

# WHAT TO SAY WHEN THEY WON'T LET YOU PLAY?

THE EFFECTIVENESS OF COGNITIVE REAPPRAISAL ON SOCIAL EXCLUSION

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**Abstract**

This study explores the effects of cognitive reappraisal in the context of ostracism. We argue that this emotion regulation strategy is mediated by language, as it involves formulating a reinterpretation of an emotional situation. We investigated the effects of reappraisals with different linguistic contents on the experience of social exclusion in a virtual ball game. Emotional responding of forty participants was compared in four conditions, in which they were given 1) a reappraisal with a positive content, 2) a reappraisal with a negative content, 3) a non-emotional linguistic load or 4) no specific instruction. A significant result was found for the participants' judgement of the other players in the game: the excluders were rated less friendly in the negative reappraisal condition and the no-instruction condition. We conclude that linguistic content influences the effectiveness of cognitive reappraisal: a reappraisal with a non-negative (i.e. neutral or positive) content is more advantageous for the relationship with the excluders than a negative reappraisal.

*Key words:* Cyberball, Cognitive reappraisal, Galvanic Skin Response, Ostracism

**INTRODUCTION**

*“Among all those things which come within the use of man, the most important are other man. For man is by nature a social animal, because he needs many things which cannot be provided by one man alone.” (Aquinas, 1264/1991)*

The need for social interaction is a universal human characteristic. According to the belongingness hypothesis proposed by Baumeister and Leary (1995), humans share an

intrinsic desire to form interpersonal relationships, which results in a strong tendency to form social groups. It is not uncommon that one or more individuals are ignored or rejected by the other members of a group. This social exclusion, or ostracism, can have serious emotional consequences for the excluded person. In the present study, we explore how the negative emotions evoked by social exclusion can be regulated, and in particular what the possible role of language may be in this emotional process.

### *Ostracism*

Ostracism, a term originally used to describe the expulsion of a citizen from the city-state Athens in the ancient Greece (Steele, Kidd, & Castano, 2015), refers to the act of excluding an individual from a social interaction. From animal research, we know that primates ostracize in order to maintain the balance between group members and resources, and to maximize their own chances of reproduction (Lancaster, 1986). In human society, social exclusion may be an even more prevalent phenomenon. Children may reject their peers when they do not conform to group norms. This can lead to an immediate disruption of cognitive processes (Hawes et al., 2012) as well as to a decrease in academic performance on the long term (Wentzel & Caldwell, 1997). In addition, peer rejection in childhood is associated with reduced classroom participation (Buhs, Ladd, & Herald, 2006) and aggression later in life (Kupersmidt, Burchinal, & Patterson, 1995; Leary, Kowalski, Smith, & Phillips, 2003).

Ostracism is not uncommon in adult life either. Ostracism is largely incorporated in our legal system, as we isolate criminals from the outside world by imprisoning them. Also, in some religious communities, social exclusion is used as a sanction against dissidents (Gruter & Masters, 1986). Furthermore, workplace social exclusion is an important factor in problems related to stress and sleep in adults (Pereira, Meier, &

Elfering, 2013) and has been linked to a direct increase in aggressive behaviour (Twenge, Baumeister, Tice, & Stucke, 2001).

Social exclusion appears to have a substantial impact on our emotional state. According to Williams' (1997, 2001) need-threat theory of ostracism, four fundamental human needs are threatened by ostracism: belonging, control, self-esteem and meaningful existence. These needs are assumed to be essential for human motivation and survival. In the explanation of his theory, Williams (2001) points out that the decrease in the excluded person's sense of belonging is caused by the excluders' active denial of the social relationship. Secondly, the target of exclusion has a feeling of losing control over the interaction with the excluders and his self-esteem is affected because he may associate the exclusion with punishment for a personal shortcoming. Finally, Williams (2001) argues that the exclusion may remind the excluded individuals of their vulnerability and the fragility of their lives and therefore perturbs the targets' sense of meaningful existence. Taken together, ostracism is a problem in both children and adult lives and seems to be a serious threat to fundamental aspects of human well-being.

#### *Ostracism in the lab: the Cyberball game*

During the last two decades, more and more studies have concentrated on the emotional impact of ostracism. The experimental paradigm used in many of these studies is the Cyberball game (Williams & Sommer, 1997). This is a simple virtual ball tossing game with a few other players. The game starts with a fair session, in which the ball is passed between the participant and the other players. At a certain moment, the game becomes unfair: the participant is excluded from the game and receives no more ball throws.

The Cyberball game appears to be very powerful in inducing the negative emotions associated with ostracism. Several studies report negative shifts in mood after

exclusion in the game (e.g. Williams, Cheung, & Choi, 2000; Zadro, Boland, & Richardson, 2006), which implies that even exclusion in a relatively simple game with unknown players has a negative impact on our emotional state. Zadro, Williams and Richardson (2004) found lower self-reported levels of belonging, control, self-esteem and meaningful existence even when the participants knew they were playing against a computer. Moreover, the negative emotional effects of being ostracized in the Cyberball game by despised out-group members (e.g. the Klu Klux Klan) have been found to be just as strong as the effects of being excluded by rival out-group members (e.g. with a different political preference) or by in-group members (e.g. with the same political preference) (Gonsalkorale & Williams, 2007). Together, the results from these studies suggest that social exclusion has a profound negative effect on people's subjective experience of emotion, as they still report feeling worse even when they are excluded by artificial players or by a social group that they do not even want to be part of.

Findings from studies that assessed the influence of ostracism on our subjective emotional experience have been complemented by evidence from studies using more objective measures of emotion. In a famous fMRI study by Eisenberger, Lieberman and Williams (2003), a pattern of neural activation similar to the pattern associated with physical pain was found during the exclusion in the game. The social 'pain' caused by social exclusion is thus also reflected in specific neural processes. Furthermore, Kelly, McDonald and Rushby (2012) compared skin conductance levels between an inclusion and an exclusion condition of the Cyberball game. Higher levels of electrodermal activity were found for the condition in which participants were excluded from the game, indicating that social exclusion induces a physiological emotional response.

To summarize, multiple studies using the Cyberball paradigm have provided evidence for the impact of ostracism on both our subjective emotional experience and our physiological emotional state.

### *The role of language in emotion regulation*

The profound emotional impact associated with ostracism raises an important question: how should we deal with the negative feelings caused by social exclusion? People use different strategies to control their responses to emotional situations or stimuli. This process of managing our emotions is called emotion regulation. For instance, when watching a sad film, we might try to gulp down our tears so as to hide our emotions. According to Gross' (1998) process model of emotion regulation, this is a response-focused strategy: the emotional response is manipulated, once it has already been generated. An example of a completely different possible strategy in the film-example is when we tell ourselves that it is 'just a film' that we are watching, in order to reduce the impact it has on our emotional state. This is an antecedent-focused strategy (Gross, 1998), as the input for the emotion - the antecedent - is manipulated, rather than the emotional response. To regulate our emotional experience and expression in a situation of social exclusion, it is important to select an appropriate and efficacious emotion regulation strategy.

In this study, we are interested in the contribution of language to the regulation of the negative emotions caused by ostracism. Although the role of language in emotion regulation does not seem directly evident, language is an important component of an antecedent-focused emotion regulation strategy that has received a lot of attention in emotion research: cognitive reappraisal. Cognitive reappraisal involves reinterpreting the meaning of an emotional stimulus or situation, in order to reduce its negative

emotional impact. In a situation when somebody is excluded from a social group, a possible reappraisal can be that the other people in the group have already been good friends for a long time, and that the exclusion is nothing to worry about. Alternatively, the excluded person can tell himself that he does not like the excluders anyway and that he does not even want to be part of their group. These two different examples of reappraisals illustrate the fact that the exact content of what we tell ourselves can take different forms. The use of language thus appears to be an essential aspect of cognitive reappraisal.

Evidence for a link between language and cognitive reappraisal also comes from neuroimaging research. Cognitive reappraisal has been related to activity in prefrontal brain areas associated with semantic knowledge and retrieval, as well as with a decrease in amygdala activity, an area associated with emotional responding (for a meta-analysis of neuroimaging studies of cognitive reappraisal see Buhle et al., 2013). This adds to the idea that cognitive reappraisal is language-mediated strategy to regulate emotion.

Given the fact that an excluded individual can give various different interpretations to a reappraisal, we may pose the question whether there is a difference in effectiveness between different semantic contents of the cognitive reappraisal. Perhaps the influence of using a reappraisal with a positive reinterpretation of the exclusion situation is completely different from the effect of, for example, thinking more negatively about the excluders. Thus, the effectiveness of the reappraisal used in a social exclusion situation might be mediated by language.

Evidence for the effectiveness of cognitive reappraisal has been found in many different emotional contexts. Remarkably, however, the exact linguistic content of the cognitive reappraisal that was offered has received very little attention in previous research. Cognitive reappraisal has been shown to be an effective strategy in regulating

the emotional responses in situations of disgust (Goldin, McRae, Ramel, & Gross, 2008; Gross, 1998), reward expectation (Delgado, Gillis, & Phelps, 2008), sadness (Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010), conditioned fear (Shurick et al., 2012), anxiety (Hofmann, Heering, Sawyer, & Asnaani, 2009), social anxiety (Goldin et al., 2012) and negative affect in general (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008). Furthermore, the effectiveness of cognitive reappraisal is supported by studies comparing cognitive reappraisal to another well-known emotion regulation strategy: expressive suppression. Expressive suppression is the 'hiding your tears' strategy in our film example; it comprises the inhibition of the outward signs of an emotion. Cognitive reappraisal has been shown to be more effective in reducing negative affect than expressive suppression (e.g. Gross, 1998; Hofmann, Heering, Sawyer, & Asnaani, 2009) and also has less negative social consequences: Butler and colleagues (2003) showed that, compared to a cognitive reappraisal condition, participants in a suppression condition were more distracted from a conversation. Also, the conversation partners of the suppressors experienced a higher increase in blood pressure – indicating higher stress levels - than the conversation partners of the reappraisers.

Although the effectiveness of cognitive reappraisal thus seems well-supported in the literature, the type of linguistic content of the reappraisals in the experiments was never clearly motivated. Participants in previous studies were asked to watch the stimuli objectively and focus on the technical aspects of the stimulus (Ehring et al., 2010; Goldin et al., 2008; Gross, 1998), to think about aspects of the stimulus considered less negative (Shurick et al., 2012), to think of something calming in nature similar to the stimulus (Delgado et al., 2008), to be aware of the fact that it was just an experiment (Hofmann et al., 2009) or to freely choose from multiple categories of reinterpretation (McRae et al., 2008). None of these studies considered the content of the reappraisal as a



subject of discussion, while we argue that language may be an important factor in the effectiveness of cognitive reappraisal. Therefore, our aims are to investigate the effectiveness of cognitive reappraisal on social exclusion and to differentiate between different linguistic forms of reappraisal: what exactly is it that we should tell ourselves when we are excluded?

*The present study: reappraising social exclusion*

In the present study, the emotional influence of cognitive reappraisals with different semantic contents was investigated in a situation of social exclusion. Because of the apparent effectiveness of the Cyberball paradigm in evoking the negative feelings associated with social exclusion (e. g. Eisenberger et al., 2003; Gonsalkorale & Williams, 2007; Kelly et al., 2012; Williams et al., 2000; Williams & Sommer, 1997; Zadro et al., 2003), an adapted version of this game was used in the present study to create a social exclusion situation. The experience of social exclusion in this game was expected to cause a negative shift in affect. After being excluded in the game, participants were instructed how to reappraise the fact that they were excluded, so as to reduce their negative emotional response. Then the Cyberball game was played again, while the participants used cognitive reappraisal to reinterpret the situation.

Although social exclusion has never been combined with the emotion regulation strategy cognitive reappraisal in the same study before, there is much evidence for the effectiveness of this strategy in a wide range of other emotional domains (e.g. Goldin et al., 2008; Gross, 1998; Delgado et al., 2008; Ehring et al., 2010, Shurick et al., 2012; Hofmann et al., 2009; Goldin et al., 2012, McRae et al., 2008). It was therefore hypothesized that cognitive reappraisal can also have an effect on the negative feelings caused by social exclusion.

This study included two different reappraisal conditions, as a first step in addressing the question whether the semantic content of the reappraisal has an influence on the effectiveness of the reappraisal. The content of both reappraisals was focused on the other players in the game; the excluders were either put in a more positive, or in a more negative light. In the positive reappraisal condition, participants were instructed to tell themselves that the other players were probably already good friends and that it did not matter that they did not throw the ball to them. In the negative reappraisal condition, they told themselves that the other players were annoying and unfriendly anyway and that they did not even want to play with them.

Emotional responding in the two reappraisal conditions was compared to two different control conditions. The first control condition did not include any specific instructions: participants passively experienced the fact that they were excluded. In this way, the emotional influence of reappraising the situation could be compared to using no strategy at all. Importantly, however, the absence of a specific instruction also generates a difference in cognitive load between the reappraisal conditions and the control condition. Therefore, a second control condition was included, in which the cognitive load was similar to the reappraisal conditions, but the emotional content was omitted and the sentence had a neutral meaning. In this linguistic load condition, participants had to tell themselves that the ball was passed during the game and that the ball was played from one player to another. Thus, this condition was added to control for the possibility that merely adding an extra cognitive-linguistic task to the game had an effect on the emotional state, rather than the fact that a reappraisal strategy was used.

To determine the emotional impact of the exclusion and the effects of the different reappraisals, a subjective measure as well as a physiological measure of emotion were used. Subjective experience of emotion was examined with self-report

measures, so as to assess people's conscious evaluation of the effects of the reappraisals. To complement the subjective evaluation of the emotional response with a more objective measure, the participants' physiological state of arousal was assessed using the Galvanic Skin Response (GSR). This response involves changes in electrodermal activity after presentation of emotional stimuli. As the GSR is known as a reliable and unambiguous measure for activation of the sympathetic nervous system (Dawson, Schell, & Filion, 2000) and changes in electrodermal activity have been reported before in combination with the Cyberball paradigm (Kelly et al., 2012), this seemed a useful physiological method to supplement subjective evaluations of emotion.

*Differentiating between positive and negative reappraisal: expectations*

The positive reappraisal condition was hypothesised to have a more positive effect on the emotional state of socially excluded individuals than the negative reappraisal condition and the two control conditions. Intuitively, we may reason that thinking positively about others will also cause us to feel better ourselves. This idea is in accordance with what Macleod and Moore (2000) emphasize in their review on positive cognitions, well-being and mental health: positive cognitions play an important role in mental health, because thinking positively can certainly lead to a positive affective shift. Additionally, a recent line of research focusing on the effects of loving-kindness and compassion meditation has found evidence for an increase in positive affect associated with positive thinking about other people (for a review, see Hofmann, Grossman & Hinton, 2011). Loving-kindness meditation involves concentrating on the direction of positive feelings towards other people, while compassion mediation concentrates on feelings of sympathy for those who suffer. Both forms of meditation have been shown to improve positive affect and to reduce negative affect and therefore, Hofmann and

colleagues (2011) argue that these forms of meditation might be useful strategies in interpersonal problems. As the positive reappraisal strategy in this study involves developing a more positive attitude towards the excluders, this may have a positive effect on the emotions of the excluded person as well.

The negative reappraisal strategy used in this study is close to what is likely to spring to mind when we try to soften the impact of social exclusion in real life. We often tend to think more negatively about excluders, in an attempt to find a reason that we do not even want to be included. For example, parents may tell their children that the kids who exclude them are not worth playing with anyway, and someone who is the only one out of a friend group not invited to a birthday party may try hard to think more negatively about the party host. Thus, it is interesting to study the effects of negative reappraisals focused on the excluding individuals, as they seem to be part of our daily strategies to cope with social exclusion.

Even though cognitive reappraisal is usually associated with a positive shift in mood, the negative reappraisal condition might have a different effect. By logical reasoning, we could argue that telling yourself how unfriendly the excluders are may result in an increase in self-esteem or control and may thus be an effective strategy in reducing negative affect. However, a more plausible result is that these negative thoughts intensify the negative emotion that was already present, resulting in a negative loop of thoughts that makes the individual even angrier or sadder. The negative reappraisal condition might therefore be less effective than the positive reappraisal condition, and may possibly even cause more negative feelings than the participants will experience in the control conditions.

To conclude, the effectiveness of cognitive reappraisal is expected to be mediated by language: a positive reappraisal strategy might be more effective in reducing the negative emotions caused by social exclusion than a reappraisal with a negative content.

## METHODS

### *Participants*

Forty Dutch participants (27 women and 13 men), ranging in age from 18 to 27 years old ( $M = 21.7$  years,  $SD = 2.0$  years), were recruited from an online participant database consisting mainly of Utrecht University students. Participants were randomly assigned to one out of four conditions. Each experimental condition thus contained 10 participants. All participants were non-dyslectic students without any attention deficits. Only right-handed participants were included in the sample, because of practical advantages in the set-up of the experiment. They received a compensation of 8 euros per hour for their participation. Informed consent was obtained from all participants and no participants were excluded from the analysis.

### *Apparatus and materials*

The GSR signal was acquired using a Biosemi ActiveTwo Mk II system at a sampling rate of 2048 Hz. Two passive GSR electrodes and separate CMS and DRL electrodes were used in combination with conductive electrode gel. The GSR electrodes were applied to the fingertips of the index and middle finger of the left hand using adhesive tape and the CMS and DRL electrodes were placed on the forehead. GSR data was recorded using ActiView Acquisition Software (Biosemi, n.d.).

The experiment, presented in the ZEP experiment control application (Veenker, 2015), was displayed on a 22 inch screen. The Cyberball game was controlled by the

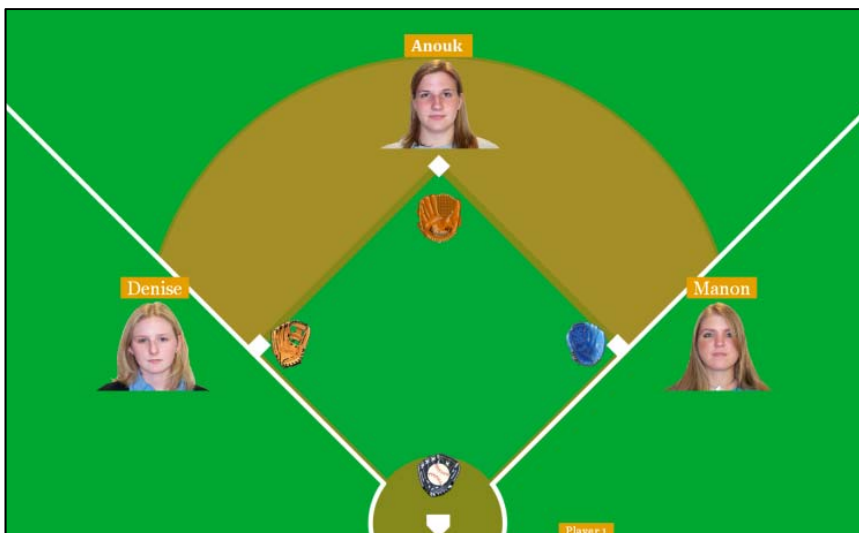
participant using the arrow keys of a regular keyboard with the right hand. Rating questions in between sessions of the game were answered with an optical mouse.

### *The Cyberball game*

The ball game used in the present study was an adapted version of the Cyberball game, as originally designed by Williams and Sommer (1997). The layout of the game is displayed in Figure 1. The three virtual players were each represented with a picture, a name and a baseball glove. The combinations of names and pictures varied randomly across participants and the positions of the virtual players were counterbalanced across conditions. For the pictures, face stimuli with a neutral emotion from the Park Aging Mind Laboratory face database were used (Minear & Park, 2004). The names of the virtual players were chosen from the top 50 of Dutch baby names in 1990, as reported by the Meertens Instituut (2012). The gender of the virtual players was always identical to the gender of the participant. The participant was represented in the game with a self-chosen baseball glove that was always located at the bottom of the screen.

**Figure 1.**

*Layout of the Cyberball game. The participant is displayed at the bottom of the screen and the virtual players on the other sides.*



The experiment contained three separate blocks of the Cyberball game. In the initial fair block of the game (block I), both the participant and the virtual players each received approximately nine ball throws. In the following two unfair blocks (blocks II and III), the participant received three ball throws in the beginning, after which an exclusion was made and the participant received no more throws. In the unfair blocks, the number of nine ball throws per player was corrected to still reach roughly the same number of throws compared to the fair block. The maximum number of ball throws in each block was 50. The first two blocks were identical for all forty participants. In the third block however, the unfair game was combined with different reappraisal conditions, described under *Stimuli and design* below.

The duration of a ball throw by a virtual player varied between 5000 ms and 7750 ms, including the waiting time of a virtual player before the ball left the glove. In determining the throw duration, the time it takes for the skin conductance level to peak and recover again after presentation of a stimulus - in our case the start of a ball throw - was taken into account. According to Dawson, Schell and Fillion (2000), it takes 2 to 10 seconds for the skin conductance level to peak and reach a point of 50% recovery. Therefore, the throw duration was based on the average of this time interval. The reason for the variation in duration was to make the game appear more natural and interesting. In this way, we tried to prevent the participants from habituating to the game too quickly.

### *Stimuli and design*

The design of this study was a mixed design with two independent variables: block and condition. Block was a within-subjects variable with three levels, as each participant played three separate blocks of the Cyberball game: a fair block (block I), an unfair block

without reappraisal (block II) and an unfair block with reappraisal (block III). Condition was a between-subjects variable with four levels, representing the four different reappraisal conditions that became relevant in the third block: a positive reappraisal condition (POSR), a negative reappraisal condition (NEGR), a linguistic load condition (LL) and a control condition (C) without any specific instructions.

In the positive reappraisal (POSR) condition, participants were instructed to remember the Dutch equivalent of the following sentence: *“Oh well, they are probably very good friends already. It doesn’t matter that they don’t pass the ball to me.”* In the negative reappraisal condition (NEGR), the sentence was: *“Oh well, they are annoying and unfriendly anyway. I don’t even want to play with them.”* These positive and negative reappraisals were called *mantras* in the instructions. In the linguistic load (LL) condition, participants remembered the non-emotional sentence: *“During the ball game, the ball is passed. The ball is played from one player to another.”* There was no reappraisal stimulus for the control condition (C), as in this condition, the exclusion was passively experienced without any additional tasks.

Emotional responding was assessed in two dependent variables: the answers to the rating questions after each block and the GSR response during ball throws that were not directed towards the participant.

The rating questions were used to determine the subjective emotional state of the participant. Six different questions were presented in random order after each block of Cyberball. Four of the questions concerned the mood of the participants. These questions consisted of the sentence “I’m feeling ... at the moment” and were answered on a 7-point Likert scale. In the first question, participants rated how bad or good they felt, with a score of 1 being “very bad” and a score of 7 being “very good”. The scores in between 1 and 7 were defined as “quite bad” (2), “a little bad” (3), “not bad or good” (4),



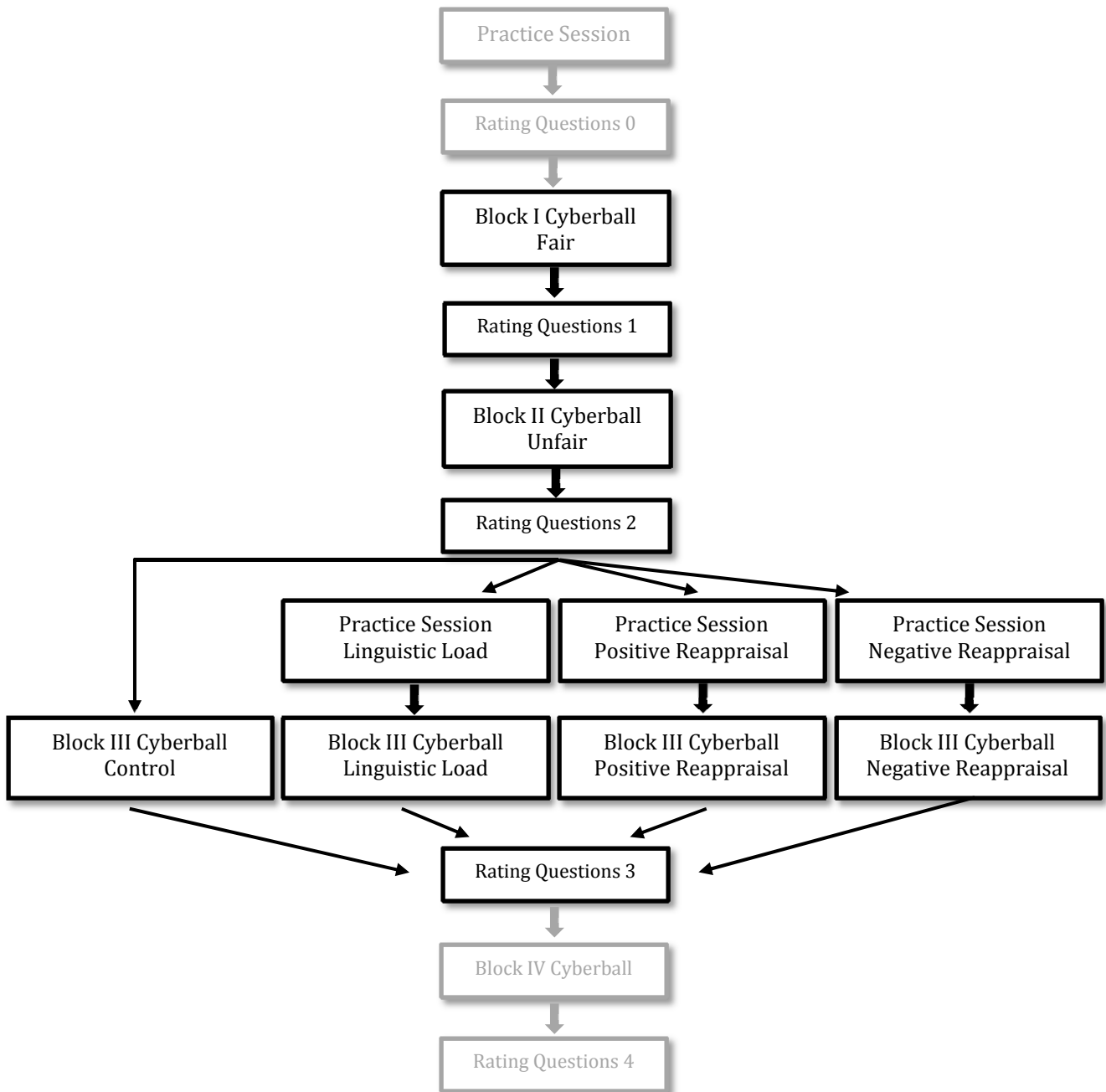
“a little good” (5) and “quite good” (6). The other three mood questions concerned the contrasts “very angry” (1) versus “very peaceful” (7), “very sad” (1) versus “very happy” (7) and “very rejected” (1) versus “very accepted” (7). The fifth question “What is your opinion of the other players?” and the sixth question “What do you think the other players think about you?” were rated on a scale from very unfriendly (1) to very friendly (7). For all questions, the seven points of the Likert scale were defined in the same way as for the bad/good question.

As a second dependent variable considering the physical emotional response of the participants, GSR was measured during each block of the Cyberball game. Each time the ball left the glove of one of the players in the game, a trigger was sent to the recording computer immediately. The triggers representing a ball throw not directed towards the participant were considered relevant for the analysis.

Originally, the experiment contained a fourth block of Cyberball, played with different virtual players. In this block, one of the virtual players was excluded from the game, instead of the participant. The present article focuses on the first three blocks of Cyberball and on the rating questions and GSR measurement related to these blocks. This means that the first and last set of rating questions and the GSR response during the fourth block are not included in the analyses presented here. The overall design of the study is displayed in Figure 2, with the focus of the present study in black.

Figure 2.

*Schematic overview of the study design. The focus of the present study is displayed in black.*



*Procedure*

Upon arrival in the lab, participants washed their hands using hand soap with a skin-neutral pH value without any perfume or colouring agents. It was made sure that the participant's name was not identical to the name of any of the virtual players in the Cyberball game. The two GSR electrodes and the CMS-DRL electrodes were applied after making certain that the fingertips were not injured in any way. There was a period of at least 10 minutes between application of the electrodes and the start of GSR measurement.

Participants were instructed that they were going to play multiple sessions of a virtual ball game with three other players and that they had to answer a set of questions in between sessions of the game. Nothing was mentioned about whether the other players represented real people or not. The participants were told that speed was not an important factor, but they were instructed to keep their right hand close to the arrow keys. The experimenter was in a different room during the experiment and it was stressed that the experimenter would not pay any attention to their actions or answers.

At the beginning of the game, participants were given the opportunity to fill in their own name and choose a baseball glove. A short practice session followed so as to become familiar with the game. Subsequently they played the four blocks of Cyberball, i.e. the fair block, the unfair block without reappraisal, the unfair block with reappraisal and the fourth block in which a virtual player was excluded from the game. In between these blocks, the six rating questions were answered, as described above.

In the negative reappraisal condition, the positive reappraisal condition and the linguistic load condition, a condition specific instruction and a short practice session were inserted between the unfair block without reappraisal (block II) and the unfair block with reappraisal (block III). Participants were instructed to repeat their sentence

to themselves at every ball throw that was not directed at them during the entire third block. The practice session preceding this block consisted of three ball throws, none of which were directed towards the participant. Participants had to repeat the sentence out loud during the first two throws of the practice session and in silence during the third throw. The control condition did not contain a practice session or specific instruction; in this condition, the two unfair blocks (blocks II and III) were identical to each other.

When the complete Cyberball game was finished, the GSR electrodes were removed and the participants were asked to fill out a final questionnaire regarding their experience during the experiment and their attitudes towards and experiences with ostracism in everyday life.

After completing all measures, participants were given the opportunity to ask questions about the experiment and offered a reward for their participation.

### *Data analysis*

With regard to the rating data, separate dependent t-tests were conducted for each question, to compare the responses for the fair block (block I) with the responses for the unfair block without reappraisal (block II). By means of these tests, self-reported emotional experience was compared between inclusion and exclusion in the game, so as to assess the influence of the act of exclusion. For all t-tests, the statistical assumptions were met. The rating differences between these first two blocks were not analysed separately for each experimental condition, as the different reappraisal conditions only apply to the third block.

In order to investigate whether responses differed between the unfair block without reappraisal (block II) and the unfair block with reappraisal (block III), repeated

measures ANOVAs were conducted for each question. Block (II or III) was taken as within-subjects variable and condition (control, linguistic load, positive reappraisal or negative reappraisal) as between-subjects variable, to examine possible interactions with condition. All statistical assumptions for these tests were met. In this way, the influence of the different reappraisals on the subjective reports of emotion was investigated.

As the first step in pre-processing the GSR data, a high pass filter with a low cut-off of 0.05 Hz and no high cut-off was applied in order to remove drifts. The sampling rate was adjusted from 2048 Hz to 10 Hz. For the data segmentation, a time frame with the average of the minimum and maximum throw duration (6375 ms) was chosen per trigger. In this way, a compromise was made between a time frame too restricted for the GSR response on the one hand and the risk of an overlap between the maxima of two triggers on the other hand. The mean GSR activity for all the relevant triggers was calculated per participant per block. That is, all the triggers representing a ball throw that was not directed towards the participant were included in separate averages for block I (fair), block II (unfair without reappraisal) and block III (unfair with reappraisal) per participant.

The statistical procedures used to analyse the GSR data were analogous to the tests used for the rating data. To test whether the GSR responses differed significantly between the fair block (I) and the unfair block without reappraisal (II), the means of the two blocks were compared in a dependent t-test (for which all statistical assumptions were met). In this way, it could be evaluated whether the act of exclusion in the game had an effect on the physiological response to the ball throws not directed towards the participant. To address the question whether the unfair blocks without reappraisal (block II) and with reappraisal (III) differed significantly and whether this effect

depended on condition, a repeated measures ANOVA (all statistical assumptions met) was conducted with block (II or III) as within-subjects variable and condition (control, linguistic load, positive reappraisal or negative reappraisal) as between-subjects variable. By means of this test, effects of the different reappraisals on the GSR response to excluding ball throws could be examined.

## RESULTS

### *Rating questions*

For all six questions, there was a significant difference in ratings between the fair block (block I) and the unfair block without reappraisal (block II), as indicated by the separate dependent t-tests. Participants reported feeling worse, angrier, sadder and more rejected after the unfair block without reappraisal than after the fair block. Additionally, ratings were significantly more negative for both their evaluation of the other players and their estimation of the other players' judgements about themselves. The results for the t-tests comparing the ratings of the fair block and the unfair block without reappraisal are summarised in Table 1.

As for the difference between the unfair block without reappraisal (block II) and the unfair block with reappraisal (block III), means and standard deviations of the answers to the rating questions are displayed in Table 2. Repeated measures ANOVAs comparing these means indicated that there was a significant block\*condition interaction ( $F(3, 36) = 2.873, p = .05$ ) for the participants' judgements of the other players. For the five other rating questions, no significant changes were found between the unfair block without reappraisal and the unfair block with reappraisal (all  $ps > .174$ )

and no significant interactions with condition (all  $ps > .109$ ). A summary of the results of these repeated measures ANOVAs can be found in Table 3.

As indicated in Table 4, pairwise comparisons with Bonferroni adjusted p-values indicated that participants significantly rated the other players less friendly after the unfair block with reappraisal than after the unfair block without reappraisal for the Control condition ( $p = .038$ ) and the Negative Reappraisal condition ( $p = .038$ ). No significant change in judgement of the other players between these two blocks was found for the POSR and LL conditions. The significant interaction effect is also apparent from Figure 3.

**Table 1.**

*Results of the dependent t-tests comparing the rating data of the fair block (block I) and the unfair block without reappraisal (block II).*

Rating Question	Block I		Block II		$t(39)$
	M	SD	M	SD	
Bad/good	5.73	.78	4.85	1.31	4.869*
Angry/peaceful	5.98	.73	4.88	1.44	5.208*
Sad/happy	5.23	1.00	4.55	1.18	4.521*
Rejected/accepted	5.43	.93	2.85	1.00	13.155*
Opinion of other players	4.90	1.03	2.98	1.10	9.168*
Estimation of other players' opinion	4.98	1.10	3.10	1.15	9.230*

*Note. M = Mean, SD = Standard Deviation*

\* $p < .001$

**Table 2.**

*Means (M) and standard deviations (SD) of the ratings in the unfair block without reappraisal (block II) and the unfair block with reappraisal (block III).*

Rating question	Condition	Block II		Block III	
		M	SD	M	SD
Bad/good	C	5.1	1.287	5.1	1.101
	LL	4.7	1.059	4.7	1.160
	POSR	5.1	1.197	4.7	1.703
	NEGR	4.5	1.716	4.1	1.37
Angry/peaceful	C	5.4	1.578	5.4	1.776
	LL	4.3	1.059	4.5	1.179
	POSR	4.7	1.494	4.8	1.317
	NEGR	5.1	1.524	4	1.414
Sad/happy	C	4.4	.966	4.4	.966
	LL	4.4	.843	4.4	1.075
	POSR	5	1.414	4.4	1.506
	NEGR	4.4	1.43	4.1	.994
Rejected/accepted	C	2.9	.738	2.6	1.075
	LL	3.4	1.075	3.6	1.075
	POSR	2.4	.699	2.8	1.033
	NEGR	2.7	1.252	2.7	1.16
Opinion of other players	C	3.2	1.229	2.5	1.08
	LL	3	.667	3.3	.823
	POSR	2.8	1.135	3	1.247
	NEGR	2.9	1.37	2.2	1.033
Estimation of other players' opinion	C	3.3	1.16	2.9	1.101
	LL	3.6	1.265	3.5	.85
	POSR	2.7	.949	3.3	.675
	NEGR	2.8	1.135	2.5	1.269

*Note.* C = Control, LL = Linguistic Load, POSR = Positive Reappraisal,

NEGR = Negative Reappraisal.



**Table 3.**

*Results of the repeated measures ANOVAs comparing the rating data of the unfair block without reappraisal (block II) and the unfair block with reappraisal (block III).*

<b>Rating question</b>	<b>Source</b>	<b>SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>p</b>
Bad/good	Between subjects					
	Condition	3.5	3	1.167	.764	.522
	Error	55	36	1.528		
	Within subjects					
	Block	.8	1	.8	1.412	.243
	Block*Condition	.8	3	.267	.471	.705
	Error	20.4	36	.567		
	Total	80.5	39			
Angry/peaceful	Between subjects					
	Condition	5.825	3	1.942	1.192	.327
	Error	58.650	36	1.629		
	Within subjects					
	Block	.8	1	.8	.938	.339
	Block*Condition	5.5	3	1.833	2.150	.111
	Error	30.7	36	.853		
	Total	101.475	39			
Sad/happy	Between subjects					
	Condition	1.069	3	.356	.329	.805
	Error	39.025	36	1.084		
	Within subjects					
	Block	1.012	1	1.012	1.715	.199
	Block*Condition	1.238	3	.413	.699	.559
	Error	21.250	36	.590		
	Total	63.594	39			
Rejected/accepted	Between subjects					
	Condition	5.119	3	1.706	2.494	.075
	Error	24.625	36	.684		
	Within subjects					
	Block	.112	1	.112	.150	.701
	Block*Condition	1.338	3	.446	.593	.623
	Error	27.05	36	.751		
	Total	58.244	39			

*(table continues)*

Rating question	Source	SS	df	MS	F	p
Opinion of other players	Between subjects					
	Condition	1.819	3	.606	.648	.589
	Error	33.675	36			
	Within subjects					
	Block	1.012	1	1.012	1.923	.174
	Block*Condition	4.538	3	1.513	2.873*	.05*
	Error	18.950	36	.526		
	Total	59.994	39			
Estimation of other players' opinion	Between subjects					
	Condition	4.125	3	1.375	1.516	.227
	Error	32.650	36	.907		
	Within subjects					
	Block	.050	1	.050	.107	.746
	Block*Condition	3.050	3	1.017	2.166	.109
	Error	16.900	36	.469		
	Total	56.775	39			

\* $p = .05$

**Table 4.**

*Pairwise comparisons for the block\*condition interaction for the opinion of the other players in the unfair block without reappraisal (Block II) and the unfair block with reappraisal (Block III).*

Condition	Mean Difference Block III – Block II	Std. Error	Sign.
C	-.7*	.324	.038*
LL	.3	.324	.361
POSR	.2	.324	.542
NEGR	-.7*	.324	.038*

*Note.*  $p$ -values have been adjusted using the Bonferroni-correction.

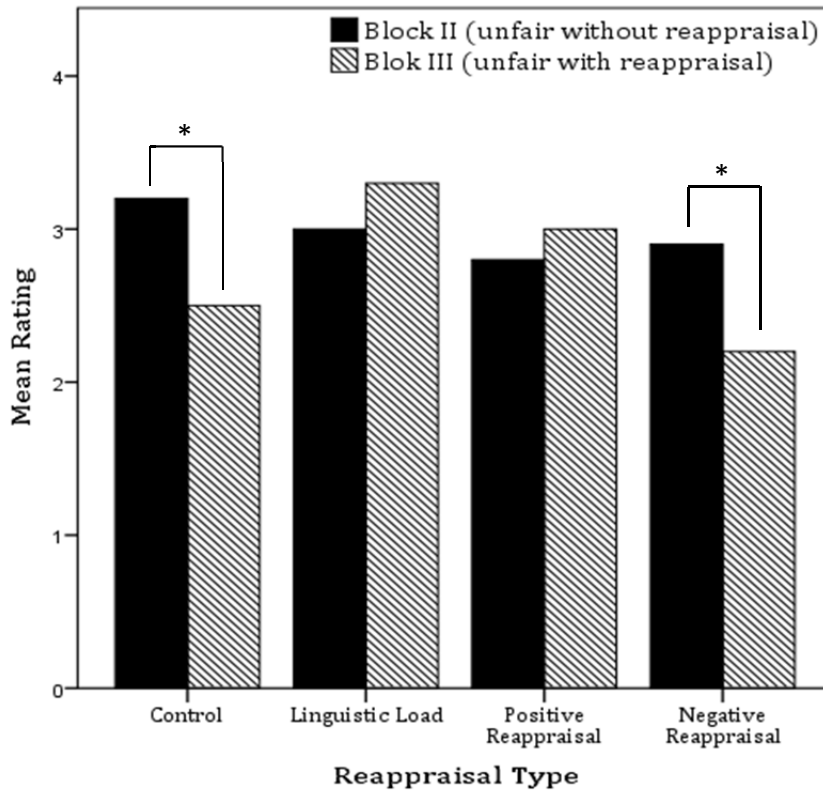
C = Control, LL = Linguistic Load, POSR = Positive Reappraisal,

NEGR = Negative Reappraisal.

\*  $p < .05$

**Figure 3.**

*Mean ratings for the opinion of the other players per condition for the unfair block without reappraisal (block II) and the unfair block with reappraisal (block III).*



\* $p < .05$

#### *GSR measurement*

No significant differences in average GSR activity were found between the fair block (block I) ( $M = -3.725$ ,  $SD = 13.053$ ) and the unfair block without reappraisal (block II) ( $M = -3.281$ ,  $SD = 6.240$ ), as indicated by the dependent t-test ( $t(39) = -.281$ ,  $p = .78$ ). The repeated measures ANOVA yielded no significant effect for the comparison between the unfair block without reappraisal (block II) and the unfair block with reappraisal (block III) ( $F(1,36) = .405$ ,  $p = .529$ ) and no significant interactions with condition were found ( $F(3,36) = .019$ ,  $p = .997$ ).

## DISCUSSION

In this study, we aimed to explore the effects of the emotion regulation strategy cognitive reappraisal in the situation of ostracism. In particular, we were interested in the possible role of language in the effectiveness of cognitive reappraisal. Participants were placed in an experimental social exclusion situation and subsequently, the influence of two cognitive reappraisal strategies with different linguistic contents was investigated. Emotional responding was measured with both self-report measures and the Galvanic Skin Response (GSR).

### *The effects of ostracism*

As expected, the act of exclusion in the game had a clear influence on the self-reported mood of the participants. Participants indicated that they felt worse, angrier, sadder and more rejected after being excluded. Additionally, the other players were judged less friendly and the participants indicated that they thought that the other players also judged them less friendly. This can be inferred from the significant difference in ratings after the unfair block (no reappraisal) compared to those after the fair block. This result is in accordance with results from previous studies, which showed strong mood effects of exclusion within the Cyberball paradigm (Gonsalkorale & Williams, 2007; Williams et al., 2000; Zadro et al., 2003).

However, the physiological response to excluding ball throws in the game, as indicated by the GSR measurements, did not differ significantly between the fair block and the unfair block (no reappraisal). This result is in contradiction with the findings from Kelly and colleagues (2012), who reported a significant difference in overall skin conductance levels between an inclusion and an exclusion block.

There are several possible explanations for the apparent discrepancy between the subjective and physiological measures of emotion. Firstly, participants may have overestimated their levels of emotional disturbance and may thus have reported to be more affected by the exclusion than they in reality were. Alternatively, it is possible that the participants understood that the goal of the game was to evoke negative emotions and that they tried to base their answers on how they thought they were 'supposed' to feel, rather than on how they actually felt. A third possible explanation concerns the method that we used to analyse the GSR data. Per block of Cyberball, the physiological responses to the ball throws not directed at the participant were averaged and these average 'exclusion' scores per block were compared to each other. As this method provides a clear comparison between responses to excluding acts within a context of inclusion on the one hand and excluding acts within a context of exclusion on the other, this was considered a reasonable method to analyse physiological responding in the Cyberball game. It is, however, possible that other methods of analyzing the GSR data would have led to different results.

If both the subjective ratings and the GSR measurements of the excluding ball throws did nonetheless accurately reflect the emotional state of the participants, we can conclude that the act of exclusion did have a clear effect on mood, but that the effect was not strong enough to induce a physical response.

### *The role of language in reappraising social exclusion*

The most important goal of this study was to investigate whether the linguistic content of the reappraisal made a difference for the effectiveness of this strategy in a social exclusion situation. To address this question, we compared subjective ratings and GSR measurement between the unfair block without reappraisal and the unfair block with

reappraisal. The results indicate that for one of the six questions, the ratings differed between these two blocks: participants judged the other players more negatively after being offered a reappraisal strategy, compared to the unfair block without reappraisal, but only in the control condition and in the negative reappraisal condition. This change in opinion of the other players was not found in the linguistic load condition and the positive reappraisal condition. For the four mood questions and the question regarding the participants' estimation of the other players' opinion, ratings did not change significantly after applying a reappraisal strategy. How can these results be interpreted?

In the negative reappraisal condition and the control condition without reappraisal, the exclusion caused the participants to have a more negative attitude towards the excluders. This was a rather unsurprising result for the negative reappraisal condition; in this condition, participants were telling themselves that the other players were annoying and unfriendly, which, evidently, also made them rate the other participants less friendly. As for the control condition, we could of course not control any strategies that the participants used to deal with the exclusion. It is possible that, without being offered any strategies but still feeling bad about being excluded, they started to develop their own strategies to regulate their emotions. If the participants that received no instructions instinctively responded by forming negative thoughts about the excluders, this could explain the negative shift found in this condition.

There was no significant change in the participants' judgements of the other players in the linguistic load condition and the positive reappraisal condition. Apparently, the attitude towards the excluders did not become more negative when the participants evaluated the situation in a positive or a neutral way. The content of the positive reappraisal prevented the participants from letting the exclusion further influence their opinion of the other players and the repetition of the non-emotional

sentence in the linguistic load condition might even have had a calming, distancing effect. This suggests that saying something positive or non-emotional to yourself does not negatively influence the relationship with the excluders.

Together, these results suggest that using a reappraisal with a content that is not negative (but neutral or positive) is more advantageous for the relationship with the excluders than thinking about the excluders in a negative way. One might argue that a worsening of the relationship with the excluders is better avoided, as negative feelings about the excluders may lead to aggressive or undesired behavior towards the others. This in turn will not tone down the exclusion and may even intensify it (Barner-Barry, 1986). This implicates that when we try to alleviate the social pain of being excluded, we might better look for positive or neutral words than for negative ones; a notion that also relates to recent research on loving-kindness meditation and compassion meditation, in which concentrating on positive thoughts about others is shown to result in a positive shift in affect (Hofmann et al., 2011).

As for the GSR measurements, no significant changes or interactions were found between the unfair block without reappraisal and the unfair block with reappraisal. With respect to the emotional responding in these two blocks, GSR measurement and rating data are largely consistent with each other, since for five out of six rating questions no significant effects and interactions were present. Possibly, the fact that the negative reappraisal and the control condition caused the participants to feel more negative towards the other players, did not induce a physical change in arousal. Alternatively, the lack of a GSR effect can again be explained by the method we used to analyse the GSR data. Perhaps, a different method would have revealed a physiological increase in arousal caused by the decrease in evaluation of the other players. This,

however, seems unlikely, as also self-reports of mood did not change significantly between these blocks.

To conclude, language seems to play a role in the effectiveness of reappraisal, as reappraisals with different semantic contents lead to different effects in the subjective evaluations of the excluding individuals. However, the effects in this study were rather limited. The reappraisal strategies that were offered did not cause any shifts in self-reported mood with respect to the contrasts bad/good, angry/peaceful, sad/happy and rejected/accepted, as well as no changes in how the participants thought the other players evaluated them and no effects of electrodermal activity. The goal of this study was to offer a cognitive-linguistic strategy to cope with the emotional effects of social exclusion and to explore possible effects on mood and physiological arousal, but the question remains why the effects of the present study were restricted to only one significant interaction.

#### *Limitations of the present study and directions for future research*

The rather limited effects of the reappraisals on subjective and objective measures of emotion could lead us to conclude that cognitive reappraisal is a relatively ineffective strategy in reducing the immediate negative effects of ostracism. However, the absence of a strong effect could also be due to theoretical choices made in this study.

Firstly, it is possible that a more substantial effect can be found for reappraisals with a semantic content different from the reappraisals used in the present study. Here, a distinction was made between positive and negative reappraisals, but both sentences were focused on the other players. As Williams (1997, 2001) points out, ostracism threatens one's feelings of belonging, control, self-esteem and meaningful existence. These aspects are all related to reflections about oneself. This could explain why other-



focused reappraisals have a minor effect on the negative emotions caused by social exclusion. If the self, rather than the other, is the main focus of the reappraisal, e.g. “I know that I am a nice person, I have lots of friends anyway.”, the negative feelings about oneself might be lessened. That is, self-focused reappraisals might be more effective than other-focused reappraisals in a social exclusion paradigm.

Another possibility is that the effect will become more profound in the long term. In the present experiment, the focus was on the immediate effects of reappraisal strategies, but possibly reappraising the exclusion situation multiple times over a longer time span is a prerequisite for the strategy to be effective in reducing negative affect. Interestingly, immediate effects of cognitive reappraisal have often been reported in previous research (Delgado et al., 2008; Ehring, et al., 2010; Goldin, et al., 2008; Gross, 1998; Hofmann et al., 2009; McRae et al., 2008; Shurick et al., 2012;). A difference between the cognitive reappraisals used in previous studies and the reappraisal forms used this study is the fact that in our study, the relationship with other people is reappraised, rather than a stimulus not directly related to an interaction involving oneself (e.g. a disgusting picture or a sadness-inducing film). The reinterpretation of a social interaction with other people may be a more multifaceted and complicated process to reinterpret than the emotion-evoking stimuli in other studies and as a consequence, it may take longer for the reappraisal to have an effect on emotions.

The lack of substantial effects in mood and physical arousal can also be interpreted in the light of the experimental procedure in this study. First of all, our sample size was rather small. Possibly, more substantial effects can be found with a bigger sample size. As an example, Kelly and colleagues (2012) measured subjective experience of emotion and electrodermal activity in a comparable study with a sample

size of 42 participants. At first sight, this sample size seems to be comparable to the forty participants in our study. However, our between-subjects design with different reappraisal strategies resulted in four conditions each containing ten participants, while Kelly and colleagues (2012) made within-subjects comparisons within the complete group of 42 participants, resulting in a more powerful design.

Secondly, although Zadro and colleagues (2004) report that the Cyberball paradigm is still effective in increasing self-reported negative affect when participants know that they are playing against a computer, the fact that no attempt was made to make participants believe that they were playing with real people might have influenced the effectiveness of the reappraisal in this experiment. More precisely because the reappraisals were focused on the other players in the game, it might have been hard to identify with the content of the reappraisal, if the participants realised that the other players were not real.

Furthermore, the duration of the ball throws was quite long. This long duration was required because of the slow nature of the GSR response, but it might have caused the participants to be too bored for the reappraisal to have an effect. Interestingly, the fact that the game was relatively boring did not have an effect on the negative influence of the act of exclusion (in the second block). It is possible that during the third block (unfair with reappraisal), the participants had already lost too much interest in the game for the reappraisals to be really effective, while in the first two blocks they were still attentive enough.

Finally, it might have felt unnatural to memorize one sentence that had to be repeated at every ball throw not directed towards the participant. This way of offering a reappraisal has not been used before in experimental cognitive reappraisal paradigms, as most studies gave the participants more liberty in their way of reappraising the

stimulus or situation (e.g. Ehring et al., 2010; Delgado et al., 2008; Goldin et al., 2008; Gross, 1998; Hofmann et al., 2009; McRae et al., 2008; Shurick et al., 2012). It is possible that giving the participants different, more spontaneous reappraisal instructions while still including the different semantic perspectives would enhance the effect of the reappraisals.

Future research is needed to further explore the effectiveness of cognitive reappraisal in situations of ostracism. The interaction found in this study points toward an interesting relation between language, cognitive reappraisal and ostracism. It would therefore be interesting to improve the design of this study with respect to the sample size, the realistic quality of the other players, the duration of the ball throws and the spontaneity of the reappraisals. Also, it might be worthwhile to consider different methods of GSR analysis, rather than averaging the responses to excluding ball throws. Furthermore, the effects of different reappraisals on the long term as well as the effect of other-focused reappraisals are essential in understanding the mechanisms of this emotion regulation strategy in social exclusion paradigms. In conclusion, the present study opens an interesting debate about language as a mediator in emotion regulation, by providing initial evidence for a link between language and cognitive reappraisal in situations of social exclusion.

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