. Proposers earned significantly more if they were matched with a responder in Contemplate rather than a responder in No ( $p=0.045$ ), but overall the model for proposer payoffs is not significant (Wald test;  $p=0.445$ ). To some extent, this reflects that effects of the proposer condition on offers will have two consequences for proposer payoffs that tend to cancel each other out: if proposers make a lower offer, they can potentially keep more points, but it is then also more likely that the offer gets rejected.

For responder payoffs these effects point in the same direction: if the proposer makes a higher offer, the responder can get more points and is also more likely to accept the offer. This suggests that the effects of the proposer condition on responder earnings should correspond to the treatment effects on offers reported in Fig. 1. And indeed, responders earned more if the proposer was in Other rather than in Self ( $p<0.001$ ), No ( $p=0.031$ ) or Contemplate ( $p<0.001$ ). Responder earnings were also higher if the proposer was in No rather than Self or Contemplate but these effects are not significant at the 5% level ( $p=0.076$  and  $0.051$ , respectively). The responders' own self-talk condition does not significantly affect responder earnings

(Appendix A, Table 5). Together, these results suggest that if self-talk does affect earnings, it is rather what your partner says to himself/herself that affects your earnings than what you say to yourself.

## 4 Discussion

The aim of the current study is to investigate whether the use of strategic self-talk phrases as a cognitive restructuring strategy could affect people's behavior and emotional experience during bargaining interactions. Regarding proposers, we are primarily interested in whether self-talk could nudge them towards offering larger parts of the pie or prompt them to keep more for themselves depending on the particular self-talk phrase they are instructed to use. For responders, we explored whether strategic self-talk phrases would enable them to regulate emotions when confronted with an unfair offer and, as such, whether it would affect acceptance rates and satisfaction levels.

### 4.1 Self-talk effects in proposers and responders

Our results regarding proposers are quite clear-cut: they demonstrate that other-focused self-talk can nudge proposers towards fairer behavior, as offers were higher in this group than in the other conditions. In other words, if proposers are instructed to tell themselves to focus on the other participant, this stimulates them towards fairer behavior. However, it is less clear how this effect came about. Proposers telling themselves "Let me also think of the other person" could have made higher offers because this self-talk phrase heightened their concern for fairness or because it increased their awareness that the responder could reject a low offer. Our results indicate that both mechanisms could be at work. On the one hand, proposers in the other-focused condition made less very low offers, thus reducing the chance of rejection. On the other hand, proposers also made more very generous offers in the other-focused condition than in the other conditions. These very generous offers are higher than would be strictly necessary for acceptance, so the prevalence of these offers in the other-focused condition suggests that notions of fairness or altruism were also guiding behavior.

It is interesting to note that there are no differences in behavior between proposers that are not directly instructed to focus on the other party. That is, there were no differences in the offers made by proposers who did not engage in any instructed self-talk, proposers who were instructed to focus on themselves and proposers who were prompted to think calmly before making a decision. If we assume that the default stance for participants is to try to make as much money from the interaction as possible, we can explain the similar outcomes for the self-focused self-talk condition and the no self-talk condition. That is, the proposers in the self-focused self-talk condition make low offers because they are instructed to focus on their own interests and the proposers in the no self-talk condition make low offers because the default stance is to focus on their own interests. Although we might have expected fairer

offers in the contemplation-inducing self-talk condition than in the self-focused or no self-talk condition, this is not what we see. Thinking calmly about their decision does not, in itself, seem to lead to fairer behavior on the part of the proposers. Proposers who take the time to overthink their decision might realize that lower offers can be rejected. However, they might also come to realize that it is not rational for responders to refuse positive offers, and they might thus make low offers. We do not have information on the reasoning process of our participants, but the outcomes of our study are in line with the idea that contemplation-inducing self-talk led proposers to focus on the irrationality of refusing a positive offer and, consequently, to make relatively low offers.

For responders the results are less clear-cut. We found higher acceptance rates for responders in the contemplation-inducing and other-focused self-talk conditions as compared to the condition without self-talk, but responder behavior did not differ between the self-focused self-talk condition and any of the other conditions (nor were there significant differences between the other conditions with instructed self-talk). However, given that other-focused and contemplation-inducing self-talk phrases enhance acceptance rates as compared to no instructed self-talk whereas self-focused self-talk seems to do so less, there is thus some suggestion in the data that the content of the self-talk matters for acceptance. Furthermore, satisfaction levels were lowest in the self-focused condition, but this only reached statistical significance in comparison to the contemplation-inducing self-talk condition. There is thus no clear overarching interpretation of the findings for the responders, but there are some differences in relation to the findings for the proposers that stand out. Whereas for proposers only the other-focused self-talk condition differed from the other conditions, for responders, the other-focused self-talk and the contemplation-inducing self-talk groups pattern together in terms of acceptance rates. Perhaps both of these conditions allow participants to down-regulate negative emotions that they experience on being confronted with a low offer. Other-focused self-talk may contribute to a sense of empathy for the other party (they also just want to get some money out of their participation in the experiment); contemplation-inducing self-talk may help responders in realizing that it is not rational to refuse positive offers. Both of these perspectives may down-regulate negative emotions and induce responders to accept offers. In contrast, when responders focus on themselves (because they are instructed to do so in the self-focused self-talk condition and as a likely default in the no self-talk condition) the injustice of a low offer will presumably be felt more acutely and rejection follows.

Although we also found higher acceptance rates when responders focused on the other party, we note that the findings for responders are somewhat different to those reported in previous studies that found that both acceptance rates and emotional experience could be altered when responders focus on the other party in the interaction (Grecucci et al. 2013; van 't Wout et al. 2010). These studies found higher acceptance rates and a less negative emotional experience to be associated with a reappraisal that put the intentions of the other participant in a less negative light (i.e. reappraisals of the type 'maybe this is the best offer he/she can make in his/her personal circumstances' enhanced acceptance rates). Our other-focused self-talk phrase ('let me also think of the other person') may have been interpreted in different ways

by the responders. That is, although we had assumed that self-talk that focuses on the other participant would function as an empathic nudge ('the other participant is just someone like me who would also like to get some money out of this experiment'), it could also have served to emphasize the other participant's egocentric behavior ('I'm supposed to think of this other person now: well, how selfish to make such a ridiculously low offer!'). In this sense then, the particular effect that the other-focused self-talk had may have differed per responder and thus may have had opposite effects on acceptance rates and experienced emotions.

## 4.2 Self-talk phrase interpretation and experimenter-demand effects

The effects of the self-talk phrases for both the proposers and the responders thus crucially hinge on the exact interpretation that participants gave to the phrases, particularly the other-focused phrase. Future research could investigate this further by using different other-focused self-talk phrases (e.g. "let me think about how the other might react" vs. "let me also care about the other's interests") or compare our treatment in the UG with the same self-talk treatment in a Dictator Game in which the other person cannot reject the offer. However, it should be noted that self-talk phrases that take the form of clear-cut behavioral instructions are not appropriate in this context. That is, if we tell responders to say to themselves 'accept every offer' and they accept every offer, we are more likely to conclude that they complied with experimental instructions instead of being nudged in a certain direction by the self-talk intervention. This entailed that our self-talk phrases had to be more implicit than would be the case in the sports psychological work (in which it does make sense to assess effects of clear-cut instructions). Our self-talk phrases were thus intended to highlight a specific element that is of relevance in the bargaining interaction (the participant's own interests, the interests of the other party and the importance of thinking over the situation prior to making a decision), rather than provide clear behavioral instructions.

Nonetheless, it is possible that our participants took the self-talk instructions as an implicit request to behave in certain ways. Although this may hold for some participants, we do not consider a straightforward "experimenter demand effect" to fully explain our results for various reasons. In the first place, our study has a between-subject design, which should mitigate experimenter demand effects (given that the participants do not know the nature of the different conditions and thus would not be able to adapt their behavior in accordance with perceived demand effects as easily as in within-subject designs) (Zizzo 2010). Furthermore, we see that the effect of the specific self-talk phrase fades away later in the sequence (see Appendix B), which is more plausibly explained as a diminishing effect of self-talk (given that saying the same phrase to oneself repeatedly is likely to lose its effect over time). In contrast, if participants are acting in accord with what they think is required from them, then this effect is less likely to disappear over time.



### 4.3 Effects of waiting time

Another issue that is relevant in the interpretation of the results is how the imposed waiting time affects decisions. All participants in the self-talk conditions had to wait at least six seconds before they could enter their decision (which offer to make for proposers and whether to accept the offer for responders) while participants in the no self-talk condition could make their decision immediately. This factor may thus have influenced the results, as previous studies (Cappelletti et al. 2011; Cardella and Chiu 2012; Grimm and Mengel 2011; Oechssler et al. 2008) suggest that forced ‘cooling off’ periods enhance acceptance rates. However, waiting time does not fully explain our results. If the presence of self-talk only affected decisions because of its association with waiting time in our design, we would not expect to see differences between the self-talk conditions. For the proposers, the other-focused self-talk condition clearly has a different effect on offers than the self-focused self-talk condition, the contemplation-inducing self-talk condition and the no self-talk condition. For the responders, we would expect to see higher acceptance rates in the self-focused self-talk condition as compared to the no self-talk condition if waiting time was the primary factor influencing acceptance rate. As this difference is not significant, we suggest that the particular way in which the waiting time is filled (i.e. the specific content of the self-talk) is also of importance in determining acceptance rates. In addition, differences in proposer and responder behavior between the conditions with self-talk and the baseline treatment without self-talk tended to decrease over the rounds of the sessions (see Appendix B). This is to be expected if the differences indeed reflect effects of self-talk and if self-talk effects fade out with repetition.

### 4.4 Effects of self-talk use over time

As stated above, the effects of our self-talk manipulation were found to diminish over time. So much so, in fact, that in this analysis we only present the findings from the first sequence, in which differential effects of self-talk are still present (but see Appendix B for an analysis of the effects over the sequences). This finding may be surprising if the self-talk intervention is seen as a mental strategy, which should be more effective the more it is trained (Hatzigeorgiadis et al. 2011). Indeed, the meta-analysis conducted by Hatzigeorgiadis et al. (2011) found training to be a significant moderator of self-talk effects in sports contexts (larger effect sizes were demonstrated for studies with longer training and implementation sessions). However, given our particular set-up, current theorizing on self-talk can explain our findings. For each of the 20 UGs that the participants played, they had to repeat their self-talk phrase to themselves twice. At the end of the full session, the self-talk phrase had thus been repeated 40 times. Participants were explicitly prompted to engage in the intervention each round and an enforced waiting period entailed that this part of the process could not be skipped. Participants thus had to keep the phrase in memory throughout the experiment and make the conscious effort of repeating it to themselves when cued. This entails that the self-talk phrase posed demands on

mental resources, thereby depleting them as the experiment progressed. In line with the dual process theories of self-talk as espoused by Van Raalte et al. (2016), the extended use of the System 2 self-talk that our study required could overtax the cognitive system and erase any differential effects that the various self-talk phrases had in the initial phases of the study. This effect may be particularly pronounced because the assigned self-talk phrases impeded the participant's own organic self-talk from occurring. Participants were thus not free to fully focus on their own priorities in making a decision, but instead had to devote mental energy to repeating the experimenter-determined self-talk phrase. In this sense, assigning specific phrases, that may not be in line with the participant's natural inclinations, could be seen as a negative intervention and potentially have a counterproductive effect. Future research could investigate this issue by allowing participants some measure of freedom in determining their own self-talk phrase, as there is some suggestion in the literature that there are motivational advantages associated with self-determined self-talk phrases (Hardy 2006). Self-talk phrases that are more in line with the participant's own perspective on the matter may be less cognitively demanding (and unambiguous) and thus remain effective over time.

## 5 Conclusion

Together then, our results suggest that the use of strategic self-talk phrases affects behavior in bargaining situations. If proposers are instructed to talk to themselves in a way that induces a focus on the other participant, this can nudge them towards fairer behavior. Also, responders are more likely to accept a low offer when they are instructed to talk to themselves in a way that either induces a focus on the other participant or that simply induces them to think calmly before making a decision. When responders are instructed to engage in self-talk involving their own interests, they are not inclined to accept a low offer more readily, and they also tend to experience more negative emotion.

In general, our study does not only show how the literature on bargaining can be enriched by taking a self-talk angle, but also that self-talk is relevant beyond individual behavior in the domain of sports. Indeed, the study of interdependent behavior in social interactions can benefit from involving a self-talk perspective. So, for Usain Bolt to be inclined to share his bottle of champagne after winning the race, he should really be told to also think of poor Justin Gatlin. And if Justin Gatlin is then instructed to avoid talking to himself only about his own loss, they might actually get to enjoy a post-race drink together.

## 6 Appendix A: Additional information on analyses

### 6.1 A.1. Additional information on analyses of proposer behavior for sequence 1

See Table 2.

**Table 2** Regressions of offers on dummy variables for the self-talk condition of the proposer (reference category: no self-talk). A: linear regression of “Number of points offered”, B: logistic regression for “Offer is 1 point”, C: logistic regression for “Offer is smaller or equal to 5 points”, D: logistic regression for “Offer is 6 to 9 points”, E: logistic regression for “Offer is 10 or more points”. Standard errors adjusted for the repeated offers by the same proposers

	A (Offer)	B (Offer = 1)	C (Offer ≤ 5)	D (6 ≤ Offer ≤ 9)	E (Offer ≥ 10)
Self	− 1.396 (0.761)	1.136 (0.761)	0.679 (0.496)	− 0.306 (0.481)	− 0.570 (0.574)
Other	1.589* (0.647)	− 2.035 (1.172)	− 1.080* (0.530)	− 0.177 (0.425)	1.017* (0.435)
Contemplate	− 1.292 (0.770)	0.439 (0.865)	0.820 (0.532)	− 0.616 (0.497)	− 0.323 (0.537)
Constant	6.965*** (0.477)	− 2.246*** (0.617)	− 0.766* (0.354)	− 0.209 (0.308)	− 1.181*** (0.301)
(Pseudo) $R^2$	0.139	0.098	0.078	0.009	0.064
Num. of Obs	900	900	900	900	900
Self = Other <sup>a</sup>	$p=0.000$	$p=0.004$	$p=0.001$	$p=0.785$	$p=0.006$
Self = Contemplate <sup>a</sup>	$p=0.903$	$p=0.354$	$p=0.789$	$p=0.564$	$p=0.708$
Other = Contemplate <sup>a</sup>	$p=0.000$	$p=0.034$	$p=0.001$	$p=0.368$	$p=0.014$

Standard errors in parentheses

\*:  $p < 0.05$ , \*\*:  $p < 0.01$ , \*\*\*:  $p < 0.001$

<sup>a</sup>:  $p$ -value for the rejection of the hypothesis of equality of effects (F-test for Model A, Chi-squared test for Models B to E)

## 6.2 A.2. Additional information on analyses of responder behavior for sequence 1

See Tables 3, 4.

**Table 3** Acceptance rates (A) and average satisfaction (S) by self-talk condition of the responder and number of points offered. Number of observations in parentheses (N)

Offer	Self			Other			Contemplate			No		
	A	S	(N)	A	S	(N)	A	S	(N)	A	S	(N)
1	0.18	1.52	(28)	0.23	1.89	(35)	0.41	2.33	(32)	0.19	1.98	(26)
2	0.50	1.50	(2)	0.47	1.97	(17)	0.43	2.36	(7)	0.14	2.29	(7)
3	0.00	1.50	(2)	0.36	2.64	(11)	0.71	3.07	(7)	0.00	2.20	(5)
4	0.50	2.21	(14)	0.75	2.25	(4)	0.33	3.50	(3)	0.00	2.00	(3)
5	0.75	3.10	(40)	0.89	3.54	(35)	0.90	3.58	(30)	0.54	2.99	(35)
6	1.00	2.70	(5)	0.95	3.82	(19)	1.00	3.97	(15)	0.86	3.04	(14)
7	0.95	3.83	(42)	0.93	4.25	(28)	0.96	5.00	(25)	0.92	4.48	(24)
8	1.00	4.26	(27)	1.00	4.95	(50)	1.00	5.08	(25)	1.00	5.28	(25)
9	1.00	5.07	(15)	1.00	5.50	(12)	1.00	5.58	(12)	1.00	5.41	(16)
10	1.00	5.98	(52)	1.00	6.19	(34)	0.96	6.12	(54)	0.95	5.94	(44)
11	1.00	6.33	(3)	1.00	6.38	(4)	1.00	6.21	(7)	1.00	6.25	(4)
12	1.00	6.00	(3)	1.00	6.00	(1)	1.00	6.40	(5)	1.00	6.60	(5)
13	1.00	6.25	(2)				1.00	6.13	(4)			
14	1.00	7.00	(2)				1.00	6.50	(3)	1.00	5.50	(1)
15	1.00	6.83	(3)				1.00	7.00	(1)			
16										0.00	2.50	(1)
Tot	0.81	4.02	(204)	0.80	4.03	(250)	0.86	4.63	(230)	0.72	4.21	(210)

**Table 4** Treatment effects on acceptance and satisfaction. Generalized structural equation model: probit regression for acceptance and linear regression for satisfaction. Sample: Responders' reactions to offers of 1 to 5 points. Standard errors adjusted for repeated measures of the same responders

	Acceptance	Satisfaction
Self	0.646 (0.425)	- 0.166 (0.294)
Other	1.061** (0.394)	0.208 (0.253)
Contemplate	1.309*** (0.402)	0.531 (0.307)
Offer = 2 points	0.491 (0.269)	0.105 (0.152)
Offer = 3 points	0.303 (0.393)	0.577* (0.237)
Offer = 4 points	0.890* (0.369)	0.574*** (0.156)
Offer = 5 points	2.042*** (0.267)	1.392*** (0.120)
Constant	- 1.676*** (0.330)	1.776*** (0.224)
$R^2$		0.265
Corr( $e_{\text{acceptance}}, e_{\text{satisfaction}}$ ) <sup>b</sup>	0.429*** (0.039)	
Num. of Obs. <sup>b</sup>	343	
Self = Other <sup>a</sup>	$p = 0.321$	$p = 0.147$
Self = Contemplate <sup>a</sup>	$p = 0.122$	$p = 0.025$
Other = Contemplate <sup>a</sup>	$p = 0.538$	$p = 0.235$

Standard errors in parentheses

\*:  $p < 0.05$ , \*\*:  $p < 0.01$ , \*\*\*:  $p < 0.001$

<sup>a</sup>:  $p$ -value for the rejection of the hypothesis of equality of effects (Chi-squared tests)

<sup>b</sup>: The statistics about correlation in error terms and number of observations pertain to the whole model, i.e., to both Acceptance and Satisfaction

### 6.3 A.3. Additional information on analyses of payoffs for sequence 1

See Table 5

**Table 5** Treatment effects on payoffs. Cross-classified multi-level regression with random effects for individual proposers and responders

	Proposer payoff	Responder payoff
<i>Proposer condition (ref. cat.: no self-talk)</i>		
Self	- 0.530 (0.737)	- 1.449 (0.820)
Other	0.071 (0.746)	1.778* (0.826)
Contemplate	- 0.649 (0.750)	- 1.622 (0.830)
<i>Responder condition (ref. cat.: no self-talk)</i>		
Self	0.717 (0.917)	0.176 (0.857)
Other	1.305 (0.894)	- 0.523 (0.830)
Contemplate	1.839* (0.920)	0.919 (0.857)
Constant	9.290*** (0.805)	6.350*** (0.797)
S.d. proposer	1.986*** (0.240)	2.663*** (0.214)
S.d. responder	1.693*** (0.233)	0.458*** (0.134)
Num. of Obs	891	891
<i>Comparisons proposer condition<sup>a</sup></i>		
Self=Other	$p=0.420$	$p=0.000$
Self=Contemplate	$p=0.874$	$p=0.835$
Other=Contemplate	$p=0.341$	$p=0.000$
<i>Comparisons responder condition<sup>a</sup></i>		
Self=Other	$p=0.502$	$p=0.395$
Self=Contemplate	$p=0.214$	$p=0.382$
Other=Contemplate	$p=0.543$	$p=0.079$

Standard errors in parentheses;

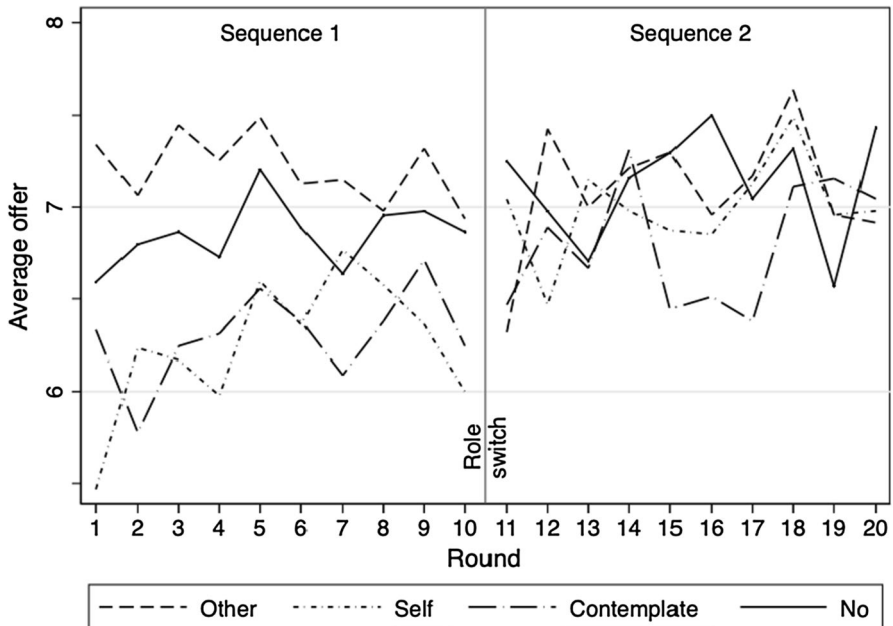
\*:  $p < 0.05$ , \*\*:  $p < 0.01$ , \*\*\*:  $p < 0.001$

<sup>a</sup>:  $p$ -values for the rejection of the null-hypotheses of equality of effects (Chi-squared tests)

## 7 Appendix B: Self-talk effects over the rounds and sequences

The results presented in Sect. 3 of the paper are based exclusively on the first sequence of ten ultimatum games. In this appendix, we look at how self-talk effects decrease over the course of the sessions of our experiment.

Figure 4 shows how the average offer size develops over the 20 ultimatum games played in a session, separated by the self-talk condition of proposers. It can be seen that self-talk effects on proposer behavior already diminish during sequence 1. This



**Fig. 4** Development of the average number of points offered over the twenty ultimatum games played in a session, separated by the self-talk condition of proposers

weakening of treatment effects in sequence 1 is also visible from a comparison of Models A and B in Table 6—which regress, respectively, offers made in rounds 1 to 5 and rounds 6 to 10 on treatment dummies. In the second five rounds, Self is no longer significantly different from no self-talk and the effect of Other becomes smaller as well. It thus seems that self-talk becomes less effective over time suggesting that saying the same phrase to oneself over and over again entails a reduction of impact over time. Figure 4 further shows that in sequence 2, after the role switch, proposer behavior did not differ significantly between the different self-talk conditions (see also Model C in Table 6). We discuss the absence of treatment effects in sequence 2 below.

A similar pattern is observed for responder behavior.<sup>5</sup> The comparison of Models A and B in Table 7 indicates that treatment effects on the acceptance of low offers were more pronounced in rounds 1 to 5 than in rounds 6 to 10. Furthermore, in sequence 1, other-focused and contemplation-inducing self-talk promoted the acceptance of low offers compared to the treatment without instructed self-talk, but there are no significant treatment differences in sequence 2 (see Model C in Table 7). As elaborated on in the discussion section of the paper, this also undermines the alternative explanation for responder effects in sequence 1, namely that they might be pure cooling-off effects.

<sup>5</sup> For brevity and simplicity, in this appendix we focus exclusively on responders' acceptance decisions and do not analyze effects on their satisfaction levels. We also refrain from a visual analysis analogous to Fig. 4 because the analysis of acceptance decisions needs to account for offer sizes.



**Table 6** Linear regressions of offers on dummy variables for the self-talk condition of the proposer (reference category: no self-talk). A: offers made in rounds 1 to 5, B: offers made in rounds 6 to 10, C: offers made in sequence 2. D: offers made in sequences 1 and 2 pooled. Standard errors adjusted for repeated offers by the same proposers

	A	B	C	D
Self	- 1.609* (0.766)	- 1.183 (0.824)	- .318 (.549)	- .835 + (.478)
Other	1.679* (0.676)	1.499* (0.686)	- .093 (.531)	.772 + (.428)
Contemplate	- 1.230 (0.756)	- 1.355 (0.825)	- .759 (.747)	- 1.009 + (.540)
Constant	6.948*** (0.486)	6.983*** (0.491)	7.281 (.418)	7.116 (.319)
$R^2$	0.151	0.129	0.014	0.060
Num. of Obs	450	450	930	1830
Self=Other <sup>a</sup>	$p=0.000$	$p=0.001$	$p=0.641$	$p=0.001$
Self=Contemplate <sup>a</sup>	$p=0.648$	$p=0.854$	$p=0.538$	$p=0.757$
Other=Contemplate <sup>a</sup>	$p=0.002$	$p=0.001$	$p=0.344$	$p=0.001$

Standard errors in parentheses

+ :  $p < 0.10$ , \* :  $p < 0.05$ , \*\* :  $p < 0.01$ , \*\*\* :  $p < 0.001$

<sup>a</sup>:  $p$ -values from  $F$  tests for the rejection of the null-hypothesis of no difference

The absence of treatment effects after the role switch can be further understood by realizing that experiences with the UG in one role in sequence 1 might affect behavior in the other role in sequence 2. Especially in the responder role participants build up knowledge on when they reject offers (cf. Sanfey 2009). In addition, participants stay in the same self-talk condition throughout which might entail that in sequence 2 they incorrectly assume that their partners are in the same self-talk condition (while participants were probably agnostic about possible self-talk instructions received by their partners in sequence 1). Both arguments might imply that, for instance, proposers in sequence 2 in the condition with self-focused self-talk are willing to offer more, because they are more worried that responders will reject unfair offers. Such experience and anticipation effects jeopardize a clean test of the effects of self-talk. This implies that we cannot use the data of sequence 2 if participants in sequence 2 behave significantly differently from participants in sequence 1 in the same condition. Therefore, we compare proposer and responder behavior between the sequences using the regression models reported in Table 8. The condition dummies Self, Other, Contemplate, and No are ‘1’ for all choices made in the respective condition, while the dummies Self\_2, Other\_2, Contemplate\_2, and No\_2 are ‘1’ only for choices in sequence 2. While the former dummies measure the baseline offer size or acceptance likelihood in the respective condition (as a condition specific constant), the latter dummies measure the change in offer sizes and acceptance from sequence 1 to sequence 2.

In line with the interpretation given above, we observe that offers by proposers receiving instructions for self-focused self-talk were significantly higher in sequence 2 than in sequence 1. Offers in the condition with other-focused self-talk were significantly lower in sequence 2 than in sequence 1. In the conditions with

**Table 7** Probit regressions of the acceptance of low offers (1 to 5 points) on dummy variables for the self-talk condition of the responder (reference category: no self-talk) and for offer size (reference category: offer = 1 point). A: acceptance decisions in rounds 1 to 5, B: acceptance decisions in rounds 6 to 10, C: acceptance decisions in sequence 2. D: acceptance decisions in sequences 1 and 2 pooled. Standard errors adjusted for the repeated acceptance decisions by the same responders

	A	B	C	D
Self	0.650 <sup>+</sup> (0.363)	0.179 (0.397)	0.087 (0.409)	0.323 (0.242)
Other	0.803* (0.354)	0.746* (0.367)	- 0.126 (0.432)	0.484* (0.243)
Contemplate	1.213** (0.357)	0.921* (0.403)	0.345 (0.442)	0.787** (0.252)
Offer = 2 points	0.030 (0.394)	0.706 <sup>+</sup> (0.706)	0.792* (0.401)	0.460* (0.201)
Offer = 3 points	0.197 (0.379)	0.293 (0.429)	0.251 (0.392)	0.113 (0.221)
Offer = 4 points	0.173 (0.445)	1.270* (0.404)	1.260*** (0.338)	0.766*** (0.209)
Offer = 5 points	1.353*** (0.249)	1.734*** (0.273)	2.125*** (0.327)	1.664*** (0.163)
Constant	- 1.255*** (0.316)	- 1.369*** (0.361)	- 1.266** (0.372)	- 1.205** (0.201)
<i>Pseudo R</i> <sup>2</sup>	0.199	0.247	0.306	0.231
Num. of Obs	179	164	221	564
Self = Other <sup>a</sup>	<i>p</i> = 0.665	<i>p</i> = 0.111	<i>p</i> = 0.569	<i>p</i> = 0.501
Self = Contemplate <sup>a</sup>	<i>p</i> = 0.118	<i>p</i> = 0.060	<i>p</i> = 0.522	<i>p</i> = 0.063
Other = Contemplate <sup>a</sup>	<i>p</i> = 0.228	<i>p</i> = 0.629	<i>p</i> = 0.265	<i>p</i> = 0.223

Standard errors in parentheses

<sup>+</sup>:  $p < 0.10$ , \*:  $p < 0.05$ , \*\*:  $p < 0.01$ , \*\*\*:  $p < 0.001$

<sup>a</sup>: *p*-values from Chi-squared tests for the rejection of the null-hypothesis of no difference

contemplation-inducing self-talk and no self-talk, offer sizes did not vary significantly between the sequences. These significant differences between sequence 1 and sequence 2 clearly show that there are experience effects: proposers in sequence 2 make different offers than proposers in the same self-talk condition without experience in the other role. For completeness, we still provide a pooled analysis of all offers in both sequences in Model D of Table 6. Due to experience and fading out of self-talk effects, some differences are clearly less significant but the substantive direction of effects remains the same.

Differences across the sequences in responders' acceptance of low offers in the conditions with self- or other-focused self-talk point in the expected direction but are not statistically significant. Thus, we have less evidence that sequence 2 should be discarded from the analysis of self-talk effects on acceptance behavior. This makes sense because acceptance decisions do not really require taking the perspective of a participant in the other role, while offers will be influenced strongly by what one expects the responder to

**Table 8** Changes in the size of offers and the chances of the acceptance of low offers between sequence 1 and 2 within the different self-talk conditions. A: linear regression of offers on variables pertaining to the self-talk condition of the proposer. B: probit regression of acceptance decisions of low offers (1 to 5 points) on variables pertaining to the self-talk condition of the responder. (Standard errors adjusted for repeated measures of the same proposers and responders, respectively.)

	A	B
Self	5.570*** (0.592)	-0.968*** (0.246)
Other	8.555*** (0.435)	-0.578* (0.224)
Contemplate	5.672*** (0.603)	-0.306 (0.244)
No	6.965*** (0.476)	-1.442*** (0.254)
Self_2	1.393* (0.690)	0.117 (0.329)
Other_2	-1.367* (0.544)	-0.490 (0.335)
Contemplate_2	0.849 (0.863)	-0.352 (0.362)
No_2	0.316 (0.633)	0.461 (0.367)
Offer = 2 points		0.446* (0.195)
Offer = 3 points		0.126 (0.223)
Offer = 4 points		0.852*** (0.204)
Offer = 5 points		1.717*** (0.165)
$R^2$	0.867	
Num. of Obs	1830	564

Standard errors in parentheses  
\*:  $p < 0.05$ , \*\*:  $p < 0.01$ , \*\*\*:  $p < 0.001$

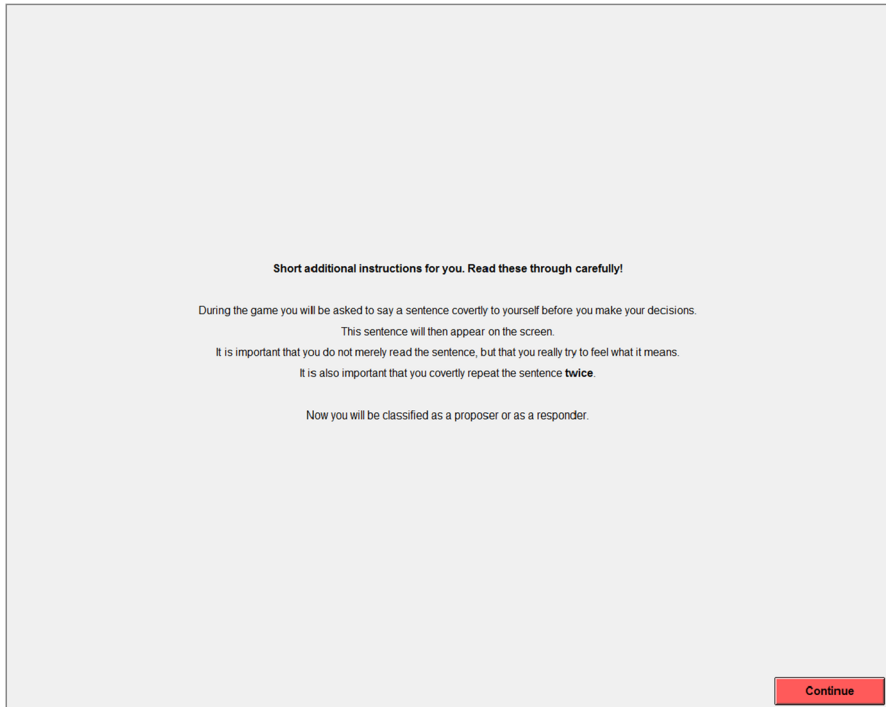
do. Model D in Table 8 shows that all the significant differences we found for sequence 1 remain if we analyze both sequences together. But here too, the effects become clearly smaller, providing evidence for a fading impact of the self-talk.

## 8 Appendix C: Instructions used in the experiment

This appendix provides an English translation of the printed instructions used in the experiment and screens with further instructions on self-talk (Figs. 5 and 6).

### INSTRUCTIONS

You are now participating in a scientific experiment.



**Fig. 5** Self-talk instructions shown to participants on their computer screens before they played the first UG

After you have read the following instructions, you can earn money. How much you earn depends on your own choices and the choices of other participants. It is thus very important that you read these instructions carefully. These instructions are the same for all participants.

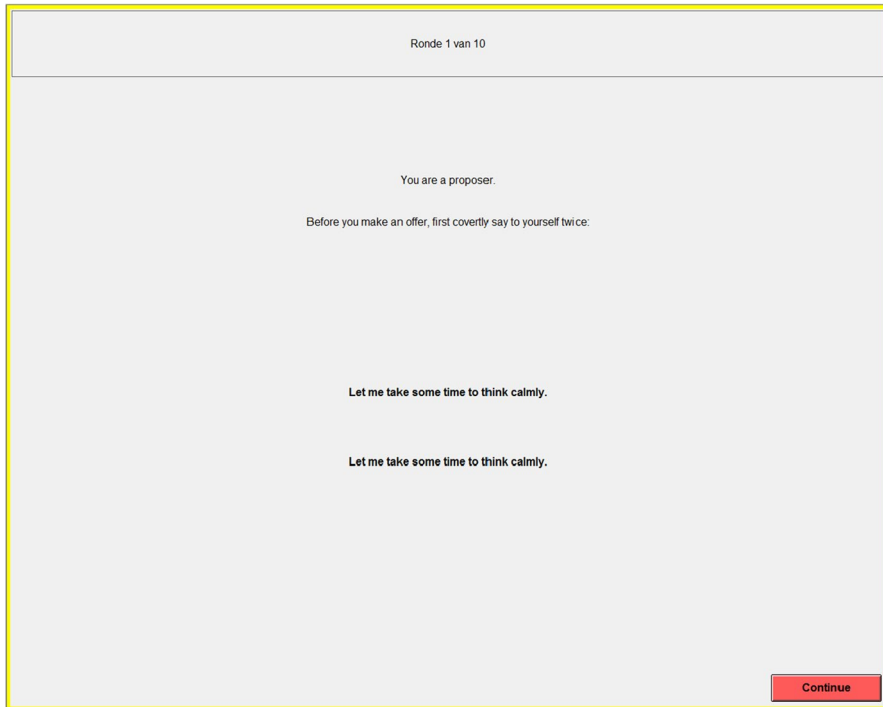
**You are not allowed to talk to other participants during the experiment. Please turn off your mobile phone and put it away.** If you have questions, please approach the experiment leader.

During the experiment we speak of points rather than Euros. Your earnings are calculated in points. At the end of the experiment, the total number of points you have earned will be converted to Euros. The exchange rate is: **20 Points = 1 Euro**

In addition to these earnings, you will receive €2,50 for being present here. At the end of the experiment, you will receive your earnings in **cash**, other participants will not be able to see how much you have earned.

During the experiment you will be matched with several other participants. This matching is done randomly. At no point before, during or after the experiment will you be informed of the identity of those you were matched with. The reverse also holds: others will never be informed about whether or when they were matched with you.

We describe in detail how the experiment proceeds on the following page.



**Fig. 6** Self-talk instructions a proposer was shown on the computer screen before making an offer (contemplation-inducing self-talk)

## The Experiment

The experiment consists of two parts. At the end you will also be asked to fill in a short questionnaire.

### Part 1

This part of the experiment consists of 10 identical rounds. Each participant is assigned randomly to one of two roles—proposers or responders—and will stay in that role for all of the ten rounds.

At the beginning of each round proposers receive a starting sum of 20 points. Proposers are matched with a new responder on every round and no proposer will ever be matched with the same responder twice. Proposers choose how many of the 20 points they want to offer to the responder that they are matched with. Proposers keep the remaining points for themselves. The offer has to be an integer with a minimal value of 1 and a maximal value of 20. Proposers submit their offer via the computer. Choices always have to be confirmed by clicking on the “Continue” button.

Responders receive the offer from the proposer via the computer and choose whether or not to accept it. If the responder accepts the offer, the responder earns the number of points that has been offered and the proposer keeps the remaining points. If the responder rejects the offer, then both the proposer and the responder do **not** receive any points for that round.

This part consists of 10 rounds in total. Every round proceeds precisely as described above. However, **each proposer gets matched with a different responder in every round. Everybody stays in the same role over these 10 rounds.** We will ensure that nobody is matched with the same player twice. **You thus send a certain number of points to a different responder 10 times or you receive 10 offers from 10 different proposers, depending on whether you are a proposer or a responder in part 1.** You and the other participants will remain reciprocally anonymous.

## Part 2

Part 2 proceeds in the same way as part 1, only now the roles are changed. Participants who were proposers in part 1 are responders in part 2, and vice versa. There are 10 rounds again and everyone keeps the same role over these rounds. Again, everyone is matched with another participant 10 times according to the same rules as in part 1. It is possible that in part 2 you will be matched with a participant with whom you were already matched in part 1. However, as the matching is random, neither you nor the other player will know that you have already been matched in part 1.

All further information will be provided to you on the screen. Please read this additional information carefully and follow the instructions.

**Click on “Continue” on the screen if you are ready to continue.**

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**Availability of data and material** Data and analysis files are available at the Open Science Framework: <https://doi.org/10.17605/OSF.IO/BZUQW>.

**Code availability (software application or custom code):** Not applicable.

## Declarations

**Conflict of interest** The authors declare no conflict of interest.

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## Authors and Affiliations

Vincenz Frey<sup>1</sup>  · Hannah N. M. De Mulder<sup>2</sup>  · Marlijn ter Bekke<sup>3,4</sup>  ·  
Marijn E. Struiksma<sup>5</sup>  · Jos J. A. van Berkum<sup>5</sup>  · Vincent Buskens<sup>6</sup> 

<sup>1</sup> Department of Sociology/ICS, Groningen University, Groningen, The Netherlands

<sup>2</sup> LUCL, Leiden University, Leiden, The Netherlands

<sup>3</sup> Donders Institute for Brain, Cognition, and Behaviour, Radboud University, Nijmegen, The Netherlands

<sup>4</sup> Max Plank Institute for Psycholinguistics, Nijmegen, The Netherlands

<sup>5</sup> Department of Languages, Literature & Communication, Utrecht University, Utrecht, The Netherlands

<sup>6</sup> Department of Sociology/ICS, Utrecht University, Utrecht, The Netherlands