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What might David do in the face of Goliath? The effects of height on status-signaling behaviours in males

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Citation

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The Effects of Height on Status-Signaling Behaviours in Males

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2023

Declaration

I hereby declare that this thesis is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which have been used in this thesis.

This thesis has also not been submitted for any degree in any university previously.

Nicole Chen Ruiying

24 July 2023

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Status-Signaling Behaviours in Males

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Abstract

While the extant literature has looked mainly at how attractive, opposite-sex
stimuli impacts our behaviour, much less is known regarding how exposure
to same-sex stimuli may also wield influence on human behaviors.
Proffering an evolutionary-based perspective, this study aims to investigate,
in a sample of heterosexual males, how exposure to taller same-sex stimuli
will differentially influence conspicuous status-signaling behaviors of
shorter males compared to taller males, in the context of a mating motive.
Two competing hypotheses are proposed: (1) shorter males will display
greater conspicuous status-signaling compared to taller males in the presence
of a tall male confederate and (2) taller males will display greater
conspicuous status-signaling compared to shorter males in the presence of a
tall male confederate. To test the prediction, a quasi-experimental mixed
design was used, and heterosexual male participants were recruited from
Singapore Management University as well as the general public ($N = 60$).
Participants were randomly assigned to either a shorter or taller male
confederate condition, with an attractive female confederate present in both
conditions. Spending on status items and their willingness to spend in the
form of a reservation price were assessed as dependent variables. Results
offered little support to either hypotheses, although there is some consistent
evidence pointing towards taller males spending more than shorter males in

the presence of a taller male confederate. Alternative explanations,

limitations and future recommendations are discussed.

Keywords: Intrasexual competition, conspicuous status-signaling,

compensatory behaviours

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Chapter 1: Introduction

It is well-established in the extant literature that exposure to attractive, opposite-sex stimuli have impacts on the behaviors and judgments of both heterosexual men and women. For example, such stimuli have been shown to cause men to discount the future (Wilson & Daly, 2004) and increase their likelihood of financial risk-taking (Baker & Maner, 2008). They have also been shown to increase receptiveness of morally questionable behavior (Ariely & Loewenstein, 2006) and acceptance of inequitability in ultimatum games (Wilson & Daly, 1985). There remains, however, a paucity of research looking into whether sexual same-sex stimuli will also have an impact on behaviors and judgments, and this present research aims to bridge this gap. More specifically, this study aims to examine how male height influences conspicuous status-signaling behaviours in other males of varying heights. Drawing on an evolutionary-based perspective, I seek to delineate how same-sex stimuli could also have impacts on our behaviors.

Theory of Sexual Selection

Our behaviors and decisions have been shaped over evolutionary history to enable us to solve recurring adaptive problems. One of such perennial issues is mating, where males and females alike are motivated to find the best mates to increase their chances of survival and reproductive success (Griskevicius et al., 2007). This process by which males and females compete for access to mates and fertilization opportunities is known as the theory of sexual selection, which was developed by Charles Darwin (1871). Within the theory of sexual selection, males and females have evolved differential behavioral adaptations to attract and retain mates (Wilson & Daly,

1985), and this can be explained via *intrasexual competition*, one of the primary means of sexual selection (Darwin, 1871).

Intrasexual Competition

Intrasexual competition refers to the rivalry with same-sex others, which is driven primarily by the goal of gaining and maintaining access to mates (Buunk & Massar, 2012; Darwin, 1871). Females in most animal species have greater minimum required parental investment in offspring than males (Fisher, 1930; Trivers, 1972; Williams, 1975). Upon copulation in humans, women potentially have an obligatory nine-month gestational investment that is substantial in terms of time, energy, resources as well as other related factors (Buss, 1989). Women would also have to engage in breastfeeding, which could last as long as four years in traditional societies (Shostak, 1981). Moreover, while men's reproductive success is mostly limited by the number of women they can fertilize, women can only carry one offspring at a time (Trivers, 1972; Wilson & Daly, 1985). Women also have a much shorter fertility window compared to men. Whereas women's fertility peaks in her twenties and declines sharply in her late thirties to early forties, men typically remain fertile throughout the lifespan. Taken together, this causes reproductively viable men to far outnumber women who are capable to reproducing.

As such, these factors make women not only a valuable reproductive resource (Trivers, 1972), but also a scarce resource which men compete for (Griskevicius et al., 2012; Li et al., 2002; Wong & Candolin, 2005). Therefore, men would face greater intrasexual competition, where they have evolved to engage in fierce competition with other men for status and

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resources such that they can successfully monopolize, conquer, and impress opposite-sex mates to increase their reproductive success.

Mate Preferences of Females

Top desirable traits that we look out for in potential mates have been reliably established across the literature to be sex differentiated. Not only have these sex differences been empirically confirmed across multiple cultures and societies, they hold true regardless of religion, ethnicity, economic environment, and political systems (Buss, 1989). Males prioritize attributes that signal reproductive value or fertility in opposite-sex partners, which typically correspond to youth and physical attractiveness (Buss, 1989; Symons, 1981; Williams, 1975). On the other hand, females prioritize characteristics that signal status and resources in opposite-sex partners (Buss, 1989), and this preference of mating with males of higher rank, bearing resources and owning better territories have also been empirically confirmed in many non-human animal species (Calder, 1967; Lack, 1940; Trivers, 1985).

Why have females evolved to prefer mates with attributes that signal status and resources? This goes back to our earlier discussion of evolved preferences to solve adaptive problems. In human evolutionary history, securing resources via mating likely gave women reproductive advantages over women who were unable to secure them, such that these reproductive benefits obtained far outweighed the reproductive costs accrued in the choice (Buss, 1991). Indeed, women who were able to secure resources would have benefitted herself and her offspring with immediate material advantage, maximizing their chances of survival. Women who were unable to successfully accrue male resource investment would have had lower survival

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and reproductive successes in human ancestral conditions (Hill & Kaplan, 1988). Moreover, the offspring would also be able to leverage on the acquired social and economic benefits for an enhanced reproductive advantage (Buss, 1989).

One such evolutionary characteristic associated with status is height (Blaker et al., 2013; Buunk et al., 2008; Jackson & Ervin, 1992). This height-status association in humans were found to revolve mainly around adult men across multiple cultures, according to Ellis (1994) based on 160 studies from both pre-industrial and industrial societies. In pre-industrial societies, where the environment greatly resembles that of evolutionary ancestral environments, this height-status association may have arose from taller men being endowed with advantageous physical traits which allowed them to out-compete other men for resources. Indeed, men of taller statures were found to be physically stronger and have better fighting abilities compared to their shorter same-sex rivals (Archer & Thanzami, 2007; Puts, 2010; Sell et al., 2009; Vonrueden et al., 2008), which results in a host of aggressive behaviors (Archer & Thanzami, 2007; Muñoz-Reyes et al., 2012; Sell et al., 2009). Such behaviors are especially relevant in the domain of resource acquisition, for they are associated with resource gaining potential in both human and non-human animals (Parker, 1974; Sell et al., 2009).

In industrial societies, fighting ability and strength may be less relevant and socially frowned upon since we are prohibited by law from using force against another individual (Puts, 2010). A possible explanation expounded by literature in understanding the relationship between height and status in modern societies is that height is associated with interpersonal dominance,

which allows for taller men to win non-physical confrontations. Indeed, taller men have been perceived to be more threatening during a non-physical contest by shorter men, due to perceptions of taller men having greater strength and fighting ability (Sell et al., 2009). Additionally, taller men are also seen as more authoritative, competent, intelligent and having better leadership qualities (e.g., Blaker et al., 2013; Blaker & Van Vugt, 2014; Cinnirella & Winter, 2009; Judge & Cable, 2004; Young & French, 1996), which may likely contribute to increased perceptions of dominance and allow them to out-compete shorter men. Expectedly, taller statures were found to be strongly associated with workplace success (Gawley et al., 2009; Judge & Cable, 2004) as well as greater earning power and higher socioeconomic status (Tyrrell et al., 2016) compared to shorter statures in men.

Taken together, females should find tall statures in males to be a highly desirable trait, as it is a reliable cue for status. Indeed, this preference has been captured across multiple empirical studies, where females preferred to be in a couple where the male was taller than the female (e.g., Courtiol et al., 2010; Fink et al., 2007; Pawlowski, 2003). Additionally, preference for the male being the taller one in a couple was most pronounced amongst females compared to males (Stulp et al., 2013); females were much more tolerant towards their male partner's height only when they were substantially shorter than the male (e.g. 21cm). This was in stark contrast to males, who were most satisfied when they were only marginally taller than their female partner (e.g. 8cm).

The David vs Goliath Dilemma

It has been reasoned above that women would prefer men of taller statures due to their association with status, and that preference has been reliably supported in the literature (e.g., Courtiol et al., 2010; Fink et al., 2007; Pawlowski, 2003; Stulp et al., 2013). Are shorter males then doomed to fail in the mating game if they were pitted against their taller counterparts? Perhaps not.

It has been theorized that males have developed a form of "flexible status psychology", such that they are able to effectively calibrate their behaviours to the environment in order to enhance their status (Van Vugt & Tybur, 2015). As such, in a situation where they are physically outcompeted by taller males, shorter males would turn towards non-physical strategies to win contests against taller males. Indeed, non-physical status-enhancing behaviours do manifest more prominently in shorter males when exposed to taller males, such as conspicuous status-signaling. For example, in the presence of taller male employees, shorter male customers spent more money compared to taller male customers (Otterbring et al., 2018). Moreover, shorter male customers, compared to taller ones, were also more likely to choose larger brand logos when exposed to taller male employees (Otterbring et al., 2018).

Conspicuous status-signaling is also relevant when there is a mating context. Conspicuous status-signaling has been used to signal mate value and attract romantic partners (Griskevicius et al., 2007; Sundie et al., 2011), are more likely to attract the attention of fertile females (Lens et al., 2012), and when the sex ratio of females to males is low (Lycett & Dunbar, 2000).

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Relatedly, when primed with mating cues, males displayed better recall memory for conspicuous status items (Janssens et al., 2011).

Taken together, conspicuous status-signaling would be a beneficial non-physical strategy that shorter males can utilise to outcompete their taller same-sex rivals in the presence of mating cues. It could also increase the desirability of shorter males in the eyes of potential mates, since females are attracted to cues of status in males (Buss, 1989). Therefore, we could preliminarily predict that shorter males, compared to taller males, are more likely to display greater conspicuous status-signaling in the presence of taller same-sex competitors within a mating context.

At the same time, one could also possibly argue that taller males may display greater conspicuous status-signaling as a proxy for competitiveness in the presence of same-sex competitors of similar stature, compared to shorter males. Being competitive is necessary amongst males to compete against each other for status and resources, as well as to impress females (Geary, 2010; Schmitt & Buss, 1996). Taller males have been shown to be more dominant (Ellis, 1994), which is linked to higher testosterone levels (Marsh et al., 2009; Popma et al., 2007). Empirical evidence indicates that greater testosterone levels is associated with a suite of behaviours that encourage competitive behaviour (e.g., Hermans et al., 2006; Stanton & Schultheiss, 2009; Welling et al., 2016). Moreover, as taller males have been associated with greater physical aggression compared to shorter males (Archer & Thamzani, 2007), taller males may also use conspicuous status-signaling as a proxy for physical aggression, since being physically aggressive is frowned upon in modern societies (Puts, 2010).

Chapter 2: Current Research

While prior research has faithfully examined decisions and behaviors using sexual opposite-sex stimuli, it has yet to address how same-sex stimuli may also have a wider impact on people. In the context of marketing and consumption, advertising campaigns these days do not rely solely on opposite-sex stimuli to promote consumption goods to consumers –same-sex stimuli are also used. One such famous example is that of Abercrombie & Fitch, where male models with provocative poses are featured to attract male consumers. Therefore, it is important to understand how a wider set of attractive stimuli may impact judgment and decisions, which is the goal of this current research.

The central argument is that in the context of intrasexual competition, men who are of shorter statures are more likely to utilise flexible behavioural strategies to compete with males of taller statures for mates. Such behaviors are likely to have arose due to the costliness accrued by the shorter male in engaging head on in a physical altercation with a taller male. At the same time, taller males may also display such behaviours as a consequence of competitiveness or indirect aggression to gain access to mates. Therefore, two competing hypotheses are posed, and this study will aims to test and unravel the competing hypotheses.

Additionally, since conspicuous status-signaling should only be activated when cues of intrasexual competition are present, as status-signaling under the absence of intrasexual competition would have been extremely costly to the male involved, I predict no main effect between participant height and conspicuous status-signaling.

Chapter 3: Study

The aim of the current study is to investigate two competing hypotheses: (1) that shorter males are more likely to display greater conspicuous status-signaling compared to taller males in the presence of taller same-sex competition in a mating context or (2) that taller males are more likely to display greater conspicuous status-signaling compared to shorter males in the presence of same-sex competition of similar stature in a mating context. To test the hypothesis, height of male participants will be the independent variable. Conspicuous status signaling will be operationalized in two ways: (1) spending on status items and (2) willingness to spend in the form of a reservation price for a fountain pen. Participants will also be primed with either a taller male confederate or a less shorter male confederate. Therefore, the current study will employ a (participant height) x 2 (male confederate: taller male, shorter male) x (attractive female) between-subjects quasi-experimental design.

In order to exclude the possibility that results will be affected by other physical traits such as self-perceived physical attractiveness and body weight, as well as personality traits such as baseline self-esteem (Sivanathan & Pettit, 2010), these variables were also controlled for in the analyses.

Analytic Plan

The present study's design and analysis were not pre-registered. All analyses were conducted in R version 4.3.1 (R Core Team, 2023). Estimated marginal means and simple slopes analyses were conducted using *emmeans* version 1.8.6 (Lenth et al., 2023). The relevant Levene's test and t-tests were conducted using *car* version 3.1.2 (Fox et al., 2023). Correlation plots were

extracted using *metan* version 1.18.0 (Olivoto, 2023). All descriptive statistics

and relevant scale reliabilities were computed using *psych* version 2.3.3

(Revelle, 2023).

Figure 1

Hypothesized Model
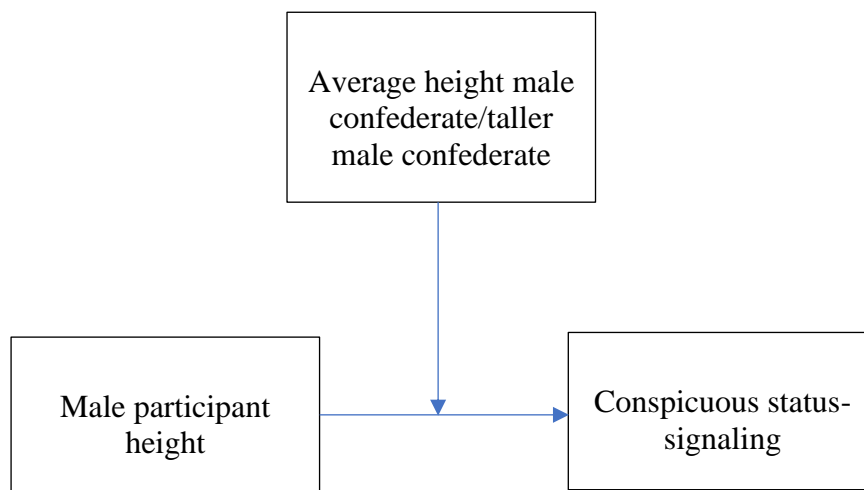
Three separate models were ran for each dependent variable. The first

model was unadjusted, the second model adjusted for demographic variables,

and the third model additionally adjusted for participant traits such as baseline

self-esteem, self-perceived physical attractiveness and weight. Because the

independent variable is a continuous predictor, it was mean-centred prior to

the main analyses.

Method

Confederate Pre-testing

Male and female confederates were recruited from a sample of

undergraduate students at Singapore Management University. The initial

recruitment yielded a total of 39 potential confederates (Female = 31, Male =

8). During the recruitment, students were asked to submit a headshot of themselves against a white background, with a neutral expression. Male students were additionally asked to declare their height. Upon further screening, a final total of 23 potential confederates (Female = 21, Male = 2) had their headshots submitted for a physical attractiveness pre-testing. All participants for the pre-testing were heterosexual males ($N = 46$), and they rated the headshots (1 = *very unattractive*, 7 = *very attractive*). Two females who fell into the moderately attractive category (Ms = 4.56; SDs = 1.14, 0.97; percentiles = 89.0) and had the highest scores were selected. Both male confederates (Ms = 3.05, 3.44; SDs = 0.76, 1.12) did not differ significantly in their physical attractiveness[1] (p = 0.076).

Table 1

Comparison of Male Confederate Ratings Between Male and Female Sample

Male Confederate Ratings			
Male Sample ($N = 46$)		Female Sample ($N = 37$)	
Average Height Male Confederate	Taller Height Male Confederate	Average Height Male Confederate	Taller Height Male Confederate
$M = 3.05$	$M = 3.44$	$M = 2.38$	$M = 3.57$
$SD = 0.76$	$SD = 1.12$	$SD = 1.19$	$SD = 1.42$
$p = 0.076$		$p < .0001$	

[1] It is interesting to note that while I did not find any significant difference in the physical attractiveness between the two male confederates when they were rated by a male sample, this no longer held true when a female sample rated the male confederates. Findings are summarised in Table 1.

Main Study

Participants. The targeted sample size was 107 heterosexual male participants, based on the power analysis conducted using G*Power (version 3.1.9.2) to detect a small to medium effect ($f^2 = 0.15$) with a power of 0.95. Ultimately, a sample of 60 heterosexual male participants were recruited from a mix of the general public as well as the SMU student population. SMU male students were recruited via the open subject pool and word-of-mouth, whereas the general public was recruited via advertisements through Telegram and word-of-mouth. Data collection was approved by the SMU Institutional Review Board [IRB-23-032-A023-M1(323)] and informed consent was obtained from all the participants. Participants were compensated S$8 upon completion of the study. Sample characteristics of the participants can be found in Table 2.

Table 2

Descriptive Statistics of Sample

	M (*SD*) or %	Observed Range
Demographics		
Race (% Chinese)	78.30%	
Age (in years)	26.85 (7.31)	18–58
Monthly household income	3.77 (1.41)	1–6
Subjective socioeconomic status	6.97 (1.41)	4–10
Predictors and Covariates		
Participant height (cm)	173.22 (6.03)	162–188
Participant weight (kg)	69.78 (11.03)	48.35–99.3
Self-esteem (baseline)	4.8 (0.81)	2.64 –6.82
Self-perceived physical attractiveness	3.37 (0.82)	1–5
Outcome Variables		
Spending on status items	5.41 (1.39)	2.6–9

Willingness to spend [a]	1.83 (0.54)	0.699–3.176

[a] Values reported are log-transformed values.

Procedure and Measures. The entire study procedure, inclusive of informed consent and debriefing, took approximately 15 minutes to complete. The flow of the procedure is depicted in Figure 2.

The study was advertised as a "Wellbeing and Decision Making" study for heterosexual males, held at the Psychology Lab in Singapore Management University. Only one participant could be assigned to each 15-minute session. Prior to the arrival of the first participant, the experimenters randomly assigned the list of participants to either the taller male confederate condition or the shorter male confederate condition. Random assignment was done using the RANDBETWEEN function on Microsoft Excel. Upon arrival at the lab, participants were given a participant ID card and an iPad to complete the questionnaires on, and were ushered into a holding room to complete a battery of baseline measures. After participants had completed the baseline measures, they were then ushered to one of the experimental condition rooms as per the random assignment. Both conditions had a moderately attractive female confederate present.

In the holding room, the participant first read the informed consent form and the cover story, which was ostensibly about understanding how the wellbeing of heterosexual males influences their decision making. After which, they proceeded to answer a series of filler wellbeing measures not pertinent to the study, with the self-esteem and self-perceived physical attractiveness measures embedded in the mix. The order of the measures were

counterbalanced for each participant. Once the participant had completed the

baseline measures, a set of instructions would appear, requesting them to exit

the holding room and to approach the experimenter outside the holding room

for further instructions.

Figure 2

Overview of Study Procedure

Confederate Pre-test	Main Study
Initial recruitment (Submission of headshots and basic information)	Experimenter gives participant their participant ID card and iPad
Informed consent for usage of headshots for pretest	Participant ushered into holding room
Final yield of potential confederates	Informed consent and cover story
Pre-testing of confederate headshots	Baseline measures and filler measures
Selection of final male and female confederates	Randomly assigned experimental condition
	Height and weight measurement
	Outcome measures and filler measures
	Demographic questions and filler measures
	Probing of true study purpose
	Debrief

The experimenter then ushered the participant into one of the

experimental condition rooms per the random assignment. To prime a mating

motive, the female confederate would smile and greet the participant in a

friendly manner, welcoming them to the second portion of the study. To prime

the participant of their height difference with respect to the male confederate's height, the male confederate was tasked to take the height of the participant. Following which, the female confederate would then step in and speak to the male confederate in a friendly tone to set up the decision making tasks, in order to elicit a form of mate competition. The female confederate then proceeded to take the participant's weight.

After the participant had their weight taken, the female confederate would direct them to another section of the room to complete a series of decision making tasks. The decision making tasks involved a series of filler measures, with the outcome measures of conspicuous status-signaling embedded within the flow. In order to keep the height prime salient, the participant was told that he would be carrying out some interactive tasks[2], and were instructed to remain standing until the tasks were complete, with the male confederate standing directly opposite the participant.

Task instructions were displayed using one of the confederate's laptops, and all task instructions were verbalized to the participant. The participant was also encouraged to clarify any doubts when they arose. These steps were carried out in order to maintain a semblance of interactiveness and consistency throughout. Upon successful completion of all tasks, the confederates invited the participant to take a seat to complete the remainder of the survey, which were filler wellbeing measures, demographic questions, and who their assistants were for the day. Privacy was given to the participant, as the confederates then excused themselves and waited outside the room. Before

[2] Interactive tasks included a memory game where cartoon animal cards were laid face down and participants had to match pairs of similar cards in the shortest time possible. Apart from the outcome measures, these tasks were filler tasks to obscure the true nature of the study.

the participant was directed to the debrief page, an open-ended question was posed to ascertain what they thought was the actual purpose of the study. None of the participants were able to correctly predict the true purpose and hypothesis.

Participant height (Independent variable). Participants had their heights measured using a wall measuring tape. Height was recorded in centimetres.

Male confederates (Moderator). Two male confederates of differing heights were utilised for this study. The shorter male confederate was 173cm tall, which is the mean height for adult males in Singapore (WorldData, n.d.). The taller male confederate was 182cm tall, which is 1.4SD (1SD = 6.35cm) above the mean height for adult males in Singapore. Due to the paucity of official height data published on a national level, the standard deviation data was obtained from a paper published by the National Bureau of Economic Research (Floud, 1998). Each of the male confederates were dummy-coded into dichotomous variables (0 = *taller*, 1 = *shorter*).

Attractive female confederate. Two moderately attractive female confederates with similar attractiveness scores were utilised for the study. They were each paired to a male confederate during the study procedure, and the pairings were counterbalanced throughout the study. Each of the female confederates were dummy-coded into dichotomous variables (0 = *first confederate*, 1 = *second confederate*).

Status items spending (Dependent variable). Taken from previous research on status-signaling consumption (Griskevicius et al., 2007; Wang & Griskevicius, 2014), participants completed items about their consumption

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preferences. They were asked the following: "Compared with the average male adult in Singapore, please indicate how much money you would want to spend on…", and indicated their willingness to spend money on a set of status-signalling items (1 = "*much less than the average adult*", 9 = "*much more than the average adult*"). The status-signaling items included a new watch, new car, new mobile phone, a nice vacation to Europe, and taking a group of friends out to dinner. The items were averaged to compute a status spending index ($\alpha = 0.75$).

Willingness to spend (DV). Taken from Rucker and Galinsky (2008), participants were asked to indicate how much they would be willing to pay for a fountain pen in the form of their reservation price (in dollars) for the product. It was an open-ended question. As the results were positively skewed, they were log-transformed prior to the formal analyses.

Covariates. Age, race, household income, subjective socioeconomic status, participant weight, self-perceived physical attractiveness and baseline self-esteem were used as covariates in the study. Participants reported their race as one of the five options (*Chinese, Malay, Indian, Eurasian* or *Other*). Race was dummy coded into dichotomous variables (0 = *Chinese*, 1 = *non-Chinese*). Monthly household income was measured using a 6-point scale (1 = *less than $2,000*, 2 = *$2,000–$5,999*, 3 = *$6,000–$9,999*, 4 = *$10,000–$14,999*, 5 = *$15,000–$19,999,* 6 = *more than $20,000*). Subjective socioeconomic status was measured using a 10-point ladder scale (1 = *Lowest status*, 10 = *Highest status*), in line with Adler and colleagues (2000). Self-perceived physical attractiveness was assessed using a 5-point Likert scale (1 = *low attractiveness*, 3 = *average attractiveness*, 5 = *high attractiveness*) as

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used in the literature (Borráz-León & Rantala, 2021; Little et al., 2001). Baseline self-esteem was assessed using the Rosenberg Self-Esteem scale (Rosenberg, 2011). Participants were asked to indicate their agreement with each of the ten items of interest on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*). Negatively-worded items were reverse-coded, and items were then averaged to compute an overall baseline self-esteem score for each participant (α = .86).

Results

Participant Height x Male Confederate Condition (DV: Status Items)

Firstly, to ascertain that the status items results did not differ between the two female confederates, an independent samples *t*-test was conducted and no significant difference was found, $t(58) = -1.51$, $p = 0.136$. As such, there was no need to control for the female confederates in the remainder of the analyses.

No main effect between participant height and status items spending should be observed. Indeed, the main effect was not significant in Model 1 (β = .040, *SE* = 0.06, $t = 0.705$, $p = 0.484$), Model 2 (β = .027, *SE* = 0.06, $t = 0.474$, $p = 0.637$), nor Model 3 (β = -.016, *SE* = 0.06, $t = -0.271$, $p = 0.788$).

The hypotheses predicted a *Participant height* x *Male confederate condition* interaction. However, the interaction between participant height and male confederate condition did not significantly predict status items spending in Model 1 (β = -.002, *SE* = 0.07, $t = -0.036$, $p = 0.972$). The results remained consistent after controlling for demographic variables in Model 2 (β = .017, *SE* = 0.06, $t = 0.244$, $p = 0.808$) and the addition of participant traits in Model

3 (β = .083, SE = 0.07, t = 1.181, p = 0.243). As such, Hypothesis 1 was not supported. A summary of the results can be found in Table 3.

Even though the interaction effect was not significant in either of the models, an estimated marginal means and simple slope analyses were conducted regardless to probe the interaction results. Participants who were taller in both shorter and taller male confederate conditions consistently spent more on status items compared to shorter participants, lending some support to the second competing hypotheses. Table 4 provides a summary of the estimated marginal means. However, simple slope analyses showed that there was no significant difference in status items spending between the shorter and taller male confederate conditions (difference = .002, p = 0.972).

Participant Height x Male Confederate Condition (DV: Willingness to Spend)

Similar to the status items, in order to ascertain that the willingness to spend results did not differ between the two female confederates, an independent samples *t*-test was conducted and no significant difference was found, $t(58)$ = -1.64, p = 0.107. As such, there was no need to control for the female confederates in the remainder of the analyses.

No main effect between participant height and willingness to spend should be observed. Indeed, the main effect was not significant in Model 1 (β = .013, SE = 0.02, t = 0.610, p = 0.544), Model 2 (β = .004, SE = 0.02, t = 0.192, p = 0.848), nor Model 3 (β = .009, SE = 0.02, t = 0.360, p = 0.720).

The hypotheses predicted a *Participant height* x *Male confederate condition* interaction. However, the interaction between participant height and male confederate condition did not significantly predict willingness to spend

in Model 1 (β = -.016, SE = 0.03, t = -0.627, p = 0.533). The results remained

consistent after controlling for demographic variables in Model 2 (β = -.003,

SE = 0.03, t = -0.127, p = 0.899) and the addition of participant traits in Model

3 (β = -.015, SE = 0.03, t = -0.521, p = 0.605). A summary of the results can

be found in Table 5.

Similarly, even though the interaction effect was not significant in

either of the models, an estimated marginal means and simple slope analyses

were conducted regardless to probe the interaction results. Taller participants

in the taller male confederate conditions spent more compared to shorter

participants, whereas taller participants in the shorter male confederate

condition spent less than shorter participants. Table 6 provides a summary of

the estimated marginal means. However, simple slope analyses showed that

there was no significant difference in status items spending between the

shorter and taller male confederate conditions (difference = .016, p = 0.533).

Figure 3

Zero-Order Correlation Matrix Between Outcome Variables and Covariates
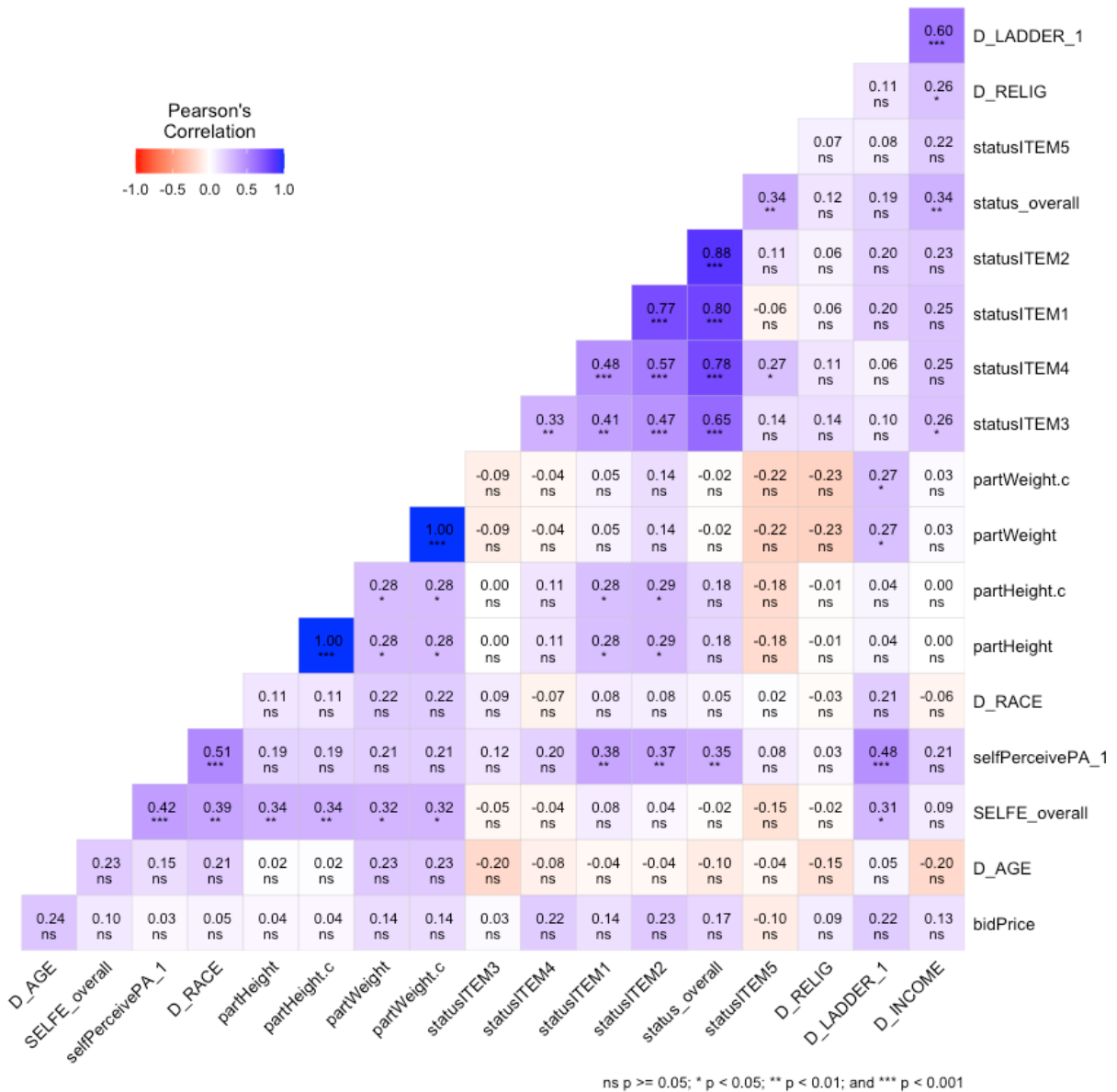
Note: statusITEM1 = new car, statusITEM2 = new watch, statusITEM3 = new mobile phone, statusITEM4 = vacation to Europe, statusITEM5 = bringing friends out to dinner
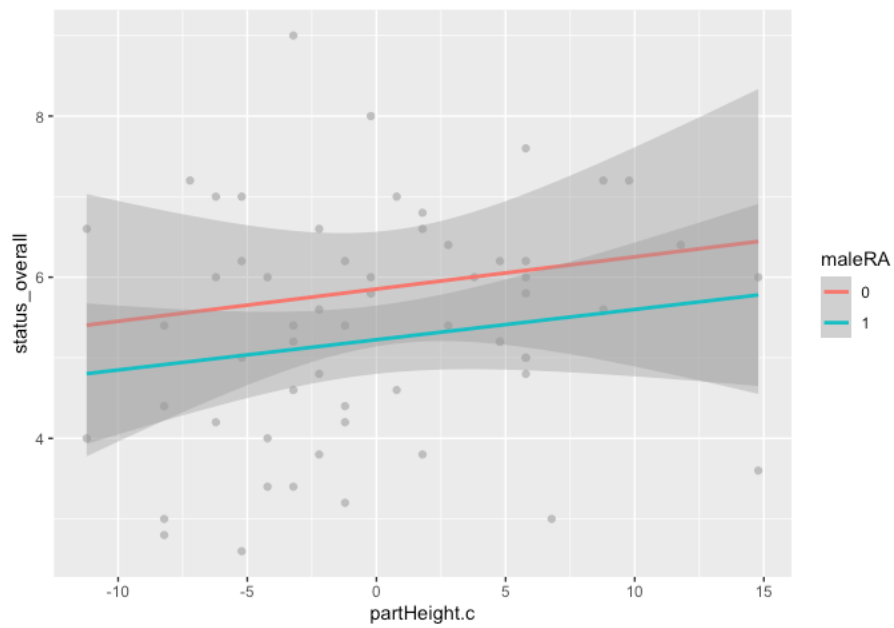
Figure 4

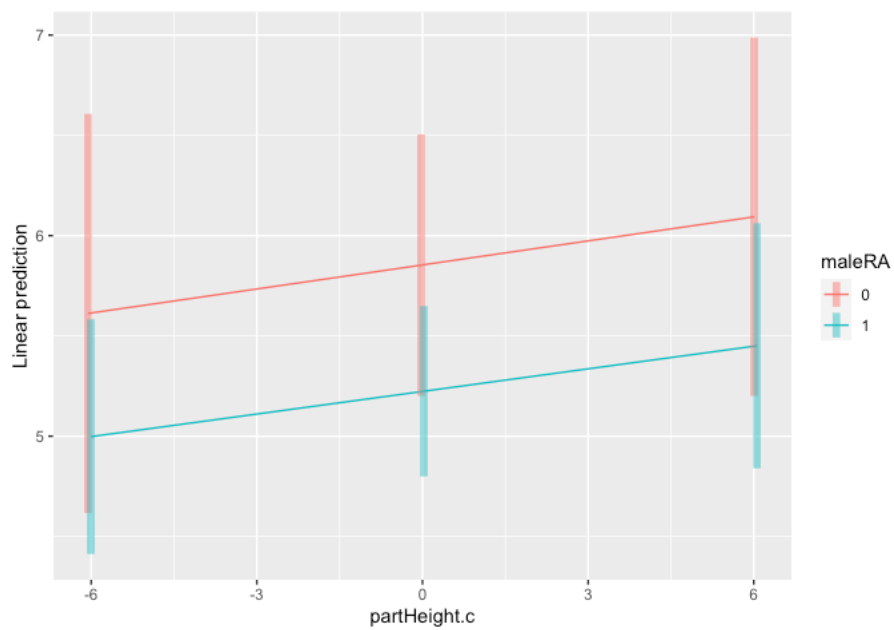*Interaction Plot for Status Items*

Figure 5

Simple Slopes for Status Items

Figure 6

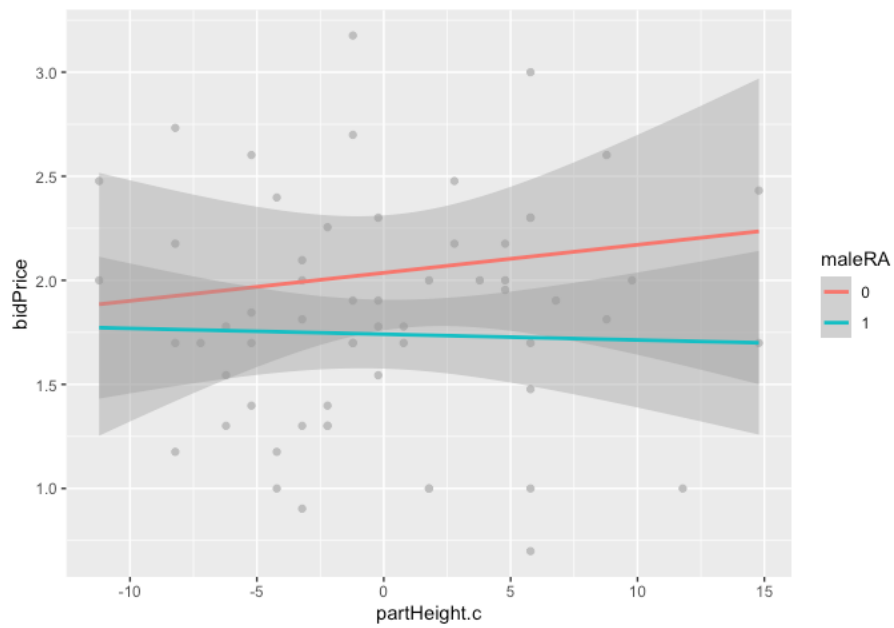*Interaction Plot for Willingness to Spend*

Figure 7

Simple Slopes for Willingness to Spend
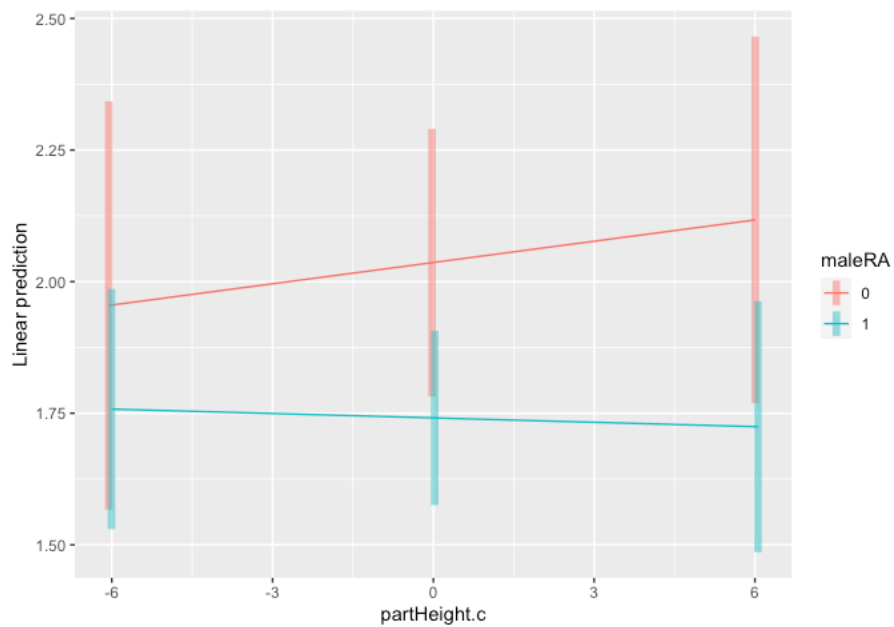
Table 3

Model Summaries with Status Items as the Outcome Variable

Predictor	Model 1				Model 2				Model 3			
	β	SE	t	p	β	SE	t	p	β	SE	t	p
Participant height x Male confederate condition	-.002	0.07	-0.036	.972	.02	0.07	0.244	.808	.083	0.07	1.181	.243
Demographics												
Age					-.003	0.03	-0.100	.921	.002	0.03	0.060	.952
Race (0 = *Chinese*, 1 = *non-Chinese*)					.161	0.48	0.366	.738	-.250	0.53	-0.471	.639
Religion					.015	0.05	0.285	.777	.013	0.05	0.257	.799
Household income					.351	0.17	2.030	**.047**	.363	0.16	2.222	**.031**
Subjective SES					-.112	0.19	-0.590	.558	-.172	0.21	-0.841	.405
Participant traits												
Baseline self-esteem									-.443	0.30	-1.489	.143
Weight									-.003	0.02	-0.143	.887
Self-perceived physical attractiveness									.816	0.28	2.934	**.005**

Note. β = standardized slope coefficient, *SE* = standard error of the slope coefficient. Bolded *p*-values indicate statistical significance at

the .05 level.

Table 4

Estimated Marginal Means for Status Items

Participant Height	Male Confederate	Estimated Marginal Means	*SE*	95% CI
-6.03	0	5.61	0.497	[4.62, 6.61]
0	0	5.85	0.325	[5.20, 6.51]
6.03	0	6.09	0.446	[5.20, 6.99]
-6.03	1	5.00	0.292	[4.41, 5.58]
0	1	5.22	0.212	[4.80, 5.65]
6.03	1	5.45	0.305	[4.84, 6.06]

Note: 0 = taller male confederate condition, 1 = shorter male confederate condition

Table 5

Model Summaries with Willingness to Spend as the Outcome Variable

Predictor	Model 1				Model 2				Model 3			
	β	SE	t	p	β	SE	t	p	β	SE	t	p
Participant height x Male confederate condition	-.016	0.03	-0.627	.533	-.003	0.03	-0.127	.899	-.015	0.03	-0.521	.605
Demographics												
Age					.025	0.01	2.376	**.021**	.023	0.01	2.166	**.035**
Race (0 = *Chinese*, 1 = *non-Chinese*)					-.134	0.18	-0.727	.471	-.126	0.22	-0.569	.572
Religion					.017	0.02	0.833	.409	.020	0.02	0.917	.364
Household income					.009	0.07	0.129	.898	.007	0.07	0.098	.922
Subjective SES					.003	0.07	0.038	.970	-.012	0.08	-0.140	.889
Participant traits												
Baseline self-esteem									.113	0.12	0.915	.365
Weight									.003	.007	0.423	.674
Self-perceived physical attractiveness									-.106	0.12	-0.918	.363

Note. β = standardized slope coefficient, *SE* = standard error of the slope coefficient. Bolded *p*-values indicate statistical significance at

the .05 level

Table 6

Estimated Marginal Means for Willingness to Spend

Participant Height	Male Confederate	Estimated Marginal Means	*SE*	95% CI
-6.03	0	1.95	0.194	[1.57, 2.34]
0	0	2.04	0.127	[1.78, 2.29]
6.03	0	2.12	0.174	[1.77, 2.47]
-6.03	1	1.76	0.114	[1.53, 1.99]
0	1	1.74	0.083	[1.58, 1.91]
6.03	1	1.72	0.119	[1.49, 1.96]

Note: 0 = taller male confederate condition, 1 = shorter male confederate condition

Exploratory Findings

Status Items

In an exploratory fashion, I investigated if the significant covariates found under the status items main analyses could act as possible moderators in my hypothesized model. Specifically, I explored household income and self-perceived physical attractiveness as second moderators separately.

Household income. The three-way interaction of *Participant height* x *Male confederate condition* x *Household income* was the outcome of interest. However, the interaction term was not significant (β = -.015, *SE* = 0.07, *t* = -0.206, *p* = .838).

Self-perceived physical attractiveness. The three-way interaction of *Participant height* x *Male confederate condition* x *Self-perceived physical attractiveness* was the outcome of interest. Likewise, the interaction term was not significant (β = .098, *SE* = 0.10, *t* = 1.106, *p* = .314).

Although not of immediate relevance, the main effect of self-perceived physical attractiveness on the dependent variable was statistically significant (β = .706, *SE* = 0.30, *t* = 2.330, *p* < .05), suggesting that participants who perceived themselves as more physically attractive spent more on status items.

Individual Status Items

According to the correlation matrix as shown in Figure 3, two individual status items had a significant correlation with participant height. These two items were "new car" and "new watch". Therefore, I explored these status items as unique dependent variables in two ways. First, the individual status items were analysed in accordance to my original hypothesized model. Second, in accordance to the abovementioned exploratory three-way

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interaction, household income and self-perceived physical attractiveness were added as second moderators separately.

Dependent variable: New car. In the original hypothesized model analyses, the *Participant height* x *Male confederate condition* interaction term remained insignificant (β = .037, *SE* = 0.10, *t* = 0.368, *p* = 0.715). The main effect of male confederate condition, however, was significant (β = -1.26, *SE* = 0.59, *t* = -2.126, *p* < .05), suggesting that in general, participants who were in the taller male confederate condition spent more on the "new car" item compared to participants in the shorter male confederate condition.

When household income was added as a second moderator, the three-way interaction of *Participant height* x *Male confederate condition* x *Household income* was not significant (β = .056, *SE* = 0.11, *t* = 0.494, *p* = .624). All main effects were also not significant (*ps* > .05).

The three-way interaction remained insignificant when self-perceived physical attractiveness was added as a second moderator (β = .195, *SE* = 0.15, *t* = 1.329, *p* = .189). However, there was a significant main effect of self-perceived physical attractiveness on the dependent variable (β = .922, *SE* = 0.46, *t* = 2.017, *p* < .05), suggesting that participants who rated themselves as more physically attractive spent more on the "new car" item.

Dependent variable: New watch. In the original hypothesized model analyses, the *Participant height* x *Male confederate condition* interaction term was also not significant (β = .007, *SE* = 0.11, *t* = 0.063, *p* = .950). No significant main effects were observed either (*ps* > .05).

When household income was added as a second moderator, the three-way interaction of *Participant height* x *Male confederate condition* x

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Household income was similarly not significant ($\beta = .050$, *SE* = 0.12, *t* = 0.416, *p* = .680). All main effects were not significant (*ps* > .05).

The three-way interaction was significant when self-perceived physical attractiveness was added as a second moderator ($\beta = .308$, *SE* = 0.15, *t* = 2.099, *p* < .05). There was also a significant main effect of self-perceived physical attractiveness on the dependent variable ($\beta = 1.266$, *SE* = 0.46, *t* = 2.762, *p* < .01), suggesting that participants who rated themselves as more physically attractive spent more on the "new watch" item.

Willingness to Spend

Similar to the analyses conducted on the status items, I also explored if the significant covariates found under the willingness to spend main analyses could act as possible moderators in my hypothesized model. Specifically, I analysed participant age as the second moderator.

The three-way interaction of *Participant height* x *Male confederate condition* x *Participant age* was the outcome of interest. However, the interaction term was not significant ($\beta = -.005$, *SE* = 0.01, *t* = -0.719, *p* = .476). There were also no significant main effects (*ps* > .05).

Chapter 4: General Discussion

This study sought to examine whether (1) shorter male participants would have a greater propensity to conspicuously status-signal in the presence of a taller male and an attractive female, compared to taller male participants, or (2) taller male participants would have a greater propensity to conspicuously status-signal in the presence of a similar-statured male and an attractive female, compared to shorter male participants. In general, there was little support found for either hypotheses.

Although the *Participant height* x *Male confederate condition* interaction effect was not significant, a probe on the interaction effect via estimated marginal means and simple slopes analyses revealed that taller participants consistently spent more than shorter participants in the taller male confederate condition across both dependent variables. Therefore, the direction of the effect seemed to support the second competing hypotheses. An interpretation for the results could be that taller males are indeed much more competitive than shorter males in the presence of intrasexual competition.

As mentioned earlier on in the introduction, taller males may display greater competitiveness driven by higher testosterone levels. Moreover, as taller males are more likely to be predisposed to higher aggression compared to shorter males (Archer & Thamzani, 2007), taller males may have adopted more flexible behavioural strategies as proxies for physical aggression in present day societies, where physical aggression is frowned upon and prohibited by law.

Additionally, although it was not measured in the current study, relationship status, relationship quality and relationship satisfaction may be relevant factors that could have affected participants' receptiveness to the mating prime. Participants who are married or are presently in a committed relationship may not have been as receptive to mating cues compared to those who are single or are in open relationships. Moreover, participants in higher-quality committed relationships or marriages should also be less receptive to a mating prime compared to participants in lower-quality committed relationships or marriages. Indeed, previous empirical findings showed that males in high-quality committed relationships had stronger negative

evaluations of infidelity, whereas males in lower-quality relationships reported highly favourable attitudes toward infidelity (Silva et al., 2017). In terms of relationship satisfaction, individuals who reported low relationship satisfaction were associated with greater infidelity-related behaviours (Drigotas et al., 1999; Maddox Shaw et al., 2013; Whisman et al., 2007).

While the exploratory findings should be interpreted with caution, nonetheless, it offers some insights into how results can be variable depending on how conspicuous status-signaling is operationalized and measured. Therefore, rather than only using a small handful of conspicuous status-signaling measures, future research can endeavour to replicate results across a wider battery of measures.

Limitations and Future Recommendations

It is important to note that the study was limited by a small sample size, suggesting a possibility that the entire analyses lacked statistical power. Therefore, it may be reasonable to surmise that the lack of statistically-significant findings might have been a result of a lack of statistical power to detect the effect size, and that any significant results we found were simply spurious (Loken & Gelman, 2017). Therefore, well-powered future studies can help to shed light on how male height influences conspicuous status-signaling in the presence of taller and shorter males, providing a more conclusive and clearer link.

Moreover, while taller males may be inherently more competitive than shorter males and display greater indirect aggressive behaviour as suggested earlier on, the argument that shorter males are more likely to be more indirectly aggressive compared to their taller counterparts is also valid.

Indeed, it was evidenced in a previous study that shorter males kept more resources for themselves in a dictator game compared to taller males (Knapen et al., 2018). Preliminarily, both competing hypotheses are reasonable. As such, two future extensions could be reaped from this – first, while the present study utilised conspicuous status-signaling as one form of indirect aggression, future studies can employ alternative paradigms in intrasexual competition research. Since the present study focused on an individual setting, an avenue for research could be examining how shorter or taller males may differentially make use of strategies in a group setting, which may include recruiting allies (Fessler & Holbrook, 2013) or the usage of weapons (Fessler et al., 2012). Second, future studies could also look at possible boundary conditions for when a taller or shorter male might show greater indirect aggressive behaviour on a specific type of measure used. Taken together, these may build a pathway to potentially resolving the competing hypotheses highlighted above.

Conclusion

To conclude, the current thesis sought to investigate whether shorter males are more likely to display greater conspicuous status-signaling than their taller counterparts, in the presence of a taller male. While the results obtained did not support the hypothesis, nevertheless, the findings provide a preliminary glimpse into a possible alternative hypothesis that taller males may display greater intrasexual competitive behaviour compared to their shorter counterparts, and offers some direction for future research.

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