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A Penny for Your Pain? The Financial Compensation of Social Pain After Exclusion

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Abstract

Research has repeatedly shown that social exclusion is distressful regardless of mitigating circumstances. In three studies we show that financially compensating social exclusion reduces the unpleasant experience and affects subsequent coping. Participants played a game of Cyberball, and either received money when they were excluded or not. Results showed that financially compensating social exclusion reduced self-reported distress and neural activity in the dorsal anterior cingulate cortex (dACC), a region found active during physical and social pain. Finally, participants played a dictator game with those who included them, excluded them, or with new players. Results showed that financial compensation increased offers to sources of exclusion to the amount that was given to sources of inclusion or new players. Hence, financially compensating exclusion helps those who are hurt and those who exclude.

Keywords

social exclusion, ostracism, money, fMRI, dorsal ACC

Rejection and ostracism is everywhere and the costs for those involved are huge (for overviews, see Eisenberger & Lieberman, 2005; McDonald & Leary, 2005; Williams, 2007; Williams, Forgas, & Von Hippel, 2005). For example, social exclusion has been found to cause pain and distress when it occurs face to face (Williams & Sommer, 1997), when it occurs in Internet chat rooms (Williams et al., 2002), when people know it is unintentional (Eisenberger & Lieberman, 2005), when people are excluded by out-group members (Williams, Cheung, & Choi, 2000) or by people they loathe (Gonsalkorale & Williams, 2007), and even when a computer is the source of exclusion (Zadro, Williams, & Richardson, 2004).

These findings suggest that humans are hardwired to belong to a group. Only a few factors have been shown to mitigate the distress caused by social exclusion, such as the physical pain reliever acetaminophen (DeWall et al., 2010), secure attachment partners (Karremans, Heslenfeld, Van Dillen, & Van Lange, in press), and a (symbolic) threat to survival (Van Beest, Williams, & Van Dijk, 2011). In the current work, we direct our attention to a factor that has received mixed support. We focus on the effects of money on social exclusion and investigate whether the distress caused by social exclusion can be financially compensated.

Compensating Social Exclusion With Money

Researchers have shown that when one has inflicted harm on another person, compensation may be a suitable tool to restore the relationship (Desmet, De Cremer, & Van Dijk, 2011a, b; Okimoto, 2008; Okimoto & Tyler, 2007). Compensation refers to the offsetting of a disadvantage on some attribute by a sufficient advantage on another attribute (Bouyssou, 1986). One form of compensation which has received much attention, and which is also the focus of the current article, is financial compensation. Money has been shown to have the ability to make up for poor treatment and unfair decision making. Compensating another person with money repairs trust in the aftermath of harm (Desmet et al., 2011a, b). It restores status (Furnham & Argyle, 1998; Opsahl & Dunette, 1966) and signals that one is a valued member of the group (Okimoto, 2008). Building on these findings we thus predicted that monetary compensation could be an effective strategy to mitigate the distress caused by social exclusion.

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Although research has become increasingly interested in how money may affect social relations (Andari et al., 2010; Dunn, Aknin, & Norton, 2008; Mead, Baumeister, Stillman, Rawn, & Vohs, 2011; Van Beest & Williams, 2006; Vohs, Mead, & Goode, 2006; Zhou, Vohs, & Baumeister, 2009), only two studies have directly assessed how money affects responses to social exclusion (Van Beest & Williams, 2006; Zhou et al, 2009). Van Beest and Williams (2006) made inclusion costly and tested whether putting a prize on inclusion would lower the distress of failing to be included. Participants played a game of Cyberball in which catching the ball was either associated with gaining money or with losing money (e.g., earning or paying 50 cents for receiving a ball). Results showed that this valence manipulation of financial consequences did not mitigate the immediate distress of being excluded. Zhou, Vohs, and Baumeister (2009) took a different approach. Instead of making money dependent on inclusion (like Van Beest and Williams [2006] did), participants either counted money (i.e., $100 bills) or paper before they were included or excluded in a game of Cyberball. Results showed that the cognitive availability of money made participants feel confident and strong, which in turn reduced the negative distress of being excluded. These effects were not found when participants counted paper. The authors reasoned that money in their study served as a substitute for social approval, and it led people to care less about being socially excluded.

Importantly, both Van Beest and Williams (2006) and Zhou et al. (2009) did not investigate whether the negative experience of social exclusion can be *compensated*. Indeed, neither increased the financial outcomes of participants that were excluded. In line with previous research on financial compensation (Furnham & Argyle, 1998; Okimoto, 2008; Opsahl & Dunette, 1966), compensating excluded people with money may make them feel more valued after being excluded and it can restore the perceived status of the excluded person. This can lead people to feel less distressed after being socially excluded.

To test our prediction that the negative distress of social exclusion can be mitigated we decided to use a manipulation in which participants would be directly rewarded for being excluded. We informed participants that they would get 50 cents for each time they did not receive a ball toss in Cyberball and reasoned that this would mitigate the self-reported distress of exclusion compared to the standard Cyberball game with no financial consequences (Experiments 1, 2, and 3). Moreover, in Experiment 2, we also compared our direct manipulation of financial compensation to the more indirect effects of money, which were shown by Van Beest and Williams (2006). In their version of Cyberball, money was dependent on inclusion, such that participants lost 50 cents for each time they did receive a ball toss. To conclude that money can only mitigate the distress after exclusion when it is dependent on exclusion (and not on inclusion), we directly compared our manipulation to the manipulation of Van Beest and Williams (2006).

Moreover, to capture how people experience ostracism we did not want to rely only on self-reported distress that is assessed after people are ostracized. For this purpose, we turned to Eisenberger, Lieberman, and Williams (2003) who used functional magnetic resonance imaging (fMRI) to examine the brain activity during social exclusion. They found an increase in blood flow in the dorsal anterior cingulate cortex (dACC), a region associated with the distress of physical pain (see also DeWall et al., 2010; Peyron, Laurent, & Garcia-Larrea, 2000). Hence, in addition to self-reported distress (Experiments 1 and 2), we also used fMRI (Experiment 3) to investigate whether the pain and distress caused by social exclusion could be financially compensated. We thus expect a decreased activity in the dACC when exclusion is financially compensated (see Experiment 3).

Finally, we were not only interested in intrapersonal feelings but also in interpersonal behavior. Prior research has shown that individuals who are socially excluded behave differently to those who excluded them than to unrelated others who would offer a new way to affiliate (Lakin, Chartrand, & Arkin, 2008; Maner, DeWall, Baumeister, & Schaller, 2007; Mead et al., 2011; Williams et al., 2000). Typically, targets behave rather negatively toward sources of exclusion (Twenge, Baumeister, Tice, & Stucke, 2001) and quite positive toward unrelated others. We extend this research by providing both options. We tested how financial compensation would mitigate subsequent money allocations. After the Cyberball game, participants played a dictator game (Forsythe, Horowitz, Savin, & Sefton, 1994), where they could offer new money (i.e., not the money that they had received in the Cyberball) to the players who had excluded them, players who included them, and unrelated others. We predicted that (Experiment 3) participants would offer less money to those who excluded them than to those who included them or unrelated others, but that financial compensation would increase offers to those who excluded them. Put differently, financial compensation would thus not only help to alleviate the suffering of targets but also help to increase the financial outcomes of those that are responsible for exclusion.

Experiment 1

Method

Participants and Design

Participants were 72 students from Leiden University (46 females, $M_{age} = 21.72$, $SD = 3.27$) and were assigned to a 2 (Social Exclusion: Inclusion vs. Exclusion) $\times$ 2 (Compensation: Financial Compensation vs. No Compensation) between-participant design.

Procedure

Participants were informed that they would participate in a three-player game of Cyberball (see Williams et al., 2000). During the game, half of the participants were equally included by the other players (i.e., they received one third of the tosses) and half of the participants were excluded (i.e., they received one toss at the beginning and then never received another toss). In the financial compensation condition, participants obtained

Table 1. Need Satisfaction After Inclusion and Exclusion (Experiment 1).

	After inclusion		After exclusion	
	M	*SD*	*M*	*SD*
No compensation	5.33[a]	1.12	2.25[b]	0.95
Financial compensation	4.76[a]	1.16	3.00[c]	1.08

Means with different superscripts differ significantly (*p*s < .05).

50 euro cent for each ball that was not thrown to them. There was a counter made visible in the Cyberball screen, which was incremented with 50 cents each time the participant was not given a ball (after the 30 throws, participants thus earned €14,50). In the no compensation condition, participants were not compensated.

After the game, we assessed participants' current satisfaction levels with belonging, self-esteem, meaningful existence, and control on a 7-point scale (1 = *not at all satisfied* and 7 = *very satisfied*). Following the procedure in previous research (Van Beest & Williams, 2006; Williams et al., 2000; Zadro, Boland, & Richardson, 2006), we combined these questions into an index of need satisfaction ($\alpha = .91$), with low ratings signaling more need threat and high ratings signaling more need satisfaction.

Results and Discussion

Need Satisfaction

A 2 (Social Exclusion) × 2 (Compensation) analysis of variance (ANOVA) yielded a main effect of social exclusion, $F(1, 68) = 90.62$, $p < .001$, $\eta^2 = .57$, indicating that need satisfaction was lower after exclusion ($M = 2.63$, $SD = 1.07$) than after inclusion ($M = 5.05$, $SD = 1.16$). More importantly, we also found a significant interaction effect, $F(1, 68) = 6.71$, $p < .05$, $\eta^2 = .09$. Simple main effects showed that in the exclusion condition needs were more thwarted in the no compensation condition ($M = 2.25$, $SD = .95$) than in the financial compensation condition ($M = 3.00$, $SD = 1.08$; $p < .05$). We did not find such a difference in the inclusion condition (see Table 1).

The results from Experiment 1 showed that, although participants' need satisfaction was lower when they were excluded than when they were included, financial compensation buffered these effects in the exclusion condition.

Experiment 2

Method

Participants and Design

We used a between-participant design with financial compensation (money dependent on exclusion vs. money dependent on inclusion vs. no compensation) as independent variable. Participants were 57 students from Leiden University (43 females and 14 males, $M_{age} = 22.16$, $SD = 4.80$).

Procedure

The procedure resembled the procedure of Experiment 1. In the money dependent on inclusion condition participants were endowed with 15 euros (to keep the earned amount constant across compensation conditions) and were told that they had to pay 50 euro cents for each ball toss they received (see Van Beest & Williams, 2006). Again, participants' fundamental were combined into an index of need satisfaction ($\alpha = .75$).

Results and Discussion

Need Satisfaction

The ANOVA on the need satisfaction ratings yielded an effect of social exclusion, $F(2, 54) = 3.55$, $p < .05$, $\eta^2 = .12$. More importantly, Tukey's Honestly Significant Difference (HSD) tests showed a significant difference between the no compensation condition ($M = 2.35$, $SD = .96$) and the money dependent on exclusion condition ($M = 3.16$, $SD = .94$; $p > .05$) but not between the no compensation condition and the money dependent on inclusion condition ($M = 2.94$, $SD = 1.01$; $p = .15$). Hence, although we did not find a difference between the need satisfaction ratings in the money dependent on inclusion and the money dependent on exclusion conditions ($p = .77$), we did find that only when you make money dependent on exclusion does it lead to less distress than the control (the no compensation) condition. These findings replicate the findings of Experiment 1 and Van Beest and Williams (2006). Financial compensation thus only mitigates the negative experience of social exclusion when it is done directly.

Experiment 3

Method

Participants

Thirty healthy right-handed participants between 18 and 23 years of age (16 female; $M_{age} = 20.00$, $SD = 1.05$) were recruited. All participants reported to be healthy and had no history of neurological disorders. All procedures were approved by the medical ethical committee of the Leiden University Medical Center, and all participants gave informed consent for the study.

Procedure

On arrival, participants were informed that they would participate in two consecutive games of Cyberball. In the first Cyberball game, participants were equally included by the other players. After the game ended, we assessed participants' fundamental needs and combined them into an index of need satisfaction after inclusion ($\alpha = .85$).

Immediately after these questions, participants played a second game of Cyberball. It was ensured that they would be playing with different people. Here, participants were always excluded (after receiving the first ball). Participants were then either financially compensated for being excluded with 50

cents per ball toss or not. Next, we asked the same questions as we did after the inclusion game and combined them into an index of need satisfaction after exclusion ($\alpha = .67$).

Subsequently, participants were assigned to the role of allocator in various dictator games (Forsythe et al., 1994). In this game, two players have to decide on how to distribute a certain amount of chips, which represented money. The allocator offers a proportion of the chips to the other player, the recipient. The recipient cannot reject the offer and has to accept any distribution. Participants in our study learned that they would be the allocator. They played the dictator game with three groups of recipients: (1) the two players who participated in the first Cyberball (inclusion) game, (2) the two players who participated in the second (exclusion) game, and (3) two new people with whom participants did not have any contact in previous tasks. There were a total of 30 trials. In each trial, the computer randomly paired participants with one of the three groups, such that they played 10 trials with each group. In each trial, participants could choose between a 4-6 distribution (i.e., 4 chips for themselves, 6 for the other), a 5-5 distribution, a 6-4 distribution (i.e., 6 for themselves, 4 for the other) and an 8-2 distribution (i.e., 8 for themselves, 2 for the other). Offers in these 10 trials were averaged. Finally, we again assessed participant's need satisfaction and combined the questions into an index of need satisfaction after the dictator game ($\alpha = .82$).

fMRI Data Acquisition and Analysis

Images were acquired using a 3.0 T Philips Achieva scanner at the Leiden University Medical Center. T2*-weighted echoplanar images ([EPI] echo time/TE = 30 ms, repetition time/TR = 2200 ms, slice matrix = 80 × 80, slice thickness = 2.75 mm, slice gap = 0.28 mm gap, field of view [FOV] = 220 mm) were obtained during two fMRI runs, which lasted for approximately 5 min each. A high-resolution T2-weighted anatomical scan (same slice prescription as EPI) was collected at the end of the scan session.

Data were preprocessed and analyzed using SPM5 software (http://www.fil.ion.ucl.ac.uk/spm/software/spm5) implemented in MATLAB (Mathworks, Sherborn, MA). The functional images were realigned and slice time corrected using the middle slice as reference. Then they were spatially normalized to EPI templates and spatially smoothed with a Gaussian kernel (6 mm, full width at half-maximum). The mean motion was 0.07 mm, with an observed maximum of 2.33 mm. A canonical hemodynamic response function was convolved at the onset of exclusion (i.e., the moment at which the ball was thrown between the two simulated players and thus not to the participant), and modelled as a zero-duration event. The analyses were carried out using the general linear model in SPM5. Similar to Gunther Moor et al. (in press), we investigated brain responses for events on which participants did not receive the ball in the inclusion game (from now on InclusionOut) compared to not receiving the ball in the exclusion game (from now on ExclusionOut). Compared to the commonly used block design, it enabled us to study brain activation when participants did not receive the ball without interference of motor responses associated with playing the ball. Contrast parameter images were computed for each individual and submitted to second-level group analyses. At the group level, whole brain contrasts between conditions were computed by performing one-tailed *t* tests. We further performed two-sample *t* tests to compare brain activation during exclusion with or without financial compensation. Results were considered significant at an uncorrected threshold $p < .001$, with an extent threshold of 10 continuous voxels.

Using the MARSBAR toolbox for SPM5 (Brett, Anton, Valabregue, & Poline, 2002), we extracted region of interests (ROIs) of the regions that were identified in the whole brain analyses, to further characterize patterns of activity.

Table 2. Need Satisfaction after Inclusion, Social Exclusion, and the Dictator Game (Experiment 3).

	After inclusion		After exclusion		After dictator game	
	M	*SD*	*M*	*SD*	*M*	*SD*
No compensation	3.82[a]	0.74	1.78[b]	0.42	4.05[a]	0.51
Financial compensation	3.93[a]	0.74	2.25[c]	0.76	4.19[a]	0.49

Means with different superscripts differ significantly (*p*s < .05).

Results

Behavioral Results

Need satisfaction. A 2 (Compensation: yes vs. no) × 3 (Time: need satisfaction after inclusion, exclusion, and after the dictator game) repeated-measures ANOVA with compensation as between-subject variable and time as repeated-measures variable, yielded a main effect of time, $F(2, 27) = 106.42$, $p < .001$, $\eta^2 = .89$ (see Table 2). Bonferroni post hoc tests (*p*s < .001) showed that need satisfaction was lower after exclusion ($M = 2.02$, $SD = .65$) than after inclusion ($M = 3.88$, $SD = .73$) and after the dictator game ($M = 4.12$, $SD = .50$). Need satisfaction after inclusion and after the dictator game did not differ significantly ($p = .20$).[1]

The interaction of compensation and time was not significant, $F(2, 27) = .53$, $p = .59$. Based on the results of Experiment 1, we further explored the effect of financial compensation on need satisfaction after exclusion, while controlling for need satisfaction after inclusion by performing an analysis of covariance (ANCOVA; see Table 2). Results revealed that needs were more thwarted in the no compensation condition ($M = 1.78$, $SD = .42$) than in the financial compensation condition ($M = 2.25$, $SD = .76$; $F = 5.63$, $p < .05$, $\eta^2 = .17$). Moreover, financial compensation did not moderate need satisfaction in the inclusion condition, or need satisfaction after the dictator game.

Dictator game results. A repeated-measures ANOVA with teams and compensation as repeated-measures variables and offers as the dependent variable, yielded only a main effect

Table 3. Participants' Offers to the Team That Included the Participant (Here Team I), the Team That Excluded the Participant (Here Team E), and the New Team (Team N).

	Team I		Team E		Team N	
	M	*SD*	*M*	*SD*	*M*	*SD*
No compensation	48.67[a]	5.15	31.67[c]	8.52	45.40[a]	7.59
Financial compensation	44.73[ab]	7.96	38.87[b]	10.23	42.40[ab]	9.76

Means with different superscripts differ significantly (*p*s < .05).

of teams, $F(2, 28) = 19.55$, $p < .001$, $\eta^2 = .58$ (see Table 3). Bonferroni post hoc tests (*p*s < .001) showed that participants made lower offers to the team that excluded them (Team E; $M = 35.27$, $SD = 9.95$) than to the team that included them (Team I; $M = 46.70$, $SD = 6.88$) or to the new team (Team N; $M = 43.90$, $SD = 8.72$). The offers to Team I and Team N did not differ significantly ($p = .13$).

Although the interaction of teams and compensation was not significant ($p = .73$), we performed an independent *t* test to compare the offers to the team that excluded them in the financial compensation condition with the offers in the no compensation condition. Offers were lower in the no compensation condition ($M = 31.67$, $SD = 8.52$) than in the financial compensation condition ($M = 38.87$, $SD = 10.23$; $t(28) = -2.10$, $p < .05$), supporting our hypothesis that people act relatively nicely to the source of exclusion when the exclusion is financially compensated. In fact, as Table 3 shows, in the financial compensation condition, offers to Team E did not differ from the offers to Teams I and N ($p > .08$).[2]

fMRI Results

Effects of social exclusion. First, we examined the effects of social exclusion, regardless of compensation or not. We compared activation when participants did not receive the ball in the exclusion game with activation when participants did not receive the ball in the inclusion game (ExclusionOut > InclusionOut). This analysis revealed activation in the bilateral anterior insula (see Table 4 and Figure 1A and B).

Effects of financial compensation on social exclusion. In order to examine the effects of financial compensation, we investigated the ExclusionOut condition relative to two baselines: ExclusionOut > Fixation and ExclusionOut > InclusionOut. The latter has been found to be most sensitive in detecting exclusion-related activation (Gunther Moor et al., in press). Testing for exclusion effects in the no compensation condition, the two-way interaction for ExclusionOut > Fixation for No Compensation > Financial Compensation resulted in increased activation in the dACC (see Figure 2A). The reversed contrast did not show significant results.

Testing for exclusion effects in the financial compensation condition, the two-way interaction for ExclusionOut > InclusionOut for Financial Compensation > No Compensation resulted in activation in the caudate nucleus (see Figure 2B). Thus, slightly differential patterns emerged with different baseline conditions (when thresholds were lowered to $p < .005$, we found activation in the dACC and caudate nucleus in all critical contrasts). These findings strongly suggest that the received money during exclusion activated reward-related brain areas (e.g., caudate nucleus).

General Discussion

In the present studies we investigated whether being excluded can be financially compensated and found that receiving money indeed reduced the suffering evoked by social exclusion. We had three different indicators that show social rejection can be financially compensated, which, according to the temporal model of social exclusion proposed by Williams (2007), can be divided into two stages.

The model proposed by Williams (2007) assumes that responses to social exclusion fall into distinct temporal stages. The immediate reactions to social exclusion fall in the *reflexive* stage. This stage involves reactions that occur without much deliberate thinking and during or immediately following the experience of exclusion (Williams, 2007). Participants' fundamental needs ratings immediately after and brain activation during Cyberball are two reactions that fall in this stage. Our ratings of participants' fundamental needs in Experiments 1, 2, and 3 showed that their needs were more satisfied after exclusion when they were financially compensated than when they were not. Experiment 2 showed that this is only the case when money is dependent on exclusion, not when it is dependent on inclusion (see also Van Beest & Williams, 2006).

In Experiment 3 we also looked at brain activation during social exclusion. In line with previous research (Eisenberger, Lieberman, & Williams, 2003; see also DeWall et al., 2010; Eisenberger, Inagaki, Rameson, Mashal, & Irwin, 2009; Masten et al., 2009), we found increased activation in the bilateral anterior insula when participants did not receive the ball in the exclusion game, compared to when participants did not receive the ball in the inclusion game. Importantly, when looking at the effects of financial compensation, we did find that the distress caused by exclusion was reduced. We found increased activation in the dACC when participants did not receive money, compared to when they did. Like the anterior insula, the dACC has also been associated with the experience of social exclusion (Eisenberger et al., 2003; see also DeWall et al., 2010; Eisenberger et al., 2009; Masten et al., 2009; Peyron et al., 2000). Moreover, when social exclusion was financially compensated we found activation in the caudate nucleus, an area associated with receiving monetary rewards (Knutson, Westdorp, Kaiser, & Hommer, 2000; Spitzer, Fischbacher, Herrnberger, Grön, & Fehr, 2007), and with the processing of reward-related information (Delgado, Miller, Inati, & Phelps, 2005). Together, these self-reports and neural reactions in the reflexive stage show that, although they still cared about being left out, participants' immediate negative response to social exclusion was reduced when they were compensated with money.

Table 4. Brain Regions Revealed by Whole Brain Contrasts.

Anatomical Region	L/R	voxels	*Z*	MNI coordinates x	y	z
ExclusionOut > InclusionOut						
Anterior insula	L	15	4.04	−30	18	−12
	R	10	3.82	33	18	−3
Medial dorsal nucleus	R	16	4.05	6	−21	3
(ExclusionOut > fixation) no compensation > (ExclusionOut > fixation) financial compensation						
Dorsal anterior cingulate cortex	L	13	3.80	−6	33	42
(ExclusionOut > InclusionOut) Financial compensation > (ExclusionOut > InclusionOut) No compensation						
Caudate nucleus	L/R	13	3.71	−6	21	−3
			3.32	3	21	0

MNI coordinates for main effects, peak voxels reported at $p < .001$, at least 10 contiguous voxels (voxels size was 3.0 × 3.0 × 3.0 mm).

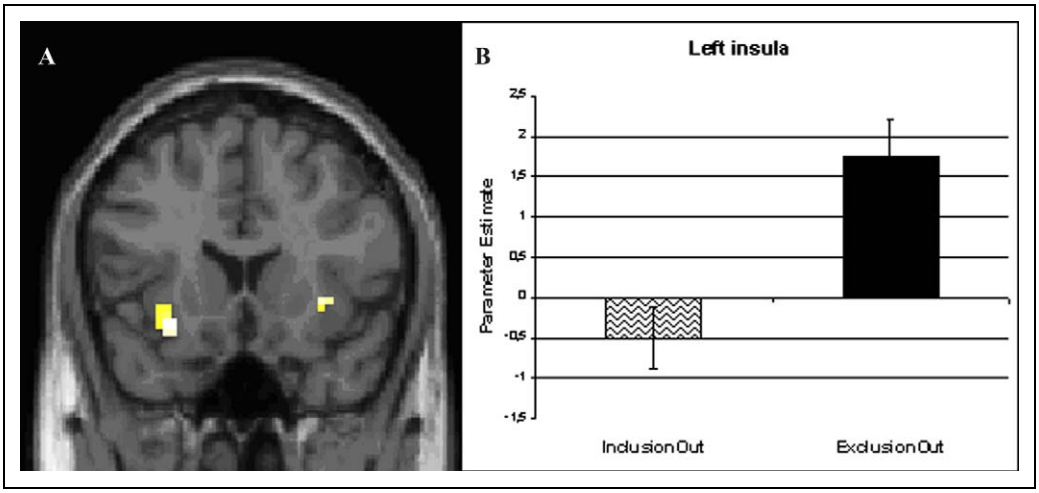

Figure 1. A, Whole brain results for regions which were active in the ExclusionOut > InclusionOut contrast (threshold at $p < .001$, uncorrected). Activation was detected in the left (MNI coordinates: $x = -30, y = 18, z = -12$) and right (MNI coordinates: $x = 33, y = 18, z = -3$) anterior insula. B, Contrast values of activation in the left anterior insula in the ExclusionOut and the InclusionOut conditions (similar patterns of activation were observed for the right anterior insula). As can be seen, activation was higher in the ExclusionOut condition than in the InclusionOut condition.

Once the individual is able to reflect upon the situational constraints of the social exclusion, responses fall in the *reflective* stage (Williams, 2007). In this stage, individuals can make a more thorough appraisal of the situation and try to cope with the social exclusion. The offers that participants made in the dictator game fall into this stage. Results revealed that participants offered less to those who excluded them than to those who included them or to unrelated others, but also that financial compensation increased offers to those who excluded them. Hence, the negative reactions to social exclusion were not only reduced in the reflexive stage, but also in the reflective stage.

Interestingly, Table 2 shows that participants' need satisfaction after the dictator game was equally high as need satisfaction after inclusion. In the dictator game, participants had the opportunity to punish the team that excluded them. Punishing the excluders may have caused this rise in need satisfaction. Indeed, taking revenge on people who harmed you can be satisfactory (Frijda, 1994; Gollwitzer & Denzler, 2009). An alternative explanation could be that having the opportunity (i.e., the power) to punish may have already increased the level of need satisfaction. Future research may investigate whether inducing power can mitigate the negative experience of social exclusion.

In line with previous research on financial compensation (Furnham & Argyle, 1998; Okimoto, 2008; Opsahl & Dunette, 1966), compensating our excluded participants directly with money may have led them to feel more valued and the money may have restored their perceived status. We can, however, not rule out that money may have also reduced the negative experience of social exclusion by making participants more self-sufficient, as the work of Zhou et al. (2009) shows. Although our results show that people still cared about being excluded (and thus did not feel completely self-sufficient), money may to some extent have reduced the need to rely on others to satisfy their needs. Future research could investigate whether money reduced the distress after exclusion because people felt more valued, because money made them rely less on others, or both.

In sum, we thus showed that money not only affects social exclusion during or right after the experience (in the reflexive

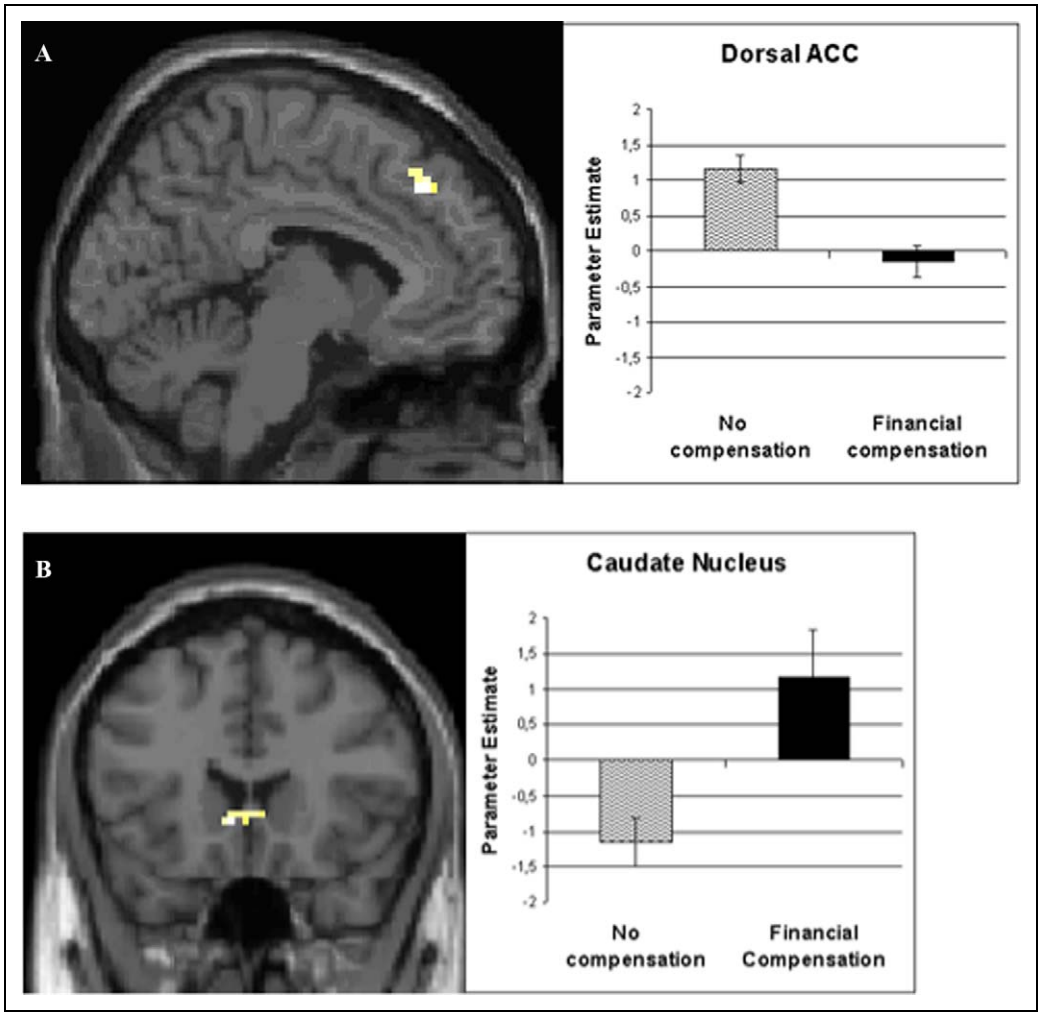

Figure 2. A, Whole brain results for regions that were active during the exclusion game in the ExclusionOut > fixation contrast for no compensation > financial compensation (threshold at $p < .001$, uncorrected). Activation was detected in the dorsal ACC (MNI coordinates: $x = -6$, $y = 33$, $z = 42$). The Figure also shows contrast values of activation in the dACC. B, Regions which were active in the ExclusionOut > InclusionOut contrast for financial compensation > no compensation (threshold at $p < .001$, uncorrected). We found increased activation in the caudate nucleus (MNI coordinates: $x = -6$, $y = 21$, $z = -3$). The Figure also shows contrast values of activation in the caudate nucleus.

stage) but also subsequent interpersonal behavior in a dictator game (in the reflective stage). These findings add to our understanding of exclusion. Prior findings have repeatedly shown that exclusion is painful even when a logical analysis of the situation would indicate that it might actually be quite beneficial to be excluded (Gonsalkorale & Williams, 2007; Van Beest & Williams, 2006; Williams et al., 2000; Zadro et al., 2004). We again show that exclusion is painful. However, we add that it becomes less painful when it is financially compensated.

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Notes

1. We also analyzed the effects of money on the different needs after exclusion separately. We did not find any differences between effects of money on the need to belong, the need for self-esteem, the need for meaningful existence, and the need for control. For all needs after exclusion in Experiments 1, 2, and 3, we found significant differences between the financial compensation and no compensation conditions (all $ps < .05$).
2. We also had a self-report assessment of participants' willingness to punish Team E, which mimicked the results of the dictator game.

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