Original Article

Evolutionary Psychology
April-June 2019: 1–13
© The Author(s) 2019
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1474704919841914
journals.sagepub.com/home/evp
SAGE

When Better Seems Bigger: Perceived Performance of Adult Professional Football Players Is Positively Associated With Perceptions of Their Body Size

Jill E. P. Knapen[1,2], Thomas V. Pollet[3], and Mark van Vugt[1]

Abstract

Research has shown a positive association between cues of physical formidability and perceptions of status, supporting a generic "bigger-is-better" heuristic. However, does better also lead to appraisals as bigger? Recent research suggests that the perceptual association between body size and social status can also be explained in terms of prestige. To test whether perceptions of prestige lead to higher appraisals of body size, we examined whether people apply a "better is bigger bias" (BBB) in football, where performance and body size tend to be uncorrelated. In two studies, we examined real coalitional sports groups on a national (Study 1) and team level (Study 2), and we manipulated target performance in an experimental third study. Results suggest that perceived performance significantly predicted both the perceived height (Studies 2 and 3) and perceived weight (Studies 1 and 2) of professional football players, supporting the BBB. Support for the team had a positive effect on body size estimations of the players; however, we did not find any support for winner or loser effects. We discuss these results in light of individual versus team performance and coalitional affiliation.

Keywords

human height, physical formidability, status, social perception, coalitional affiliation

Date received: July 29, 2018; Accepted: March 13, 2019

In 2015, the professional football player Lionel Messi was the first player in history to win the Fédération Internationale de Football Association Ballon d'Or for the fifth time. The 169-cm tall Argentine goes by the nickname of *La Pulga* ("the flea"), due to both his short stature and his speed. Even though Messi's physique does not match that of a typical high-status male individual, who is expected to be tall and strong (e.g., Murray & Schmitz, 2011; Re et al., 2012, 2013), he has achieved a very high status owing to his extraordinary footballing skills. Would Messi be perceived as larger than he really is due to the higher prestige that is attributed to him because of his football skills?

Physical formidability refers to someone's body size and physical strength which is related, at least ancestrally, to the amount of cost that an individual can inflict on same-sex competitors (Sell et al., 2009). Formidability is positively associated with social status in human status hierarchies (e.g., Ellis, 1994) and social perception (e.g., Blaker et al., 2013; Jackson & Ervin, 1992; Re et al., 2012; Young & French, 1996). Recent research suggests that the association between physical formidability and status, which we refer to as the status-size hypothesis, is not only grounded in dominance but can also be grounded in prestige (Lukaszewski, Simmons, Anderson, & Roney, 2016). To test the strength of the association between prestige-based status and perceptions of body size, we study professional football (soccer) players who are highly

[1] Section of Social and Organizational Psychology, Vrije Universiteit Amsterdam, Amsterdam, the Netherlands
[2] Department of Work and Organizational Psychology, University of Amsterdam, Amsterdam, the Netherlands
[3] Department of Psychology, Northumbria University, Newcastle upon Tyne, United Kingdom

Corresponding Author:
Jill E. P. Knapen, Department of Work and Organizational Psychology, University of Amsterdam, Nieuwe Achtergracht 129 B, 1018 WT Amsterdam, the Netherlands.
Email: j.e.p.knapen@uva.nl

prestigious. Furthermore, a majority of studies suggest there is no objective positive relationship between body size (especially height; results on weight are mixed) and status in football (e.g., Karageanes, 2005; Reilly, Bangsbo, & Franks, 2000). Thus, perceived formidability of a football player is not functional per se, as their height or weight will not necessarily influence the result in terms of winning matches. The current study examines whether individuals overestimate football players' height and weight based on their prestige, as indicated by their performance on the pitch. If supported this would be an indication of a "better is bigger bias" (BBB), where skills (prestige) lead to overestimation of body size. Furthermore, we examine whether the outcome of a match (winning or losing) and the coalitional affiliation with the player (being a supporter of the same club) affect perceptions of body size.

Body Size and Prestige-Driven Social Status

The positive association between body size and social status has been linked to dominance in earlier studies: Individuals who have physical supremacy also attain more social status within the hierarchical group. Indeed, more formidable men actually occupy a high social status position more often than less formidable men, and this has been documented in a variety of cultures (Bernard, 1928; Brown & Chia-yun, n.d.; Egolf & Corder, 1991; Ellis, 1994; Gawley, Perks, & Curtis, 2009; Handwerker & Crosbie, 1982; Judge & Cable, 2004; Mazur, Mazur, & Keating, 1984; Werner, 1982). In line with these findings, male tallness has also been linked to dominant behavior, such as having priority of way when walking (Stulp, Buunk, Verhulst, & Pollet, 2015), and dominant personality characteristics (Melamed, 1992). Finally, taller individuals are perceived as more dominant than shorter individuals are (Batres, Re, & Perrett, 2015), and cues of dominance, in turn, lead to perceptions of larger body size (Marsh, Yu, Schechter, & Blair, 2009).

In addition, the perceptual association between body size and social status can be explained in terms of prestige (Lukaszewski et al., 2016): Research shows that taller individuals are perceived as more competent (Hensley & Cooper, 1987; Young & French, 1996), charismatic (Hamstra, 2014), and as better leadership material overall (Blaker et al., 2013; Re et al., 2013) than shorter individuals are. Lukaszewski, Simmons, Anderson, and Roney (2016) argue that the higher social status attained by physically formidable men is more likely due to "their perceived benefit generation capacity (prestige) than to their aggressive intimidation of rivals and subordinates (dominance)" (p. 388). In other words, formidable men gain social status when through their physique they provide group benefits. Men with greater physical formidability are perhaps better able to effectively regulate within-group processes such as settling disputes, maintaining social order, and offering solutions to group challenges (Lukaszewski et al., 2016; Von Rueden, 2014), as well as representing the group during collaborations or conflicts with other groups (Blaker & Van Vugt, 2014; Brown & Chia-yun, n.d.; Murray, 2014; Sahlins, 1963; Vugt & Ahuja, 2010). The association between physical formidability and perceived prestige-driven social status is mediated by perceived leadership abilities, and the association does not hold for physically formidable men who were perceived as being aggressively self-interested (Lukaszewski et al., 2016; in line with, e.g., Price & Van Vugt, 2014). Thus, prestige is allocated to those individuals who can contribute benefits to the group because they possess certain skills, knowledge, or abilities (e.g., Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013; Henrich & Gil-White, 2001; Von Rueden, Gurven, & Kaplan, 2008; Vugt & Tybur, 2014), and physically formidable men are perceived as being higher in prestige (Blaker et al., 2013; Lukaszewski et al., 2016).

BBB

Social perception research suggests that men with larger body sizes are perceived as being higher in prestige, leading to higher social status perceptions. This implies that when perceiving large men, individuals make use of a heuristic of "bigger is better." As the association between size and (prestige-based) status is at least partly grounded in reality, it is arguably a good representativeness heuristic for making "quick and dirty" judgments about others: Physically formidable men do tend to occupy high-status positions, so the odds are in your favor when evaluating bigger men as being higher in status (see Gilovich, Griffin, & Kahneman, 2002). Haselton and Funder (2006) defined these odds as a "useful degree of accuracy": The association is strong enough that the estimation is probably right. More importantly, the costs of overestimating someone's status would probably be less than the costs of underestimating it, making the used heuristic likely sufficient for short-term survival and mating purposes, even when it is not entirely accurate (Haselton & Buss, 2000; Zebrowitz & Montepare, 2006).

Is there also a "better is bigger" prestige bias? According to the status representation hypothesis by Holbrook, Fessler, and Navarrete (2016), there is a positive perceptual association between envisioned body size and envisioned social status for nonthreatening male targets. When individuals automatically perceive more skilled (prestigious) in-group men to also be more physically formidable, this could be an indication of a strongly embedded prestige-based status-size heuristic or a BBB. Indeed, there is some evidence that competent, high-status individuals are judged to be taller (Cann, 1991; Dannenmaier & Thumin, 1964; Lechelt, 1975; Wilson, 1968). Furthermore, Knapen, Blaker, and Pollet (2017) found that the positive effect of individuals' voting intentions on estimated height and strength of target politicians was mediated by perceived political skills of those politicians. Finally, Masters, Poolton, and van der Kamp (2010) have shown that action capabilities and performance success are positively associated with size estimations of goalkeepers and a famous football player (David Beckham).

Body Size of Professional Football Players

To test whether this version of the BBB is a strong, default heuristic that is automatic and implicit or a more informed perceptual process, we need to examine it in a situation where it is not useful to rely on such a heuristic. The domain of football is a good fit for testing the “better is bigger” effect because there is no obvious link between body size and performance, and the distribution of height and weight of professional players approximates “the average man” (Karageanes, 2005; Reilly et al., 2000). The average professional European league football players’ height is roughly the average European male height (181.98 cm; cohort of European men 1976–1982 = 174–183 cm; Hatton & Bray, 2010). Goalkeepers, defenders, and central strikers tend to be taller than other positions, while midfielders and forwards tend to be of average height (Nevill, Holder, & Watts, 2009; Reilly et al., 2000). Notably, the latest International Centre for Sports Studies (CIES) Football Observatory (Poli, Besson, & Ravenel, 2018) reports no correlation between average height of the players in a team and team success.

Our review of research in both adolescent and adult male football players suggests that excellence in football is not associated with tallness. Studies among youth and adolescent males of different nationalities suggest that body size contributes relatively little to variation in performance in these players and that the variation is probably mostly due to biological maturity (Beunen, Ostyn, Simons, Renson, & Van Gerven, 1981; Malina et al., 2005; Malina, Eisenmann, Cumming, Ribeiro, & Aroso, 2004; Reilly et al., 2000), as youth selections tend to favor players who are advanced in biological maturation (Coelho E Silva et al., 2010; Sarmento, Anguera, Pereira, & Araujo, 2018). Studies comparing youth and adolescent elite male soccer players to control groups did not find any differences in body size between the groups (Franks, Williams, Reilly, & Nevill, 1999; Mirkov, Kukolj, Ugarkovic, Koprivica, Vladimir & Jaric, 2010), suggesting young players’ movement agility and coordination are the best predictors of future performance in soccer (Mirkov et al., 2010; however, see Gravina et al., 2008).

Reilly, Bangsbo, and Franks (2000) reviewed the literature on anthropometric and physiological characteristics of adolescent and adult soccer players and concluded that it is not possible to isolate individual prerequisites for success (including height) with great confidence. A review of research concerning adult elite soccer players found that, compared to their European counterparts, Brazilian players are shorter in stature, yet similar in body mass (Diniz, Silva, Bloomfield, Carlos, & Marins, 2008). This makes sense as Brazilian males in general tend to be shorter than European males (especially Northern/Western European males from countries like the United Kingdom, the Netherlands, and Germany; Hatton & Bray, 2010), suggesting that elite soccer players’ height follows the patterns of the average male height according to country of origin. Furthermore, when comparing physical characteristics of adult players in both elite and amateur soccer leagues, two studies have found that player heights were similar; however, while one study found that the weight of elite players was significantly higher (Hazir, 2010), the other study also found no differences regarding weight between the two player levels (Ostojic, 2004). Nevill, Holder, and Watts (2009) found that adult professional football players’ body size tended to increase over time; however, they did not account for the effect of increased body size in the general population. Furthermore, their results suggested that more successful professional players are becoming taller, but this effect was only significant in the most recent of four seasons. Thus, the majority of research suggests that body size (within the normal range) does not affect an adult’s professional performance in soccer, and elite (high-performing) soccer players are not taller than amateur soccer players or the general public. In this study, we test the general hypothesis that increased prestige is associated with greater perceived formidability. More specifically, we predict that:

Hypothesis 1a: There is a positive association between perceived player performance and perceived player height: When players are estimated to perform better, they will also be estimated to be taller.

Hypothesis 1b: There is a positive association between perceived player performance and perceived player weight: When players are estimated to perform better, they will also be estimated to be heavier.

A possible contextual factor that could influence individuals’ perceptions of football player body size is whether the player’s team wins or loses a match. Higham and Carment (1992) and Sorokowski (2010) found that, compared to height judgments before the elections, politicians who won were judged as being taller, while politicians who lost were judged as being shorter (note that these findings were not replicated by Knapen et al. (2017), who did not find substantial evidence for a “winner effect” in their study). Following work by Higham and Carment (1992) and Sorokowski (2010), we expect that player body size will be perceived as larger when a team wins compared to when a team loses.

Hypothesis 2a: The outcome of the match is positively associated with player height perceptions: When a team wins, the individual players will be perceived as taller; when a team loses, the individual players will be perceived as shorter.

Hypothesis 2b: The outcome of the match is positively associated with player weight perceptions: When a team wins, the individual players will be perceived as heavier; when a team loses, the individual players will be perceived as less heavy.

Coalitional Affiliation

Being a supporter of a football team means being a part of a sports coalition, and sports fandom has been argued to be a by-product of an evolved coalitional psychology (Kruger et al., 2018; Winegard & Deaner, 2010). The forming of sports teams reflects the importance of the role of coalitional behavior in societies and illustrates the attraction that coalitional membership still holds for individuals (e.g., Fessler, Holbrook, & Dashoff, 2016; Hirt & Clarkson, 2011). Fandom provides a sense of group affiliation that can help meet our basic need to belong by sharing something in common—in this case, the support of a particular sports team (Hirt & Clarkson, 2011). Indeed, supporting a sports team can lead to psychological benefits, as identification with the team increases social connections for the supporter, thereby facilitating well-being (Wann, 2006). Thus, individuals form and maintain coalitions with others (sports teams), in the context of intergroup conflicts (matches between teams). In this context, players of the teams would be the most prestigious and thus high-status members of the coalition. This makes football fans a very relevant group of participants for examining the social perception of high-status individuals in real empirical coalitional sports groups.

Men tend to be especially invested in sports teams and have been argued to behave in ways similarly to how males behaved in their coalitional context during human evolutionary history (Kruger et al., 2018; Winegard & Deaner, 2010). For example, a study by Wann, Haynes, McLean, and Pullen (2003) showed that when supporters identify more strongly with their team, they also report greater willingness to consider acts of hostile aggression against players and coaches of the other team, and this was more likely for male supporters than for female supporters. Considering these findings, we expect that coalitional affiliation will be positively related to estimated body size of football players:

Hypothesis 3a: Coalitional affiliation is positively associated with perceived player height: When individuals are more invested in the team, they will also estimate the players to be taller.

Hypothesis 3b: Coalitional affiliation is positively associated with perceived player weight: When individuals are more invested in the team, they will also estimate the players to be heavier.

Overview of the Current Research

This study aims to test the BBB by assessing the relationship between performance (a measure of skills and thus prestige) and perceptions of body size in a novel domain, namely sports, specifically football (soccer). To examine this, we asked participants to rate performance, height, and weight of adult professional football players in three studies. We chose to have participants rate weight instead of strength of the players because we could compare the estimations to actual weight of the players and examine whether they are being overestimated. As weight is related to muscle mass, and professional football players are physically in very good shape (weight is not related to fat percentage/being overweight), we believe this is a reasonable proxy measure for perceived strength. This is in line with earlier research showing that weight is related to perceived fighting ability for mixed-martial-arts fighters (Třebický, Havlíček, Roberts, Little, & Kleisner, 2013). The context of sports teams gives us the opportunity to test our predictions in a real-world coalition, which can be identified with both on a national level (Study 1: the national Dutch team) and team level (Study 2: two Dutch premier league teams). In Study 3, we will test the causality of the BBB by manipulating performance before body size will be rated.

Previous research has shown that different types of measurement can lead to different results (Knapen, Blaker, & Pollet, 2017). We will therefore use multiple measurements of physical formidability: height and weight and estimations in centimeters/kilograms as well as sliders from 0 to 100. We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the studies. All the research reported in this document was approved by the Scientific and Ethical Review Committee (VCWE) of the university where the research was conducted (approval number VCWE-2016-155). All participants gave their informed consent before participating in the studies and were given a debriefing afterward. They were also given contact details of the primary investigators to be used for questions or complaints. Additional information about the used analyses is included in the Electronic Supplementary Materials (ESM 1), where we also report additional analyses and tables with detailed results of all the linear mixed models for Studies 1 and 2 (ESM 2 and 3).

Method Study 1

Participants

A total of 294 participants were recruited on campus by four female experimenters and from a participant pool. Five responses were excluded from analyses (three participants indicated they did not know all four of the players, and two participants made extremely unrealistic weight judgments; e.g., estimates of 34 or 800 kg). All analyses were conducted with data from the remaining 289 participants (250 males, 39 females; $M_{age} = 22.29$, $SD = 3.44$; 98.6% Dutch nationality). As compensation for taking part in the study, the participants were entered into a raffle to win one of the two vouchers with a monetary value of €100 each.

Materials and Procedure

During the European Football Championship 2012 (EFC 2012, "European cup"), participants were approached on campus by the experimenters and asked to participate in a study about the EFC. The collection strategy for Study 1 was to get as many participants as possible at the recruitment days during the EFC. Recruitment took place on four different occasions during the EFC: 2 days before the first quarterfinal match and 2 days after each quarterfinal match (against Denmark 9th of June, against Germany 13th of June, and against Portugal 17th of June). Date of completion had no effect on height and weight judgments of the players, and therefore, we excluded it from further analyses.

While under supervision of an experimenter, 258 participants completed the survey on an iPad tablet. The remaining 31 participants completed the survey online. Excluding participants who completed the survey online rather than on an iPad tablet led to similar results as those reported below. After some

Table 1. Actual and Estimated Height and Weight of Football Players in Study 1 (www.tablesleague.com).

Player	Position	Actual Height (cm)	Perceived Height, *M* (*SD*)	Actual Weight (kg)	Perceived Weight, *M* (*SD*)
van Bommel	Midfielder	187	183.58 (3.67)	85	81.29 (4.90)
van Persie	Forward	183	183.22 (5.26)	73	77.75 (5.07)
Robben	Forward	181	178.22 (4.86)	80	75.10 (5.72)
Sneijder	Midfielder	170	169.36 (4.32)	67	70.94 (5.39)

Note. $N = 289$.

sociodemographic questions, participants were asked to estimate the body size of four prominent football players in the Dutch team: Mark van Bommel, Robin van Persie, Arjen Robben, and Wesley Sneijder (for heights and weights of the individual players, see Table 1). Height and weight were estimated by participants in centimeters and kilograms and with sliders that indicated height and weight compared to the average Dutch male from 0 (*very short/very light*) to 100 (*very tall/very heavy*). No pictures of the players were shown. The players and the accompanied questions were presented in random order. Participants were instructed to keep the player's most recent match performance in mind while answering.

Next, participants answered some final questions on their familiarity (yes/no) with and performance of the four players ("How well do you think this player performed, compared to the other players in the team?") on a 100-point scale ranging from 0 (*very bad*) to 100 (*very good*). After completion of the survey, participants were thanked and entered into the raffle, if they wished so.

Analyses

Initial analyses showed that the two different height measurements were only weakly correlated, $r(287) = .154$, $p = .009$, and the two different weight measurements were not significantly correlated, $r(287) = .067$, $p = .255$. The kilogram and centimeter measurements were moderately correlated, $r(287) = .311$, $p < .001$, and the height and weight slider measurements were moderately to strongly correlated, $r(287) = .687$, $p < .001$.

For each outcome variable (height in centimeters, continuous height, weight in kilograms, and continuous weight), we conducted three linear mixed models with the corresponding body size variable of the four players as dependent variable, and participant sex, participant height or weight, and estimated performance of the four players as independent variables. The units of analysis were the height, weight, and performance estimations made by the participants, and the four individual players were added as groupings. Tables for all analyses and the results of participant sex and participant body size are reported in the ESM 2.

Results Study 1

We expected that when players were perceived as performing well, they would also be perceived as larger in body size ("BBB"). As the Dutch team lost all four matches, we were not able to examine winner/loser effects in this study.

Height Estimations in Centimeters

On average, participants were able to correctly estimate the footballers' height in centimeters; however, some players were better estimated than others (see Table 1; although four one-sample t tests showed that only the average height estimation of van Persie did not significantly differ from his actual height ($p = 468$), average height estimations of Robben ($p < .001$) and Sneijder ($p = 012$) were also within 3 cm of their actual height, although both were significantly underestimated. Only van Bommel was largely underestimated with >3 cm ($p < .001$)

The second model (fixed main effects with random intercept) was comparatively the best fitting model (Akaike information criterion [AIC] = 6,684.704, ΔAIC second best model = 2.00; Bayesian information criterion [BIC] = 6,694.803, ΔBIC second best model = 7.05): Estimated performance ($p = .462$; bootstrap: $p = .463$) was not significantly associated with height estimation in centimeters (ESM 2, Table 1).

Continuous Height Estimations

Again, the second model (fixed main effects with random intercept) was comparatively the best fitting model (AIC = 9,097.188, ΔAIC second best model = 1.64; BIC = 9,107.287, ΔBIC second best model = 6.69): The association with estimated performance, $t(1{,}138.551) = 1.996$, $p = .046$, 95% confidence interval [CI] = [0.00, 0.09]; bootstrap: $p = .178$, 95% CI [−0.02, 0.07], was no longer significant after bootstrapping (ESM 2, Table 2).

Weight Estimations in Kilograms

Contrary to the height estimations, participants were on average not able to correctly estimate the footballers' weight in kilograms (Sneijder and van Persie were overestimated, and van Bommel and Robben were underestimated: Table 1; 4 one-sample *t* tests indicated that the average weights estimated by the participants significantly differed from the actual weights >3 kg; all *p*s < .001).

In line with the height models, the second model (fixed main effects with random intercept) was comparatively the best fitting model (AIC = 6,873.156, ΔAIC second best model = 2.00; BIC = 6,883.248, ΔBIC second best model = 7.05):

Table 2. Actual Height and Weight of Football Players in Study 2 (www.tablesleague.com).

Player	Team	Position	Actual Height (cm)	Actual Weight (kg)
Krkić	Ajax	Forward	172	68
Fischer	Ajax	Forward	179	71
Schöne	Ajax	Midfielder	178	75
van Rhijn	Ajax	Defender	180	70
Wijnaldum	PSV	Midfielder	172	69
Schaars	PSV	Midfielder	178	75
Matavž	PSV	Forward	188	74
Bruma	PSV	Defender	186	76

Estimated performance ($p = .447$; bootstrap: $p = .454$) was not significantly associated with weight estimation in kilograms (ESM 2, Table 3).

Continuous Weight Estimations

Again, the second model (fixed main effects with random intercept) was comparatively the best fitting model (AIC = 8,865.365, ΔAIC second best model = .81; BIC = 8,875.457, ΔBIC second best model = 5.86): estimated performance, $t(1,097.894) = 2.229$, $p = .026$, 95% CI [0.01, 0.08]; bootstrap: $p = .054$, 95% CI [0.01, 0.07], was associated (marginally) significantly with continuous weight estimation (ESM 2, Table 4). When players were estimated to perform better, they were also estimated to be heavier.

Summary Study 1

Our predictions were only partly supported. Estimations of height in centimeters of the four players were overall pretty accurate, while estimations of weight in kilograms seemed more difficult for the participants. Hypothesis 1a was not supported, as estimated performance was not (robustly) significantly associated with estimated height. Hypothesis 1b was partly supported, as estimated performance was (marginally) significantly associated with estimated weight in the continuous measurement. Study 2 was set up to further test the relationship of estimated performance with height and weight estimations. We extended Study 1 by adding degree of fandom of the team as a measure of investment in the coalition, and we again aimed to examine possible winner/loser effects.

Method Study 2

Participants

A total of 257 participants agreed to participate in a study about an upcoming football match between the two Dutch premier league teams Ajax and PSV on September 22, 2013. Thirty participants indicated they did not know all four of the players in the study, and they were excluded from analyses. Of the remaining 227 participants (191 males, 36 females; $M_{\text{age}} = 32.77$, $SD = 11.56$; 93% White), 81 participants agreed to also participate in the second part of the study. Of these participants, 64 had watched the game or its summary in full, 7 participants had watched part of it, and 10 participants did not watch the game or its summary at all. These 10 participants were excluded from analyses, as participants needed to be aware of the outcome of the match for the purpose of our study. Of the remaining 71 participants, 100% remembered correctly who won the match (PSV). We were able to successfully match data of Parts 1 and 2 for 67 of these participants (55 males, 12 females; $M_{\text{age}} = 33.47$, $SD = 11.59$; 92.5% White). As compensation for taking part in the study, the participants were entered into a raffle to win 1 of the 10 vouchers with a monetary value of €25 each.

Materials and Procedure

The data collection strategy for Study 2 was to get as many participants as possible, starting 5 days before the match, up until the start of the match. Participants were recruited via social media to participate in a study about the match between Ajax and PSV on September 22, 2013, by completing an online survey.

After completion of some sociodemographic questions, participants then indicated whether and which team they supported and answered questions on their favorite team. If they were neutral, participants were randomly assigned a team. Next, similarly to Study 1, participants were asked to estimate performance and body size (in sliders) of four prominent football players of one of the teams: Bojan Krkić, Viktor Fischer, Lasse Schöne, and Ricardo van Rhijn for Ajax, and Georginio Wijnaldum, Stijn Schaars, Tim Matavž, and Jeffrey Bruma for PSV (for heights and weights of the individual players; see Table 2). Participants were also asked how interested they were in the team's performance, how much they supported the team, who they thought would win the match, and what the final score of the match would be.

After the match, participants who had indicated that they would like to participate in a second part of the study were emailed a link to an online survey. For the second part, 20 PSV fans (35.71%), 36 Ajax fans (28.12%), and 11 neutral participants (25.58%; 8 were randomly assigned to PSV and 3 to Ajax) responded. They were asked whether they had seen the match and if so, which team was the winning team. Next, they completed the same measures as in the first part. After this, they were asked how satisfied they were with their team's performance in the last match and which of the four players they thought had performed the best. Upon completion of the survey, participants were thanked and entered into the raffle, if they wished so.

Analyses

Initial analyses showed that the height and weight slider measurements were moderately to strongly correlated, $r(225) = .612$, $p < .001$. As in Study 1, we ran separate analyses for the height and the weight measurements. The units of analysis were self-reported fandom and height, weight, and performance estimations made by the participants, and the four individual players for each team were added as groupings. We used similar linear mixed models analyses as in Study 1, and again tables for the analyses and the results of participant sex and participant body size are reported in the ESM 3.

Results Study 2

We expected that when players were perceived as performing well, they would also be perceived as larger in body size ("BBB"). Furthermore, we expected that winning the match would be positively associated with estimations of body size, while losing would be negatively associated with estimations of body size.

Continuous Height Estimations

The third model (random slopes for estimated performance and self-reported fandom and random intercept) was comparatively the best fitting model (AIC = 6,419.673, ΔAIC second best model = −2.916; BIC = 6,438.505, ΔBIC second best model = 6.500). In line with our expectations, estimated performance, $t(135.296) = 3.860$, $p < .001$, 95% CI [0.07, 0.20]; bootstrap: $p = .001$, 95% CI [0.07, 0.19], was significantly associated with continuous height estimation (ESM 3, Table 5). When players were estimated to perform better, they were also estimated to be taller. Fandom ($p = .150$) initially was not significantly associated with continuous height estimation. However, after bootstrapping, fandom was indeed significantly associated with height estimation: $p = .006$, 95% CI [0.01, 0.05]. Individuals who were more invested in the team also estimated the players to be taller.

Continuous Weight Estimations

Again, the third model (random slopes for estimated performance and self-reported fandom and random intercept) was comparatively the best fitting model (AIC = 6,380.039, ΔAIC second best model = 10.88; BIC = 6,398.871, ΔBIC second best model = 1.46). In line with our expectations, estimated performance, $t(778{,}146) = -3.021$, $p = .003$, 95% CI [0.04, 0.17]; bootstrap: $p = .001$, 95% CI [0.03, 0.18], was significantly associated with continuous weight estimation (ESM 3, Table 6). When players were estimated to perform better, they were also estimated to be heavier. Fandom ($p = .423$) was not significantly associated with continuous weight estimation. However, bootstrapping revealed that fandom ($p = .050$, 95% CI [−0.00, 0.04]) was indeed significantly associated with estimated weight. Individuals who were more invested in the team also estimated the players to be heavier.

Association of Performance and Body Size Over Time

Due to the correlational nature of Study 2, we were not able to study causal effects. In order to examine whether there was an effect of time for estimated performance on estimated formidability of the players, we conducted two analyses of covariance (ANCOVAs) with estimated performance at Time 1 (before the game) as the independent variable and estimated height at Time 2 (after the game) and estimated weight at Time 2 as the dependent variables. When player performance was more positively evaluated before the game, players were judged as being significantly taller, $F(1, 110) = 12.754$, $p = .001$, $\eta_p^2 = .104$, 95% CI [0.16, 0.55]; bootstrap: $p = .002$, 95% CI [0.19, 0.53], and significantly heavier, $F(1, 110) = 4.136$, $p = .044$, $\eta_p^2 = .036$, 95% CI [0.01, 0.44]; bootstrap: $p = .015$, 95% CI [0.05, 0.41], after the game. This suggests that estimated performance could also have a causal effect on estimated formidability, as performance was estimated before height and weight were. We will test for causality of this effect in Study 3.

Winner/Loser Effects

We expected that perception of body size in winners would be overestimated, while physical formidability in losers would be underestimated. PSV won the game decisively (4-0). This result is represented in the performance judgments of both teams, as the main effects of team, Ajax, PSV: $F(1, 66.862) = 20.735$, $p < .001$, and time, before match, after match: $F(1, 66.315) = 10.703$, $p = .002$, on judged performance were significant. The interaction between team and time, $F(1, 66.315) = 19.409$, $p < .001$, was also significant: Judged performance of PSV increased over time (Δ = 4.803), and judged performance of Ajax decreased over time (Δ = −32.513).

Continuous height estimations. We conducted two repeated measures mixed models with estimated height via sliders of four players of one of the teams as dependent variable, and participant sex, football team, estimated performance of the four players, self-reported fandom of the team, time (before match/after match), and the interaction between time and team as independent variables. The second model (autoregressive) was comparatively the best fitting model (AIC = 1,191.834, ΔAIC second model = −0.5; BIC = 1,197.341, ΔBIC second model = 2.3). Team ($p = .597$), estimated performance ($p = .401$), fandom ($p = .250$), time ($p = .358$), and the interaction between time and team ($p = .545$) all were not significantly associated with continuous height estimation.

Continuous weight estimations. Two similar repeated measures mixed models analyses were conducted with estimated weight via sliders of four players of one of the teams as dependent variable. Again, the second model (autoregressive) was comparatively the best fitting model (AIC = 1,190.323, ΔAIC second model = 1.684; BIC = 1,195.830, ΔBIC second model = 4.4). Team ($p = .548$), estimated performance ($p = .535$), fandom ($p = .384$), time ($p = .778$), and the interaction between time and team ($p = .528$) all were not significantly associated with continuous weight estimation.

Summary Study 2

Again, our predictions were partly supported. Hypothesis 1 was fully supported as estimated performance had a robustly significant relationship with continuous measurements of estimated height and weight. In line with our expectations, self-reported fandom was significantly associated with the height and weight estimations (fully supporting Hypothesis 3). However, we did not find any substantial support for Hypothesis 2 (winner/loser effects), which could be due to low statistical power, as we only had 67 participants for the second part of the study.

Studies 1 and 2 gave us the opportunity to examine real-life coalitional affiliation; however, this also means that real-life prior knowledge might influence results. Study 3 was set up to test causality of the performance effect on body size estimations using an experimental setup. In order to clarify the relationship between the slider and the centimeter/kilogram measures, we again used all the height and weight measures from Study 1. Furthermore, we aimed for a sample with a more even gender distribution in order to test whether men make larger formidability estimations than women do. Men have estimated politicians as taller than women did in previous research by Higham and Carment (1992), suggesting these differences were due to using one's own height as an anchor. However, this argument was not supported by later research, where men did not make larger estimations of physical formidability than women did, and participant's own height and weight did not affect estimations (Knapen et al., 2017). Given these mixed results, we will also conduct exploratory tests for participant sex effects in body size estimates.

Method Study 3

Participants

Participants were recruited via the crowdsourcing platform CrowdFlower. As the survey was in English, we aimed to recruit native speakers by making the study available for the United Kingdom and the United States only. We indicated a stopping rule at 200 participants based on a sample size analysis for $(1 - \beta) = .80$ and $\alpha = .05$, resulting in 95 participants for a medium effect size, and 175 participants for a small effect size. Unfortunately, probably due to participants entering the payment code multiple times through different accounts, after shutting down the experiment at 200 participants, we only had a total of 142 participants who actually completed the experiment. We excluded 52 participants from analysis a priori because they did not complete the whole survey ($n = 5$) or gave extremely unrealistic answers for height or weight ($n = 47$). This left us with a total of 90 participants (42 males, one person chose not to disclose their sex) with a mean age of 37.8 years ($SD = 10.41$, range 18–69 years). The majority of the participants resided in the United Kingdom (95.6%) and indicated that they were White (91.1%). Women reported an average height of 162.84 cm ($SD = 8.11$, range 144.78–187.96 cm) and an average weight of 66.41 kg ($SD = 15.28$). Men reported an average height of 178.16 cm ($SD = 8.97$, range 152.68–193.04) and an average weight of 73.84 kg ($SD = 19.70$). Only six participants indicated that they were not familiar with football (soccer), excluding them did not change the results. Participants received a small payment (US$0.30) via their CrowdFlower account after completing the study.

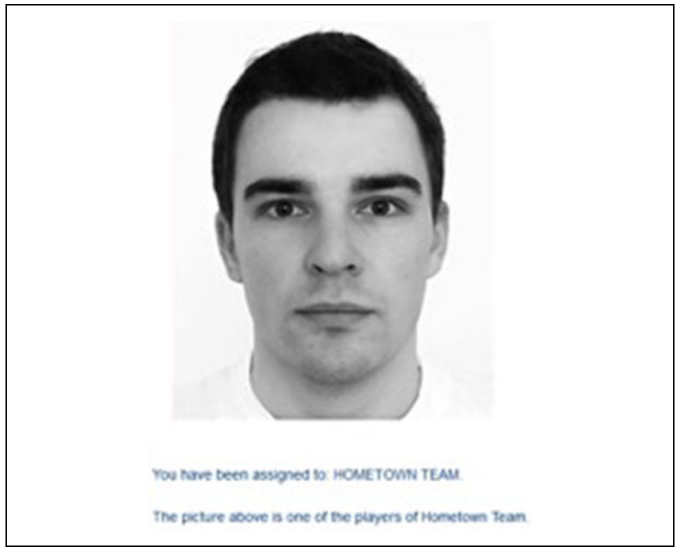

Figure 1. Picture of football player in Study 3 (from Braun et al., 2001).

Materials and Procedure

After completing some sociodemographic questions, participants were randomly assigned to either a high performance (HP) or low performance (LP) condition. Research using the "minimal group paradigm" (Tajfel, Billig, Bundy, & Flament, 1971) has shown that even minimal or arbitrary distinctions between groups can trigger in-group behavior. In order to create at least some degree of coalitional affiliation, we informed the participants that they would be assigned to one of the two teams: Home Team or Visiting Team. However, all participants were assigned to Home Team, as we expected this would create the most affiliative feelings.

All participants were shown a black and white picture of a morphed male rated as averagely attractive (used with permission from Braun, Gruendl, Marberger, & Scherber, 2001; Figure 1), announcing they had been assigned to "Home Team." Next, they read a short text about the football player in the picture (complete text can be found in ESM 4). Participants in the HP condition then read the following text: "This player has been performing very well this season. Both his number of achieved goals and his assistance in goal making were above average. Expert raters gave him 8 of the 10 points," while participants in the LP condition read this text: "This player has *not* been performing well this season. Both his number of achieved goals and his assistance in goal making were *below average*. Expert raters gave him *5 out of the 10* points."

After reading the text, participants rated the player on performance (0 = *very bad* to 100 = *very good*), height (0–100 slider and in feet/inches), and weight (0–100 slider and in pounds). All five ratings were presented in random order. To check whether participants felt coalitional affiliation with the hypothetical hometown team (HT), we asked them how positive their feelings were toward HT ($M = 71.72$; $SD = 23.08$), how involved they felt in HT ($M = 65.49$; $SD = 25.81$), whether they felt like a part of HT ($M = 60.65$; $SD = 26.16$), and whether they hoped HT would win the match ($M = 79.35$; $SD = 22.91$), all on 0–100 slider scales. Next, participants answered some manipulation checks and were given a code in order to receive payment.

Results Study 3

We expected that the high-status in-group member's (football player of the HT) body size would be estimated larger in the high-performance condition compared to the low-performance condition. We exploratorily tested whether men would on average make larger overestimations than women would make. We asked for self-reported height and weight to examine whether individuals use their own height or weight as an anchor in estimating body size.

Preliminary Analyses

As a manipulation check, we also measured perceived performance of the player. Indeed, performance was rated significantly higher in the HP condition ($M = 80.98$, $SD = 8.51$) compared to the LP condition, $M = 47.24$, $SD = 12.38$; $F(1, 88) = 231.578$, $p < .001$, $\eta_p^2 = .725$. We converted the feet/inch and pounds measures into centimeters and kilograms for consistency throughout the three studies. In Study 1, the two different height measurements were weakly correlated, and the two different weight measurements were not significantly correlated. In Study 3, there was no statistically significant correlation for either the height, $r(88) = .177$, $p = .096$, or the weight, $r(88) = .149$, $p = .162$, measurements. The kilogram and centimeter measurements were moderately correlated in Study 1, however, not significantly correlated in Study 3, $r(88) = -.004$, $p = .973$, and the height and weight slider measurements, which were moderately to strongly correlated in Study 1, were also moderately correlated in Study 3, $r(88) = .381$, $p < .001$. As in Studies 1 and 2, we ran separate analyses for each of the height and weight measurements.

Height Estimations in Centimeters

An ANCOVA with height estimations in centimeters as the dependent variable and condition, participant sex, and participant height as independent variables, $F(3, 85) = 5.559$, $p = .002$, $\eta_p^2 = .164$, showed a significant main effect for condition ($p = .003$, $\eta_p^2 = .098$; bootstrap: $p = .010$, 95% CI [−8.43, −1.42]) but not for participant sex ($p = .120$; bootstrap: $p = .138$). In line with our expectations, individuals in the LP condition estimated the football player as shorter ($M = 176.49$; $SD = 1.22$; 95% CI [174.07, 178.91]) than individuals in the high-performance condition did ($M = 181.56$; $SD = 1.13$; 95% CI [179.31, 183.81]). The effect of participant height on estimated height of the player was significant ($p = .021$, $\eta_p^2 = .061$); however, it was marginally significant after bootstrapping, and the bootstrapped 95% CI included zero, suggesting that the effect was not robust (bootstrap: $p = .060$, 95% CI [−0.25, 3.96]).

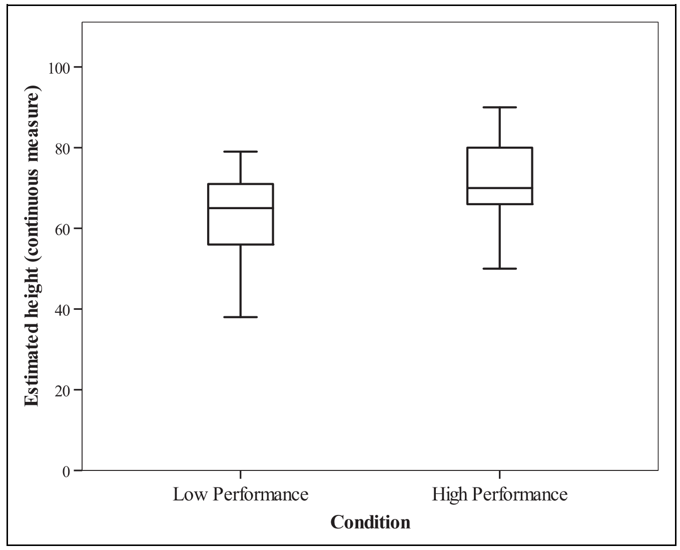

Figure 2. Estimated height in sliders by condition in Study 3.

Continuous Height Estimations

An ANCOVA with height estimations via the slider as the dependent variable and condition, participant sex, and participant height as independent variables, $F(3, 85) = 5.508$, $p = .002$, $\eta_p^2 = .163$, showed a significant main effect for condition ($p < .001$, $\eta_p^2 = .144$; bootstrap: $p = .002$, 95% CI [−13.48, −4.61]) but not for participant sex ($p = .376$; bootstrap: $p = .405$) or participant height ($p = .132$; bootstrap: $p = .120$). In line with our expectations, individuals in the LP condition estimated the football player as shorter ($M = 62.34$; $SD = 1.70$; 95% CI [58.96, 65.72]) than individuals in the HP condition did ($M = 71.15$; $SD = 1.58$; 95% CI [68.01, 74.30]; Figure 2).

Weight Estimations in Kilograms

An ANCOVA with weight estimations in kilograms as the dependent variable and condition, participant sex, and participant weight as independent variables, $F(3, 85) = 2.008$, $p = .119$, $\eta_p^2 = .066$, showed no significant effects for condition ($p = .722$; bootstrap: $p = .771$) or participant sex ($p = .696$; bootstrap: $p = .708$). The effect of participant weight on estimated weight of the player was significant ($p = .017$, $\eta_p^2 = .065$). However, it was not significant after bootstrapping (bootstrap: $p = .088$, 95% CI [−0.08, 5.89]).

Continuous Weight Estimations

An ANCOVA with weight estimations via the slider as the dependent variable and condition, participant sex, and participant weight as independent variables, $F(3, 85) = .788$, $p = .504$, $\eta_p^2 = .027$, showed no significant effects for condition ($p = .258$; bootstrap: $p = .249$), participant sex ($p = .288$; bootstrap: $p = .291$), or participant weight ($p = .517$; bootstrap: $p = .524$).

Summary Study 3

In line with Study 2, estimated performance had a significant positive effect on estimated height when continuous measurements were used. Furthermore, we also found a significant effect of estimated performance on height measurements in centimeters this time. In line with Study 1, we did not find an effect of performance on the estimations of weight in kilograms. However, contrary to Studies 1 and 2, we also did not find an effect of performance on the continuous estimations of weight. Previous findings that men overestimate height more than women do were not supported. The argument that men use their own (taller) height or (heavier) weight as an anchor was also not supported.

Discussion

Our most robust finding deals with the expected positive association of prestige with height estimations: In two of the three studies, we found evidence for estimated performance (our proxy measure for prestige) being positively associated with height estimations. The findings regarding the association between prestige and weight estimations were mixed. We did not find any association between prestige and the weight estimations in kilograms, but we did find a significant association between prestige and estimated continuous weight in the first two studies (however, not in Study 3). These results are in line with earlier studies suggesting a positive association between high-status in-group member's behavioral evaluations (political skills, leadership) and their perceived physical formidability (Knapen et al., 2017; Lukaszewski et al., 2016). Our study demonstrates the BBB: The association between prestige-based status and body size is so strong that the heuristic is also used when it is not useful (i.e., when status and size are not correlated in that domain). Our results suggest that this bias is especially strong for the association between prestige-based status and estimated height. The different height and weight measurements were not significantly, or only weakly, correlated with each other in both Study 1 and Study 3. Furthermore, the estimations made in centimeters and kilograms in Study 1, and weight estimations in kilograms in Study 3, yielded null results, while most of the estimations made with sliders (except for height in Study 1 and weight in Study 3) did show the expected associations. This is in line with research by Knapen et al. (2017) who concluded that continuous measurements give more “opportunity” for perceptual distortions than centimeter or kilogram measures do. As participants were well aware of the actual heights in centimeters of the players, this could explain why there was no association between performance and these estimations in the first study. In Study 3, we used a hypothetical football player that the participants did not know, and here we did find the expected effect in the centimeter height measurements. However, this does not explain the null results for the kilogram estimations, as participants were not very aware of the actual weights of the players. As we did not find any effects of performance on weight estimations in Study 3, the BBB association may simply be stronger for height than for weight. Although this is in line with previous research not finding prestige effect on weight measures for politicians (Knapen et al., 2017), we did expect them here as weight is a more relevant proxy for muscle mass (i.e., strength) in professional football players than it is in politicians. Perhaps a direct measure of strength would have been better here; however, then we would not have had the possibility to test for overestimation.

In line with our expectations, individuals who reported to be bigger fans of the team also estimated the players to be taller and heavier. These results support our hypothesis that individuals who are more invested in the coalition make larger estimations of prestige-based high-status individuals' body size within that coalition. In line with previous research (Knapen et al., 2017; Winegard & Deaner, 2010), this suggests that coalitional affiliation could be part of a motivated cognition for coalitional functioning. This would be an interesting hypothesis to explore further in future research dealing with body size perceptions in sports or other coalitional contexts. In the current study, we only examined perceptions within one's own coalition, and we expect that in-group estimations would be larger than out-group estimations (of rival teams' members; in line with Knapen et al., 2017).

In Study 3, we also conducted exploratory tests for participant sex effects on estimated body size, which we did not find any support for. Effects of participant sex on body size estimations have yielded mixed results in earlier research (Higham & Carment, 1992; Knapen et al., 2017), and our results are in line with Knapen et al. (2017) where the anchoring hypothesis has also not been supported. Further research should look more closely into these possible sex effects and examine whether differences are possibly due to other contributing factors than anchoring effects. Popularity of women's football's is growing rapidly, and it would also be interesting to examine sex effects within the targets: Does the BBB also apply to high-status female football players?

Limitations

Although we found an overall association of performance estimations with body size estimations, occasionally individual players stood out. These findings can possibly be explained by the deviations in height and weight that these individuals have (see also Sorokowski, 2010). Sneijder, for example, is very short for Dutch standards, and his height is often remarked or even made fun of in the (Dutch) media (e.g., www.vi.nl).

When individuals are so fully aware of a player's height, like in the case of Sneijder, it is unlikely that their perceptions of these more extreme builds will differ according to performance.

We did not find any winner/loser effects in Study 2. This could be due to lack of power because of the rather small sample of participants who participated in both parts of the study. However, previous research on body size perceptions of politicians has also documented mixed findings in these winner/loser effects (Higham & Carment, 1992; Knapen et al., 2017; Sorokowski, 2010). Winning could also be seen as another measure of performance and as such, these results would contrast our findings of performance leading to larger body size estimations. A possible explanation for this would be that although football is a team sport, people pay more attention to individual performances (as measured by asking for performance of individual players) and thus that the BBB does not generalize to team efforts (i.e., winning or losing a match).

Previous research suggests that physical formidability, especially height, can lead to a "halo effect" where the positive validation of an individual's height is automatically associated with a positive evaluation of that individual's competence (Blaker et al., 2013; Judge & Cable, 2004). In Study 3, we did not control for perceived competence when testing the association between performance and physical formidability. However, research has shown that the association between prestige and perceived body size maintains above and beyond possible confounding variables like intelligence, attractiveness, and liking (Knapen et al., 2017; Lukaszewski et al., 2016). Moreover, we expect that the experimental design of the study, incorporating the manipulation of performance while measuring perceptions of height and weight, obviates the possible "halo effect" as described above.

Conclusion

In sum, our results suggest that individuals associate prestige with body size, even when there is no *actual* association between the two, demonstrating the strength of a "better is bigger" heuristic. Messi's height and weight would thus probably be overestimated due to his football skills, were it not that he is so famous that his fans probably know exactly how tall he really is. More research is needed to further explore the role of coalitional affiliation in this association, for example, by testing in-group versus out-group targets.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research and/or authorship of this article: This research was supported by a NWO (de Nederlandse Organisatie voor Wetenschappelijk Onderzoek; www.nwo.nl) Veni grant to TVP (451.10.032).

ORCID iD

Jill E. P. Knapen https://orcid.org/0000-0002-4876-5008

Supplemental Material

Supplemental material for this article is available online.

References

Batres, C., Re, D. E., & Perrett, D. I. (2015). Influence of perceived height, masculinity, and age on each other and on perceptions of dominance in male faces. *Perception*, *44*, 1293–1309. doi:10.1177/0301006615596898

Bernard, J. (1928). Political leadership among North American Indians. *American Journal of Sociology*, *34*, 296–315. doi:10.1086/214670

Beunen, G., Ostyn, M., Simons, J., Renson, R., & Van Gerven, D. (1981). Chronological and biological age as related to physical fitness in boys 12 to 19 years. *Annals of Human Biology*, *8*, 321–331. doi:10.1080/03014468100005121

Blaker, N. M., Rompa, I., Dessing, I. H., Vriend, A. F., Herschberg, C., & Van Vugt, M. (2013). The height leadership advantage in men and women: Testing evolutionary psychology predictions about the perceptions of tall leaders. *Group Processes & Intergroup Relations*, *16*, 17–27. doi:10.1177/1368430212437211

Blaker, N. M., & Van Vugt, M. (2014). The status-size hypothesis: how cues of physical size and social status influence each other. In J. T. Cheng, J. L. Tracy, & C. Anderson (Eds.), *The psychology of social status* (pp. 119–137). New York, NY: Springer.

Braun, C., Gruendl, M., Marberger, C., & Scherber, C. (2001). *Beautycheck—Ursachen und Folgen von Attraktivitaet*. Retrieved from http://www.uni-regensburg.de/Fakultaeten/phil_Fak_II/Psychologie/Psy_II/beautycheck/english/bericht/beauty_ho_zensiert.pdf

Brown, D. E., & Chia-yun, Y. (n.d.). *"Big man" in universalistic perspective*. Manuscript. Department of Anthropology, University of California at Santa Barbara.

Cann, A. (1991). Stereotypes about physical and social characteristics based on social and professional competence information. *Journal of Social Psychology*, *131*, 225–231. doi:10.1080/00224545.1991.9713845

Cheng, J. T., Tracy, J. L., Foulsham, T., Kingstone, A., & Henrich, J. (2013). Two ways to the top: Evidence that dominance and prestige are distinct yet viable avenues to social rank and influence. *Journal of Personality and Social Psychology*, *104*, 103–125. doi:10.1037/a0030398

Coelho E Silva, M. J., Figueiredo, A. J., Simoes, F., Seabra, A., Natal, A., Vaeyens, R., . . . Malina, R. M. (2010). Discrimination of U-14 soccer players by level and position. *International Journal of Sports Medicine*, *31*, 790–796. doi:10.1055/s-0030-1263139

Dannenmaier, W. D., & Thumin, F. J. (1964). Authority status as a factor in perceptual distortion of size. *Journal of Social Psychology*, *2*, 361–365. doi:10.1080/00224545.1964.9922246

Diniz, C., Silva, D., Bloomfield, J., Carlos, J., & Marins, B. (2008). A review of stature, body mass and maximal oxygen uptake profiles of U17, U20 and first division players in Brazilian soccer. *Journal of Sports Science and Medicine*, *7*, 309–319.

Egolf, D. B., & Corder, L. E. (1991). Height differences of Low and High job status, female and male corporate employees. *Sex Roles*, *24*, 365–373. doi:10.1037/a0030398

Ellis, L. (1994). The high and the mighty among man and beast: How universal is the relationship between height (or body size) and social status. In L. Ellis (Ed.), *Social stratification and socioeconomic inequality: Reproductive and interpersonal aspects of dominance and status* (Vol. 2, pp. 93–111). Westport, CT: Praeger.

Fessler, D. M., Holbrook, C., & Dashoff, D. (2016). Dressed to kill? Visible markers of coalitional affiliation enhance conceptualized formidability. *Aggressive behavior*, *42*, 299–309. doi:10.1002/ab.21624

Franks, A., Williams, A. M., Reilly, T., & Nevill, A. (1999). Talent identification in elite youth soccer players: Physical and physiological characteristics. *Journal of Sports Sciences*, *17*, 812.

Gawley, T., Perks, T., & Curtis, J. (2009). Height, gender, and authority status at work: Analyses for a national sample of Canadian workers. *Sex Roles*, *60*, 208–222. doi:10.1007/s11199-008-9520-5

Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics and biases: The psychology of intuitive judgment*. Cambridge, England: Cambridge University Press.

Gravina, L., Gil, S. M., Ruiz, F., Zubero, J., Gil, J., & Irazusta, J. (2008). Anthropometric and physiological differences between first team and reserve soccer players aged 10–14 years at the beginning and end of the season. *The Journal of Strength & Conditioning Research*, *22*, 1308–1314. doi:10.1519/JSC.0b013e31816a5c8e

Hamstra, M. R. W. (2014). "Big" men: Male leaders' height positively relates to followers' perception of charisma. *Personality and Individual Differences*, *56*, 190–192. doi:10.1016/j.paid.2013.08.014

Handwerker, W. P., & Crosbie, P. V. (1982). Sex and dominance. *American Anthropologist*, *84*, 97–104. doi:10.1525/aa.1982.84.1.02a00070

Haselton, M. G., & Buss, D. M. (2000). Error management theory: A new perspective on biases in cross-sex mind reading. *Journal of Personality and Social Psychology*, *78*, 81–91. doi:10.1037/0022-3514.78.1.81

Haselton, M. G., & Funder, D. C. (2006). The evolution of accuracy and bias in social judgment. In M. Schaller, J. A. Simpson, & D. T. Kenrick (Eds.), *Evolution and social psychology* (pp. 15–38). New York, NY: Psychology Press.

Hatton, T. J., & Bray, B. E. (2010). Long run trends in the heights of European men, 19th–20th centuries. *Economics and Human Biology*, *8*, 405–413. doi:10.1016/j.ehb.2010.03.001

Hazir, T. (2010). Physical characteristics and somatotype of soccer players according to playing level and position. *Journal of Human Kinetics*, *26*. doi:10.2478/v10078-010-0052-z

Henrich, J., & Gil-White, F. J. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior*, *22*, 165–196. doi:10.1016/S1090-5138(00)00071-4

Hensley, W. E., & Cooper, R. (1987). Height and occupational success: A review and critique. *Psychological Reports*, *60*, 843–849. doi:10.2466/pr0.1987.60.3.843

Higham, P. A., & Carment, D. W. (1992). The rise and fall of politicians: The judged heights of Broadbent, Mulroney and Turner before and after the 1988 Canadian federal election. *Canadian Journal of Behavioural Science/Revue Canadienne Des Sciences Du Comportement*, *24*, 404–409. doi:10.1037/h0078723

Hirt, E. R., & Clarkson, J. J. (2011). The psychology of fandom: Understanding the etiology, motives, and implications of fanship. In L. R. Kahle & A. Close (Eds.), *Consumer behavior knowledge for effective sports marketing* (pp. 59–85). New York, NY: Routledge.

Holbrook, C., Fessler, D. M., & Navarrete, C. D. (2016). Looming large in others' eyes: Racial stereotypes illuminate dual adaptations for representing threat versus prestige as physical size. *Evolution and Human Behavior*, *37*, 67–78. doi:10.1016/j.evolhumbehav.2015.08.004

Jackson, L. A., & Ervin, K. S. (1992). Height stereotypes of women and men: The liabilities of shortness for both sexes. *The Journal of Social Psychology*, *132*, 433–445.

Judge, T. A., & Cable, D. M. (2004). The effect of physical height on workplace success and income: preliminary test of a theoretical model. *The Journal of Applied Psychology*, *89*, 428–441. doi:10.1037/0021-9010.89.3.428

Karageanes, S. J. (2005). *Principles of manual sports medicine*. Philadelphia, PA: Lippincott Williams & Wilkins.

Knapen, J. E. P., Blaker, N. M., & Pollet, T. V. (2017). Size, skills, and suffrage: Motivated distortions in perceived formidability of political leaders. *PLoS One, 12*, *e0188485*. doi:10.1371/journal.pone.0188485

Kruger, D. J., Falbo, M., Blanchard, S., Cole, E., Gazoul, C., Nader, N., & Murphy, S. (2018). University Sports Rivalries Provide Insights on Coalitional Psychology. *Human Nature*, *29*, 337–352. doi:10.1007/s12110-018-9316-4

Lechelt, E. C. (1975). Occupational affiliation and ratings of physical height and personal esteem. *Psychological Reports*, *36*, 943–946. doi:10.2466/pr0.1975.36.3.943

Lukaszewski, A. W., Simmons, Z. L., Anderson, C., & Roney, J. R. (2016). The role of physical formidability in human social status allocation. *Journal of Personality and Social Psychology*, *110*, 385–406. doi:10.1037/pspi0000042

Malina, R. M., Cumming, S. P., Kontos, A. P., Eisenmann, J. C., Ribeiro, B., & Aroso, J. (2005). Maturity-associated variation in sport-specific skills of youth soccer players aged 13–15 years. *Journal of Sports Sciences*, *23*, 515–522. doi:10.1080/02640410410001729928

Malina, R. M., Eisenmann, J. C., Cumming, S. P., Ribeiro, B., & Aroso, J. (2004). Maturity-associated variation in the growth and functional capacities of youth football (soccer) players 13–15 years. *European Journal of Applied Physiology*, *91*, 555–562. doi:10.1007/s00421-003-0995-z

Marsh, A. A., Yu, H. H., Schechter, J. C., & Blair, R. J. R. (2009) Larger than life: Humans' nonverbal status cues alter perceived size. *PLoS One*, *4*, e5707. doi:10.1371/journal.pone.0005707

Masters, R., Poolton, J., & van der Kamp, J. (2010). Regard and perceptions of size in soccer: Better is bigger. *Perception*, *39*, 1290–1295. doi:10.1068/p6746

Mazur, A., Mazur, J., & Keating, C. (1984). Military rank attainment of a west point class: Effects of cadets' physical features. *American Journal of Sociology*, *90*, 125–150. doi:10.1086/228050

Melamed, T. (1992). Personality correlates of physical height. *Personality and Individual Differences*, *13*, 1349–1350. doi:10.1016/0191-8869(92)90179-S

Mirkov, D. M., Kukolj, M., Ugarkovic, D., Koprivica, V. J., & Jaric, S. (2010). Development of anthropometric and physical performance profiles of young elite male soccer players: A longitudinal study. *Journal of Strength and Conditioning Research*, *24*, 2677–2682. doi:10.1519/JSC.0b013e3181e27245

Murray, G. R. (2014). Evolutionary preferences for physical formidability in leaders. *Politics and the Life Sciences: The Journal of the Association for Politics and the Life Sciences*, *33*, 33–53. doi:10.2990/33_1_33

Murray, G. R., & Schmitz, J. D. (2011). Caveman politics: Evolutionary leadership preferences and physical stature. *Social Science Quarterly*, *92*, 1215–1235. doi:10.1111/j.1540-6237.2011.00815.x

Nevill, A., Holder, R., & Watts, A. (2009). The changing shape of "successful" professional footballers. *Journal of Sports Sciences*, *27*, 419–426. doi:10.1080/02640410802668676

Ostojic, S. (2004). Elite and Nonelite Soccer Players: Preseasonal physical and physiological characteristics. *Research in Sports Medicine*, *12*, 143–150. doi:10.1080/15438620490460495

Poli, R., Besson, R., & Ravenel, L. (2018). The CIES Football Observatory 2017/18 season. Neuchatel, Switzerland: International Centre for Sports Studies (CIES). Retrieved from http://www.football-observatory.com/IMG/pdf/cies_football_analytics_2018.pdf

Price, M. E., & Van Vugt, M. (2014). The evolution of leader-follower reciprocity: The theory of service-for-prestige. *Frontiers in Human Neuroscience*, *8*, 363. doi:10.3389/fnhum.2014.00363

Re, D. E., Dzhelyova, M., Holzleitner, I. J., Tigue, C. C., Feinberg, D. R., & Perrett, D. I. (2012). Apparent height and body mass index influence perceived leadership ability in three-dimensional faces. *Perception*, *41*, 1477–1485. doi:10.1068/p7342

Re, D. E., Hunter, D. W., Coetzee, V., Tiddeman, B. P., Xiao, D., DeBruine, L. M., . . . Perrett, D. I. (2013). Looking like a leader—Facial shape predicts perceived height and leadership ability. *PLoS One*, *8*, e80957. doi:10.1371/journal.pone.0080957

Reilly, T., Bangsbo, J., & Franks, A. (2000). Anthropometric and physiological predispositions for elite soccer. *Journal of Sports Sciences*, *18*, 669–683. doi:10.1080/02640410050120050

Sahlins, M. D. (1963). Poor man, rich man, big-man, Chief: Political types in Melanesia and Polynesia. *Comparative Studies in Society and History*, *5*, 285–303. doi:10.1017/S0010417500001729

Sarmento, H., Anguera, M. T., Pereira, A., & Araújo, D. (2018). Talent identification and development in male football: A systematic review. *Sports Medicine*, *48*, 907–931. doi:10.1007/s40279-017-0851-7

Sell, A., Cosmides, L., Tooby, J., Sznycer, D., von Rueden, C., & Gurven, M. (2009). Human adaptations for the visual assessment of strength and fighting ability from the body and face. *Proceedings of the Royal Society of London B: Biological Sciences*, *276*, 575–584. doi:10.1098/rspb.2008.1177

Sorokowski, P. (2010). Politicians' estimated height as an indicator of their popularity. *European Journal of Social Psychology*, *40*, 1302–1309. doi:10.1002/ejsp

Stulp, G., Buunk, A. P., Verhulst, S., & Pollet, T. V. (2015). Human height is positively related to interpersonal dominance in dyadic interactions. *PLoS One*, *10*, *e0117860*. doi:10.1371/journal.pone.0117860

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. *European Journal of Social Psychology*, *1*, 149–178. doi:10.1002/ejsp.2420010202

Třebický, V., Havlíček, J., Roberts, S. C., Little, A. C., & Kleisner, K. (2013). Perceived aggressiveness predicts fighting performance in mixed-martial-arts fighters. *Psychological Science*, *24*, 1664–1672. doi:10.1177/0956797613477117

Von Rueden, C. (2014). The roots and fruits of social status in small-scale human societies. In J. T. Cheng, J. L. Tracy, & C. Anderson (Eds.), *The psychology of social status* (pp. 179–200). New York, NY: Springer.

Von Rueden, C., Gurven, M., & Kaplan, H. (2008). The multiple dimensions of male social status in an Amazonian society. *Evolution and Human Behavior*, *29*, 402–415. doi:10.1016/j.evolhumbehav.2008.05.001

Vugt, M. V., & Ahuja, A. (2010). *Selected: Why some people lead, why others follow, and why it matters*. London, England: Profile Books.

Vugt, M. V., & Tybur, J. M. (2014). The evolutionary foundations of hierarchy: Status, dominance, prestige, and leadership. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (Vol. 2, pp. 788–809). New York, NY: John Wiley.

Wann, D. L. (2006). Understanding the positive social psychological benefits of sport team identification: The team identification-social psychological health model. *Group Dynamics*, *10*, 272–296. doi:10.1037/1089-2699.10.4.272

Wann, D. L., Haynes, G., McLean, B., & Pullen, P. (2003). Sport team identification and willingness to consider anonymous acts of hostile aggression. *Aggressive Behavior*, *29*, 406–413. doi:10.1002/ab.10046

Werner, D. (1982). Chiefs and presidents: A comparison of leadership traits in the United States and among the Mekranoti-Kayapo of Central Brazil. *Ethos*, *10*, 136–148. doi:10.1525/eth.1982.10.2.02a00030

Wilson, P. R. (1968). Perceptual distortion of height as a function of ascribed academic status. *The Journal of Social Psychology*, *74*, 97–102. doi:10.1080/00224545.1968.9919806

Winegard, B., & Deaner, R. O. (2010). The evolutionary significance of red sox nation: Sport fandom as a byproduct of coalitional psychology. *Evolutionary Psychology*, *8*, 432–446. doi:10.1177/147470491000800310

Young, T. J., & French, L. A. (1996). Height and perceived competence of U.S. presidents. *Perceptual and Motor Skills*, *82*, 1002. doi:10.1177/003151259608200301

Zebrowitz, L. A., & Montepare, J. (2006). The ecological approach to person perception: Evolutionary roots and contemporary offshoots. In M. Schaller, J. A. Simpson, & D. T. Kenrick (Eds.), *Evolution and social psychology* (pp. 81–113). New York, NY: Psychology Press.