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# High intrasexual competition is related to inflated height reports in male junior soccer players

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ABSTRACT

Intrasexual competition refers to the rivalry between same-sex individuals over access to potential mates. Because in many animal species larger males are more likely to defeat smaller opponents over access to potential mates and additional resources, it has been suggested that intrasexual competition was a major driver in the emergence of male-biased sexual size dimorphism. In the same vein, human male height has been related to aggressive behavior, status and dominance. Given the value of body size in agonistic interactions, body inflation strategies are likely to have evolved in many animal species. In this study, we explored the relationship of the bias in reporting one's own height—a phenomenon reminiscent of animal self-inflation mechanisms—with intrasexual competition, and sociable and aggressive dominance, in the highly competitive context of Uruguayan pre-professional soccer. We also considered the bias in reporting additional operationalizations of body size, i.e., weight, and body mass index (BMI). We showed that intrasexual competition is positively correlated with height over-report. To the best of our knowledge, this study is the first to relate intrasexual competition and the bias in reporting one's own height, a putative indicator or power and status.

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## 1. Introduction

In addition to obvious differences in primary sex characteristics, i.e., those organs directly involved in reproduction, human males and females exhibit relatively marked differences in a number of attributes referred to as secondary sex characteristics, including males displaying larger statures, more robust cranial and facial features, and greater muscularity (Frayer & Wolpoff, 1985).

In humans, sex differences in height, and height preference, have been extensively studied in relation to intersexual selection—i.e., mate choice. A wealth of evidence points to a significant female preference for taller males; e.g., taller men receive more responses on personal advertisements (Pawlowski & Koziel, 2002), females report dating taller men more frequently (Shepperd & Strathman, 1989), and women in a potentially fertile phase of the menstrual cycle, seem to prefer taller men (Gangestad, Garver-Apgar, Simpson, & Cousins, 2007; Pawlowski & Jasienska, 2005). It has also been shown that women, but not men, consider partner stature unacceptable if it results in the female being taller than the male (Stulp, Buunk, & Pollet, 2013). However, despite this female preference for taller men, exceptional height does not seem to confer reproductive success in human males (Barber, 1995; Buss & Barnes, 1986; Stulp, Pollet, Verhulst, & Buunk, 2012). That average height men usually marry at an earlier age, and thus extend their reproductive window, has been suggested as a possible explanation of this apparent contradiction (Stulp, Pollet, et al., 2012). It has also been noted though, that scarce food supply and highly-demanding environments may dampen the female preference for taller men (Sear & Marlowe, 2009; Sorokowski & Sorokowska, 2012; Sorokowski, Sorokowska, Fink, & Mberira, 2011).

Several lines of evidence suggest that height preference in humans is rooted in the signaling value of human stature. Adult height is the result of complex interactions between genetic factors and environmental conditions (Gahtan & Mark, 2013; Gustafsson & Lindenfors, 2009; Lango Allen et al., 2010; Lettre, 2011), and thus, it has been proposed as a good indicator of good health, status and cognitive abilities (Case

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& Paxson, 2006; Judge & Cable, 2004; Silventoinen, Lahelma, & Rahkonen, 1999; but see also Samaras, 2012). Human height has also been found to be negatively related to fluctuating asymmetry, which results from perturbations of the ontogenetic development, thus human height has also been considered as a proxy for good genes (Manning, 1995).

A consensus over an exact definition of body size does not exist (Lovich & Gibbons, 1992). Therefore, in addition to measures along a major morphological axis (height, in humans), body weight, and body mass index (BMI) have been frequently used as operational measures of size (e.g., Gustafsson & Lindenfors, 2004; Lindenfors et al., 2007; Plavcan, 2012a). Male BMI seems to play a lesser role than height in female preferences, following also a curvilinear pattern (Maisey, Vale, Cornelissen, & Tovée, 1999). Furthermore, differences in socio-economic context have been found to influence the role played by BMI on females' attractiveness judgment of men, with BMI having a larger influence in rural contexts than in urban settings (Swami & Tovée, 2005).

In addition to intersexual selection, further non-mutually-exclusive mechanisms, including intergroup violence, and mate and resource competition, have also been implied in the emergence of SSD in many animal species (Frayer & Wolpoff, 1985; Isaac, 2005; Kanazawa & Novak, 2005; Plavcan, 2012). Among mammals, larger males are more likely to defeat smaller male opponents leading to higher social rank and increased dominance (Ellis, 1994). It has recently been argued that intrasexual competition may play a greater role than previously thought in human male-biased SSD (Hill, Bailey, & Puts, 2016). Accordingly, a positive association between human male stature and different attributes relevant to intrasexual competition has been observed. Male height has been found to be positively associated with greater actual and perceived physical strength (Sell et al., 2009), aggressive behavior and entitlement (Archer & Thanzami, 2007; but see also Archer & Thanzami, 2009), perceived fighting ability (von Rueden, Gurven, & Kaplan, 2008; but see Třebický et al., 2015), increased perceived authority (Stulp, Buunk, Verhulst, & Pollet, 2012), and dominance in dyadic agonistic interactions (Stulp, Buunk, Verhulst, & Pollet, 2015).

However, in humans the relationship between BMI—an alternative measure of body size—and intrasexual competition remains unclear. A positive correlation between fighting ability and BMI has been reported for females (Palmer-Hague, Zilioli, Jagore, & Delecce, 2015), but these variables do not seem to be significantly associated in males (Třebický et al., 2015). Similarly, BMI was found to be positively correlated with physical aggression in women, and—surprisingly—negatively associated in adolescent males (Pinhey, 2002).

The value of a large body size in relation to intrasexual competition—particularly in contest competition—was recognized early (Darwin, 1872, 1981). Moreover, in *The Expression of the Emotions in Man and Animals*, Darwin proposed that body-inflation mechanisms may serve as a means of exciting fear in the enemy, and eventually deter potential rivals (Darwin, 1872/2009). Subsequent research has provided evidence of the association between dominance and an expanded posture both in primates and humans (Weisfeld & Linkey, 1985). Weisfeld and Beresford (1982) reported a positive association, in high school students, of erect posture while receiving midterm grades with the numerical examination score received. In the same direction, it has been observed that the experience of power can influence an individual's perceptions of their own height, that is individuals in a simulated high-power situation report significantly higher height values than those in a low-power condition (Duguid & Goncalo, 2012).

A number of studies based on height self-reports, have shown that both males and females tend to over-report their height (Rowland, 1990; Sharples, Crutchley, García, Gray, & Horwarth, 2012; Shields, Connor Gorber, & Tremblay, 2008; Wang, Patterson, & Hills, 2002; but see Bowring et al., 2012). Whether such inaccuracies in height report—reminiscent of animal self-inflation mechanisms—are related to intrasexual competition is an interesting question.

In this regard, Fisher and Cox (2011) have proposed that human intrasexual competition is composed of four major themes: self-promotion, competitor derogation, mate manipulation, and competitor manipulation. In intrasexual contexts, males more frequently engage in deceptive acts and tactics related to exaggeration of superiority and sexual promiscuity, intensity, and popularity. (Tooke & Camire, 1991). Thus, in this study, we investigated whether intrasexual competition and two different forms of dominance—sociable and aggressive dominance—were associated with the bias in height report. We also examined the potential association of intrasexual competition and both forms of dominance in relation to weight and body mass index (BMI), as alternative measures of body size. We hypothesized that intrasexual competition and dominance levels would be positively associated with the extent of size over-report, mimicking animal self-inflation mechanisms.

As an operational measurement of intrasexual competition, in this research we used the scale developed by Buunk and Fisher (2009) which focuses on intrasexual competition as an attitude, that is, the extent to which one views confrontation with same-sex individuals in competitive terms. Sociable and aggressive dominance—two forms of dominance characterized by Kalma, Visser, and Peeters (1993)—were also considered in this study. According to the authors of these scales, sociable dominance is characterized by a strong need to dominate in a reasonable way, a positive attitude towards others, a central position in groups, and a solid self-esteem; whereas aggressive dominance is characterized by a prevailing negative attitude towards others, and a strong motivation to realize one's own aims, even at the expense of personal relationships (Kalma et al., 1993).

While in many mammals dominance is achieved aggressively, in humans alternative mechanisms—such as sport competitions, competitions for promotion, elections and criticism—are used (Mazur & Booth, 1998). It has been suggested that athletic competition constitutes a culturally regulated expression of intrasexual competition, which provides a venting channel such that the competition does not escalate into uncontrolled violence (Geary & Bjorklund, 2000). The present research was conducted in the highly competitive context of Uruguayan pre-professional association football (soccer). Soccer has been characterized as one of the most competitive sports (Ben-Naim, Vazquez, & Redner, 2007), making it an ideal environment to study intrasexual competition mechanisms and dominance relationships.

Despite its small size population of 3.43 million inhabitants, Uruguay has a reputed soccer history having won two Olympic titles, two World Cups and 15 America Cups—the oldest continental soccer championship in the world. Becoming a successful soccer player in Uruguay is one of the few available avenues for upwards social mobility for the least advantaged, with 700 Uruguayan adolescent males joining different clubs affiliated with the Uruguayan Soccer Association (AUF) every year. The selection process involved in becoming a professional soccer player is extremely competitive—only 5% will become First Division players, while less than 1% will become successful international players (Secretaría Nacional del Deporte (Uruguay), 2009).

To summarize, in this study we examined the association of intrasexual competition and two forms of dominance—sociable and aggressive dominance—with the bias in self-reporting different operationalizations of body size—height, weight and BMI—in the context of pre-professional soccer in Uruguay. The highly competitive nature of this sport, makes it an ideal context for studying competition and dominance attitudes. This study is based on self-reported measures of psychological attributes; and a combination of self-reported and measured anthropometric data, which combined provide a measure of a self-enhancement strategy reminiscent of animal self-inflation mechanisms. As this research was carried out in a non-US, non-European country, we believe the results reported here would add to the cultural diversity of social psychology studies.

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