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DOI
10.1177%2F0956797618772822

Publication date
2018

Document Version
Final published version

Published in
Psychological Science

Citation for published version (APA):
Knapen, J. E. P., Blaker, N. M., & van Vugt, M. (2018). The Napoleon Complex: When Shorter Men Take More. *Psychological Science*, *29*(7), 1134-1144. https://doi.org/10.1177%2F0956797618772822

Research Article

Psychological Science
2018, Vol. 29(7) 1134–1144

DOI: 10.1177/0956797618772822
www.psychologicalscience.org/PS

The Napoleon Complex: When Shorter Men Take More

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Abstract
Inspired by an evolutionary psychological perspective on the Napoleon complex, we hypothesized that shorter males are more likely to show indirect aggression in resource competitions with taller males. Three studies provide support for our interpretation of the Napoleon complex. Our pilot study shows that men (but not women) keep more resources for themselves when they feel small. When paired with a taller male opponent (Study 1), shorter men keep more resources to themselves in a game in which they have all the power (dictator game) versus a game in which the opponent also has some power (ultimatum game). Furthermore, shorter men are not more likely to show direct, physical aggression toward a taller opponent (Study 2). As predicted by the Napoleon complex, we conclude that (relatively) shorter men show greater behavioral flexibility in securing resources when presented with cues that they are physically less competitive. Theoretical and practical implications are discussed.

Keywords
Napoleon complex, human height, status, behavioral flexibility, indirect aggression, open data

Received 4/21/15; Revision accepted 1/11/18

When a military commander told Napoleon Bonaparte that he felt uncomfortable being so much taller than his Emperor, Napoleon allegedly replied: “You may be taller, but I am greater” (Donker & Burmanje, 2012, p. 53).[1] This story exemplifies the popular belief, known as the Napoleon complex, that short men compensate behaviorally for a height disadvantage. The origins of the Napoleon complex are unclear but have been attributed to Alfred Adler’s (1956) inferiority complex theory, which assumes that individuals respond to feelings of inferiority on certain traits by overcompensating on others.

Evolutionary psychology may offer a framework for examining whether the Napoleon complex has a scientific basis. Sexual selection theory suggests that an individual’s physiology and psychology have been shaped by the joint forces of intersexual and intrasexual competition (e.g., Buss & Schmitt, 1993; Puts, 2010), which is also expected to apply to men’s height. Tallness increases the ability to attract a potential mate (e.g., Stulp, Buunk, & Pollet, 2013)—an example of intersexual selection, in which certain traits make individuals more successful at attracting mates (and producing offspring) than others. Intrasexual selection—competing with rivals for mates—occurs (partially) on male physical characteristics, such as strength and size, that enable success in combat with other males (Sell, Hone, & Pound, 2012). Taller males indeed have a higher chance of winning physical contests (Archer & Thanzami, 2007). In the current research, we focused on intrasexual competition, examining dyadic male–male contest behaviors in line with a Napoleon complex.

Height, Status, and Competition

Taller men enjoy several advantages over shorter men, such as a higher social standing in the workplace (e.g.,

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Gawley, Perks, & Curtis, 2009), and are typically healthier and better educated (e.g., Silventoinen, Lahelma, & Rahkonen, 1999). Several studies across different cultures have found an association between a relatively tall stature and holding a position of power (Handwerker & Crosbie, 1982; Werner, 1982). Ellis (1994a) found, on the basis of 160 studies from preindustrial and industrial societies, a height–status association in humans across multiple cultures, principally for adult men. This height–status association remained after controlling for factors such as nutrition and intelligence (Ellis, 1994b; Persico, Postlewaite, & Silverman, 2004; Silventoinen et al., 1999). Status is also embodied in stature. Men feel taller when assigned to a high-status position (Duguid & Goncalo, 2012), and tall men are seen as having higher status (Blaker et al., 2013; Jackson & Ervin, 1992). For women, the height–status association is either weaker or nonexistent in most reported studies (e.g., Blaker et al., 2013; Gawley et al., 2009; however, see Handwerker & Crosbie, 1982).

Height, together with muscularity, represents men's physical formidability, increasing their perceived competitive fighting ability against other males (e.g., Fessler, Holbrook, & Snyder, 2012). For instance, height was positively related to dominant behavior in a sample of Western men (Stulp, Buunk, Verhulst, & Pollet, 2015). However, it is unclear whether height or physical strength better predicts competitive ability: Strength is often not measured (Handwerker & Crosbie, 1982; Werner, 1982) or not mentioned in previous studies (Ellis, 1994a), and studies that measured both height and strength resulted in mixed findings (for a more detailed description, see Section 1 in the Supplemental Material available online). Archer and Thanzami (2007) suggest that height is a stronger predictor of competitive ability, while Sell et al. (2009) and von Rueden, Gurven, and Kaplan (2008) suggest that strength is the main predictor. Recent research showed that cues of physical formidability—both height and strength—lead to increased status allocation, presumably because people use formidability as a cue to specific leadership abilities (Lukaszewski, Simmons, Anderson, & Roney, 2016). Because we focused on the Napoleon complex, our studies concerned the impact of height, not strength, on competitive male–male interactions.

The Napoleon Complex

It has been argued that men have a flexible status psychology that allows them to calibrate their behavior to opportunities in the environment for status enhancement (van Vugt & Tybur, 2015). Thus, being shorter and less formidable than a competitor should alter the trade-offs associated with various physical and nonphysical strategies to compete. We hypothesized that—recognizing a situation in which they are physically outcompeted—shorter males will turn to alternative strategies to win contests (i.e., exercise behavioral flexibility; Zaccaro, Gilbert, Thor, & Mumford, 1991). Though there are many examples of such alternative strategies (forming coalitions, deception), for this first investigation into a potential Napoleon complex we examined whether shorter males behave more indirectly aggressively toward a taller opponent (i.e., by disadvantaging them in a nonphysical way). Indirect forms of aggression to disadvantage opponents entail, for instance, gossiping or securing resources in an unobtrusive manner (Archer & Coyne, 2005; Cummins, 2006) and, unlike direct aggression, pose no or limited physical risk to the aggressor—they are the safer option (Campbell, 1999).

The current research examined the Napoleon complex hypothesis in settings in which male dyads compete with each other over resources in economic games. We expected that shorter men would behave more indirectly aggressively by taking valuable resources from a taller opponent. We predicted that this Napoleon complex psychology would be activated under the following conditions: (a) Men are competing for resources intrasexually, (b) shorter men are paired with taller rivals, (c) the height difference is salient and internalized, and (d) the costs of disadvantaging the opponent through indirect aggression are reasonably low (e.g., without risk of retaliation or physical aggression).

Overview of Studies

We first present a pilot study, which formed the motivation to conduct our two main studies. Then, in Study 1, we tested our predictions by comparing behavior in a dictator game versus an ultimatum game. In the dictator game, one player has unconditional power over resource allocation, while in the ultimatum game, that player's allocation decision can be rejected—thus posing a risk of retaliation by the opponent. The main expectation is that shorter men take more resources in the dictator game but not necessarily in the ultimatum game. Economic games can be used to mimic actual resource contests (Cummins, 2006), as individuals tend to behave in these economic games as if they are in real physical encounters (Van Lange, Joireman, Parks, & Van Dijk, 2013). Participants meet each other in dyads before the game to get a sense of relative height differences, which should activate a Napoleon complex psychology among the shorter men. To increase the competitiveness of the games, the allocators can take the money—rather than give it away—and the leftovers will automatically go to their opponent (Bardsley, 2008). In Study 2, we tested how height affects indirect aggressive behavior (dictator game) and physical aggression (hot-sauce task; Lieberman, Solomon, Greenberg, & McGregor, 1999) and expected that shorter men would be more indirectly aggressive, but not more physically aggressive, than tall men.

Pilot Study

Method

Sixty participants (43 women) took part in a study at the University of Groningen (age: M = 20.90 years, SD = 2.18 years). They were paid €2, plus what they decided to take home from the dictator game. The independent measures were "Did you ever feel small?" which was measured on a 7-point Likert scale (1 = *never*, 7 = *often;* M = 2.55, SD = 1.79); self-reported height in centimeters (males: M = 187.65 cm, SD = 6.68 cm; females: M = 173.05 cm, SD = 6.19 cm); and participant sex. The main dependent measure was the number of €1 coins left behind in the dictator game for other people (M = 2.68, SD = 1.88).

Participants were led into a cubicle and read all instructions on paper. They completed a paper-and-pencil questionnaire with sociodemographic questions, including the measures on their height, and read the instructions for the dictator game. The money for the dictator game, in coins, was placed in an envelope. Participants read in the instructions that the envelope contained eight €1 coins and that they could choose to leave behind as many coins as they would like and that we would give away what they left behind to someone else (a participant like them in the study or a person on campus—they did not know the identity of the recipient). They were instructed to seal the envelope and leave it behind in the experimental room. There was no deception, and the money was allocated to either other participants or people on campus. After completing the study, all participants were thanked and debriefed via e-mail.

Results

We tested the effect of participant height (in centimeters) and feeling small on the number of coins given away in the dictator game (with a constant of 1 added to avoid values of 0) with a generalized linear model with a Poisson distribution (corrected for overdispersion in SPSS Version 23). Because of the modest correlation between self-reported height and feeling small (r = .365, p = .004), separate analyses were run for these two predictors. Also, participant sex was added to each model, along with the interactions between sex and height and between sex and feeling small, as we expected to mainly find an effect among male participants.

There was a significant effect of feeling small on the number of coins given away in the dictator game, Wald $\chi^2(1)$ = 4.85, p = .028, while participant sex did not predict coin allocation, Wald $\chi^2(1)$ = .18, p = .673. Furthermore, there was a significant interaction between participant sex and feeling small on coin allocation, Wald $\chi^2(1)$ = 4.83, p = .028. Parameter estimates showed that feeling small led to a decrease in coins allocated to other people for male participants, Wald $\chi^2(1)$ = 6.20, b = −0.161, SE = 0.065, 95% confidence interval (CI) = [−0.288, −0.034], p = .013, but not for female participants, Wald $\chi^2(1)$ < .001, b < 0.001, SE = 0.034, 95% CI = [−0.068, 0.067], p = .996. Applying a bootstrapping procedure (1,000 resamples, 95% CI bias-corrected and accelerated) corroborated the finding that male participants who felt smaller gave away fewer coins, b = −0.161, SE = 0.085, 95% CI = [−0.315, −0.011], p = .029 (Fig. 1).

Self-reported height in centimeters (absolute height) did not predict coin allocation, Wald $\chi^2(1)$ = 0.06, p = .939 (controlling for participant sex, Wald $\chi^2(1)$ = 0.32, p = .570). There was also no interaction between participant sex and absolute height on coin allocation in the dictator game, Wald $\chi^2(1)$ = 0.27, p = .602.

This pilot study thus established that feeling small significantly affected men's allocations in the dictator game (but not women's). We did not find an effect of absolute height on resource allocation in the dictator game. However, there was no competitive context; the dictator game was played with an anonymous other, and opponent height or relative height was not included in the design of the pilot study. Therefore, in Study 1,

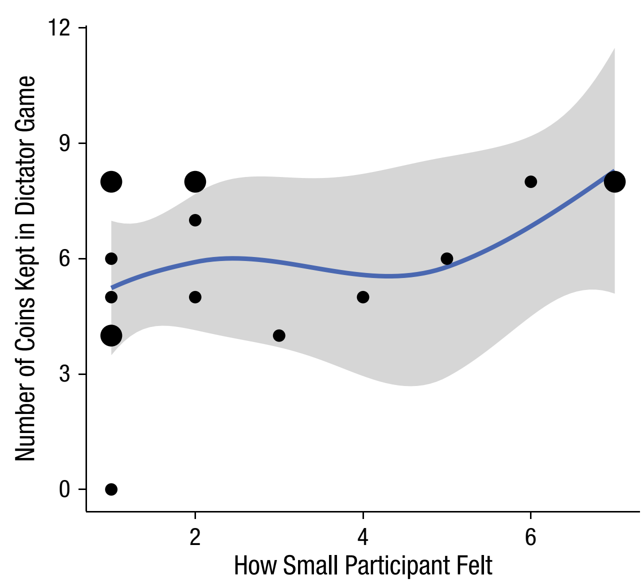

Fig. 1. Results from the pilot study: scatterplot showing the number of coins participants kept in the dictator game as a function of how physically small participants felt. The regression line was obtained using locally weighted scatterplot smoothing (the gray band indicates the 95% confidence interval; for readers who want to recreate the plot in the *ggplot2* R package, span = 1).

we examined the effects of own and opponent stature in a dyadic male–male competitive context and manipulated the possibility of retaliation by the opponent.

Study 1

Method

The data-collection strategy for Study 1 was to get as many participants as possible within the 2 weeks the lab was available for this project. Forty-two male participants (age: M = 23.02 years, SD = 2.98 years; height: M = 182.98 cm, SD = 6.79 cm) completed the study at the Vrije Universiteit Amsterdam in return for €5 or course credits (excluding a bonus for playing economic games). Participants were paired up during the study (21 dyads; all pairs were strangers) with an "opponent." The independent variables in the main model were participants' own height in centimeters and their opponent's height in centimeters. An additional model considered the participants' relative height in centimeters (participant's height – opponent's height). The main dependent variables were the number of coins (out of 18) participants kept for themselves in a dictator game (M = 12.62, SD = 4.05) and the number of coins (also out of 18) participants kept for themselves in an ultimatum game (M = 10.24, SD = 1.91). Also, the difference in coins kept for self in the two games was calculated as an additional dependent variable (coins kept for self in the dictator game – coins kept for self in the ultimatum game). The "coins" that participants played the economic games with in this study were poker chips worth €0.10 each.

In each session, 2 male participants stood opposite each other for approximately 10 s, were introduced as each other's opponent, and then led off to separate cubicles for the duration of the study. Participants first played a one-shot dictator game followed by a one-shot ultimatum game, in which they divided 18 coins in each game. Although participants were told they were chosen to divide the money between themselves and their opponent during the games, both participants were actually given the allocator role. When making decisions for the ultimatum game, participants did not know that their opponent had allocated them money in the dictator game. Participants were told their opponent would leave the lab separately following the study. The games were framed in a "taking" rather than a "giving" way; participants were told the money was theirs to take, and the leftovers would automatically go to the opponent (see Bardsley, 2008). In the dictator game, participants could anonymously take as many coins as they wanted without consequences, while in the ultimatum game the opponent had the opportunity to see how much was taken by the other and accept or reject the division (in the case of rejection, both participants were left with nothing). Participants also filled out demographic information, including their height in centimeters, as well as age and self-reported socioeconomic status (SES; α = .62, as used by Griskevicius, Tybur, Delton, & Robertson, 2011). Finally, participants were debriefed and paid.

Results

For the specific syntax used for Studies 1 and 2, see Section 2 of the Supplemental Material. We used generalized estimating equations (GEEs; in SPSS Statistics Version 23) to analyze all data in Studies 1 and 2, which enabled us to take the dyadic structure of the data into account and specify a Poisson log-linear (for the economic games, always corrected for overdispersion) or a normal distribution. The independent variables were added to the model as fixed effects one at a time, and both parameter estimates and an indicator of model fit (corrected quasi-information criterion, or QICc) are reported. Lower QICc values indicate superior model fit (see Pan, 2001). Note that the participant and opponent height variables were not independent from the relative height variable and were thus never included in the same model. Participant height significantly correlated with SES, r = .33, p = .031, indicating that taller participants had higher SES. If a height variable had a significant effect on behavior in either economic game, we repeated the analysis with SES as a covariate.

Dictator game. We reverse-scored the dependent variable (number of coins kept for self in the dictator game) and added a constant (1) in order to better fit a Poisson distribution and to avoid values of zero. QICc values in this section represent the model fit after adding the mentioned independent variable as a fixed effect (unless explained otherwise) and should be compared with the intercept-only model (QICc = 124.63) or each other.

Participant height was added as a fixed factor, which had a significant effect on coins kept for self in the dictator game, Wald $\chi^2(1)$ = 7.03, b = 0.025, SE = 0.009, 95% CI = [0.007, 0.044], p = .008 (QICc = 117.00), indicating that shorter participants kept more coins for themselves (see Fig. 2). Opponent height was then added to the model but had no significant effect on coins kept for self in the dictator game, Wald $\chi^2(1)$ = 1.61, b = −0.016, SE = 0.013, 95% CI = [−0.041, 0.009], p = .205 (QICc = 115.84). Participant height remained a significant predictor after controlling for opponent height and SES, Wald $\chi^2(1)$ = 5.42, b = 0.027, SE = 0.012, 95% CI = [0.004, 0.050], p = .020. SES was not significantly related to behavior in the dictator game, Wald

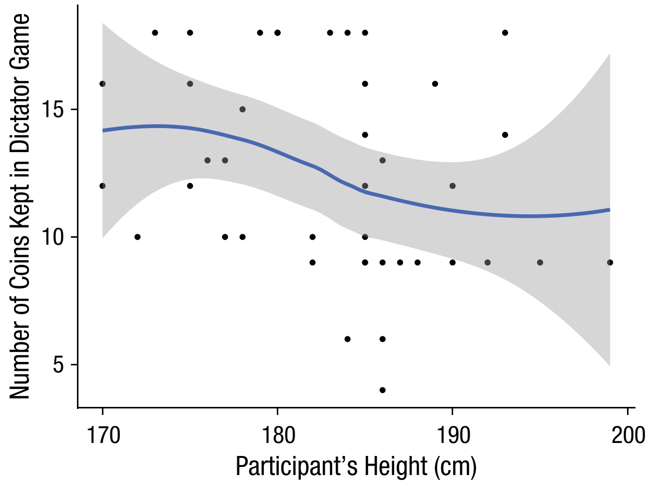

Fig. 2. Results from Study 1: scatterplot showing the number of coins each participant kept for himself in the dictator game as a function of that participant's own height. Larger dots indicate two data points, and smaller dots indicate one data point. The regression line was obtained using locally weighted scatterplot smoothing (the gray band indicates the 95% confidence interval; for readers who want to recreate the plot in the *ggplot2* R package, span = 1).

$\chi^2(1) = 0.61$, $b = 0.092$, $SE = 0.118$, 95% CI = [−0.139, 0.323], $p = .436$. Finally, there was no significant interaction between absolute height and opponent height, Wald $\chi^2(1) = 0.13$, $b = 0.001$, $SE = 0.001$, 95% CI = [−0.002, 0.003], $p = .718$ (QICc = 117.75). Thus, shorter participants (regardless of their opponent's height) kept more coins for themselves in the dictator game.

Adding relative height as a predictor to the intercept-only model showed that the shorter a participant was compared with his opponent, the more coins he kept for himself in the dictator game, Wald $\chi^2(1) = 5.58$, $b = 0.023$, $SE = 0.010$, 95% CI = [0.004, 0.042], $p = .018$ (QICc = 114.75). The relative-height model showed the best model fit (lowest QICc value), but the effect of relative height was likely driven largely by participants' own height, considering the separate effects of own and opponent height.

Ultimatum game. Of the 42 ultimatum game offers, 7 were rejected and 35 were accepted. We transformed number of coins kept for self in the ultimatum game in the same manner as coins kept for self in the dictator game (reverse-coded, plus a constant of 1). The QICc values of the models reported in this section can be compared with those obtained from the intercept-only model (QICc = 21.63) or with each other.

Participant height (added as a fixed effect to the intercept-only model) had a marginally significant effect on coins kept for self in the ultimatum game, Wald $\chi^2(1) = 3.53$, $b = 0.005$, $SE = 0.003$, 95% CI = [< 0.001, 0.011], $p = .060$ (QICc = 22.93), suggesting a trend in which shorter participants kept more coins for themselves. Opponent height was subsequently added as a fixed effect, which was not significantly related to number of coins kept for self in the ultimatum game, Wald $\chi^2(1) = 1.54$, $b = 0.004$, $SE = 0.003$, 95% CI = [−0.002, 0.011], $p = .215$ (QICc = 24.62). The effect of participant height was significant when we controlled for opponent height and SES, Wald $\chi^2(1) = 8.20$, $b = 0.008$, $SE = 0.003$, 95% CI = [0.003, 0.014], $p = .004$. SES was not significantly related to coins kept for self in the ultimatum game, Wald $\chi^2(1) = 2.41$, $b = -0.062$, $SE = 0.040$, 95% CI = [−0.141, 0.016], $p = .121$ (QICc = 26.23).

We tested the interaction between participant height and opponent height by adding the interaction term as a fixed effect to the model with participant height and opponent height as predictors (mean centered). There was a marginally significant interaction between participant height and opponent height on coins kept for self in the ultimatum game, Wald $\chi^2(1) = 3.83$, $b = -0.001$, $SE = 0.001$, 95% CI = [−0.002, < 0.001], $p = .051$ (QICc = 26.16). Simple effects showed that when participants' opponents were shorter than average (1 *SD* below the mean), shorter participants kept more coins for themselves in the ultimatum game, $b = 0.014$, $SE = 0.005$, 95% CI = [0.004, 0.023], $p = .005$. However, shorter participants did not keep more coins for themselves in the ultimatum game when their opponent was taller than average (1 *SD* above the mean), $b = 0.001$, $SE = 0.004$, 95% CI = [−0.007, 0.009], $p = .846$.

Finally, we added relative height as a fixed factor to the intercept-only model, which showed that there was no significant relationship between relative height and coins kept for self in the ultimatum game, Wald $\chi^2(1) = 0.42$, $b = 0.001$, $SE = 0.002$, 95% CI = [−0.002, 0.005], $p = .519$ (QICc = 23.58). Like in the dictator game, shorter males kept more coins for themselves in an ultimatum game. However, their opponent's height may also play a role in the decision-making process.

Dictator versus ultimatum game. To test whether there was a significant effect of height on the different actions of participants in the two economic games, we repeated our analyses with the amount of extra coins that each participant kept in the dictator game compared with the ultimatum game as the dependent variable (z score of coins kept in dictator game – z score of coins kept in ultimatum game). On average, participants kept more coins to themselves in the dictator game compared with the ultimatum game (mean difference = 2.38, $SD = 3.42$). The same GEE procedure as before was used, taking into account the dyadic structure of the data, except instead of a Poisson log-linear distribution a normal distribution was specified, and standardized variables were used. The QICc values in this section should be compared with those obtained from the intercept-only model (QICc = 39.63) or with each other.

Participant height was added as a fixed effect to the intercept-only model. Participant height had no significant effect on selfish behavior in the dictator game compared with the ultimatum game, Wald $\chi^2(1) = 0.66$, $b = -0.100$, $SE = 0.123$, 95% CI = [−0.341, 0.141], $p = .417$ (QICc = 41.22). Subsequently, opponent height was added to the participant-height model. There was a significant effect of opponent height, indicating that participants kept more coins for themselves in the dictator game compared with the ultimatum game when their opponent was taller, Wald $\chi^2(1) = 6.06$, $b = 0.300$, $SE = 0.122$, 95% CI = [0.061, 0.539], $p = .014$ (QICc = 39.54; with opponent height as the only fixed effect, QICc = 39.05). The effect of opponent height remained significant after we controlled for SES (and participant height), Wald $\chi^2(1) = 7.19$, $b = 0.316$, $SE = 0.118$, 95% CI = [0.085, 0.547], $p = .007$ (QICc = 40.35). SES was marginally significantly related to coins kept for self in the dictator game versus the ultimatum game, Wald $\chi^2(1) = 3.09$, $b = -0.182$, $SE = 0.103$, 95% CI = [−0.384, 0.021], $p = .079$, suggesting a trend in which participants with lower SES keep more coins to themselves in the dictator game versus the ultimatum game. Finally, there was no significant interaction between participant height and opponent height, Wald $\chi^2(1) = 1.75$, $b = -0.193$, $SE = 0.146$, 95% CI = [−0.479, 0.093], $p = .186$ (QICc = 40.50).

We tested the effect of relative height by adding it as a fixed effect to the intercept-only model. The shorter participants were compared with their opponent, the more coins they kept for themselves in the dictator game compared with the ultimatum game, Wald $\chi^2(1) = 5.40$, $b = -0.281$, $SE = 0.121$, 95% CI = [−0.518, −0.044], $p = .020$ (QICc = 38.39).

Results showed that shorter participants kept more coins to themselves in a dictator game, regardless of their opponent's height. Though relatively shorter participants also kept more coins for themselves, this effect was likely strongly driven by their own height. In the ultimatum game, shorter participants kept more money to themselves, but not when their opponent was taller than average. On average, participants kept more coins for themselves in the dictator game compared with the ultimatum game. The taller the opponent, the more coins participants kept for themselves in the dictator game compared with the ultimatum game. Participant height had a similar effect in the two economic games, but opponent height was more important in the ultimatum game than in the dictator game. In Study 2, we looked at behavior in the dictator game with a larger sample and added a measure involving direct, physical aggression (the hot-sauce task; Lieberman et al., 1999).

Study 2

Method

For Study 2, we set a goal to recruit 80 pairs of men. One hundred sixty-four participants (82 pairs of men) took part in the study, and data were collected in three waves—in April 2012, April 2013, and April 2014. See Section 3 of the Supplemental Material for more information on data collection. Participants (age: $M = 22.02$ years, $SD = 2.72$ years; height: $M = 182.42$ cm, $SD = 8.03$ cm) were recruited at Vrije Universiteit Amsterdam and via the contacts of students involved in the project for their thesis. The study was conducted with pairs of male participants who acted as each other's opponents and who did not know each other. Participant height in centimeters and opponent height in centimeters were the main independent variables, and relative height was again an additional independent variable (participant height – opponent height). The main dependent variables were the number of coins kept for self in the dictator game and (noninstrumental) direct aggression, as measured by the amount of hot sauce allocated to the opponent in a hot-sauce task (see Lieberman et al., 1999).

As in Study 1, participants were brought into the lab in pairs, stood opposite each other for several seconds, and were told that the other participant was their opponent. Height in centimeters was then measured with a stadiometer (a medical height-measurement device) and read aloud to ensure that any height differences were known and salient to the participants. Next, participants were seated in separate closed cubicles and were assured that they would not meet the opponent face to face again. Other physical measures were taken to mask the importance of height and to boost a sense of competition. Handgrip strength was measured in the cubicle with a hand dynamometer (the result was not read aloud or included in the study because of a defective hand dynamometer), and an experimenter took a photo of participants' faces. In the cubicle, participants first completed some sociodemographic questions (also including the question "Do you ever feel small?") and then proceeded to participate in a dictator game and a hot-sauce allocation task (order of the tasks was counterbalanced).

The procedure of the dictator game was identical to that of the dictator game in Study 1, except that participants now divided 15 coins (instead of 18). The "coins" in this dictator game were again poker chips worth €0.10 each. The hot-sauce task was adapted from Lieberman et al. (1999). Participants were told this was a "taste test," in which they would prepare a food sample for their opponent. Participants inserted (with a syringe) an amount of hot sauce between 0 and 5 ml into a small cup of water for their opponent to drink.

A larger amount of hot sauce indicated higher levels of aggression toward the other person. Note that the original hot-sauce paradigm was designed to be a measure of reactionary aggression, but in this study, participants gave the hot sauce in response to no particular transgression. However, the competitive atmosphere created (by being branded opponents) could create a similar effect (e.g., Adachi & Willoughby, 2011).

Results

An independent-samples *t* test showed that participants who reported a non-Caucasian ethnicity were significantly shorter (M = 178.41 cm, SD = 9.59 cm) than the Caucasian participants (M = 183.98 cm, SD = 6.76 cm), $t(63.18) = 4.19$, $p = .001$. If a height variable had a significant effect on behavior in the dictator game or the hot-sauce task, we tested its robustness by repeating the analysis with participant ethnicity as a covariate. As with Study 1, relative height was always tested in a separate model to absolute and opponent height.

Dictator game. To analyze height effects on behavior in the dictator game, we used GEE (Poisson log-linear distribution, corrected for overdispersion, dyadic structure specified—see Section 2 of the Supplemental Material for syntax), adding one fixed effect at a time. The dependent variable (coins kept for self in the dictator game) was reverse-coded, and a constant (1) was added to better fit a Poisson distribution. The model-fit values reported in this section can be compared with those obtained from the intercept-only model (QICc = 331.15) and with each other.

In line with Study 1, participant height had a significant effect on coins kept for self in the dictator game, Wald $\chi^2(1) = 4.38$, $b = 0.009$, $SE = 0.004$, 95% CI = [0.001, 0.018], $p = .036$ (QICc = 326.18), indicating that shorter participants kept more coins for themselves in the dictator game (see Fig. 3). Opponent height was then added to the model. Opponent height did not significantly affect coins kept for self in the dictator game, Wald $\chi^2(1) = 1.34$, $b = -0.006$, $SE = 0.005$, 95% CI = [−0.015, 0.004], $p = .247$ (QICc = 325.85). The effect of participant height remained significant after controlling for ethnicity and opponent height, Wald $\chi^2(1) = 4.27$, $b = 0.010$, $SE = 0.005$, 95% CI = [0.001, 0.019], $p = .039$ (QICc = 327.06), and ethnicity was not significantly related to behavior in the dictator game, Wald $\chi^2(1) = 0.37$, $b = -0.064$, $SE = 0.106$, 95% CI = [−0.272, 0.143], $p = .542$. Subsequently, we added the interaction term to the model with participant height and opponent height as fixed effects, which was not significant, Wald $\chi^2(1) = 1.00$, $b = -0.001$, $SE = 0.001$, 95% CI = [−0.002, 0.001], $p = .317$ (QICc = 326.51).

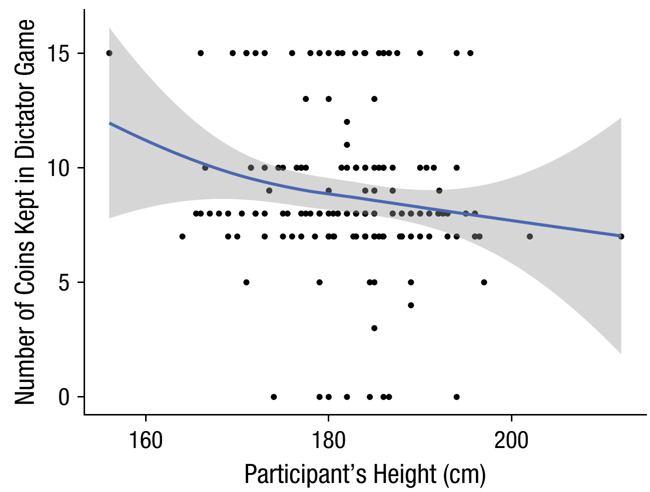

Fig. 3. Results from Study 2: scatterplot showing the number of coins each participant kept for himself in the dictator game as a function of that participant's own height. The regression line was obtained using locally weighted scatterplot smoothing (the gray band indicates the 95% confidence interval; for readers who want to recreate the plot in the *ggplot2* R package, span = 1).

Next, we added relative height as a fixed effect to the intercept-only model. Results showed that a shorter relative height was related to more coins kept for self in the dictator game, Wald $\chi^2(1) = 5.03$, $b = 0.008$, $SE = 0.004$, 95% CI = [0.001, 0.015], $p = .025$ (QICc = 324.90). The relative-height model showed the best fit (lowest QICc), but its effect was likely driven more by participants' own height than the opponent's height, considering their separate effects. Finally, the effect of feeling small was tested by adding the variable to the intercept-only model—feeling small was not significantly related to behavior in the dictator game, Wald $\chi^2(1) = 0.08$, $b = -0.006$, $SE = 0.022$, 95% CI = [−0.050, 0.037], $p = .781$ (QICc = 333.06).

Hot-sauce allocation task. To analyze height effects on behavior in the hot-sauce task, we used GEE (normal distribution, dyadic structure specified, standardized variables). The QICc values in this section can be compared with those obtained from the intercept-only model (QICc = 165.00) and with each other. First, participant height (added as a fixed factor to the intercept-only model) had no effect on aggressive behavior, Wald $\chi^2(1) = 0.10$, $b = -0.024$, $SE = 0.074$, 95% CI = [−0.169, 0.122], $p = .749$ (QICc = 166.91). Opponent height was then added as a fixed factor, which also did not have a significant effect on aggressive behavior, Wald $\chi^2(1) = 2.36$, $b = -0.117$, $SE = 0.076$, 95% CI = [−0.266, 0.032], $p = .125$ (QICc = 166.77). The interaction term was added, which showed there was no interaction effect between participant and opponent height on aggressive behavior in the hot-sauce task, Wald $\chi^2(1) = 0.58$, $b = 0.070$, $SE = 0.092$, 95% CI =

[−0.110, 0.249], p = .446 (QICc = 168.10). Additionally, feeling small (added as a fixed factor to the intercept-only model) was not significantly related to behavior in the hot-sauce task, Wald $\chi^2(1)$ = 0.63, b = −0.020, SE = 0.078, 95% CI = [−0.172, 0.133], p = .802 (QICc = 166.94). Finally, there was no effect of relative height (added as a fixed factor to the intercept-only model), Wald $\chi^2(1)$ = 1.45, b = 0.074, SE = 0.061, 95% CI = [−0.046, 0.193], p = .228 (QICc = 166.12).

Replicating the results of Study 1, Study 2 showed that shorter participants kept more coins for themselves in a dictator game. Again, opponent height did not significantly affect resource allocation in the dictator game. Shorter relative height was also significantly related to keeping more coins in the dictator game, though this was expected to be mainly driven by the effect of participant height. Feeling small had no effect on behavior in the dictator game. None of the height variables were significantly related to physically aggressive behavior in the hot-sauce task.

Studies 1 and 2: Combined Data Analysis

We also investigated the effect of height on behavior in the dictator game by combining the data from Studies 1 and 2. The independent variables were participant height, opponent height, and relative height. The dependent variable was the percentage of coins kept for self in the dictator game (maximum number of coins to keep was 18 for Study 1 and 15 for Study 2). As before, we used GEE (normal distribution, dyadic structure specified, standardized variables) to analyze the data. Model-fit statistics in this section should be compared with each other and with those obtained from the intercept-only model (QICc = 207.00).

First, we added participant height as a fixed factor, which showed that shorter participants kept more coins for themselves, Wald $\chi^2(1)$ = 7.83, b = −0.174, SE = 0.062, 95% CI = [−0.295, −0.052], p = .005 (QICc = 202.82). Subsequently, opponent height was added to the model, which was marginally significantly related to percentage of coins kept for self in the dictator games, Wald $\chi^2(1)$ = 2.81, b = 0.116, SE = 0.069, 95% CI = [−0.020, 0.251], p = .094 (QICc = 202.15). This result indicates a trend in which participants kept a higher percentage of coins for themselves when faced with a taller opponent. Participant height remained a significant predictor after we controlled for opponent height, Wald $\chi^2(1)$ = 9.69, b = −0.193, SE = 0.062, 95% CI = [−0.315, −0.072], p = .002. There was no significant interaction between participant height and opponent height, Wald $\chi^2(1)$ = 0.38, b = 0.042, SE = 0.068, 95% CI = [−0.091, 0.174], p = .540 (QICc = 203.85). Finally, we added relative height as a fixed effect to the intercept-only model, which showed that relatively shorter participants kept a higher percentage of coins to themselves in the dictator games, Wald $\chi^2(1)$ = 9.33, b = −0.202, SE = 0.066, 95% CI = [−0.332, −0.072], p = .002 (QICc = 200.67).

Discussion

Across three studies, we found preliminary support for the Napoleon complex—the idea that short men compensate behaviorally in dyadic intrasexual competitions with taller rivals by behaving more indirectly aggressively in resource contests. The pilot study showed that feeling small, but not actual shorter height, was related to keeping more resources in an anonymous dictator game. These results were not replicated in the main studies, possibly because the actual presence of a taller opponent overruled the main effect of "feeling small." Studies 1 and 2 showed that (relatively) shorter men took more resources in a dictator game, suggesting that shorter males are more likely to adopt alternative competitive strategies such as indirect aggression. Study 2 also showed that (relatively) shorter men did not behave with more direct physical aggression in the hot-sauce task, suggesting that shorter males are not more aggressive generally. In Study 1, opponent height did not affect resource allocation in the dictator game, but having a taller opponent was related to taking more resources in the dictator game (allocator has unconditional power) compared with the ultimatum game (allocator has conditional power, opponent can retaliate). Shorter men also kept more coins for themselves in the ultimatum game, but not when their opponent was taller than average—note that men who were relatively shorter than their opponent did not take more resources in the ultimatum game, this was an effect only of participant height.

The results imply that participant height is most important in predicting competitive behaviors in an absolute-power situation (the dictator game), regardless of opponent height. This is not surprising as shorter and taller men likely have different life experiences that may influence their decision making in behavioral experiments. In our studies, we used relative differences in actual height as predictors, which can be seen as a strength of our method. Future research could use an experimental setup—such as a virtual reality study—to manipulate experienced height differences independently of men's actual height. A limitation of our research is that we did not successfully measure an individual's physical strength—something we suggest for future research. The participants in Studies 1 and 2 faced their opponent, so other cues to formidability, such as muscularity (Sell et al., 2009), could have affected their decisions. Yet regardless of potential differences in other body features, we still found an independent effect of height. Finally, although we assume that the ultimatum game is perceived by the allocator as involving a risk of physical retaliation, this assumption will need to be explicitly tested in future research.

To our knowledge, this is the first study to examine the effect of height differences on men's behaviors in a quasi-experimental research paradigm. Beyond looking at physical strength, there are still a few questions to answer and possible future studies to conduct. For instance, given our current data, we cannot clearly establish whether shorter men indeed are more indirectly aggressive or simply less altruistic in same-sex encounters with taller rivals. The competitive version of the dictator game we used—taking money from the opponent—suggests an act of indirect aggression, however (Bardsley, 2008). Future research with alternative paradigms such as a helping task could study the influence of height in a noncompetitive setting. Additionally, a group situation could activate the Napoleon complex in different ways. There are alternative strategies to physical aggression, such as recruiting allies, gossiping, or even showing leadership to enhance one's social reputation. Furthermore, weapons or coalition size could compensate for short height (Fessler & Holbrook, 2013; Fessler et al., 2012). Finally, our current research focused entirely on intrasexual competition, but that is just one element of sexual selection theory. In terms of underlying mechanisms, the Napoleon complex may also be shaped by intersexual selection forces—shorter men could use behavioral strategies to impress females, such as risk taking, generosity, or showing commitment (e.g., Griskevicius et al., 2007; Iredale, Van Vugt, & Dunbar, 2008). For further studies, it would be of great interest to add a potential mating opportunity to the paradigm to see how intersexual competition affects the Napoleon complex. The presence of an attractive female could exacerbate other kinds of overcompensating behaviors in short men—for example, an increased propensity toward risk taking to impress women (e.g., Frankenhuis, Dotsch, Karremans, & Wigboldus, 2010).

In summary, our results are among the first to show that height differences matter in intrasexual competitions between men. Consistent with predictions from sexual selection theory, and in line with the Napoleon complex, our results showed that short men kept more resources in competitive interactions, using height cues to assess the appropriateness of different behavioral tactics to take these resources from their male rivals. Further research could focus on the development of the Napoleon complex in men, perhaps using insights from life-history theory.

Action Editor

Steven W. Gangestad served as action editor for this article.

Author Contributions

All authors contributed to the study concept and design, provided critical revisions, and approved the final manuscript. Data collection (and coordination of students who helped collect data) was performed by N. M. Blaker and J. E. P. Knapen. J. E. P. Knapen drafted most of the Introduction and Discussion. N. M. Blaker analyzed most of the data and drafted most of the Method and Results. J. E. P. Knapen and N. M. Blaker contributed equally to this article and share first authorship.

Acknowledgments

The authors would like to thank Daniel Nettle, Thomas Pollet, and numerous students for their assistance with data collection. Thomas Pollet also provided helpful comments on earlier versions of this manuscript, and we thank Peter Dekker for statistical advice.

Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797618772822

Open Practices

All data have been made publicly available via the Open Science Framework and can be accessed at https://osf.io/x9h8b/. The materials for this study have not been made publicly available, and the design and analysis plans were not preregistered. The complete Open Practices Disclosure for this article can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797618772822. This article has received the badge for Open Data. More information about the Open Practices badges can be found at http://www.psychologicalscience.org/publications/badges.

Note

1. Napoleon was actually of average stature for his time (Lugli et al., 2007).

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