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Social decision making in narcissism: Reduced generosity and increased retaliation are driven by alterations in perspective-taking and anger

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ABSTRACT

Narcissism can lead to various interpersonal problems. However, the characteristics of social decision making in trait narcissism and the cognitive and affective underpinnings are poorly understood. We employed established game theoretical paradigms to investigate different facets of social behavior in participants (N = 122; 41 female, mean age = 30 years) with a wide range of scores on the Pathological Narcissistic Inventory. Interpersonal traits, attitudes, and emotions were assessed as potential mediators of behavioral differences. High narcissism scores were related to lower generosity, especially when this could result in being punished. This maladaptive behavior was fully mediated by reduced perspective-taking abilities in narcissism. Also, narcissism scores predicted higher levels of punishment behavior, driven by higher levels of experienced anger. Hence, the difficulties narcissists face in interactions may be due to their reduced perspective-taking skills and resulting reduced generosity as well as enhanced anger-based retaliation behavior.

1. Introduction

Narcissism – both on the sub-clinical and on the pathological level – is characterized by enhanced feelings of grandiosity and entitlement as well as by impairments in interpersonal functioning (Bushman & Baumeister, 1998; Campbell, Bush, Brunell, & Shelton, 2005; Given-Wilson, Ilwain, & Warburton, 2011; Morf & Rhodewalt, 2001). Narcissists are considered less likable by others (Back et al., 2013), are less often engaged in committed and satisfactory relationships (Campbell, 1999; Campbell, Foster, & Finkel, 2002; Carroll, 1987; Paulhus, 1998), and their behavior negatively impacts on others and on society (Barry, Kerig, Stellwagen, & Barry, 2011; Rosenthal & Pittinsky, 2006; Sedikides, Campbell, Reeder, Elliot, & Gregg, 2002). Considering the increase of narcissistic traits in young generations (Cai, Kwan, & Sedikides, 2012; Twenge, Konrath, Foster, Campbell, & Bushman, 2008), a more comprehensive understanding of social decision making and the underlying impairments in narcissism is crucial. Accordingly, the present study addressed two questions. First, which specific characteristics of social decision making in reciprocal interactive situations are affected by trait narcissism? Second, which differences in socio-cognitive and -affective abilities mediate the observed behavioral differences?

Concerning the first question, psychological research suggests that (sub-clinical) narcissism is related to reduced prosocial decision making. Narcissists report lower moral and ethical standards (Antes et al., 2007; Brown, Sautter, Littvay, Sautter, & Bearnes, 2010; Cooper & Pullig, 2013), volunteer less for the sake of others, and invest less time to help others (Brunell, Tumblin, & Buelow, 2014; Lannin, Guyll, Krizan, & Madon, 2014). Using a social dilemma ('Public Goods Game') Campbell et al. (2005) demonstrated that trait narcissism predicts more selfish and less prosocial choices.

While previous studies investigated how generously narcissists acted towards others, it is yet unknown how their behavior is shaped in interactions that consist not only of an isolated action towards another, but also entails the other's response. In fact, decades of research in behavioral economics suggest that the opportunity to reciprocate or retaliate against others' actions determines social decision making in two important ways: First, people adjust generous or cooperative behavior to whether their interaction partners can respond (e.g., by punishing unfair distribution choices; Fehr & Gachter, 2002; Güth, 1995; Spitzer, Fischbacher, Herrnberger, Gron, & Fehr, 2007; Steinbeis, Bernhardt, & Singer, 2012). Put simply, people give more when others have the option to retaliate, a behavioral tendency that has been termed strategic giving (e.g., Steinbeis et al., 2012). Second, people tend to punish those who behave selfishly (Fehr & Fischbacher, 2004; Fehr & Gachter, 2002; McAuliffe, Jordan, & Warneken, 2015). This behavior can reflect

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anger-based retaliation, but also a tendency to enforce social norms (Fehr & Fischbacher, 2004; Fehr & Gachter, 2002; McCall, Steinbeis, Ricard, & Singer, 2014; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003; Sigmund, 2007). Based on this literature, two crucial questions arise regarding social decision making in narcissism: First, how do narcissists adjust their generous behavior depending on whether or not their interaction partner can punish (i.e., how strategic do they behave)? And second, how do people scoring high on narcissism punish others' unfair offers (i.e., how norm-driven or anger-driven do they behave)?

The second goal of the present study concerns the mechanisms that underlie altered social decision making in narcissism. Research shows, for instance, that reduced levels of empathy and perspective-taking drive the enhanced sense of entitlement in criminal narcissists (Hepper, Hart, Meek, Cisek, & Sedikides, 2014). Besides impairments in such interpersonal traits, narcissism has been linked to enhanced Machiavellian attitudes and increased negative emotions such as anger (Bushman & Baumeister, 1998; Menon & Sharland, 2011; Witte, Callahan, & Perez-Lopez, 2002). As these socio-affective and socio-cognitive processes have been related to inter-individual differences in social behavior in the general population (Bereczkei, Birkas, & Kerekes, 2010; Hein, Silani, Preuschoff, Batson, & Singer, 2010; Knoch, Pascual-Leone, Meyer, Treyer, & Fehr, 2006; Rudolph, Roesch, Greitemeyer, & Weiner, 2004), the present study systematically tested whether inter-individual differences in such traits mediate the identified alterations in social decision making in narcissism.

In order to address the first goal, we used well-established game theoretical paradigms that specifically allowed the assessment of 1) *first mover giving behavior*: giving behavior displayed towards others who could or could not respond with punishment (Dictator Game and 2nd Party Punishment Game; Axelrod & Hamilton, 1981; Camerer, 2003; Fehr & Fischbacher, 2004) and 2) *second/third mover punishment behavior*: costly punishment responses to distribution choices of others in direct and observed interactions (2nd and 3rd Party Punishment Game; Fehr & Fischbacher, 2004). In order to investigate possible mediators of altered social decision making, we assessed state affect during the hypothetical punishment game, as well as interpersonal traits (Interpersonal Reactivity Index and Cognitive and Emotional Empathy Questionnaire; Davis, 1983; Savage, Teague, Koehne, Borod, & Dziobek, submitted), and Machiavellianism (Henning & Six, 1977).

Concerning first mover behavior, we expected to replicate findings of reduced generosity in narcissism (e.g., Campbell et al., 2005). Beyond, we were interested whether trait narcissism is related to enhanced strategic behavior (i.e., less generosity especially when others cannot punish), which would be in line with reports of enhanced Machiavellian attitudes in narcissism (Menon & Sharland, 2011). Alternatively, given that narcissists are less concerned with the effects their actions have on others (Sedikides et al., 2002), it may be that they are less sensitive to other's prospective reactions and, hence, behave less generously not only when retaliation is impossible (Dictator Game), but also when the other player can punish (2nd Party Punishment Game). Concerning second and third mover punishment behavior, based on findings of a heightened perception of others as unfair and enhanced anger and aggression in narcissism (Bushman & Baumeister, 1998; Menon & Sharland, 2011), we hypothesized that narcissism is related to an increase in anger-based punishment.

2. Material and methods

2.1. Participants

Participants completed a short screening on demographic information and mental health. Only participants without a history of psychiatric disorders were included. In total, 122 Native German speaking participants took part in the study (41 female, mean age = 30 years, SD = 11 years). Sample size was selected based on recommendations to ensure statistical power even in case of small to medium effect sizes (Vazire, 2016).

Participants filled in in the Pathological Narcissistic Inventory (PNI; Pincus et al., 2009), which has good psychometric properties and measures narcissism in a more comprehensive manner by including both grandiose and vulnerable elements (as opposed to the NPI, which has been criticized for focusing too much on the grandiose elements; Brown & Zeigler-Hill, 2004; Maxwell, Donnellan, Hopwood, & Ackerman, 2011; Miller & Campbell, 2008; Morf & Rhodewalt, 2001; Pincus et al., 2009). We used the overall PNI score because of (i) the correlation between the grandiose and the vulnerable subscales and (ii) its validation with other trait narcissism scales as well as with narcissistic personality disorder according to the DSM-IV (Ackerman et al., 2011; Maxwell et al., 2011). The participant sample was divided into a low narcissism and a high narcissism group according to a median split on the PNI (median = 123, ranging from 20 to 219). The low and high narcissism groups did not differ in age, gender, or handedness (ps > 0.1) (see Table 1). Dichotomizing data in this way allowed us to perform ANOVAs including narcissism group as a factor and testing for interaction effects (see, for example, Byrne & Worthy, 2013; Heiserman & Cook, 1998; Svindseth, Nøttestad, Wallin, Roaldset, & Dahl, 2008 for similar approaches). Importantly, in addition to testing for differences between the low and the high narcissism group, the relation of narcissism to all dependent variables was also assessed dimensionally by means of correlations with PNI scores.

The study was approved by the Ethics Commission of the Department of Psychology of the Humboldt University of Berlin. Participants signed informed consent and received 7 euros per hour for their participation in addition to the money they could gain in the game theoretical paradigms.

2.2. Data acquisition & general procedure

All game theoretical paradigms were assessed on 17 in. TFT monitors in two subsequent testing sessions. Hypothetical distribution scales and questionnaires were filled in via an online platform after the two testing sessions (Questback GmbH. Released 2014. EFS Survey Enterprise Feedback Suite, Version 10.4).

2.3. Measures

2.3.1. Game theoretical paradigms

Participants completed the economic games on two days (separated on average by two weeks) whereby first mover giving paradigms were completed on the first and second/third mover punishment paradigms were completed on the second day. Participants received instructions in written form and filled in control questions in order to ensure they understood the underlying payoff functions. Participants were informed that they were playing for monetary units (MUs; 1 MU = 10 Euro cents) and that they would receive the pay-off of a randomly selected trial at the end of the experimental sessions. All game theoretical paradigms were completed as anonymous one shot versions. Participants were informed that they were connected to randomly selected players via an interactive digital internet platform. In reality, players played according

Table 1
Demographic and questionnaire data.

	High narcissism group		Low narcissism group		Statistics	
	M	SD	M	SD		
Gender	21:39		19:41		$t(118) = 0.38$	$p = 0.38$
Age	29.4	10.1	32.0	11.7	$t(114) = 1.27$	$p = 0.21$
Handedness	2.0	0.18	1.9	0.28	$t(118) = -1.17$	$p = 0.25$
PNI	149.4	21.2	85.5	28.3	$t(120) = -14.1$	$p < 0.001$

to preprogrammed algorithms. All the games were programmed in Python (van Rossum & Drake, 2001) using z-tree as a template (Fischbacher, 2007).

2.3.1.1. First mover giving behavior

2.3.1.1.1. Dictator Game (DG). In the DG (Camerer, 2003) participants took the role of Player A and were first informed about their endowment (150 MUs). Then, participants could indicate how many MUs in increments of 1 MU they wanted to assign to a second player (Player B). The percentage of MUs participants transferred to player B was averaged across the two trials.

2.3.1.1.2. 2nd Party Punishment Game (2PPG). The 2PPG is a version of the Ultimatum Game (UG; Fehr & Fischbacher, 2004; Güth, 1995) in which not only the Player A, but also Player B has MUs at their disposal. Participants were assigned the role of Player A for two rounds. Similar to the DG, Player A had an endowment of 150 MUs while Player B (simulated) had an endowment of 50 MUs. After players were informed about their endowments, Player A chose how many MUs s/he wanted to assign to Player B in increments of 1 MU. Subsequently, Player B could invest his/her MUs to reduce Player A's MU level in the following way: every 1 MU reduced Player A's MU level by 3 MUs. The average percentage of MUs transferred to Player B was calculated.

The order of DG and 2PPG trials was randomized across participants.

2.3.1.2. Second and third mover punishment behavior

2.3.1.2.1. 2nd Party Punishment Game (2PPG). Instructions and endowments were identical to the 2PPG described above, but participants were assigned the role of Player B. After receiving information about the endowments, participants were informed about the amount of MUs Player A (simulated) had assigned to them. Participants played two rounds in pseudorandomized order, in one round Player A offered a high amount (75 MUs, 50% of her endowment) and in one round Player A offered a low amount (10 MUs, 6.7%). Finally, participants could choose how many of their 50 MUs in increments of 1 MU they wanted to use in order to deduce the MU level of Player A (1 MU of Player B reducing Player A's MUs by 3). The percentage of MUs invested to punish Player A was calculated for low offer and high offer trials.

2.3.1.2.2. 3rd Party Punishment Game (3PPG). In the 3PPG (Fehr & Fischbacher, 2004) participants were assigned the role of Player C (the third party). First, participants were informed about their own and the other players' endowments: Player A had 150 MUs, Player B did not have any MUs, and Player C (participant) had 50 MUs. Then, Player C observed how many MUs Player A (simulated giver) assigned to Player B (simulated receiver). Participants played two rounds in pseudorandomized order. Endowments, simulated choices, etc. were identical to the 2PPG. The percentage of MUs invested to punish Player A was calculated for low offer and high offer trials.

The order of 2PPG and 3PPG trials was randomized across participants.

In addition, established hypothetical distribution scales were assessed in which participants could be first movers (Social Value Orientation Scale; van Lange, 1999) and second/third movers (Hypothetical Punishment Scales; Fehr & Fischbacher, 2004). Details on methods and results are provided in Supplements S1 and S2.

2.3.2. State and trait questionnaires

In order to investigate potential mediators of altered social decision making in trait narcissism, state affect, interpersonal reactivity (e.g., empathy and perspective-taking), and Machiavellian attitudes were assessed via an online platform.

2.3.2.1. State affect. While completing the hypothetical punishment scales, participants were asked to rate how happy, sad, angry, and disgusted they felt (on a scale from 0 to 7) after each of the transfers (0–150 MUs) of both Player B and Player C.

2.3.2.2. Interpersonal reactivity. Participants filled in the Interpersonal Reactivity Index (IRI; Davis, 1983) and the Cognitive and Emotional Empathy Questionnaire (CEEQ; Savage et al., submitted). The IRI is a 28 item questionnaire measuring empathetic concern, personal distress, perspective-taking, and fantasy. The fantasy subscale was not included due to previous criticism (Baron-Cohen & Wheelwright, 2004). The CEEQ is a 30 item questionnaire measuring the cognitive and emotional facets of empathy, including the subscales empathic concern, perspective taking, mirroring, and mental state perception. Sum scores for all subscales were derived for both questionnaires.

2.3.2.3. Machiavellianism. The 18 item Machiavellianism scale (Henning & Six, 1977) assesses self-beneficial and manipulative attitudes at the expense of other people's well-being. A mean Machiavellian score was calculated for each participant.

3. Results

The relation of narcissism to the different parameters of social decision making was assessed by means of comparing the high narcissism with the low narcissisms group (according to a median split on participants' PNI scores) and by correlations with narcissism (according to participants' absolute PNI scores).

3.1. Game theoretical paradigms

3.1.1. First mover giving behavior (DG and 2PPG)

Data of 121 participants was available and included in the analyses. Details on missing data are provided in Supplement S3. Participants' average scores of giving in the DG and giving in the 2PPG were subjected to a repeated measures ANOVA with the within-subject factor Game (DG versus 2PPG) and the between-subject factors Group (low versus high narcissism). The main effect of Game shows that participants gave significantly more in the 2PPG (when the other player could punish them) than in the DG ($F(1, 120) = 81.9$, $p < 0.001$, $\eta p^2 = 0.406$), which reflects strategic giving (Steinbeis et al., 2012) (see Fig. 1). In addition, the high narcissism group gave significantly less overall than the low narcissism group, as reflected in a main effect of Group ($F(1, 120) = 5.2$, $p < 0.05$, $\eta_p^2 = 0.041$). A two-way interaction of Game and Group ($F(1, 120) = 4.4$, $p < 0.05$, $\eta_p^2 = 0.036$) indicates that high narcissists gave significantly less than low narcissists in the 2PPG ($t(120) = 2.6$, $p < 0.01$, $d = 0.48$), but not (significantly) in the DG ($t(120) = 1.4$, $p = 0.17$, $d = 0.25$). Mirroring the ANOVA findings, narcissism (PNI score) correlated (trend) negatively with giving overall (DG and 2PPG combined) ($r = -0.16$, $p = 0.07$) and significantly negatively with giving in the 2PPG ($r = -0.18$, $p < 0.05$).

3.1.2. Second/third mover punishment behavior (2PPG and 3PPG)

Participants' amounts of punishment were subjected to a repeated measures ANOVA with the within-subject factors Game (2PPG versus 3PPG) and Offer (low offer versus high offer from Player A) and the between-subject factor Group (low versus high narcissism). The main effect of Offer shows that participants assigned more punishment for low offers than for high offers ($F(1, 115) = 104.7$, $p < 0.001$, $\eta_p^2 = 0.477$), which is in line with the literature (Fehr & Fischbacher, 2004) (see Fig. 1). In addition, punishment was significantly enhanced in the high narcissism group ($F(1, 115) = 7.2$, $p < 0.01$, $\eta_p^2 = 0.059$). The two-way interaction of Offer and Group ($F(1, 115) = 4.3$, $p < 0.05$, $\eta_p^2 = 0.036$) indicates that high narcissists punish low offers significantly more than non-narcissists ($t(120) = -2.9$, $p < 0.01$, $d = 0.53$), which was not the case for high offers ($t(120) = -1.0$, $p > 0.1$, $d = 0.18$). No other main effects or interactions reached significance ($Fs(1, 115) < 0.36$, $p > 0.18$). In line with the ANOVA results, PNI scores were correlated with overall punishment ($r = 0.27$ $p < 0.01$) and with the amount of punishment in the low offer condition ($r = 0.30$ $p < 0.01$).

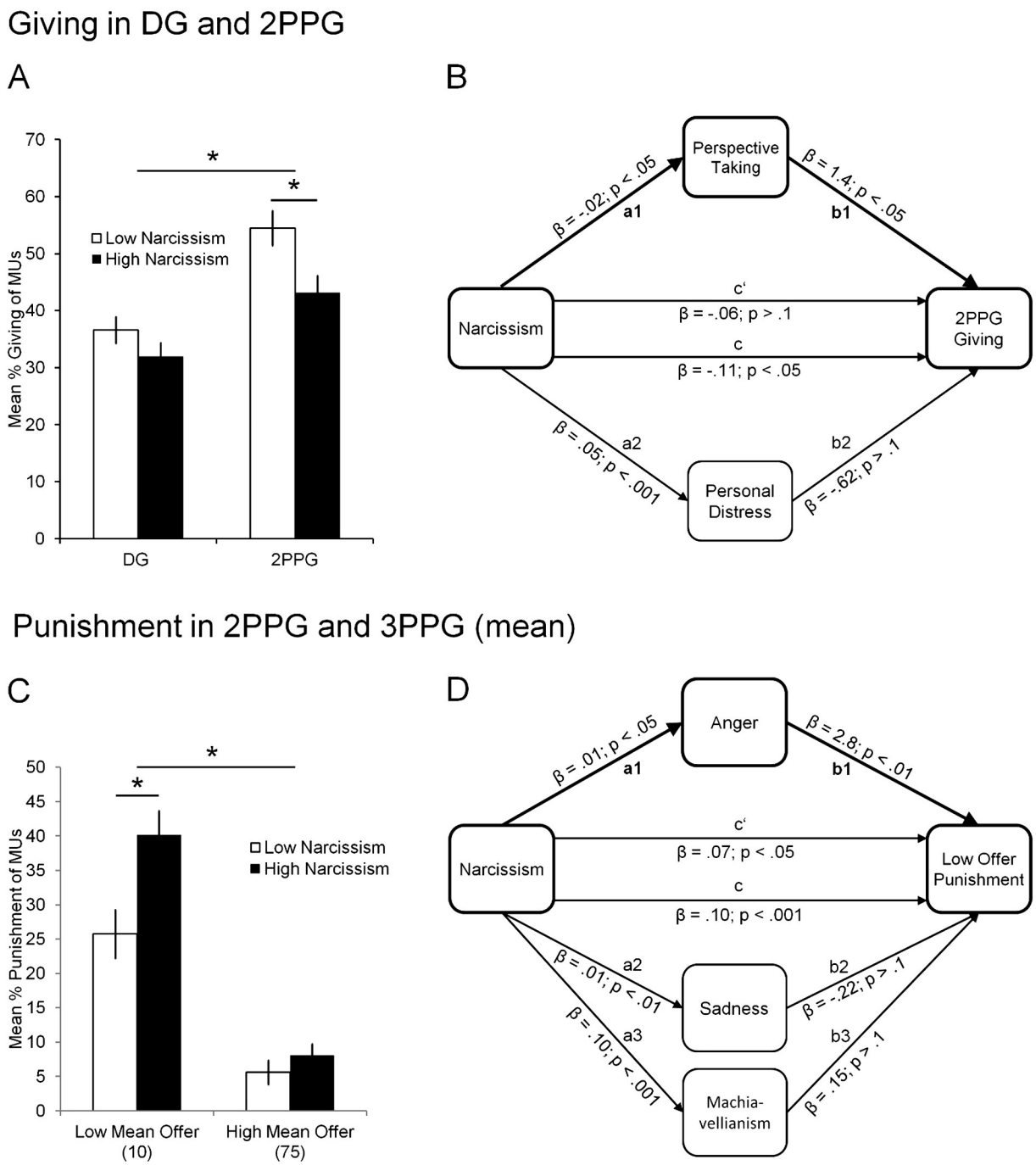

Fig. 1. Results of game theoretical paradigms and mediation models. A) Means and Standard errors for first mover giving behavior (DG and 2PPG) for the low and the high narcissism group. B) Mediation model for the effect of narcissism on giving in the 2PPG. Perspective-taking and personal distress are modeled as mediators and perspective-taking was revealed as a full mediator. C) Means and Standard errors for punishment behavior to low and high offers (averaged across 2PPG and 3PPG) for the low and the high narcissism group. D) Mediation model for the effect of narcissism on low offer punishment. State anger (in low offers), state sadness (in low offers), and Machiavellianism are modeled as mediators and state anger was revealed as a mediator.

Taken together, game theoretical paradigms revealed trait narcissism to be related to lower giving, particularly in settings where retaliation was possible. When taking the role of the receiver or observer, narcissists punished others more harshly, especially when offers were low.

3.2. State and trait questionnaires

See Table 2 for descriptive results of all questionnaires.

3.2.1. State affect

Participants' affect ratings on anger, sadness, disgust, and happiness were subjected to repeated measures ANOVAs with the within-subject factors Game (hypothetical 2PPG versus hypothetical 3PPG), Offer (0 MUs, 25 MUs, 50 MUs, 75 MUs, 100 MUs, 125 MUs, 150 MUs) and the between-subject factor Group (low versus high narcissism). The main effects of Offer show that anger, sadness, and disgust increased and happiness decreased with decreasing offers ($Fs(1, 111) \geq 47.0$, $ps < 0.001$, $\eta_p^2 s \geq 0.297$). In addition, the high narcissism group reported significantly more anger ($F(1, 111) = 10.7$, $p < 0.01$, $\eta_p^2 = 0.088$) and sadness (F(1,

Table 2
Means (M) and standard deviations (SD) of state/trait questionnaires.

	High narcissism group		Low narcissism group		Statistics	
	M	SD	M	SD		
State anger	3.5	1.1	3.0	1.1	$t(111) = -2.24$	$p < 0.05$
State sadness	3.3	1.3	2.7	1.2	$t(111) = -2.76$	$p < 0.01$
State disgust	2.6	1.6	2.2	1.5	$t(111) = -1.35$	$p = 0.18$
State happiness	3.3	0.9	3.5	1.1	$t(111) = 1.20$	$p = 0.23$
IRI: EC	19.5	3.8	19.2	5.0	$t(120) = -0.37$	$p = 0.71$
IRI: PT	16.8	4.4	18.8	4.6	$t(120) = 2.42$	$p < 0.05$
IRI: PD	14.1	3.8	11.3	4.9	$t(120) = -3.52$	$p < 0.01$
CEEQ: EC	16.6	2.8	16.9	2.8	$t(120) = 0.71$	$p = 0.48$
CEEQ: PT	13.7	3.3	15.2	2.9	$t(120) = 2.61$	$p < 0.05$
CEEQ: mirroring	14.5	3.2	13.5	3.7	$t(120) = -1.47$	$p = 0.14$
CEEQ: MSP	16.5	4.2	17.3	3.8	$t(120) = 1.02$	$p = 0.31$
Machiavellianism	24.9	11.4	17.8	11.6	$t(120) = -3.38$	$p < 0.01$

111) = 9.9, $p < 0.01$, $\eta_p^2 = 0.082$), while no group differences were revealed for disgust or happiness ($ps > 0.1$). In accordance, PNI scores correlated significantly with overall anger ($r = 0.20$, $p < 0.05$) and sadness ($r = 0.23$, $p < 0.05$), as well as anger ($r = 0.20$, $p < 0.05$) and sadness ($r = 0.25$, $p < 0.01$) specific to low offers.

3.2.2. Interpersonal reactivity

The high narcissism group reported significantly less perspective-taking ($t(120) = 2.4$, $p < 0.05$, $d = 0.44$) and higher personal distress ($t(120) = 3.5$, $p < 0.01$, $d = 0.64$) in the IRI than the low narcissism group. Accordingly, PNI scores correlated negatively with perspective-taking ($r = -0.20$, $p < 0.05$) and positively with personal distress ($r = 0.45$, $p < 0.001$) in the IRI. In the CEEQ, the high narcissism group reported significantly less perspective-taking ($t(120) = 2.6$, $p < 0.01$, $d = 0.47$) and, similarly, PNI scores correlated with perspective-taking ($r = -0.21$, $p < 0.05$).

3.2.3. Machiavellianism

The high narcissism group reported significantly more Machiavellianism than the low narcissism group ($t(120) = 3.4$, $p < 0.01$, $d = 0.61$) and PNI scores were correlated with the Machiavellian Index ($r = 0.35$, $p < 0.001$).

Taken together, questionnaires revealed enhanced negative state affect in narcissism as well as enhanced personal distress, reduced perspective-taking and higher Machiavellian attitudes.

3.3. Mediation analyses

Mediation models were calculated using a bootstrapping based approach (Preacher & Hayes, 2008). Bootstrapping techniques allow for repeated resampling from a given population, and resampling was repeated 5000 times. The 5000 estimates of the indirect association were used to generate a 95% bias corrected confidence interval (CI) (Preacher & Hayes, 2008).[2]

3.3.1. First mover giving behavior

Our main findings suggest that trait narcissism is related to lower giving specifically in the 2PPG. In addition, we found that perspective-taking (CEEQ) and personal distress (IRI) correlated with both narcissism (PNI score, see above) and with giving in the 2PPG (perspective-taking: $r = 0.20$, $p < 0.05$; personal distress: $r = -0.19$, $p < 0.05$).

Hence, PNI scores were modeled as independent variable and giving in the 2PPG as dependent variable, while perspective-taking (PT) and personal distress (PD) were tested as mediators (see Fig. 1). The model revealed that narcissism was negatively associated with giving in the 2PPG, with PT and with PD. While PT was positively related with giving in the 2PPG, no relation was found for PD. Results of the mediation analysis indicated that PT was a mediator for reduced giving. The mediation analysis revealed that the direct relationship between narcissism and 2PPG giving became non-significant when PT was included in the model, suggesting full mediation.

3.3.2. Second/third mover punishment behavior

Our main findings show that trait narcissism is related to higher punishment, especially when offers are low. Also, Machiavellianism and state anger and sadness (both for low offers) correlated with narcissism as well as with low offer punishment (Machiavellianism: $r = 0.35$, $p < 0.001$; state anger: $r = 0.20$, $p < 0.05$; state sadness: $r = 0.25$, $p < 0.01$).

Hence, PNI scores were modeled as independent variable and punishment in low offers as dependent variable, while state anger, state sadness, and Machiavellianism were tested as mediators (see Fig. 1). Narcissism was associated with low offer punishment and with anger, sadness, and Machiavellianism. The direct effect of anger was associated positively with punishment. No relations were found for sadness and Machiavellianism. Due to paths a and b being significant for state anger, mediation analysis was applied. Results indicated that anger was a robust mediator for enhanced punishment in narcissism (Preacher & Hayes, 2008).

Taken together, mediation analyses revealed clear mediators for the differences between high and low narcissism in social decision making.

4. Discussion

Considering the personal and societal costs of narcissism (Barry et al., 2011; Rosenthal & Pittinsky, 2006; Sedikides et al., 2002), a more comprehensive understanding of the impairments in narcissists' social behavior and of the underlying factors is crucial. The present study addressed this objective by 1) investigating the link between sub-clinical narcissism and various components of social decision making such as generous, strategic and punishment behaviors and by 2) examining the inter-individual differences in socio-cognitive and -affective traits that account for the observed alterations in social exchange behavior. Employing established game theoretical paradigms as well as state and trait questionnaires, we revealed that trait narcissism is linked to reduced generosity, driven by poorer perspective-taking skills, and to increased anger-based punishment.

4.1. Narcissism, generosity, and the mediating role of perspective-taking

In accordance with the literature, narcissism in our study was related to reduced giving (Campbell et al., 2005). Interestingly, narcissists did not show enhanced strategic behavior (i.e., being particularly or exclusively generous when others could punish, e.g., Güth, 1995; Steinbeis et al., 2012). By contrast, people scoring high on narcissism behaved more selfishly than people with lower scores especially in settings in which interaction partners could retaliate (2PPG). Hence, rather than displaying enhanced strategic behavior, narcissists seemed to be less sensitive to or less aware of the potential negative reactions of others to non-generous offers. Results of the mediation analyses suggest that lower generosity in the 2PPG was fully driven by a reduced perspective-taking ability in participants scoring high on narcissism. The impaired ability or willingness to take an interaction partner's perspective (or action opportunities) into account, thus, led narcissists to behave less generously in situations where generosity would have been in their own interest (in order to forgo punishment). While reduced giving and ignorance of others' punishment options seems relatively harmless in the setting described here, research in economics and psychology suggests that large-scale cooperation can break down

[2] In addition to the bootstrapping based approach, we estimated mediation effects with structural equation modelling (SEM) using the AMOS software package. Both methods yielded similar results; SEM based analyses and estimates are reported in the Supplementary material S4.

quickly and irrevocably when individuals choose unfair and selfish distribution options (Fehr & Gachter, 2002; Ledyard, 1995). The lack of considering other peoples' perspectives and action opportunities and the ensuing tendency to behave less generously towards others may well be one of the core reasons for the impaired social interactions of narcissists (e.g., unstable relationships; Back et al., 2013; Campbell et al., 2002).

4.2. Narcissism, punishment, and the mediating role of anger

Complementarily to reduced generosity and lower sensitivity to others' punishment options, high narcissists exhibited enhanced levels of punishment when faced with other people's offers, especially when these were unfair. Such behavior may have two different origins: First, it may reflect the tendency to reinforce fairness norms by punishing unfair agents (Fehr & Fischbacher, 2004) or, second, it may be a direct result of anger experienced when treated unfairly (Bushman & Baumeister, 1998; Menon & Sharland, 2011), hence, reflecting impulsive retributive actions. Supporting the latter, people with high trait narcissism reported higher states of sadness and anger during the interaction, particularly when receiving unfair offers. Mediation analyses suggest that enhanced punishment behavior in narcissists was driven by their higher levels of experienced anger elicited by others unfair offers. This finding is in line with reports of narcissists' enhanced sense of being treated unjust, increased levels of anger, and their augmented tendency to blame others (Bushman & Baumeister, 1998) as well as with research on the relation of anger and punishment (Knoch et al., 2006; McCall et al., 2014). Somewhat surprisingly, narcissists did not punish more when they were directly affected by the other's unfair choice (2PPG) than when they merely observed an unfair interaction (3PPG). Our data suggest that this was due to enhanced anger not only when unfair behavior was experienced (2PPG), but also when it was observed (3PPG). Narcissists, hence, generally respond to unfairness with heightened anger, which, in turn leads them to punish more harshly. The tendency to respond aggressively to others' unfair behavior may jeopardize stable social interactions. In fact, research suggests that stable cooperation is strongly supported by an interaction strategy that has been termed 'generous tit-for-tat' (Wedekind & Milinski, 1996), namely doing as the other does (e.g., cooperating when the other cooperates), but with bracing cooperative behavior at least once after the other has behaved selfishly.

5. Conclusion

The present study revealed that the decreased proneness or ability of narcissists to take others' perspectives leads to reduced generous behavior towards others, a pattern that played out especially when interaction partners could retaliate. Conversely, when facing unfair distribution choices of others narcissists responded with more anger and, consequently, stronger retaliation behavior. Since both reduced generosity and enhanced retributive aggressive actions have been reliably shown to endanger stable cooperation it is likely that they are at the core of the difficulties narcissists face when interacting with others - ranging from being considered less sympathetic and experiencing less satisfying relationships to being an actual burden to others and society. Accordingly, the present results could contribute to intervention research that aims at improving interpersonal relationships and behavior in narcissism, because they suggest that targeted trainings in the domain of social cognitive abilities such as perspective-taking and emotion regulation may help to enhance prosocial behavior and reduce impulsive retributive actions in narcissism.

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Appendix A. Supplementary data

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