



Stranger, Lover, Friend?

The Pain of Rejection Does Not Depend

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Abstract: Social exclusion, even from minimal game-based interactions, induces negative consequences. We investigated whether the nature of the relationship with the excluder modulates the effects of ostracism. Participants played a virtual ball-tossing game with a stranger and a friend (friend condition) or a stranger and their romantic partner (partner condition) while being fully included, fully excluded, excluded only by the stranger, or excluded only by their close other. Replicating previous findings, full exclusion impaired participants' basic-need satisfaction and relationship evaluation most severely. While the degree of exclusion mattered, the relationship to the excluder did not: Classic null hypothesis testing and Bayesian statistics showed no modulation of ostracism effects depending on whether participants were excluded by a stranger, a friend, or their partner.

Keywords: interpersonal relationships, ostracism, rejection, social exclusion, social interaction

Picture yourself at a party. Having a conversation with a friend of yours and a person you just met, you notice that your friend gets on better and better with the stranger. At first, you are delighted for your friend and enjoy listening to them. However, as time moves on, you realize that your friend does not seem to notice you anymore and directs all her attention to the stranger, even if you try to take part in the conversation. How would this make you feel? And does it matter whether you are ignored mainly by your friend, the stranger, or both?

Excluding or ignoring individuals or groups by other individuals or groups is referred to as ostracism (e.g., Williams, 1997, 2007). Phylogenetically, being ostracised from one's group meant losing access to resources such as food, mates, and protection, and severely reduced the chance of survival (MacDonald & Leary, 2005; Williams et al., 2005). Accordingly, social exclusion still increases the risk of depression and suicidal behavior as well as aggression and violence in the affected individuals (Williams et al., 2005).

Besides potential long-term consequences, research on ostracism repeatedly revealed immediate effects of social exclusion on the satisfaction of basic needs (e.g., Böckler et al., 2014; Gonsalkorale & Williams, 2007; Jamieson et al., 2010; Lau et al., 2009; Wirth et al., 2010; Zadro et al., 2004; for an overview, see Williams, 2007). Specifically, ostracism impairs *belongingness* as the fundamental human need for affiliation (see also Baumeister & Leary, 1995), *self-esteem* as the perception of oneself as a worthy person, *control* as the feeling of self-efficacy and *meaningful existence* as protection when faced with

one's own mortality (see Williams, 1997). Some studies also reported detrimental effects of social exclusion on mood (e.g., increased sadness and anger; Buckley et al., 2004; Gonsalkorale & Williams, 2007; Williams et al., 2000); others, however, did not find mood effects (e.g., Baumeister et al., 2002; Böckler et al., 2014; Zadro et al., 2004).

On the interpersonal level, exclusion leads to more negative evaluations of both the ostracizing individuals and the relationship to them (Böckler et al., 2014; Buckley et al., 2004; Wirth et al., 2010). Behaviorally, exclusion has been reported to induce prosocial tendencies ("tend and befriend"), but also withdrawal from social encounters or even antisocial behavior (e.g., Smart Richman & Leary, 2009; Taylor et al., 2000; Wesselmann et al., 2015; Williams, 2007).

The most widely used paradigm to study ostracism is the (virtual) ball-tossing game, where three people pass a ball to one another and the participant is either included or excluded by the other two players (Williams, 1997; Williams et al., 2000). The degree of ostracism can be manipulated by the number of passes a person receives during the game (Hartgerink et al., 2015). Employing this and comparable paradigms, a growing field of research examined boundary conditions of the immediate effects of ostracism and revealed that they are highly resilient to experimental manipulations. Negative consequences of being ostracized occur even when participants know that the other players are controlled by a computer algorithm (Zadro et al., 2004), belong to a highly unpopular group like the Ku Klux Klan (Gonsalkorale & Williams, 2007), or when

the interaction is merely based on eye contact (Böckler et al., 2014), text messages (Smith & Williams, 2004), or access to information (Jones et al., 2009). Similarly, even exclusion from virtually passing a bomb (rather than a ball) that can kill one's virtual character causes aggression against the ostracizing person (Van Beest et al., 2011), and winning money by being excluded does not prevent participants from feeling hurt (Van Beest & Williams, 2006).

Despite this repeatedly demonstrated resilience of ostracism effects, initial and anecdotal evidence suggests that the *nature of the relationship* to the excluder might, in fact, shape some of the consequences of social exclusion. In a diary study, Nezlek et al. (2012) found that ostracism by close others and friends reduced basic need satisfaction more severely than ostracism by acquaintances or strangers. Similarly, exclusion from a lab-based ball-tossing game had a stronger impact on relationship evaluation when people played with their partner and a stranger than when they played with two strangers (Arriaga et al., 2014). However, in the same study, the identity of the interaction partners did not influence the effects of exclusion on basic need satisfaction. Taken together, this preliminary evidence suggests that the nature of the relationship with interaction partners matters when *reflective* consequences of exclusion are investigated in naturalistic contexts (e.g., emotions, thoughts, basic need satisfaction that were reported in a diary), while the pattern is less clear when *reflexive* effects of exclusion are assessed in the laboratory (e.g., emotions, evaluations, basic need satisfaction during or immediately after an interaction; see Williams, 2007).

The present study aimed at further investigating the role of relationship status on reflexive consequences of ostracism by experimentally manipulating whether a stranger, a friend, or their romantic partner excluded participants in a virtual ball-tossing game. Specifically, participants played the game simultaneously with a friend and a stranger (friend condition) or with their romantic partner and a stranger (romantic partner condition) while being either fully included, fully excluded, excluded only by the stranger or excluded only by their close other. The extent of exclusion in terms of received ball-tosses was identical for exclusion by the stranger, and exclusion by the close other. We assessed how this manipulation affected the most common consequences of ostracism, namely basic need satisfaction, mood, relationship evaluation, and evaluation of ones' interaction partners. We chose a setup where all participants interacted simultaneously with a close other and a stranger. This setup differs from the study by Arriaga and colleagues (2014), where participants played either with a close other and a stranger or they played with two strangers. The reason for our setup was that we aimed to establish maximal comparability between the different conditions. Furthermore, this setup allowed a parametric

modulation of the degree of exclusion: Participants were either fully included (receiving a third of all ball tosses), included by only one other player (partial exclusion; receiving a sixth of all ball tosses), or fully excluded (receiving only two ball tosses at the beginning). In the following, we will outline our hypotheses concerning differences resulting from different levels of exclusion (full exclusion, exclusion by one other player, full inclusion) and from the relationship with the excluder (close other vs. stranger).

In accordance with previous results, we expected full exclusion (in comparison to full inclusion) to result in lower basic need satisfaction and more negative evaluations of the relationship to the fellow players and of their traits. Furthermore, the parametric manipulation of the extent of exclusion allowed us to investigate whether this gradation is reflected in dependent variables, with highest scores when participants are fully included, medium scores when they are excluded by one other player, and lowest scores when they are excluded by both players. This linear kind of relationship between levels of ostracism and dependent variables has been reported in previous studies (Williams et al., 2000). Alternatively, and also reported in the literature, ostracism may induce comparable negative consequences independent of whether it is inflicted on participants by both or by only one of their fellow players (Buckley et al., 2004).

Most importantly, the present study probed whether and how the relationship with the excluder modulates immediate effects of ostracism, distinguishing between two alternative hypotheses. First, initial evidence suggests that exclusion by close others tends to hurt more than exclusion by strangers (e.g., Nezlek et al., 2012). Exclusion by a friend or a romantic partner can signify damage to an intimate relationship and thereby cause more negative effects than exclusion by a stranger (Sacco et al., 2014). Hence, if the relationship with the excluder modulates negative consequences of ostracism, we expect more severe effects for ostracism by the friend/partner as compared to the stranger, even though the number of received ball-tosses is identical. We termed this hypothesis the "relationship-matters-hypothesis." In addition, given that intimacy and mutual dependency are considered especially strong in romantic partners (e.g., Aron et al., 2008; Baumeister & Leary, 1995), the difference between exclusion by a stranger and by a close other might be more pronounced when participants play with their partners than with their friends.

An alternative hypothesis is what we termed the "resilience-to-manipulation-hypothesis." While previous studies showed more detrimental effects of exclusion by close others on reflective consequences and on some reflexive measures (e.g., relationship evaluation), other measures seemed less susceptible to the relationship with the

excluder (e.g., basic need satisfaction immediately after a ball game; see Arriaga et al., 2014). The absence of an influence of relationship on immediate effects of ostracism would be in line with the temporal need-threat model that predicts relationship manipulations to shape reflective, but not reflexive consequences of ostracism (Williams, 2009). This model is supported by a general pattern apparent in the ostracism literature, namely that ostracism always hurts, no matter who inflicts it and how (e.g., Gonsalkorale & Williams, 2007; Jones et al., 2009; Smith & Williams, 2004; Van Beest et al., 2011; Zadro et al., 2004).

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

Forty same-sex pairs of friends (6 pairs male; $M_{\text{age}} = 20.81$ years) and 40 mixed-sex couples ($M_{\text{age}} = 23.78$ years) participated in the study. All 160 participants signed informed consent prior to participation, received course credits or payment, and were debriefed after the experiment. Procedures complied with the ethical standards of the 1964 Declaration of Helsinki.

All participants were recruited via an online platform, either for a “study with a friend” (friend condition) or a “study with your partner” (romantic partner condition). The 80 participants in each relationship type condition (friends or romantic partners) were randomly assigned to one of four ostracism conditions, resulting in 20 participants per experimental group. Besides one difference in questionnaires (friendship vs. relationship questionnaire, see Questionnaires section), friends and romantic partners underwent the exact same experimental procedure in the same laboratory and with the same setup. Sample sizes were determined before data collection by power analyses with G*Power 3.1 (Faul et al., 2007). Estimates for exclusion-related effect sizes were based on previous studies (e.g., Gonsalkorale & Williams, 2007; Zadro et al., 2004; $d_s > 1$) and take between-group comparisons into account. Desired power was set to $1 - \beta = .80$ and the α -level was set to .05. Sensitivity analysis showed that with our sample size of 160 participants, a medium effect size of $f = 0.026$ or $\eta_p^2 \geq .065$ can be detected for the two-way interaction of interest ($df = 3$) and for the main effect of interest ($df = 3$) with a statistical power of $1 - \beta = .80$ in an analysis of variance (ANOVA) with α -level = .05.

Material

All materials are made available on the Open Science Framework (questionnaires: <https://osf.io/2rv9y/>; experiment: <https://osf.io/8taqd/>).

Questionnaires

Friendship Questionnaire

Participants in the friend condition answered five questions concerning the duration and intensity of their friendship: “How long (in months) have you two been friends?”; “How often per week do you meet on average?”; “Would you refer to each other as ‘good friends’, ‘friends’, ‘good acquaintances’ or ‘acquaintances?’”; “How important is the other’s opinion to you?” (scale from 1 = *not at all* to 5 = *very much so*); “Do you talk to the other about your problems?” (scale from 1 to 5). Responses were z -transformed and the mean was taken as an indication of friendship depth.

Relationship Questionnaire

Participants in the romantic partner condition answered five questions concerning their relationship: “How long (in months) have you been a couple?”; “Do you live together?”; “How often do you meet during a regular week?”; “When is your anniversary?”; “What was the last present you gave your partner/your partner gave you?”. The last two questions served as control questions. Responses to the first three questions were z -transformed and their mean was taken as an indication of relationship depth.

Manipulation Check

To ensure that our manipulation had the intended effects, participants rated the extent of inclusion during the game (scale from 1 = *not at all* to 9 = *very much so*), guessed the percentage of received passes (marked with a cross on a line from 0% to 100%) and rated how they felt during the game (scale from 1 = *excluded* to 9 = *accepted*) (e.g., Williams et al., 2000). The mean of the responses was used for further analyses.

Mood

All participants rated two statements regarding their mood during the ball game and four statements regarding their current mood (i.e., after the game) on a scale from 1 (= *not at all*) to 9 (= *very much so*) (Böckler et al., 2014; Williams et al., 2000; Wirth et al., 2010). High rates represented positive mood and low arousal, low rates represented negative mood and high arousal. Means were calculated for mood during the game and current mood.

Basic Need Satisfaction

Participants answered the typically employed questions about the satisfaction of four basic needs (belonging,

control, self-esteem, and meaningful existence; e.g., Williams et al., 2000; Wirth et al., 2010). This questionnaire entails 12 statements that can be rated from 1 (= *not at all*) to 9 (= *very much so*). High values represent high need satisfaction; low values represent low need satisfaction. Means were calculated for each basic need.

Relationship Evaluation

Participants evaluated their relationship to the two other players by answering how worthy, how important, and how close they felt to their fellow players (scales from 1 = *not at all* to 9 = *very much so*) (e.g., Buckley et al., 2004; Wirth et al., 2010). The mean across the statements was calculated.

Trait Judgments

Participants rated their agreement (scale from 1 = *not at all* to 9 = *very much so*) to eight statements (four negative, four positive) concerning each of their fellow players (e.g., creative, attractive, boring, dishonest; e.g., Williams et al., 2002; Wirth et al., 2010). Trait judgments for the stranger and the close other were calculated as the mean differences between positive and negative traits.

Debriefing Questionnaire

To be able to investigate the effects of demand characteristics and participants' insight into the current study, all participants were asked about the suspected goal of the present investigation ("What do you think this experiment is about?") and the expected outcomes ("What findings do you think are expected from this experiment?").

Virtual Ball-Tossing Game

Participants played a computer-based ball-tossing game on a 17" monitor. The person in possession of the ball could decide whom of the two other players they wanted to pass it to by pressing the respective button on the keyboard. Participants were represented by a schematic figure at the lower center of the screen. Photographs of the two other players were displayed next to their schematic figures on the upper left and right sides of the screen. Pictures of participants were taken just before the experiment and fed into the computer program; the stranger was an unknown student from another university with gender being matched to that of the friend/partner. The position of friend/partner and stranger on the screen and the position of the excluding person (left vs. right) was counterbalanced across participants. Participants were randomly assigned to one of four experimental conditions: *included*, *excluded*, *excluded by stranger*, *excluded by friend/partner*. Participants in the *included* condition received 20 of the overall 60 passes (exactly as many as would be expected when everyone receives the ball equally often). Participants in the *excluded*

condition received two passes at the beginning of the game and were subsequently ignored. Participants in the *excluded by stranger* condition received 10 passes overall, but only from their friend or partner (exactly as many as would be expected when the friend/partner tosses the ball equally often to both other players). Accordingly, participants in the *excluded by friend/partner* condition received 10 passes, but only from the stranger. The overall duration of the game was approximately 4 min.

Procedure

Participants arrived with a friend of the same sex/their partner of the opposite sex, received a short introduction to the overall procedure, and had their photographs taken. Participants signed informed consent and filled in the friendship or relationship questionnaires, respectively. Subsequently, the cover story made participants believe they would be connected to a third player from another university via an online gaming platform. Participants were then located in different, but adjacent rooms to prevent any form of feedback or interaction during the game. Right after the game, participants completed the remaining questionnaires (manipulation check, mood, basic need satisfaction, relationship evaluation, trait judgments, and debriefing questionnaire). No interactions whatsoever took place in the time between the ball-tossing game and filling in the questionnaires. Finally, we debriefed participants about the goal of the experiment and the fact that the ball game was based on a computer algorithm. To reduce the risk of raising suspicion in the participant pool, we asked participants to sign an agreement not to talk about the experiment to their fellow students.

Data Analysis

The present study followed a two factorial design with the between-subject factors Type of relationship (friends vs. partners) and Exclusion condition (included vs. excluded vs. excluded by stranger vs. excluded by close other). Friendship/relationship depth questions served to make sure that friendship/relationship depth did not differ between experimental groups. Manipulation checks were supposed to test whether the exclusion manipulation had worked. Dependent variables of interest were participants' mood, basic need satisfaction, relational evaluation, and trait judgments. Participants' behavior during the ball-tossing game (number of passes to the respective other players) was subjected to explorative analyses. No other experimental conditions, dependent variables, or covariates were assessed or analyzed in the present study; no data were excluded.

The influence of Exclusion condition and Type of relationship was assessed by means of two-factorial ANOVAs. In case of significant overall effects, subsequent independent sample two-tailed *t*-tests were performed, employing a Bonferroni-Holm-correction of the α -level to correct for multiple comparisons.

Because the resilience-to-manipulation-hypothesis explicitly predicts the *absence* of significant differences between exclusion by close others versus exclusion by strangers, we additionally calculated nondirectional Bayes factors (BF_{10}) for this specific comparison in the dependent variables of interest with a value of 1 as scale parameter for the prior distribution. Bayesian statistics allow a better interpretation of nonsignificant results than frequentist statistics because they estimate the probability of the hypothesis of no difference given the measured data. Specifically, the Bayesian factor (BF) provides the ratio of the alternative and the null hypothesis. In addition, Bayesian statistics can be better suited to deal with small sample sizes than frequentist approaches (McNeish, 2016). BF_{10} was computed as $f(\text{data|H1}) / f(\text{data|H0})$, with f denoting marginal likelihoods. Bayesian statistics allow arguing in favor of the null hypothesis and we interpreted $BF_{10} > 3$ as substantial evidence for the alternative (difference) and $BF_{10} < .33$ as substantial evidence for the null hypothesis (no difference; Marin & Robert, 2007).

Results

The datasets that the following analyses are based on are available in an Open Science Framework repository (<https://osf.io/5zrnt/>).

Tables 1 and 2 display descriptive results in the friend and partner conditions, respectively. Figure 1 shows the effects of all conditions on the dependent variables of interest. Only paired comparisons that survived corrections of the α -level are reported in the main text. To increase readability, test statistics for post hoc *t*-tests are provided in Table 3. Three participants in the friend condition missed to fill in the trait judgments; one of them also missed the basic need questionnaire. We kept the remaining data of these participants in the analyses.

Friendship Questionnaire

Participants knew each other for 17.08 months on average ($SD = 39.80$) and met two to three times a week in their free time ($M = 2.68$, $SD = 2.05$). They referred to each other as “friends” ($M = 3.08$, $SD = 0.88$) (rather than as acquaintances), considered the other’s opinion important ($M = 3.84$, $SD = 0.82$), and regularly talked to each other about

private issues ($M = 4.1$, $SD = 0.81$). Hence, we can reliably consider our participants as friends. The ANOVA revealed no significant differences in overall friendship depth between Exclusion conditions, $F(3, 76) = 0.42$, $p = .989$, $\eta_p^2 = .002$, demonstrating that friendship duration and intensity were comparable across experimental conditions.

Relationship Questionnaire

Participants reported relationship durations of 33.25 months on average ($SD = 36.82$) and met approximately six times a week ($M = 5.8$, $SD = 1.82$). 57.5% lived with their partner. Control questions concerning the anniversary and the last presents were answered consistently within couples. Taken together, responses suggest that our sample consisted of actual couples. Overall relationship depth did not differ between Exclusion conditions, $F(3, 76) = 0.39$, $p = .990$, $\eta_p^2 = .002$.

Manipulation Check

As expected, responses to manipulation check questions differed significantly between Exclusion conditions, $F(3, 156) = 99.63$, $p < .001$, $\eta_p^2 = .66$. Participants in the included condition indicated more inclusion compared to participants in all other conditions, $ds \geq 2.46$ (see Table 3 for all test statistics for post hoc *t*-tests). Similarly, participants in the fully excluded condition reported lower inclusion than participants in the partial exclusion conditions, $ds \geq 1.12$. Participants in the two conditions in which only one player excluded them did not differ. These findings suggest that our manipulation had the intended effects and that participants consistently noticed the difference between inclusion, partial exclusion (exclusion by only one other player), and full exclusion.

Mood

Exclusion condition did not influence the participant’s mood *after* the game, $F(3, 152) = 2.45$, $p = .066$, $\eta_p^2 = .05$. Type of relationship revealed no main or interaction effect, $F_s < 1$. Participant’s mood *during* the game was shaped by the Exclusion condition, $F(3, 152) = 15.10$, $p < .001$, $\eta_p^2 = .23$. Specifically, participants reported higher mood scores in the inclusion condition compared to all other conditions, $ds \geq 0.82$. Full exclusion resulted in reduced mood scores as compared to the exclusion by one other player, $ds \geq 0.51$. Critically, there was no difference between being excluded by the close other versus by the stranger. Bayesian statistics provided substantial support in favor of the null hypothesis (no difference), $BF_{10} = .18$. This pattern of results indicates that participants’ mood

Table 1. Mean scores (*M*) and standard deviations (*SD*) of all dependent variables for the four Exclusion conditions when participants played with a friend and a stranger

	Included <i>M</i> (<i>SD</i>)	Excluded <i>M</i> (<i>SD</i>)	Excluded by friend <i>M</i> (<i>SD</i>)	Excluded by stranger <i>M</i> (<i>SD</i>)
Manipulation check	6.21 (1.29)	1.79 (0.86)	2.92 (0.80)	3.04 (1.03)
Mood after the game	6.81 (1.45)	6.30 (1.68)	6.08 (1.57)	6.40 (1.78)
Mood during game	7.00 (1.30)	4.95 (1.37)	5.30 (1.35)	5.53 (1.47)
Belonging	7.17 (1.29)	3.43 (1.60)	4.02 (1.31)	4.04 (1.62)
Control	6.42 (1.15)	2.95 (1.11)	3.38 (0.96)	3.74 (1.75)
Self-esteem	7.28 (1.32)	5.45 (1.18)	5.78 (1.64)	5.65 (2.13)
Meaningful existence	6.85 (1.43)	3.38 (1.20)	5.12 (1.59)	4.86 (2.04)
Relational evaluation	5.82 (1.31)	2.38 (1.20)	3.25 (1.12)	3.12 (1.70)
Friend positive	7.78 (0.69)	7.22 (1.26)	6.86 (1.44)	7.22 (1.00)
Friend negative	1.90 (0.86)	2.59 (1.19)	2.95 (1.51)	2.38 (1.26)
Stranger positive	6.16 (1.21)	5.26 (1.52)	5.26 (1.08)	4.84 (1.31)
Stranger negative	2.75 (0.96)	4.67 (1.68)	3.78 (0.90)	4.26 (1.42)

Table 2. Mean scores (*M*) and standard deviations (*SD*) of all dependent variables for the four Exclusion conditions when participants played with their romantic partner and a stranger

	Included <i>M</i> (<i>SD</i>)	Excluded <i>M</i> (<i>SD</i>)	Excluded by partner <i>M</i> (<i>SD</i>)	Excluded by stranger <i>M</i> (<i>SD</i>)
Manipulation check	5.62 (1.01)	2.18 (0.96)	3.29 (1.28)	3.29 (1.08)
Mood after the game	7.04 (1.32)	5.65 (1.42)	6.48 (1.77)	6.46 (1.77)
Mood during game	7.28 (1.18)	5.00 (1.83)	6.63 (1.62)	6.00 (1.42)
Belonging	7.35 (1.06)	3.03 (1.69)	4.38 (1.34)	4.25 (1.69)
Control	6.52 (1.19)	2.87 (1.06)	3.98 (1.39)	4.02 (1.51)
Self-esteem	7.83 (0.98)	4.93 (1.30)	6.03 (1.49)	5.17 (1.70)
Meaningful existence	7.30 (1.02)	4.22 (1.54)	6.02 (1.61)	5.32 (1.70)
Relational evaluation	6.05 (1.60)	2.82 (1.54)	3.90 (1.46)	4.00 (1.76)
Partner positive	7.92 (0.88)	7.44 (1.39)	7.30 (1.58)	7.79 (0.87)
Partner negative	2.41 (1.17)	3.00 (1.46)	2.75 (1.40)	2.55 (0.93)
Stranger positive	6.55 (0.85)	5.06 (1.48)	5.50 (0.98)	4.65 (1.05)
Stranger negative	2.86 (1.04)	4.48 (1.39)	3.63 (1.15)	4.07 (1.49)

during the game decreased with the degree of ostracism, but was not susceptible to who inflicted the exclusion.

Type of relationship was reflected in a small main effect on mood during the game, $F(1, 152) = 5.34$, $p = .022$, $\eta_p^2 = .03$, with generally higher mood scores in participants who played with their partners. Type of relationship did not interact with Exclusion condition, $F(3, 152) = 1.47$, $p = .226$, $\eta_p^2 = .028$, suggesting that the intimacy of the relationship (i.e., friends vs. romantic partners) did not shape the effects of ostracism.

Basic Need Satisfaction

Exclusion condition significantly influenced satisfaction of all basic needs (belonging: $F(3, 151) = 57.61$, $p < .001$, $\eta_p^2 = .53$; control: $F(3, 151) = 57.80$, $p < .001$, $\eta_p^2 = .54$; self-esteem: $F(3, 151) = 20.31$, $p = .002$, $\eta_p^2 = .29$; meaningful

existence: $F(3, 151) = 30.75$, $p < .001$, $\eta_p^2 = .38$; mean basic need satisfaction: $F(3, 151) = 63.96$, $p < .001$, $\eta_p^2 = .56$). Specifically, fully included participants scored higher than participants in all other conditions in belonging, $ds \geq 2.20$, control, $ds \geq 1.84$, self-esteem, $ds \geq 1.20$, meaningful existence, $ds \geq 1.02$, and overall basic need satisfaction, $ds \geq 2.02$. Fully excluded participants reported lower basic need satisfaction than participants excluded by one of the other players for belonging, $ds \geq 0.56$, control, $ds \geq 0.69$, meaningful existence, $ds \geq 0.77$, and overall basic need satisfaction, $ds \geq 0.67$. No differences between full exclusion and partial exclusion were found for self-esteem. Crucially, when comparing exclusion by close other with exclusion by a stranger we found no significant differences for any individual or overall basic needs. Bayesian statistics provided substantial support for this pattern for overall need satisfaction: $BF_{10} = .22$, belonging: $BF_{10} = .17$, control:

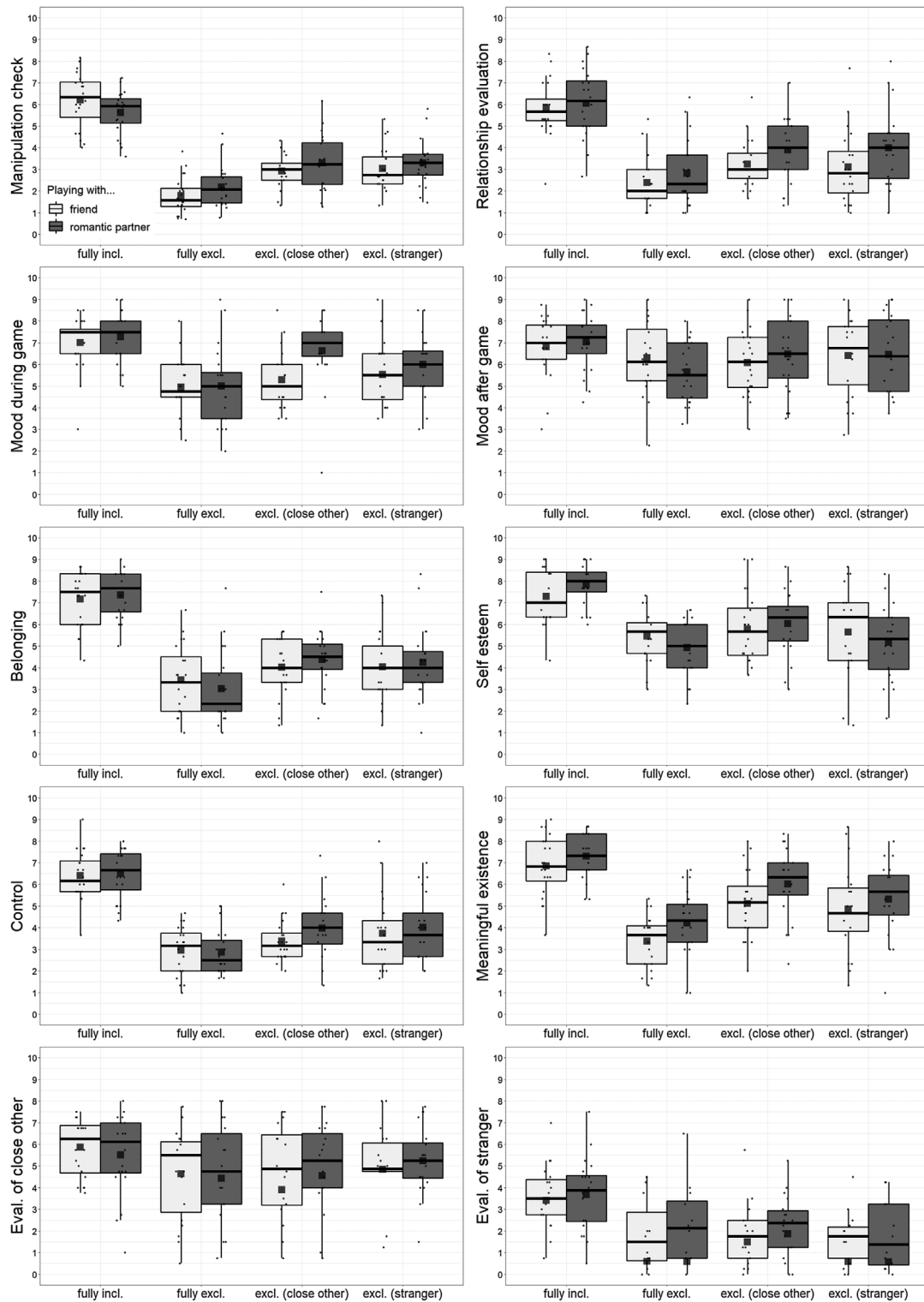


Figure 1. Ratings on dependent variables of interest for all exclusion and relationship type conditions. Box plots for ratings on dependent variables of interest (from upper left to lower right: manipulation check, relationship evaluation, mood during the game, mood after the game, belonging, self-esteem, control, meaningful existence, evaluation of close other, evaluation of stranger) for all exclusion conditions and relationship types. Light gray boxes represent data from participants playing with their friends, dark gray boxes represent data from participants playing with their romantic partners. Dark squares in each boxplot represent the mean, dark midlines represent the median for each condition. The boxed part above the midline includes the upper quartile of the data for each condition, the boxed part below the midline includes the lower quartile. Individual data points are shown for each condition.

Table 3. Test statistics (before correction) of all post hoc comparisons of Exclusion condition

	Paired comparisons																	
	I vs. E			Ef/p vs. Es			I vs. Es			E vs. Ef/p			E vs. Es					
	t	p	CI95 +/-	t	p	CI95 +/-	t	p	CI95 +/-	t	p	CI95 +/-	t	p	CI95 +/-			
Manipulation check	16.58	.000 ^{bh}	3.46/4.40	-0.26	.799	-0.53/0.41	11.16	.000 ^{bh}	2.31/3.31	11.02	.000 ^{bh}	2.25/3.25	5.00	.000 ^{bh}	-1.56/-0.67	-5.33	.000 ^{bh}	-1.62/-0.74
Mood during game	6.80	.000 ^{bh}	1.53/2.8	0.58	.562	-0.48/0.88	3.66	.000 ^{bh}	.54/1.81	4.57	.000 ^{bh}	0.78/1.97	-2.75	.007 ^{bh}	-1.70/-0.27	-2.31	.023 ^{bh}	-1.47/-0.11
Belonging	12.67	.000 ^{bh}	3.39/4.66	0.15	.880	-0.62/0.72	10.98	.000 ^{bh}	2.51/3.62	9.76	.000 ^{bh}	2.48/3.75	-2.90	.005 ^{bh}	-1.62/-0.30	-2.48	.015 ^{bh}	-1.64/-0.18
Control	14.26	.000 ^{bh}	3.06/4.05	-0.61	.542	-0.84/0.44	10.47	.000 ^{bh}	2.25/3.31	8.20	.000 ^{bh}	1.96/3.21	-3.02	.003 ^{bh}	-1.29/-0.26	-3.14	.003 ^{bh}	-1.59/-0.36
Self-esteem	8.69	.000 ^{bh}	1.83/2.91	1.29	.200	-0.27/1.29	5.35	.000 ^{bh}	1.04/2.26	6.01	.000 ^{bh}	1.45/2.87	-2.27	.026	-1.35/-0.09	-0.58	.566	-0.93/0.51
Meaningful existence	10.92	.000 ^{bh}	2.68/3.87	1.20	.236	-0.32/1.26	4.62	.000 ^{bh}	0.86/2.16	5.53	.000 ^{bh}	1.27/2.69	-5.13	.000 ^{bh}	-2.45/-1.08	-3.47	.001 ^{bh}	-2.04/-0.55
Relationship evaluation	13.74	.000 ^{bh}	2.70/3.96	0.05	.963	-0.68/0.71	7.60	.000 ^{bh}	1.74/2.98	6.58	.000 ^{bh}	1.66/3.09	-3.22	.002 ^{bh}	-1.58/-0.37	-2.71	.008 ^{bh}	-1.66/-0.25
Judgment close other	2.56	.013	.26/2.06	-1.49	.140	-1.88/0.27	2.78	.007 ^{bh}	0.42/2.49	1.68	.097	-.12/1.42	0.50	.619	-0.88/1.47	-1.08	.282	-1.46/0.43
Judgment stranger	5.63	.000 ^{bh}	1.92/4.00	2.45	.017	0.21/2.01	4.96	.000 ^{bh}	1.12/2.61	6.64	.000 ^{bh}	2.08/3.86	-2.08	.042	-2.15/-0.04	0.02	.983	-1.15/1.17

Note. I = Inclusion; E = Exclusion; Ef/p = Exclusion by friend/partner; Es = Exclusion by stranger. ^{bh}Comparisons surviving Bonferroni-Holm-correction.

BF₁₀ = .20, meaningful existence: BF₁₀ = .33 and, slightly weaker, for self-esteem, BF₁₀ = .37. These results indicate that basic need satisfaction was not dependent on the person who inflicted the exclusion.

Basic need satisfaction did not differ between participants who played with their partners and participants who played with their friends, except that those playing with their partners scored generally higher on meaningful existence, $F(1, 151) = 7.28, p = .008, \eta_p^2 = .05$. Type of relationship did not interact with Exclusion condition for any basic need or overall need satisfaction, $F_s(3, 152) \leq 1.26, p_s \geq .292, \eta_p^2 \leq .024$, suggesting that the intimacy of the relationship did not shape effects of ostracism.

Relationship Evaluation

Relationship evaluation differed significantly between Exclusion conditions, $F(3, 152) = 36.99, p < .001, \eta_p^2 = .42$. Participants in the included condition indicated higher evaluations of the relationship compared to all other conditions, $d_s \geq 1.47$. Participants in the excluded condition reported lower relationship evaluation than participants in partial exclusion conditions, $d_s \geq 0.61$. Again, there was no difference between being excluded by the close other and by the stranger, a pattern strongly supported by Bayesian statistics, $BF_{s10} = .17$. Hence, like mood during the game and basic need satisfaction, relationship evaluation decreased with increasing degrees of exclusion, while the identity of the excluder (close other vs. stranger) did not matter.

Participants who played with their partners evaluated the relationship better on average than participants who played with their friends, $F(1, 152) = 5.55, p = .020, \eta_p^2 = .04$. No interaction effect was revealed, $F < 1$, hence, exclusion effects did not depend on whether participants played with their friend or romantic partner.

Trait Judgments

Exclusion condition significantly influenced judgments of the *stranger*, $F(3, 149) = 16.15, p < .001, \eta_p^2 = .25$. Post hoc comparisons revealed that fully included participants judged the stranger more positively compared to all other conditions, $d_s \geq 1.11$, while no other difference reached significance. Bayesian statistics also pointed in favor of the null hypothesis, $BF_{10} = .40$. No further main or interaction effects were revealed, $F_s < 1$.

Exclusion condition had a small effect on trait judgments of the *close other*, $F(3, 149) = 3.29, p = .022, \eta_p^2 = .06$. Post hoc comparison revealed no differences, except that participants assigned more positive traits to their close other when they were fully included as compared to when

they were excluded by the close other, $d = 0.63$. Numerically, participants judged strangers more positively when they were excluded by their close other compared to the stranger, an effect that did not reach significance in t -tests or substantial support in Bayesian statistics, $BF_{10} = 2.56$, however. No further main or interaction effects were revealed, $F_s < 1$.

Despite the absence of significant interactions of Relationship type and Exclusion condition in any dependent variable of interest, comparisons between exclusion by a friend and by a romantic partner are reported in the Electronic Supplementary Material, ESM 1 (Sections S1 and S2). Additionally, exclusion by a stranger and by close other was compared separately for the friend and romantic partner condition (ESM 1, Section S3). All additional analyses are in line with the findings reported in the main text and support the Resilience-to-manipulation-hypothesis.

Debriefing Questionnaire

While some participants correctly suspected that we were interested in the effects of social exclusion during the game, none of them suspected that the relationship to the including/excluding person mattered or that the other's behavior was based on an algorithm. None of the participants expressed doubts about the authenticity of their co-actors responses.

Behavior During the Virtual Ball-Tossing Game

Participants passed the ball to their friend/partner more often than to the stranger, $t = 3.38$, $p = .001$, $d = 0.27$. We calculated the difference of passes to the close other and to the stranger for each participant for the included condition and the half excluded conditions (the excluded condition did not yield enough ball-tosses). Exclusion condition did not affect this difference score, $F(2, 117) = 2.54$, $p = .083$, $\eta_p^2 = .04$. Participants, hence, did not seem to adjust their behavior during the game to the other players' behavior.

Discussion

The present study addressed whether the nature of the relationship to the excluder shapes immediate consequences of ostracism. Participants played a virtual ball-tossing game with a stranger and a friend or a stranger and their partner, while being either fully included, fully

excluded, excluded only by the stranger, or excluded only by their close other.

Replicating previous findings, full exclusion, as compared to full inclusion, decreased participants' mood during the game, reduced satisfaction of all basic needs, and led to more negative evaluations of the relationship to the other players and their personality traits (e.g., Böckler et al., 2014; Gonsalkorale & Williams, 2007; Jamieson et al., 2010; Lau et al., 2009; Wirth et al., 2010; Zadro et al., 2004). In accordance with some of the literature, mood after the game was not affected by ostracism condition (e.g., Baumeister et al., 2002; Böckler et al., 2014; Zadro et al., 2004; but see Buckley et al., 2004; Gonsalkorale & Williams, 2007).

Results of the manipulation check demonstrate that participants reliably noticed the difference between the partial and full exclusion conditions. Similarly, participants who were fully excluded (i.e., excluded by the stranger as well as their close other) reported reduced mood during the game, less satisfaction of the basic needs belonging, control and meaningful existence and a lower relationship evaluation than those who were excluded by only one of the other players. Self-esteem and trait judgments showed numerically, but no statistical differences between full and partial exclusion, which may be due to generally weaker effects in those measures. Taken together, the majority of dependent variables directly reflected the extent of exclusion, suggesting that immediate negative consequences are susceptible to the degree of ostracism (for similar findings, see Williams et al., 2000). Researchers have compared the evolution and the function of physical and psychological responses to social exclusion with responses to physical pain. Specifically, they have argued that the main goal of those responses is to quickly and effectively detect and reduce threats to inclusion (MacDonald & Leary, 2005). In that respect, sensitivity to the degree of exclusion may help to infer the urgency of a particular situation as well as selecting adequate actions to foster inclusion.

Importantly, while the level of ostracism clearly mattered, the nature of the relationship did not shape any negative effects of exclusion. Type of relationship (friend vs. romantic partner) did not modulate ostracism effects in any of the outcome measures, nor did ostracism by the close other reduce participants' mood, basic need satisfaction, relationship evaluation or trait judgments more strongly than exclusion by a stranger, a pattern of results that was supported by Bayesian statistics. Note that exclusion by the stranger and exclusion by the close other did also not differ *numerically* in any of the dependent variables. In fact, for all ratings from 1 to 9, the average difference between exclusion by a stranger and close other was 0.13.

Nonetheless, (replication) studies with larger sample sizes are necessary before drawing strong conclusions, especially given the absence of statistical effects in the present study (Brynsbaert, 2019). With a sample size of 20 participants per condition, only medium-sized effects can be detected and it may well be that differences in reflexive ostracism effects due to the relationship with the excluder are present, but very subtle. In our short and minimal game-based situation in which participants interacted simultaneously with a stranger and a close other, their well-being did not seem to depend on whether the stranger, their friend, or their partner excluded them. This absence of modulatory effects of relationship status on any of the negative consequences of exclusion is in line with findings demonstrating the resilience of reflexive ostracism effects to the identity of the other players or the type of interaction (e.g., Gonsalkorale & Williams, 2007; Jones et al., 2009; Smith & Williams, 2004; Van Beest et al., 2011; Williams, 2009; Zadro et al., 2004). Future studies could provide more comprehensive investigations of the temporal need-threat model by assessing the modulatory effects of relationship manipulations on reflexive and reflective consequences in the same sample.

While some studies showed that receiving the “silent treatment” by a partner is painful (Zadro et al., 2008) and that exclusion by friends reduces need satisfaction (Pharo et al., 2011), experimental comparisons of exclusion by strangers versus close others are sparse. One laboratory-based ball-tossing study compared participants who played with two strangers to participants who played with their partner and a stranger, reporting mixed results: While relationship evaluation was impaired when the partner was involved, basic need satisfaction was largely immune to relationship type (Arriaga et al., 2014). A diary-based study in which 40 participants reflected on the consequences of real-life exclusion over the course of two weeks reported more severe effects of ostracism by close others than by strangers (Nezlek et al., 2012). Hence, existing findings hint towards a role of relationship type in *reflective* effects of exclusion but do not provide a clear picture of the effect of relationship type on *reflexive* consequences. Our study suggests that while participants are sensitive to the degree of exclusion even in a minimal lab-based interaction, the nature of the relationship with the excluder does not matter for reflexive effects of ostracism. Hence, humans seem to have strong sensors not only for whether or not they are excluded but also for the extent of exclusion. By contrast, the pain of rejection, at least in classic laboratory settings, may not be shaped by who we interact with and how this interaction looks like specifically.

In order to further disentangle when, how, and to what degree the relationship to the excluder matters, future studies may employ stronger manipulations of relationship

depth and/or more extreme implementations of ostracism. In ball-tossing settings, this could entail testing children-parent dyads in which children are excluded by either their parent or a stranger. Given the high levels of dependency children experience towards their parents, this setup would comprise a particularly strong manipulation of relationship depth (e.g., MacDonald & Leary, 2005). In addition, paradigms that confront participants with longer-lasting, more severe, and/or more ecologically valid instances of rejection (e.g., social media-based exclusion, Wolf et al., 2015) might help to further address the effects of relationship to the excluder. As mentioned before, larger sample sizes would be desirable in these studies.

The present study revealed some general differences between participants who played the game with their partners and those who played with their friends. The former reported generally increased mood during the game, higher levels of meaningful existence, and higher evaluations of their relationship to the other players. Hence, independent of the ostracism condition, participants enjoyed playing with their partners more than playing with a friend, felt more meaningful to the others, and valued the relationship more when their partner was involved. This pattern of results supports the special role of romantic partners (e.g., Aron et al., 2008; Baumeister & Leary, 1995) and underlines the validity of our manipulation of relationship type.

In addition to well-known and self-report-based measures such as basic need satisfaction and relationship evaluation, the present study explored participant's behavior during the interaction. Results revealed no meaningful differences in terms of directions of ball tosses between any of the ostracism conditions. Hence, during the interaction itself, tendencies such as “tend-and-befriend” or withdrawal from/antisocial behavior towards the excluder (e.g., Smart Richman & Leary, 2009; Taylor et al., 2000; Twenge et al., 2007; Wesselmann et al., 2015) did not occur.

To conclude, given the high prevalence of social exclusion and its devastating long-term consequences, understanding the boundary conditions and factors that shape its negative effects is critical. The present study revealed that the core effects of ostracism increase with the degree of exclusion, but are independent of whether it is inflicted on us by strangers, friends, or even our romantic partner.

Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at <https://doi.org/10.1027/1864-9335/a000446>

ESM 1. Results of additional ANOVAs and post-hoc comparisons.

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Open Data


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