

## Comfortably numb?

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*Published in:*  
Journal of Nonverbal Behavior

*Document version:*  
Peer reviewed version

*DOI:*  
[10.1007/s10919-014-0198-9](https://doi.org/10.1007/s10919-014-0198-9)

*Publication date:*  
2015

[Link to publication](#)

*Citation for published version (APA):*  
Schaafsma, J., Krahmer, E. J., Postma, M., Swerts, M. G. J., Balsters, M. J. H., & Vingerhoets, A. J. J. M. (2015). Comfortably numb? Nonverbal reactions to social exclusion. *Journal of Nonverbal Behavior*, 39(1), 25-39. <https://doi.org/10.1007/s10919-014-0198-9>

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Comfortably Numb?  
Nonverbal Reactions to Social Exclusion

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## Abstract

This study examined people's nonverbal reactions to being excluded during a social interaction. According to the 'numbness hypothesis', individuals who are being excluded may not display overt signs of distress but may lack in emotion and appear lethargic or numb instead.

Nevertheless, the validity of this hypothesis has recently been questioned. In the present study, we hypothesized that the nonverbal behaviors of individuals who are being excluded are likely to be indicative of sadness and social withdrawal rather than numbness per se. For this purpose, participants were excluded or included during an interaction with two confederates. Automatic detection of facial expressions indicated that, although participants did display a more neutral face when they were excluded compared to when they were included, they also expressed more sadness and less joy. In addition, manual coding of nonverbal behaviors indicated that individuals who were excluded displayed fewer affiliative behaviors. These findings are not compatible with the numbness hypothesis. Individuals who are being excluded do display emotions (i.e., more sadness, less joy), be it that these emotions are typically associated with decreased energy levels and social disengagement.

**Key words:** Social Exclusion; Facial Emotional Expression; Numbness

## Comfortably Numb?

## Nonverbal Reactions to Social Exclusion

“S’pose you didn’t have nobody. S’pose you couldn’t go into the bunkhouse and play rummy ‘cause you was black. How’d you like that? S’pose you had to sit out there an’ read books. Sure you could play horseshoes till it got dark, but then you got to read books. Books ain’t no good. A guy needs somebody – to be near him.” He whined, “A guy goes nuts if he ain’t got nobody. Don’t make no difference who the guy is, long’s he’s with you. I tell ya,” he cried, “I tell ya a guy gets too lonely an’ he gets sick.” (Steinbeck, 1937, p. 72)

Being ignored, excluded or rejected probably ranks among the most unpleasant and painful of human experiences. As social creatures, people have a fundamental need to form and maintain positive interpersonal relationships. Several authors have suggested that this need is deeply rooted in our evolutionary history (e.g., Baumeister & Leary, 1995; Williams, 2001). Without the protection of a social group, it would have been more difficult for our ancestors to hunt, gather, and to defend themselves against outside attack, and so exclusion from the group would most likely have resulted in early death. It has also been argued that, as a result of such evolutionary pressures, humans have evolved mechanisms to detect the slightest cues of exclusion during their interactions with others. For example, there is evidence that even relatively subtle nonverbal cues such as not receiving eye contact are painful and can result in feelings of exclusion or social disconnection (e.g., Wesselmann, Cardoso, Slater, & Williams, 2012; Wirth, Sacco, Hugenberg, & Williams, 2010).

To cope with the pain of social exclusion<sup>1</sup>, people may respond in a host of negative ways. For example, socially excluded individuals often become aggressive toward others (e.g., Buckley, Winkel, & Leary, 2004; Twenge, Baumeister, Tice, & Stucke, 2001), are more likely to engage in self-defeating behaviors such as risk-taking and procrastination (e.g., Twenge, Catanese, & Baumeister, 2002), and are less willing or able to self-regulate (e.g., Baumeister, DeWall, Ciarocco, & Twenge, 2005). Remarkably, however, researchers have not always found

relationships between exclusion and emotional distress. Instead, some studies suggest that - during interactions in which people are being excluded - they respond in a seemingly numb manner rather than with overt displays of emotions. For example, Williams (2001) observed that people who were excluded by others during a ball toss game or a role-play conversation slumped down in their chairs, stared at their feet, and ignored everything around them. It was “as though they had been hit with a stun gun” (p. 159).

To explain this paradoxical finding, it has been hypothesized that social exclusion may initially lead to a state of cognitive deconstruction (DeWall & Baumeister, 2006; Twenge, Catanese, & Baumeister, 2003). That is, individuals who are being excluded may experience empty, neutral, or even bored feelings because they hide out in a mental state that is characterized by a lack of emotion, absence of meaningful thought, and lethargy. Twenge and colleagues (2003) have argued that this deconstructed state could be adaptive because it may help people to avert the pain or distress that might otherwise arise following threats of social exclusion. Thus, according to this ‘numbness hypothesis’, individuals who are being excluded may not experience and show any overt signs of distress but may appear lethargic or indifferent instead.

So far, however, very little is known about the nonverbal behaviors of people who are being excluded. Reports of the presumed lethargy of excluded individuals have up to now been anecdotal and the nonverbal behaviors of individuals who are being excluded have not been systematically analyzed and compared to those of included individuals. Furthermore, there has been considerable debate about whether or not exclusion leads to emotional numbness. Studies that relied on self-report measures of mood have generally yielded inconsistent results, with some studies finding significant mood differences between included and excluded participants (e.g., Zadro, Williams, & Richardson, 2004), and others not (e.g., DeWall & Baumeister, 2006). On the basis of a meta-analysis, however, Gerber and Wheeler (2009a) question the validity of the numbness hypothesis and conclude that *in vivo* inductions of exclusion do lead to a decrease in positive mood and an increase in negative mood (see also Baumeister, DeWall, & Vohs, 2009 for a reply, and Gerber & Wheeler, 2009b for a rejoinder). Similarly, in a study comparing

different exclusion paradigms, Bernstein and Claypool (2012) found that participants who had been excluded from an interaction with others (i.e., during a virtual ball-toss game) reported lower mood levels compared to included participants and compared to participants who had been told that they would end up alone later in life.

These findings could imply that the lethargy or passiveness that individuals who are being excluded have incidentally been observed to display nonverbally does not reflect a lack of emotion per se. The goal of the present paper is to shed light on this issue by examining the nonverbal behaviors of people who are being excluded during an interaction. Our primary expectation is that individuals who are being excluded do experience and display emotions, but that these emotions are typically associated with decreased energy levels and social disengagement (e.g., sadness). Although research on the effects of exclusion or rejection has generally not distinguished between the various emotions that people might experience or display, we based this expectation upon studies demonstrating that relatively passive emotions such as sadness typically arise following social losses and unpleasant events over which people have no control (e.g., Smith & Ellsworth, 1985). For example, various studies show that the dissolution of friendships and of romantic or intimate relationships can result in sadness and depression (e.g., Keller & Nesse, 2005; Lorentz et al., 1997; Sbarra & Ferrer, 2006; Tamako, 1983). Moreover, when asked to describe instances that are likely to elicit sadness, people typically write about separation, the loss of a relationship or rejection (Shaver, Schwartz, Kirson, & O'Connor, 1987).

Sadness is associated with distinct nonverbal expressions (e.g., narrowed eyes, pulled down corners of the lips, and a closed and downward looking posture) that may be difficult for people to suppress (e.g., Coulson, 2004; Ekman & Friesen, 1978). Several studies also suggest that sadness and depression tend to be associated with social withdrawal and an inclination to turn inward. For example, Cunningham (1988) found that - compared to people who felt happy - individuals who were sad were more interested in solitary and avoidant behaviors such as sitting and thinking, being alone and taking a nap. In addition, Likowski and colleagues (2011) found that sad people showed less facial mimicry (which is important for social bonding, e.g.,

Chartrand & Bargh, 1999) than people who felt happy. One possible explanation for this decreased social interest is that it affords a pause and allows individuals to reassess their situation and find a way to deal with it (Green & Sedikides, 1999; Lazarus, 1991; Salovey, 1992, Sedikides, 1992). This could imply that individuals who are being excluded may have appeared lethargic in previous studies, not because they lack in emotion or meaningful thought and psychologically withdraw from the interaction (as the numbness hypothesis would suggest), but because they are sad, try to regulate their emotions, and hence do not have the capacity to direct their attention outwardly (e.g., engage in affiliative behaviors).

People may also display sadness when they are being excluded because this may serve an important communicative function. For example, according to Fridlund (1994, but see also Parkinson, 2005) facial expressions should be understood as social messages that communicate what someone is likely to do or wants other people to do. From this point of view, expressions of sadness do not necessarily reflect a person's internal state but are a signal (i.e., a call for help) to others instead. In the context of exclusion, this may be particularly adaptive because expressions of sadness often elicit empathic responses in others, which may help individuals to restore social bonds (e.g., Balsters, Kraemer, Swerts, & Vingerhoets, 2013; Hasson, 2009).

On the basis of the foregoing, we expected that individuals who are being excluded would display nonverbal expressions that are associated with sadness and would also become more socially withdrawn (i.e., display fewer affiliative tendencies). We set up an experiment in which some of the participants were excluded during an interaction with two confederates. These interactions were video recorded and participants' nonverbal behaviors were analyzed in three ways. First, we examined whether external raters were able to determine on the basis of nonverbal cues whether participants were included or excluded. Second, we examined participants' nonverbal expression of emotions in more depth, by analyzing their facial expressions with the Computer Expression Recognition Toolbox (CERT; Ekman & Friesen, 1978; Littlewort et al., 2011). To obtain a complete picture, we focused not only on expressions of sadness and on neutral expressions, but also included joy, anger, contempt, disgust, fear, and surprise in the analyses. Third, we examined whether participants' behaviors were indicative of

social or psychological withdrawal, by manually coding their nonverbal behavior patterns using the Ethological Coding Scheme for Interviews (ECSI) that was developed by Troisi (1998).

## Method

### Participants and Design

Participants were 60 undergraduate students from Tilburg University who participated in return for course credit. They were randomly assigned to an exclusion or inclusion condition. One participant expressed suspicion during the experiment about the purpose of the study and was excluded from further analyses, leaving a final sample of 59 students (37 women,  $M_{\text{age}} = 20.8$ ,  $SD = 2.4$ ).

### Procedure

Participants arrived at the lab individually for a study that ostensibly concerned group decision-making under time pressure. Upon arrival, they were informed about the global procedure of the experiment and they were led to believe that they would engage in a decision-making task with two other participants. In reality, they would interact with two confederates (one male, one female). Participants were also asked permission to make video recordings during the group discussion task. In addition, they were told that they could withdraw their participation at any time, without having to give a reason and without penalty.<sup>2</sup>

After giving informed consent, participants filled out a questionnaire to assess baseline mood levels. To ascertain that participants in both conditions were in a comparable state of mind at the beginning of the discussion, they then watched a 7-minute film fragment consisting of underwater scenes filmed in the Red Sea, accompanied with soothing music. Following this, they were again asked to fill out the mood questionnaire a second time. After having completed this questionnaire, they were accompanied to a discussion room where they met with the other two “participants” (the confederates). They were seated at a hexagonal table so that they had one conversation partner on each side, and each person had a digital DV camera (25 fps) in front. Both the participant and the confederates were videotaped and the camera was adjusted so that face and upper body were in full view.

After having been seated, participants read a text about a communication problem in a



local gym and they were instructed to discuss two questions with respect to this case (How did the problem arise? And how could it be solved?). They were given four minutes to answer each question. The actual experimental manipulation took place during the discussion of the second question (i.e., after four minutes). From this point on, the confederates in the exclusion condition discussed the case solely among themselves and ignored (i.e., did not respond verbally or nonverbally) any contribution from the participant. In contrast, in the inclusion condition the two confederates responded to and affirmed the participant's input to the discussion.

After 2 x 4 minutes, the experimenters re-entered the discussion room and brought the participant and the confederates to separate rooms. Here, participants were asked to fill in the mood questionnaire once more. After this, they were shown a different 7-minute Red Sea underwater scene with relaxing music. Subsequently, participants filled out a questionnaire that, among other things, assessed their mood one last time.<sup>3</sup>

Finally, participants were fully and extensively debriefed about the experiment. They were told that assignment to the exclusion or inclusion condition was random. Particular care was taken to make sure that participants who had been ignored during the discussion understood that this was not personal. They were also asked not to discuss the experiment with other students.

## Measures

**Manipulation checks.** To assess participants' mood during the experiment, they were asked to complete a mood scale derived from Mackie and Worth (1989) at four different points throughout the experiment (at the beginning, after the first movie, following the experimental manipulation, and after the second movie). The scale consisted of six 7-point bipolar semantic differential scales: *sad - happy*, *unpleasant - pleasant*, *unsatisfied - satisfied*, *discontent - content*, *sullen - cheerful*, and *low-spirited - in high spirits*. A lower score on this scale indicates a more negative mood. Alpha's were  $> .80$ .

**Perceptions of external raters.** We examined whether outside observers could see on the basis of nonverbal cues whether a person was excluded or not. For this purpose, 25 undergraduate students (8 women) judged whether participants were being included or excluded. For each of the 59 participants in the experiment, two fragments of 8 seconds (200 frames) were

selected. One fragment was selected from the first half of the experimental manipulation (frames 1000 – 1200, i.e., 0.40 – 0.48 minutes), and another fragment from the second half (frames 4000 – 4200, 2.40 – 2.48 minutes). This resulted in  $59 \times 2 = 118$  fragments that were presented to the individual raters in random order. For each fragment, raters indicated whether they believed the person in the film-clip was included or excluded. Furthermore, they rated on a five point scale how certain they were of their choice (1 *very uncertain*, 5 *very certain*). For data processing, perceived inclusion and exclusion were contrast-coded ( $-1 = \textit{exclusion}$ ,  $1 = \textit{inclusion}$ ), and these scores were multiplied with the certainty score. This resulted in a score ranging from  $-5$  (*very certainly excluded*) to  $+5$  (*very certainly included*) for each fragment.

**Nonverbal expression of emotions.** To examine participants' nonverbal expression of emotions, we analyzed their facial displays using the Computer Expression Recognition Toolbox (CERT) developed by Littlewort and colleagues (2011). This tool offers a fully automatic real-time recognition of the Facial Action Coding (FACS) Action Units (AUs). FACS (originally developed by Ekman and Friesen, 1978) is arguably the most precise existing system used to code component movements of the facial muscles. Given a video sequence, CERT localizes the face and estimates the presence of Action Units by performing local Gabor transforms at informative facial locations. The action units recognized during the first stage of facial expression analysis serve as input for the recognition of seven basic emotions, as well as neutral expressions. The classification of the emotions also makes use of information about AU intensity. The output of the classifier is the posterior probability of each emotion. The reported performance of the emotion classification is around 90%. For the analysis of participants' facial displays, we divided the four minutes before and the four minutes during the experimental manipulation (inclusion or exclusion) into two segments each, resulting in  $2 \times 2$  segments. We focused on neutral displays and expressions of sadness, but also included joy, anger, contempt, disgust, fear, and surprise to obtain a complete picture.

**Nonverbal behavior patterns.** To examine whether participants' nonverbal behaviors were indicative of social withdrawal or psychological disengagement, we used the Ethological Coding System for Interviews (ECSI, Troisi, 2002; Troisi & Moles, 1999). The ECSI is a

validated scale that can be used to measure people's nonverbal behaviors during social interactions. It consists of eight behavioral categories and a total of 37 nonverbal cues. For present purposes, our primary interest was in two behavioral categories: 'Affiliation' and 'Flight'. The first category ('Affiliation') concerns nonverbal behaviors that express friendliness, invite social interaction and reflect a positive attitude (associated with ECSI category behaviors 2-6, e.g., smile, head tilt, eyebrow flash). The second category ('Flight') includes nonverbal behaviors that serve to cut off the sensory receptors from aversive social stimuli and are associated with withdrawal and psychological disengagement from the interaction (behaviors 10-15, e.g., look away/down, chin to chest). For exploratory purposes, we also included the categories 'Displacement' and 'Relaxation'. The former concerns behavior patterns that generally correspond with social tension and anxiety (behaviors 24-32 from the ECSI, e.g., hand-face touching, yawning) whereas the latter includes behaviors that are indicative of low levels of emotional arousal and are associated with a reduction in nonverbal signals (behaviors 33-37, e.g., settle, fold arms, neutral face).

For each participant, two independent raters who were blind to the experimental manipulation coded two 30-second fragments from the experimental manipulation (0.30-1.00 minutes and 2.30-3.00 minutes). As required by the ECSI guidelines, coding was done without sound. Cohen's kappa's for the two primary behavioral categories of interest (Affiliation and Flight) were adequate (.607 and .800, respectively). For the two remaining categories (Displacement and Relaxation), Cohen's kappa's were relatively low (.510 and .473, respectively).

## Results

### Manipulation Checks

To examine whether there were mood differences between participants who were excluded and those who were in the control (inclusion) condition, we subjected the self-reported mood scores to a within-subjects ANOVA, with the experimental manipulation (inclusionary status: excluded vs. included) as a between-subjects factor. This analysis revealed a significant main effect of time of measurement,  $F(3, 171) = 5.09, p = .002, \eta_p^2 = 0.082$ . Participants

reported lower average mood levels at the beginning than at the end of the experiment ( $M = 5.15$  and  $M = 5.46$ , respectively). There was also a trend for inclusionary status, with excluded participants reporting lower average mood levels ( $M = 5.20$ ) than included participants ( $M = 5.47$ ),  $F(1, 57) = 2.92$ ,  $p = .093$ ,  $\eta_p^2 = 0.049$ . More important, however, is that we found a significant interaction between inclusionary status and time of measurement,  $F(3, 171) = 7.69$ ,  $p < .001$ ,  $\eta_p^2 = 0.119$ . The means for this interaction are displayed in Table 1. A contrast analysis revealed that participants who had been excluded reported lower mood levels after the experimental manipulation than before the experimental manipulation,  $F(1, 57) = 12.12$ ,  $p = .001$ ,  $\eta_p^2 = 0.017$ . There was a trend suggesting that participants who had been included reported somewhat higher mood levels after the experimental manipulation compared to before,  $F(1, 57) = 3.58$ ,  $p = .064$ ,  $\eta_p^2 = 0.059$ .

We also examined whether excluded participants could be identified as such by external raters. For this purpose, we conducted a MANOVA, with raters' average evaluations of participants' inclusionary status during the first and second film fragment as the dependent variables and participant inclusionary status as a between-subjects factor. This analysis revealed a significant multivariate effect (Pillai's),  $F(1, 56) = 11.65$ ,  $p < .001$ ,  $\eta_p^2 = 0.29$ . Univariate analyses showed that for both the first and the second fragment, participants in the exclusion condition were perceived as more excluded ( $M = -1.05$  and  $M = -1.37$ , respectively) than participants in the inclusion condition ( $M = 1.41$  and  $M = 1.26$ , respectively),  $F_s > 12.38$ ,  $p_s < .001$ ,  $\eta_p^2 = 0.178$  and  $0.220$ . These findings suggest that individuals who are excluded during an interaction display nonverbal behaviors that are distinct from the nonverbal behaviors of included individuals.

INSERT TABLE 1 ABOUT HERE

### **Nonverbal Expression of Emotions: Facial Displays**

We analyzed participants' facial displays before and during the experimental manipulation with a series of two-way mixed ANOVAs, in which the different emotion

expressions automatically recognized at the four time intervals (2 x 2 minutes before the experimental manipulation and 2 x 2 minutes during the experimental manipulation) were included as the within-subjects factor and inclusionary status as the between-subjects factor. Two participants were excluded from the analyses because the recordings made prior to the experimental manipulation were corrupted. In all the analyses, the assumption of sphericity was violated and so we report Greenhouse Geisser corrected values. For an overview of the means, see Table 2. An overview of representative stills can be found in Figure 1.<sup>4</sup>

#### INSERT FIGURE 1 ABOUT HERE

First, we examined whether being excluded resulted in the display of more neutral facial expressions. No main effect was found for inclusionary status or for time of measurement,  $F(1, 55) = .67, p = .67$  and  $F(2.56, 140.58) = 1.38, p = .25$ , respectively. There was, however, a significant interaction between inclusionary status and time of measurement,  $F(2.56, 140.58) = 3.61, p = .02, \eta_p^2 = .062$ . To examine this interaction, we performed a series of planned contrasts. We compared the neutral displays in the 2 x 2 minutes before the manipulation (contrast weight -2) with the neutral displays in the 2 x 2 minutes during the experimental manipulation (contrast weight 2) in the exclusion and inclusion condition. We found that in the exclusion condition, participants displayed more neutral emotions during the experimental manipulation ( $M = .424$  and  $M = .421$ ) than before ( $M = 3.81$  and  $M = 3.61$ ),  $F(1, 55) = 8.28, p = .006, \eta_p^2 = 0.13$ . In the inclusion condition, however, there was no difference in neutral displays before or during the experimental manipulation,  $F(1, 55) = .61, p = .44$ . We also analyzed whether excluded participants displayed more neutral expressions over the course of the experimental manipulation by comparing the neutral displays in the first two minutes and the last two minutes of the experimental manipulation (contrast weight -1 and 1, respectively). This analysis revealed that the display of neutral expressions by excluded participants did not change during the experimental manipulation,  $F(1, 55) = .02, p = .90$ .

Second, we examined whether participants displayed more sadness when they were being

excluded compared to when they were being included. In this analysis, the main effect of inclusionary status was not significant,  $F(1, 55) = .09, p = .76$ . Furthermore, there was no main effect of time of measurement,  $F(2.63, 144,36) = 1.76, p = .16$ . In line with our expectations, however, we did find a significant interaction between inclusionary status and time of measurement,  $F(2.63, 144,36) = 4.12, p = .011, \eta_p^2 = 0.07$ . In support of our predictions, a contrast analysis comparing sad displays before and during the experimental manipulation revealed that in the exclusion condition, participants displayed more sadness in the 2 x 2 minutes of the experimental manipulation ( $M = .086$  and  $M = .083$ ) than in the 2 x 2 minutes before the experimental manipulation ( $M = .062$  and  $M = .067$ ),  $F(1, 55) = 12.24, p = .001, \eta_p^2 = 0.18$ . This display of sadness did not change during the first two and the last two minutes of the experimental manipulation,  $F(1, 55) = .16, p = .69$ . Participants in the inclusion condition did not differ in their nonverbal display of sadness prior to and during the experimental manipulation,  $F(1, 55) = .43, p = .52$ .

INSERT TABLE 2 ABOUT HERE

All in all, these results indicate that, although participants did display more neutral expressions when they were being excluded compared to when they were being included, this does not necessarily reflect a lack of emotion or emotional expressivity. For exploratory purposes, we also analyzed whether being excluded affected participants' nonverbal expressions of joy, surprise, anger, fear, and disgust. For facial expressions of joy, we found a main effect of time of measurement that approached conventional levels of significance,  $F(2,68, 147,13) = 2.71, p = .052, \eta_p^2 = 0.047$ . Participants tended to display less joy during the 2 x 2 minutes of the experimental manipulation ( $M = .045$  and  $M = .044$ , respectively) compared to the 2 x 2 minutes before the manipulation ( $M = .051$  and  $M = .054$ , respectively). Interestingly, we also found that this main effect was qualified by a significant interaction between inclusionary status and time of measurement,  $F(2,68, 147,13) = 5.53, p = .002, \eta_p^2 = 0.091$ . A contrast analyses revealed that participants in the exclusion condition expressed less joy during the experimental manipulation

( $M = .036$  and  $M = .034$ ) compared to before ( $M = .053$  and  $M = .057$ ),  $F(1, 55) = 17.82, p < .001, \eta_p^2 = 0.24$ . Yet, in the inclusion condition, participants did not differ in this regard,  $F(1, 55) = .74, p = .39$ .

For anger, surprise, fear, and disgust, we did not find an effect of inclusionary status or of time of measurement, nor did we find significant interactions between inclusionary status and time of measurement,  $F_s < 2.26, p_s > .11$ . Nevertheless, for contempt we did find a significant interaction between inclusionary status and time of measurement,  $F(2.57, 141.26) = 2.90, p = .045, \eta_p^2 = 0.05$ . A contrast analysis revealed that participants who were excluded expressed less contempt during the experimental manipulation ( $M = .378$  and  $M = .384$ ) compared to before the manipulation ( $M = .434$  and  $M = .425$ ),  $F(1, 55) = 6.15, p = .016, \eta_p^2 = 0.10$ . For included participants, no such difference was found,  $F(1, 55) = .88, p = .35$ .

#### *Nonverbal Behavior Patterns: Affiliation and Withdrawal*

We were also interested in whether participants who were excluded displayed fewer affiliative behaviors and psychologically disengaged from the interaction. To examine this, we analyzed the scores that were obtained from manually coding two video fragments, using two behavioral categories (Affiliation and Flight) from the ECSI scheme. For each behavioral category, we conducted a MANOVA with the scores on the first and second video fragment as dependent variables, and inclusionary status as the between-subjects factor. For affiliation, this analysis yielded a significant multivariate effect (Pillai's),  $F(2, 57) = 9.82, p < .001, \eta_p^2 = 0.26$ . Univariate analyses revealed a trend for the first fragment, and a significant effect of inclusionary status for the second fragment,  $F(1, 58) = 3.06, p = .09, \eta_p^2 = 0.05$  and  $F(1, 58) = 19.61, p < .001, \eta_p^2 = 0.25$ , respectively. As can be seen from Table 3, participants who were excluded displayed fewer affiliative behaviors ( $M = 1.00$  and  $M = 0.84$ ) than participants who were included ( $M = 1.45$  and  $M = 1.76$ ). For flight, however, the multivariate effect was not significant,  $F(2, 57) = 1.49, p = .23$ . Thus, participants who were excluded did not psychologically disengage from the interaction more than included participants did.

For exploratory purposes, we also analyzed two other behavioral categories from the ECSI scheme (Displacement and Relaxation). No differences were found between included and

excluded participants in the display of these behaviors,  $F_s < .57$ ,  $ps > .57$ .

INSERT TABLE 3 ABOUT HERE

### Discussion

There is general consensus that it is painful to be excluded, ignored, or rejected. Nevertheless, there has been debate about how people respond to it emotionally. Some researchers have argued that individuals who are being excluded become emotionally numb and may not display any overt signs of distress (e.g., Twenge et al., 2003), but others have questioned this so-called numbness hypothesis and have argued that excluded individuals do experience emotional distress (e.g., Gerber & Wheeler, 2009a). To shed light on this issue, we examined the nonverbal reactions of people who were being excluded during a discussion. Based upon previous research on how people cope with social losses, we expected that the nonverbal behaviors of people who are being excluded during an interaction would not be indicative of numbness per se, but would be indicative of emotions (such as sadness) that are generally associated with decreased energy levels and social disengagement.

The findings largely confirm this expectation. Participants who had been excluded reported lower average mood levels after the experimental manipulation compared to before. More important, however, is that they also displayed more sadness and less joy during than before the experimental manipulation. No such difference was found for participants in the inclusion condition. In addition, participants who were being excluded displayed fewer affiliative behaviors than participants who were being included. At the same time, they did not seem to psychologically disengage from the interaction (i.e., engage in flight behaviors), as the numbness hypothesis would suggest. All in all, these findings provide converging evidence that being excluded does result in emotional distress.

These findings are an important contribution to present research and theorizing on how people react to social exclusion because they provide a much more nuanced picture than the ‘numbness vs. no numbness’ perspective that seems to dominate the present debate. The



nonverbal behaviors of individuals who are being excluded do not suggest numbness as such but seem to be indicative of emotions that have previously been described as ‘reflective affective states’ instead (Green & Sedikides, 1999). These reflective affective states (such as sadness) may be a more adaptive response to exclusion than numbness. For example, whereas numbness is characterized by lethargy, a relative absence of meaningful thought, and psychological disengagement (Twenge et al., 2003), sadness promotes personal reflection. This may help people to consider the negative event and its implications, and to redirect their goals (e.g., Bonanno & Keltner, 1997; Frijda, 1987; Lazarus, 1991). From a social functional perspective, one could also argue that it is adaptive for excluded individuals to display sadness because this may elicit empathy and helping responses in others, which may help to restore group ties (e.g., Balsters et al., 2013; Fridlund, 1994; Kreibig, Wilhelm, Roth, & Gross, 2007).

Interestingly, participants who were being excluded were less likely to engage in affiliative behaviors (i.e., nonverbal behaviors that allowed them to establish or maintain contact), although they did not seem to psychologically withdraw from the interaction (i.e., engage in behaviors that cut off the sensory receptors for aversive or stressful stimuli). This finding provides further support for the idea that socially excluded individuals display sadness rather than numbness, given that sadness tends to orient people inward. For example, Green and Sedikides (1999) found that sad participants were more self-aware and more inclined to perform introverted behaviors compared to angry or thrilled participants. Nevertheless, it is also possible that excluded individuals displayed fewer affiliative behaviors because they reciprocated the lack of affiliative behaviors of the confederates toward them. As previous research has shown, people tend to imitate the behavior of those around them and are likely to match the affiliative behaviors displayed by their interaction partners (e.g., Chartrand & Bargh, 1999; Sadler & Woody, 2003). Interestingly, however, participants did not seem to mimic the affiliative behaviors that the confederates displayed toward each other.

The fact that participants displayed more neutral expressions when they were excluded compared to when they were included could also be due to the passivity and self-focused attention that is generally associated with sadness. Alternatively, it is possible that display rules

may have motivated participants to mask or neutralize their feelings, particularly because the interactions were video recorded and because they were in the presence of strangers. Although this possibility cannot be ruled out, it also means that the present findings are all the more remarkable. That is, despite the strong contextual cues that may have discouraged people to express their feelings, we still found that they displayed more sadness and less joy when they were excluded compared to when they were included. In our view, this provides further support for the idea that receiving the silent treatment gives rise to negative emotions that may be difficult to suppress, be it that these emotions tend to be relatively passive (which may create the impression of numbness or lethargy).

Future research should, however, examine in more depth the contextual factors that might play a role in the emotions that people display when they are being ignored or excluded. For example, people may be less likely to mask negative affect when they are being excluded by close others rather than by people they have not met before. Moreover, being excluded by close others may not elicit responsive affective states, but may elicit so-called social affective states (e.g., anger), that may orient people toward corrective or affiliative action (e.g., Green & Sedikides, 1999). Furthermore, people's nonverbal reactions may depend on the type of exclusion. For example, receiving the silent treatment may be particularly painful and may elicit stronger negative responses than some of the other manipulations that have been used in previous studies such as the Cyberball paradigm, future-alone manipulations, or reliving rejection (Twenge et al., 2003; Williams, Cheung, & Choi, 2000). In this regard, there may also be important differences between paradigms that manipulate short-term instances of exclusion (such as the one that we used) and those that manipulate chronic exclusion (e.g., future alone manipulations) (e.g., Bernstein & Claypool, 2012).

Taken together, the present study sheds new light on how people respond to social exclusion. Using multiple measures (i.e., self-report mood scales, observations by external raters, automatic coding of facial muscles using CERT, and manual coding of nonverbal behaviors using ECSI), we not only found that excluded participants experienced a decrease in average mood levels, but we also found that their nonverbal behaviors were indicative of increased

sadness and decreased joy. These findings do not suggest a state of deconstruction, in which people avoid self-awareness and keep emotional distress at bay (e.g., Twenge et al., 2003). Instead, our findings suggest that people who are being excluded experience and display very specific emotions. These emotions may not only allow them to reflect and to revise their goals, but possibly also help them to reestablish group ties. As such, people's responses to exclusion may be more adaptive than has hitherto been suggested.

Authors' Notes

Preliminary analyses of some of the data that are presented in this paper appeared in the proceedings of the 32<sup>nd</sup> Annual Meeting of the Cognitive Science Society (Krahmer, Schaafsma, Swerts, Balsters, & Vingerhoets, 2010). We express our gratitude to Bregje Rijbroek, Rian Blankenstein, Marjolein de Vries, and Charlotte Oostrom for their help in collecting the data for this study. We are also grateful to Eric Postma for his help in analyzing the data with the Computer Expression Recognition Toolbox (CERT).

## Footnotes

<sup>1</sup>In this paper, we use the term ‘exclusion’. This term is meant to be synonymous to the term ‘ostracism’, which is generally defined as being ignored or excluded (e.g., Williams, 2001).

<sup>2</sup>This study was part of a larger research project and so we incorporated other measures as well. For example, we measured various trait level variables (e.g., need to belong, fear of negative evaluation, self-esteem, trust, perceptiveness, responsiveness) and we also measured participants’ heart rate. For this latter purpose, six electrodes were applied to participants’ chests after the global procedure was explained. The heart rate measures did not yield a clear pattern of results, however, which is probably due to important confounds. For example, we found that excluded participants had lower heart rates (reflected in an increase in LVET scores) during the experimental manipulation compared to before whereas no such difference was found for participants in the inclusion condition. We suspect that this difference is the result of the required needs of the task (i.e., participants in the exclusion condition no longer talked and moved whereas participants in the inclusion condition were still actively involved in the interaction) rather than a psychological change brought by the exclusion experience (see also Mendes, 2009). Further information about these data and further analyses are available from the authors upon request.

<sup>3</sup>Given that the study was part of a larger research project, the post experiment questionnaire also included a scale that assessed aggressive and prosocial behavioral intentions toward the confederates and that assessed participants’ attachment styles.

<sup>4</sup>Because estimates for several emotions (sad, joy, anger, fear, surprise, and disgust) were skewed, we conducted an additional set of analyses with square-root transformed data that normalized the distribution. These analyses yielded a similar pattern of results and all findings persisted.

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Table 1

*Average Mood Scores as a Function of Inclusionary Status and Measurement Time (Standard Deviations between Brackets)*

	Inclusion	Exclusion
Mood 1: Initial	5.21 (.76)	5.09 (.81)
Mood 2: After film 1	5.41 (.61)	5.41 (.73)
Mood 3: After manipulation	5.68 (.64)	4.92 (.83)
Mood 4: After film 2	5.56 (.68)	5.37 (.77)

Table 2

Mean Emotional Expressions as a Function of Inclusionary Status and Time of Measurement (Standard Deviations ~~in Parentheses-between~~ Brackets)

	Inclusion				Exclusion			
	Before manipulation		During manipulation		Before manipulation		During manipulation	
	Minute 1-2	Minute 3-4	Minute 1-2	Minute 3-4	Minute 1-2	Minute 3-4	Minute 1-2	Minute 3-4
Neutral	.424 (.114)	.422 (.117)	.411 (.107)	.409 (.098)	.381 (.111)	.361 (.109)	.424 (.122)	.421 (.127)
Sad	.073 (.070)	.069 (.060)	.067 (.052)	.068 (.051)	.062 (.057)	.067 (.076)	.086 (.089)	.083 (.086)
Joy	.049 (.044)	.051 (.048)	.055 (.045)	.053 (.044)	.053 (.046)	.057 (.052)	.036 (.029)	.034 (.031)
Anger	.033 (.041)	.033 (.044)	.027 (.025)	.028 (.028)	.027 (.025)	.037 (.043)	.033 (.026)	.031 (.032)
Disgust	.017 (.017)	.017 (.014)	.018 (.014)	.016 (.012)	.025 (.040)	.036 (.057)	.028 (.035)	.032 (.055)
Surprise	.009 (.008)	.009 (.013)	.008 (.008)	.009 (.009)	.009 (.011)	.008 (.008)	.008 (.009)	.009 (.010)
Fear	.012 (.016)	.013 (.025)	.012 (.020)	.015 (.022)	.008 (.012)	.009 (.013)	.008 (.010)	.007 (.007)
Contempt	.382 (.133)	.385 (.136)	.402 (.146)	.401 (.112)	.434 (.134)	.425 (.168)	.378 (.161)	.384 (.167)

*Table 3*

*Mean Number of Affiliative and Flight Behaviors (Standard Deviations in Parentheses)*

	Inclusion		Exclusion	
	Fragment 1	Fragment 2	Fragment 1	Fragment 2
Affiliation	1.45 (1.12)	1.76 (0.79)	1.00 (0.86)	0.84 (0.82)
Flight	1.14 (0.35)	1.21 (0.41)	1.32 (0.54)	1.13 (0.34)

## Figure Captions

*Figure 1.* Representative stills of speakers in the Exclusion (top) and Inclusion (bottom) conditions.

