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Power Increases the Socially Toxic Component of Narcissism  
Among Individuals with High Baseline Testosterone

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**ABSTRACT**

The corrosive effects of power have been noted for centuries, but the self-related changes responsible for those effects have remained somewhat elusive. Narcissists tend to rise to – and abuse – positions of power, so we considered the possibility that positions of power may corrupt because they inflate narcissism. Two pathways were considered: powerholders abuse their power because having power over others makes them feel superior (Grandiosity Pathway) or deserving of special treatment (Entitlement Pathway). Supporting the Entitlement Pathway, assigning participants to a position of power (vs. equal control) over a group task increased scores on the Exploitative/Entitlement component of narcissism among those with high baseline testosterone. What is more, heightened Exploitative/Entitlement scores among high-testosterone participants endowed with power (vs. equal control) statistically explained amplified self-reported willingness to misuse their power (e.g., taking fringe benefits as extra compensation). The Grandiosity Pathway was not well supported. The Superiority/Arrogance, Self-absorption/Self-admiration, and Leadership/Authority facets of narcissism did not change as a function of the power manipulation and testosterone levels. Taken together, these results suggest that people with high (but not low) testosterone may be inclined to misuse their power because having power over others makes them feel entitled to special treatment. This work identifies testosterone as a characteristic that contributes to the development of the socially-toxic component of narcissism (Exploitative/Entitlement). It points to the possibility that structural positions of power and individual differences in narcissism may be mutually reinforcing, suggesting a vicious cycle with personal, relational, and societal implications.

Keywords: narcissism, power, testosterone, corruption, entitlement

For centuries power has been viewed as a corrupting force. Despite the recent surge in psychological research examining the cognitive, motivational, and behavioral consequences of power, the self-related changes that explain the corrupting influence of power have remained somewhat elusive. The socially-toxic behaviors of the powerful resemble those of narcissists, so we investigated the possibility that social power increases narcissism.

### **Two Possible Power-to-Corruption Pathways**

Narcissism consists of two separate components: Entitlement and Grandiosity (Brown, Budzek, & Tamborski, 2009). Entitlement is the desire to be recognized and treated as special by others. Grandiosity is relatively more intrapersonal, and is characterized by an arrogant sense of self-importance.

The maladaptive behaviors and interpersonal problems that characterize abusive powerholders, such as aggression, cheating, and counterproductive workplace behaviors have been linked with the Exploitative/Entitlement component of narcissism (for a review see Grijalva et al., 2015). Hence, increased entitlement and exploitation seemed a viable explanation for the corrupting influence of power. We label this the Entitlement Pathway.

An alternative possibility is that power corrupts because it makes people think they are better than others. We label this the Grandiosity Pathway. Conceptually, this pathway is similar to the theory that power corrupts through inflated self-esteem (Kipnis, 1972) because the grandiosity components of narcissism are correlated with self-esteem (whereas the Exploitative/Entitlement component is not; Emmons, 1984, 1987; Watson & Biderman, 1993).

The evidence for the link between power and self-esteem is mixed, however. Recalling a time of power (vs. recalling yesterday's activities) increased self-esteem (Fast, Gruenfeld, Sivanathan, & Galinsky, 2009). Yet giving people actual power (vs. equal control) over a group

task did not change self-esteem (Kipnis, 1972; Wojciszke & Struzynska-Kujalowicz, 2007). Thus, self-esteem did not explain the corrupting influence of power (Kipnis, 1972).

Given that the Exploitative/Entitlement component of narcissism has been linked with a wide range of socially-toxic behaviors, we favored the Entitlement Pathway. Nevertheless, we examined both possible pathways by examining how power changes scores on the narcissism components that capture grandiosity and entitlement.

### **Testosterone**

While the notion that social power corrupts has anecdotal and scientific support (e.g., Kipnis, 1972), not everyone misuses their position of power. We focused on testosterone as an attribute that may predispose people to the corrupting influence of structural power. Leaders with high testosterone were prone to use their position of power to improve their own outcomes at the expense of others (Bendahan, Zehnder, Pralong, & Antonakis, 2015). If narcissism is the missing link between power and corruption, then gains in power should have the strongest effect on narcissism among those with high testosterone.

Being endowed with power may increase entitlement and exploitation among high-testosterone individuals. Testosterone is positively associated with dominant behavior that is intended to achieve or maintain high social rank (Archer, 2009; Mazur & Booth, 1998). Those highly motivated to dominate others strive to retain their positions of power, even at the expense of group interests (Maner & Mead, 2010; Mead & Maner, 2012a; Mead & Maner 2012b). Garnering special treatment and manipulating others for one's purposes may help to maintain or even increase a power differential between the self and others. We therefore predicted that social power inflates the Exploitative/Entitlement component of narcissism among those with high testosterone. An experiment tested these hypotheses by measuring individual differences in

circulating testosterone and manipulating whether participants believed they had power (vs. equal control) over a group task.

## Experiment

### Participants and Procedure

Previous work examining the interaction between manipulated hierarchical position and measured testosterone levels has used inconsistent sample sizes. We therefore used a rule of thumb of at least 50 participants per cell (Simmons, Nelson, & Simonsohn, 2013). By the end of recruitment (the day we reached 200 participants), 206 participants (98 female) completed the study in exchange for monetary payment. The study was approved by the school's internal review board.

To increase the believability of the role-play power manipulation, participants arrived in groups for a team-dynamics study. The experimenter brought the group to a room which was labelled "group room" and was set up to facilitate a group interaction. Participants were told they would complete a team task together in that room. Then they were led to individual cubicles where they were asked to complete initial measures. In reality, those tasks comprised the study procedures. All study materials are public ([osf.io/7e3c6](https://osf.io/7e3c6)).

**Testosterone.** Participants completed a testosterone briefing session 24 hours before the main experiment. The session aimed to ensure that participants would provide a clean saliva sample during the main experiment (SOM).

To minimize circadian fluctuations in testosterone, the experiment was conducted between 12(noon) and 3pm (Mehta, Jones, & Josephs, 2008). Saliva was collected before the power manipulation. Participants drooled 1.5ml of saliva through a straw into a sterile polypropylene SaliCap® tube. After collection, saliva samples were frozen at -20°C. Samples

were shipped on dry ice to Clemens Kirschbaum's laboratory. Sampling tubes were centrifuged at 10,000rpm for 5min. Salivary testosterone concentrations were measured using commercially available chemiluminescence-immuno-assays with high sensitivity (lower limit of detection: 1.8pg/ml; analytical range: 1.8-760pg/ml). Six participants provided unusable saliva samples. The inter- and intra-assay coefficients were 5.68% and 5.39%. Men ( $M=101.38\text{pg/mL}$ ,  $SD=54.91$ ) registered testosterone levels that were approximately three times higher than women ( $M=30.26\text{pg/mL}$ ,  $SD=21.23$ ;  $t(190)=11.647$ ,  $p<.0001$ ), which is consistent with guidelines for determining that testosterone analyses were specific to testosterone (Schultheiss & Stanton, 2009).

**Power manipulation.** We used a previously validated power manipulation that gives participants asymmetric (vs. equal) control over a group task and rewards (Case & Maner, 2014; Maner & Mead, 2010; Mead & Maner, 2012a). Participants completed two measures that were said to measure leadership abilities. We told all participants they had achieved the highest combined score on the leadership measures. Therefore, any changes in narcissism could be attributed to differences in interpersonal power (described below) rather than performance feedback.

Participants randomly assigned to the power condition were informed they would be the "Boss" of the group task because of their top scores on the leadership tasks. As Boss, they would instruct the other group members ("subordinates") about how to perform the team task, evaluate their subordinates throughout the task, and decide how to distribute monetary rewards that would be earned during the group task. In contrast, participants in the equal-control condition were told that all group members have equal control over the group task and that the monetary rewards earned during the group task would be divided equally among group members. As a

manipulation check, participants indicated how powerful they felt (0=*not at all*; 100=*very much so*;  $M=58.87$ ,  $SD=24.09$ ).

Ostensibly because the group room was not yet available, participants were asked to complete additional measures while they waited to start the group task. In reality, those were the dependent measures. The cover story was given to encourage continued feelings of interpersonal power during the completion of the outcome variables. In a funnel debriefing, only two participants expressed substantial suspicion about the manipulation or group task, suggesting the cover story was successful.

**Narcissism.** Narcissism was assessed with the commonly-used 40-item Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988); participants choose between two options, with one option being more narcissistic than the other. The instructions were modified by informing participants to respond in terms of their momentary feelings (Giacomin & Jordan, 2014).

We computed scores for the four factors identified by Emmons (1984, 1987). Exploitative/Entitlement (e.g., “I insist on getting the respect that is due to me”;  $M=2.53$ ,  $SD=1.86$ ;  $\alpha=.59$ ) which was used to test the Entitlement Pathway. Self-absorption/Self-admiration (e.g., “I am an extraordinary person”;  $M=3.66$ ,  $SD=2.10$ ;  $\alpha=.66$ ) and Superiority/Arrogance (e.g., “I can make anybody believe anything”;  $M=2.74$ ,  $SD=1.70$ ;  $\alpha=.54$ ) were clear tests of the Grandiosity pathway. Leadership/Authority (e.g., “I see myself as a good leader”;  $M=4.31$ ,  $SD=2.42$ ;  $\alpha=.77$ ) was not a conceptually clear test of Grandiosity but its positive correlation with self-esteem (e.g., Emmons, 1984) suggests it may capture positive self-views. Thus, the factor was computed and examined as a potential test of the Grandiosity Pathway.



**Corruption.** Willingness to abuse one's power was assessed by summing responses to the 18-item Misuse of Power scale (Lee-Chai, Chen, & Chartrand, 2001). This scale captures willingness to use one's power to improve one's outcomes at the expense of others (e.g., "There is nothing wrong with occasionally taking credit for one of your subordinates' ideas"; 1=*strongly disagree*, 9=*strongly agree*;  $M=71.11$ ,  $SD=21.09$ ;  $\alpha=.81$ ). It predicts willingness to misuse power in a variety of specific situations (e.g., accept a bribe) and has predictive value beyond the constructs of dominance and exploitation (Lee-Chai et al., 2001).

**Digit ratio.** Second (index) to fourth (ring) digit ratio (2D:4D) has been used as a proxy for testosterone levels (e.g., Nepomuceno et al., 2016; Ronay & von Hippel, 2010) because it has been argued that 2D:4D reflects exposure to androgens in the womb (Manning, 2002). However, recent meta-analyses concluded that digit ratio may not be linked to androgen-receptor genes (Voracek, 2014) or correlated with testosterone (Honekopp et al., 2007).

We measured digit ratio. Images of participants' right hands were acquired via a flatbed scanner. Digit length was measured from the metacarpophalangeal crease to the tip of the finger. Eight participants provided unusable (blurry) hand scans, resulting in a final sample of 192 participants (92 female; 101 equal-control condition;  $M_{age}=21.97$ ). Digit ratio was calculated by dividing the length of the 2nd digit by the length of the 4th digit ( $M_{men}=.95$ ,  $SD=.03$ ;  $M_{women}=.96$ ,  $SD=.03$ ). Consistent with meta-analytic conclusions (Honekopp et al., 2007), digit ratio and testosterone did not covary among males ( $r(99)=-.021$ ,  $p=.839$ ) or females ( $r(91)=.050$ ,  $p=.638$ ).

## Results

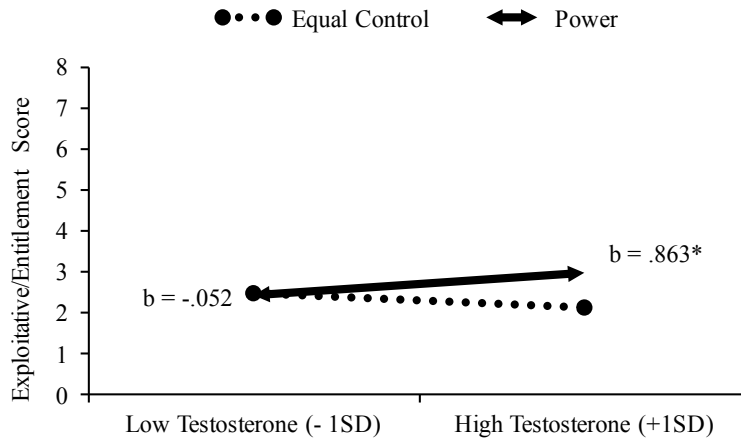
**Predictive model.** To account for gender differences in the predictors testosterone and 2D:4D, those variables were standardized within gender (Maner, Miller, Schmidt, & Eckel,

2008). Preliminary analyses revealed that power condition did not interact with gender or digit ratio; those will not be discussed further. Full results are reported in the SOM.

Men (vs. women) are more narcissistic (Grijalva et al., 2015) and report being more willing to misuse their power (Lee-Chai et al., 2001), so we controlled for gender to isolate the effects of interest. Excluding gender as a covariate did not change the interpretation of the results (SOM). The predictive model for main-text analyses was: power condition (centered), testosterone (standardized within gender), participant gender (centered), and the theoretically-relevant interaction (power condition X testosterone levels).

**Power manipulation check.** Endowing participants with power (vs. equal control) over the group task heightened self-reported feelings of power,  $\beta=.157$ ,  $t(187)=2.178$ ,  $p=.031$  (partial  $r=.157$ ); participants in the power condition felt more powerful ( $M=62.84$ ,  $SD=21.74$ ) than participants in the equal-control condition ( $M=55.30$ ,  $SD=25.61$ ). There were no other significant predictors ( $ps>.295$ ). Hence, the manipulation worked regardless of testosterone levels.

**Entitlement.** Full results are reported in Table 1. The predicted interaction between power condition and testosterone levels was not significant ( $\beta=.124$ ,  $t(187)=1.701$ ,  $p=.091$ ; partial  $r=.123$ ) but we proceeded with a priori hypothesis testing (Iacobucci, 2001; Keppel & Wickens, 2004; Winer, Brown, & Michels, 1991). Supporting the Entitlement Pathway, endowing participants with power (vs. equal control) over the group task increased Exploitative/Entitlement scores among high- (+1SD from the mean;  $\beta=.233$ ,  $t(187)=2.278$ ,  $p=.024$ ; partial  $r=.163$ ) but not low-testosterone participants (-1SD from the mean;  $\beta=-.014$ ,  $t(187)=.137$ ,  $p=.891$ ; partial  $r=-.010$ ).



**Figure 1.** Endowing participants with power (vs. equal control) over a group task increased scores on the Exploitative/Entitlement component of narcissism among participants with high (+1SD) but not low (-1SD) testosterone levels. Unstandardized regression coefficients compare the power condition to the equal-control condition. \* $p=.024$

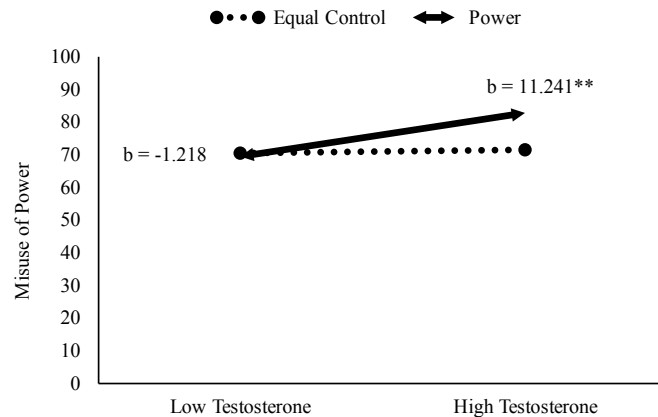
**Table 1**

<u>Outcome Variable</u>	<u>Exploitative/Entitlement</u>				<u>Self-absorption/Self-admiration</u>				<u>Superiority/Arrogance</u>			
	$\beta$	$t$	$p$	$pr$	$\beta$	$t$	$p$	$pr$	$\beta$	$t$	$p$	$pr$
Power Condition	.109	1.525	.129	.111	.102	1.410	.160	.103	.023	.326	.745	.024
Testosterone	.025	.344	.732	.025	.019	.260	.795	.019	.045	.630	.529	.046
Gender	.123	1.713	.088	.124	.138	1.918	.057	.139	.229	3.238	.001	.230
Power X Testosterone	.124	1.701	.091	.123	.050	.688	.492	.050	.115	1.604	.110	.117
<i>Power Condition at +1SD T</i>	.233	2.278	.024	.164	.152	1.478	.141	.107	.138	1.368	.173	.100
<i>Power Condition at -1SD T</i>	-.014	.137	.891	-.010	.052	.503	.616	.037	-.092	.913	.363	-.067

**Grandiosity.** Regressing the Superiority/Arrogance and Self-absorption/Self-admiration factors on the main predictive model revealed only main effects of gender. Full results are reported in Table 1.

**Leadership/Authority.** Regressing Leadership/Authority scores on the main predictive model revealed a main effect of gender ( $\beta=.260$ ,  $t(187)=3.689$ ,  $p<.0001$ ; partial  $r=.260$ ) whereby male participants ( $M=4.90$ ,  $SD=2.27$ ) endorsed more narcissistic Leadership/Authority statements than female participants ( $M=3.66$ ,  $SD=2.42$ ). Power condition was not a significant predictor ( $\beta=.030$ ,  $t(187)=.423$ ,  $p=.673$ ) nor was baseline testosterone ( $\beta=-.060$ ,  $t(187)=.839$ ,  $p=.403$ ). The interaction between power condition and testosterone levels was not significant ( $\beta=.078$ ,  $t(187)=1.090$ ,  $p=.277$ ). The simple effect of the power manipulation (vs. equal control) was not significant among high-testosterone ( $\beta=.108$ ,  $t(187)=.286$ ,  $p=.078$ ) nor low-testosterone participants ( $\beta=-.048$ ,  $t(187)=.633$ ,  $p=.633$ ).

**Misuse of power.** Regressing Misuse of Power scores on the main predictive model revealed the predicted interaction between power condition and testosterone levels ( $\beta=.149$ ,  $t(187)=2.081$ ,  $p=.039$ ; partial  $r=.150$ ; Figure 2). Consistent with predictions, the power manipulation increased self-reported misuse of power among high-testosterone participants (+1SD;  $\beta=.267$ ,  $t(187)=2.666$ ,  $p=.008$ , partial  $r=.191$ ; Figure 2) but not among low-testosterone participants (-1SD;  $\beta=-.029$ ,  $t(187)=.290$ ,  $p=.772$ ; partial  $r=-.021$ ).



**Figure 2.** Being assigned to a position of power (vs. equal control) over a group task heightened reported  $f$  among high-testosterone (+1SD) but not low-testosterone (-1SD) participants. Unstandardized regression coefficients compare the power condition to the equal-control condition. \*\* $p=.008$

The main model revealed a main effect of gender ( $\beta=.218$ ,  $t(187)=3.106$ ,  $p=.002$ ; partial  $r=.221$ ). Power condition ( $\beta=.119$ ,  $t(187)=1.693$ ,  $p=.092$ ; partial  $r=.123$ ) and testosterone levels ( $\beta=.018$ ,  $t(187)=.245$ ,  $p=.806$ ; partial  $r=.018$ ) were not significant predictors.

**Process analyses.** We tested which narcissism facet explained the interactive effect of power condition and testosterone levels on misuse of power scores. We estimated a moderated-mediation model with 5,000 bias-corrected bootstrap samples (Hayes, 2013; Model 8) controlling for gender (excluding gender did not change the conclusions of the results; SOM).

Supporting theorizing, the indirect effect of power condition on misuse of power scores via Exploitative/Entitlement scores was significant for high-testosterone participants (+1SD; 95% CI[.570, 7.806]) but not for low-testosterone participants (-1SD; 95% CI[-3.640, 2.900]). This was not the case for Superiority/Arrogance scores (+1SD: 95% CI[-.661, 1.870]; -1SD; 95% CI[-2.080, .453]), Self-absorption/Self-admiration scores (+1SD: 95% CI[-.694, 1.999]; -1SD: 95% CI[-.439, 1.536]), or Leadership/Authority scores (+1SD: 95% CI[-2.111, .316]; -1SD; 95% CI[-.460, 2.010]). Hence, the effect of the power manipulation on self-reported misuse

of power was mediated by increased Exploitative/Entitlement scores among participants with relatively high testosterone levels.

### **Discussion**

We tested two self-related pathways that may help explain the corrupting influence of power. The first was that power corrupts because it leads people to think they are better than others (Grandiosity Pathway). The second was that power corrupts because it makes people feel entitled to special treatment (Entitlement Pathway). Those who enjoy power try to keep it, even at the expense of others (Maner & Mead, 2010; Mead & Maner, 2012a; Mead & Maner, 2012b) so we predicted that power would be especially likely to foster entitled self-views among those with high testosterone.

Supporting the Entitlement Pathway, giving participants power (vs. equal control) over a group task increased scores on the Exploitative/Entitlement component of narcissism, but only among those with high testosterone. Furthermore, the power manipulation increased stated willingness to misuse power among high (but not low) testosterone participants. Inflated Exploitative/Entitlement scores among high-testosterone participants in the power (vs. equal-control) condition statistically accounted for heightened self-reported willingness to misuse power. Future research could examine whether these results depend on receiving social power *and* positive feedback given that our manipulation endowed participants with both.

Consistent with previous work (Kipnis, 1972; Wojciszke & Struzynska-Kujalowicz, 2007), giving participants actual social power (vs. equal control) over a group task did not inflate self-views. The empirical divergence of Exploitative/Entitlement from the other narcissism factors is consistent with previous work (Emmons, 1984, 1987; Watson & Biderman, 1993).

However, the manipulation check suggested that our power manipulation was relatively weak. A stronger power manipulation may produce different results.

Digit ratio did not moderate the effects of power. While 2D:4D has been used as an indirect measure of in-utero exposure to androgens, it has been suggested that the hormonal processes that give rise to 2D:4D may not be androgen related (Voracek, 2014). Future research should continue to uncover the similarities and differences between 2D:4D and testosterone to better understand what overlapping psychological correlates they may have.

### **Broader Context**

This paper originated from the first author's interest in why people misuse their power. In early discussions, the first and second author noted the striking similarity between the conduct of the powerful and the narcissistic, leading to the basic hypothesis of this work. Previous work suggested that testosterone may predispose people to the corrupting influence of power (Bendahan et al., 2015) and has been theoretically linked to narcissism (Grijalva et al. 2015) so we investigated its moderating role in the current work.

### **Concluding Remarks**

Power is an essential component of social life. Although the corrupting nature of power long has been noted, the self-related processes responsible have remained an enigma. The current findings suggest that entitlement may be a missing piece of the puzzle. They indicate that although power does not turn everyone into corruptive tyrants, it does have the most pernicious consequences when it gets into the hands of those who want it the most.

### **Author Note**

The experiment reported in this manuscript has not been shared at professional meetings nor have the data been disseminated.

### **Acknowledgments**

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