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Abstract

This study investigated sex differences in jealousy after subliminal exposure to rivals wearing high-status or low-status clothes. It was expected that individual differences in preventive jealousy would moderate the relationship between a rival's characteristics and jealousy. Participants (Men: $n = 54$, M age = 21.6 yr., $SD = 3.5$; women: $n = 71$, M age = 20.7 yr., $SD = 1.9$) completed a parafoveal subliminal priming paradigm as well as questionnaires about jealousy and preventive jealousy. As predicted, women were not affected by their rival's status, but women high in preventive jealousy reported more jealousy than women low in preventive jealousy. However, whereas men low in preventive jealousy reported equal amounts of jealousy after exposure to a high-status and a low-status rival, surprisingly, and contrary to the expectations, men high in preventive jealousy reported most jealousy after exposure to a low-status rival. To explain these unexpected results, threats to self-esteem were discussed.

Keywords

jealousy, status, preventive jealousy, subliminal priming, sex differences

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Introduction

Jealousy can be conceptualized as one part of a coordinated system of cognitive, affective, physiological, and behavioral responses aimed at guarding one's mate from potential sexual competitors which, ultimately, is of importance to reproductive success (Daly, Wilson, & Weghorst, 1982; Maner & Shackelford, 2008). Since losing a mate to another person is costly, it is to be expected that men and women will expend considerable effort to retain their partners, albeit driven by different motivations. Whereas mothers can always be certain of their genetic relationship to their offspring, men face paternal uncertainty. Male jealousy is therefore hypothesized to have evolved as an anti-cuckoldry adaptation and to function primarily to prevent a mate's sexual infidelity. In contrast, female jealousy is hypothesized to be a response to threats of emotional infidelity and to function to retain resources, protection, and commitment of a mate, since these enhance offspring survival rate (Daly et al., 1982; Buss, Larsen, Westen, & Semmelroth, 1992).

Evolutionary psychologists (e.g., Trivers, 1972; Buss, 1989, 1994; Kenrick Sadalla, Groth, & Trost, 1990; Townsend & Levy, 1990a, 1990b; Buunk, Massar, & Dijkstra, 2007) assume that men and women should be most distressed about rivals who exceed them on dimensions relating to their mate value. A woman's mate value is largely determined by the attractiveness of her face and body, since in men, a preference for physically attractive women is supposed to have evolved because in ancestral times attractiveness would have been a cue to a woman's health and fertility. Thus, when confronted with a rival, women should be most jealous when a rival is physically attractive. On the other hand, a man's mate value is determined largely by his social status and dominance or by characteristics that point to his ability to acquire status in the future, such as assertiveness and confidence (Buss, 1989; Geary, 2000). In addition, there are indications that physical dominance and upper body muscularity are attractive to women (e.g., Frederick & Haselton, 2007), especially in the context of short-term relationships. Indeed, the jealousy-evoking potential of these characteristics has been confirmed in several studies, which show that overall, a rival's physical attractiveness evokes more jealousy in women, and a rival's status and social and physical dominance evoke more jealousy in men (Dijkstra & Buunk, 2002; Massar & Buunk, 2009; Massar, Buunk, & Dechesne, 2009).

Women's preferences for high-status men are assumed to reflect a desire for a mate who can provide them and their offspring with sufficient resources (Buss, 1989; Kenrick et al., 1990). A classic study by Townsend and Levy (1990a) showed that women's willingness to enter a relationship with a man is determined more by his socio-economic status than by his physical attractiveness. When judging male models with differing physical attractiveness and social status, women in their study found the unattractive but high-status model a more desirable mate than the attractive but medium-status model. In a second study, these same authors (Townsend & Levy, 1990b) showed that a man's

clothes can be an indicator of a man's status (see also Hill, Nocks, & Gardner, 1987; Nelissen & Meijers, 2011; Workman & Lee, 2011). In their study, women rated men of varying attractiveness who were either wearing the costume of a Burger King employee or were wearing a high-class business suit and a Rolex watch. The results showed that women preferred the high-status male, irrespective of his attractiveness, for all levels of relationships (ranging from having coffee with someone to marrying him). However, for male participants, women's clothing style had no effect on their preferences. Similarly, in a study on the evaluation of medical doctors, Brase and Richmond (2004) found that even when social status was a constant due to the fact that all target stimuli were presented as doctors, women rated a male physician in blue jeans and a white t-shirt as significantly less attractive and authoritative than the same person wearing a white doctor's coat.

During the course of human evolution, humans have evolved to be especially sensitive to the presence of sexual rivals, since protecting the pair bond was—and often still is—crucial to one's reproductive success (e.g., Kenrick, Delton, Robertson, Becker, & Neuberg, 2007; Quinlan & Quinlan, 2007). A growing number of studies suggest that people possess a set of fundamental social motives, such as disease avoidance and mate guarding, which increase chances for survival and reproductive success (Kenrick, Neuberg, Griskevicius, Becker, & Schaller, 2010). Empirical studies indicate that certain cues can activate these motives, such as the presence of an attractive opposite-sex individual. Once activated, these motives then exert functionally specific effects on lower-order social cognitive processes such as attention (Maner, Gailliot, Rouby, & Miller, 2007; Kenrick et al., 2010), but also on higher-level cognition such as consumption (e.g., Griskevicius & Kenrick, 2013). For example, studies by Maner et al. (2007) reveal that by priming jealousy, and thereby activating the mate-guarding motive, a perceptual vigilance to potential sexual competitors was activated, especially among participants for whom intra-sexual rivalry was a salient concern. Similarly, rapidly evaluating stimuli in one's environment as threatening or rewarding—automatic evaluation—is an essential ability of organisms, and research has indicated that subliminal priming techniques can be used to investigate natural, immediate, and unintentional effects in an individual's responses to certain stimuli (Ferguson & Zayas, 2009). As such, this method provides an opportunity to assess participants' responses to a rival while circumventing demand characteristics and socially desirable answers. In previous research, it was shown that after being exposed to subliminally presented rival characteristics, men and women responded with varying degrees of jealousy (Massar & Buunk, 2009: partial $\eta^2 = 0.05\text{--}0.06$; Massar & Buunk, 2010: Cohen's $d = 0.65\text{--}0.81$; Massar, et al., 2009: Cohen's $d = 0.55\text{--}0.60$). The present study aims to extend these findings by showing that jealousy can be evoked in a similar manner by exposure to rivals of varying status, as indicated by their clothing.

In light of the centrality of the jealousy-evoking effect of a rival's status and social dominance for men, it was expected that men's jealousy would be aroused even when exposure to such rivals takes place outside their conscious awareness. To investigate this, in the present study men and women were subliminally exposed to a photograph of a rival wearing either high-status clothes (e.g., a business suit) or low-status clothes (e.g., a maid's uniform or a builder's costume). Specifically, a parafoveal priming paradigm was used to very briefly expose participants to the stimulus materials (Chartrand & Bargh, 1996). In this paradigm, stimuli are briefly presented outside the foveal (center) visual field, which makes conscious perception impossible, but does influence impression formation (McCulloch, Ferguson, Kawada, & Bargh, 2008). It was expected that men will react with more jealousy after being exposed to a rival wearing high-status clothes than after being exposed to rival wearing low-status clothes. In contrast, because a rival's status and social dominance do not evoke women's jealousy to such an extent (e.g., Dijkstra & Buunk, 2002), it was not expected that a rival's status, as apparent from her clothes, would affect women's jealousy. However, to prevent any confounding effects of a rival's facial attractiveness—a characteristic that has been shown to evoke women's jealousy even on a subliminal level (Massar & Buunk, 2010)—the heads of the individuals in the pictures were removed.

In addition to emotional responses like jealousy, men and women have a number of behaviors at their disposal to solve the adaptive problem of fending off sexual competitors and preventing a mate's infidelity. These mate-guarding behaviors are often harmless, such as buying gifts or spending as much time together as possible. But behaviors such as tracking a partner's whereabouts, checking their belongings, preventing a mate from spending time with any individuals of the opposite sex, and, in extreme cases, sexual or physical partner-directed aggression may also be included in mate guarding activities (Daly et al., 1982; Buss & Shackelford, 1997; Cousins, Fugère, & Franklin, 2009). In addition, although initially stemming from a feeling of wanting to protect a valuable and important relationship (De Miguel & Buss, 2011), mate-guarding behaviors, especially those stemming from suspicion about a partner's possible infidelity, have been associated with negative relationship dynamics (e.g., Attridge, 2013). There is research that indicates that especially when rivals are perceived to have a higher mate value, this tendency for possessiveness and jealousy is enhanced (Arnocky, Sunderani, Miller, & Vaillancourt, 2012).

Buunk (1997) designed a preventive jealousy questionnaire to measure individual differences in the degree to which one is inclined to prevent even innocent, superficial contact between one's partner and members of the opposite sex. Preventive jealousy has been associated with neuroticism, low self-esteem, and low emotional stability (Dijkstra & Barelds, 2008), and also occurs in the absence of an actual relationship threat. As such, it can be considered as a measure of an individuals' dispositional tendency to prevent a partner's

infidelity. In the current research, preventive jealousy was included to examine the extent to which individual differences on this measure influence the relationship between exposure to rival characteristics and state jealousy.

Hypothesis 1. It was expected that both men and women with a tendency to be preventively jealous would report more jealousy after subliminal exposure to a rival than participants with a low tendency to be preventively jealous.

Hypothesis 2. Preventive jealousy was expected to function as a moderator: specifically, men high in preventive jealousy should react with more jealousy after subliminal exposure to a rival wearing high-status clothes than to a rival wearing low-status clothes. However, since we did not expect an effect of a rival's clothing and status on women's jealousy, preventive jealousy was not hypothesized to moderate women's jealousy scores.

Method

Participants

Participants were undergraduate students at the University of Groningen. The study was advertised as a study on "Emotions in Relationships" in the university's online experiment participation system, and students could voluntarily sign up to participate. They received partial course credit for their participation. Fifty-four men (M age = 21.6 yr., $SD = 3.5$) and 71 women (M age = 20.7 yr., $SD = 1.9$) took part in this study. Forty women and 21 men indicated they were involved in a romantic relationship, with an average duration of 23.9 mo. ($SD = 19.1$) for women and 17.1 mo. ($SD = 12.8$) for men.

Design

Upon arrival at the lab, men and women were randomly assigned to either the high-status prime condition (27 men, 37 women) or the low-status prime condition (27 men, 34 women). With regard to relationship status, the distribution was as follows for participants with a relationship: 20 women in the high-status condition, 20 women in the low-status condition, 10 men in the high-status condition, and 11 men in the low-status condition. Although there were no specific hypotheses for the influence of relationship status, it was controlled in analyses.

Materials and Procedure

All stimuli and procedures, including the use of a cover story to conceal the true purpose and hypotheses of the study, were approved by the Ethics Committee of

Psychology (University of Groningen). After providing informed consent, participants were taken to individual cubicles and were informed by the female experimenter that the research would consist of two unrelated studies. In reality, both elements were connected, but to prevent biased answering, participants were told that one study would be about reaction times (the subliminal priming procedure) and one study would be about intimate relationships and emotions (the preventive jealousy measure, the jealousy scenario, and the dependent variables). Participants were informed that all instructions would be presented on a computer screen. If participants understood all instructions and had no further questions, the experimenter left the cubicle.

Preventive jealousy. After answering some demographic questions (age, sex, relationship status, and relationship duration), the Preventive Jealousy Scale (taken from Buunk, 1997), was introduced as within the context of a study on emotions in intimate relationships. Participants rated on a 5-point scale, with anchors 1: Not applicable at all and 5: Very much applicable, how much each of the five statements applied to them. Examples are, "I don't want my partner to meet too many people of the opposite sex" and "I demand from my partner that he/she does not look at other women/men." In the original study (Buunk, 1997), internal reliability for this scale was .89. In the current study, it was comparable ($\alpha = .86$, Spearman-Brown split-half coefficient = .86). Convergent and discriminant validity for this measure were confirmed by Barelds and Dijkstra (2003) in a large sample from the Dutch general population. Moreover, in research by Swami, Inamdar, Stieger, Nader, Pietschnig, Tranc, et al. (2012; $\alpha = .76$), this measure was moderately associated with perceiving the partner as more attractive than oneself (the love-is-blind bias).

Parafoveal priming procedure. Next, participants started the parafoveal priming task (adapted from Chartrand & Bargh, 1996; see also Massar & Buunk, 2009, 2010), which was programmed in E-Prime 2.0 (Psychology Software Tools, Pittsburgh, PA). Participants were instructed that they were going to complete a reaction time task and that very short flashes would appear on the screen at unpredictable places and times. Their task would be to indicate as quickly as possible whether a flash appeared on the left or the right side of the screen by pressing one of two designated keys on the keyboard. Since the intent was only to prime the participants with the stimuli, no reaction times were recorded.

Participants were instructed to be seated 80–100 cm from the computer screen and to sit erect on their chair to ensure exposure to the stimuli in the parafoveal visual field, i.e., in the periphery of the attended region. Two keys on the keyboard were labeled *L* and *R*, and participants were instructed to press the *L* key whenever they saw a flash on the left side of the screen, and the *R* key whenever they saw a flash on the right side of the computer screen. A fixation point

consisting of an asterisk (*) remained in the center of the screen and participants were told to focus on this fixation point throughout the task because of the unpredictable location and timing of the stimuli on the screen.

As priming stimuli, pre-rated photographs of high-status and low-status men and women were used.¹ These priming stimuli were flashed (exposure time 60 msec.) in 15 of the 60 experimental trials. In the practice trials and in the remainder of the 45 experimental trials, participants were exposed to geometrical shapes (circles, triangles, and squares), which also were presented for 60 msec. The geometrical shapes were of the same size as the priming stimuli and consisted of grey drawings on a white background. Both the geometrical shapes and the priming stimuli measured 4 × 5 cm (width × height) and were presented for 60 msec. Each picture was immediately followed by a 60 msec. masking picture, of the same size as the stimulus picture. This mask consisted of a scrambled (unrecognizable) version of the stimulus pictures and ensured that even if participants moved their eyes toward the flash, they would not consciously perceive the target stimulus. The stimulus pictures and the mask appeared randomly at one of four parafoveal locations on the screen (for details, see Chartrand & Bargh, 1996). Intervals between the offset of the mask and the onset of the next picture varied randomly from 2 to 7 sec. Both the random presentation in one of the four parafoveal regions and the random time intervals between stimulus presentations ensured that it was impossible for participants to learn or predict the next presentation of the stimuli. To familiarize themselves with the procedure, participants were given 15 practice trials, in which only geometrical shapes were flashed. After the practice trials, the participants completed the 60 experimental trials.

Jealousy vignette and dependent variables. After completing the parafoveal priming task, participants read a shortened version of the scenario developed by Dijkstra and Buunk (1998), which has been successfully used by Massar and Buunk (2009, 2010). Participants were told to visualize and imagine the situation described in the vignette before continuing with the experiment. The male version reads as follows: “You are at a party with your girlfriend and you see an unfamiliar man walk up to her. He starts flirting with her. She seems to like it, and starts flirting back.”

The next part of the experiment consisted of the jealousy slider, on which participants could indicate how jealous they would feel if the situation described in the scenario would happen to them. The slider had endpoints 0: Not jealous at all and 100: Extremely jealous. Participants used the mouse to slide a knob to the position on the scale that best indicated their feelings. This measure has been used in previous research, and it consistently shows strong correlations with the adjective “jealous” taken from the Multiple Adjective Rating Scale for jealousy (DeSteno & Salovey, 1996), ranging from $r = .84$ (Massar et al., 2009) to $r = .75$ (Massar & Buunk, 2009). In the current study, the jealousy slider was also

strongly related to the adjective “jealous” ($r = .73, p < .001$) as well as with the average of all adjectives reported below ($r = .63, p < .001$).

In addition to measuring jealousy, a Multiple Adjective Rating Scale was used consisting of jealousy-related emotions, the average of which was used as the score for jealousy (DeSteno & Salovey, 1996). This scale has been used in previous studies (e.g., Massar & Buunk, 2010; Dijkstra, Barelds, & Groothof, 2013; Arnocky, Ribout, Mirza, & Knack, 2014) and consistently shows good internal reliability (α ranges = .90–.95). Moreover, this scale is able to measure experienced jealousy after a partner’s online transgressions as well as a partner’s offline (real life) transgressions (Dijkstra et al., 2013). Instructions for participants consisted of a request to think back to the scenario they had just read and to indicate how they would feel in that situation. They then subsequently rated how suspicious, betrayed, worried, distrustful, jealous, rejected, hurt, anxious, angry, threatened, and sad they would feel on a 5-point scale with anchors 1: Not at all and 5: Very strong (internal reliability: $\alpha = .94$, Spearman-Brown split-half coefficient = .92).

In the last part of the study, participants’ awareness of the subliminal primes was assessed. In a funneled debriefing procedure (similar to the one suggested by Bargh & Chartrand, 2000) consisting of open-ended questions, they were asked what they thought the purpose of the study was, whether they thought any tasks in the study were related, whether anything in the study seemed strange or suspicious to them, whether they thought the reaction time task had any influence on their answers to subsequent questions, and what they thought the content of the flashes had been. Participants indicated they were not aware of the purpose of the study, of the effect of the reaction times task on other variables, or of what the content of the flashes had been. After completing all measures, the participants were thanked, debriefed about the aim and hypotheses of the study, and received their course credit.

Results

To be able to include preventive jealousy as a moderator variable, the possibility of *a priori* sex differences were first checked. A *t* test showed that men and women reported equal preventive jealousy ($M = 1.85, SD = 0.81$, and $M = 1.98, SD = 0.81$, respectively; $t_{123} = -0.89, p = .38$). Therefore, this variable was suitable to be used as a moderator in subsequent analyses. Before conducting the main analyses, *z* scores were computed for preventive jealousy. Relationship status was controlled for by adding this variable in the regression models. These analyses revealed that there were no significant main effects or interactions ($B < 6.66, p > .08$ for the jealousy slider; $B < -0.32, p > .05$ for the Multiple Adjective Rating Scale). Given these results, relationship status was left out of further analyses.

Jealousy slider. A regression analysis with participant sex (men vs women), prime (high- vs low-status), and preventive jealousy (standardized) as predictors, and

Table 1. Summary of Multiple-regression Analyses for Participant Sex, Status Prime, and Preventive Jealousy (PJ) Predicting Jealousy.

	Jealousy Slider				Multiple Adjective Rating Scale			
	B	SE B	t	ΔR^2	B	SE B	t	ΔR^2
Participant sex	1.91	1.50	1.28		−0.05	0.08	−0.62	
Status prime	−1.71	1.50	−1.14		−0.05	0.08	−0.64	
PJ	9.40	1.54	6.11†		0.46	0.08	5.99†	
Sex × Prime	−1.16	1.50	−.77	.02	−0.05	0.08	−0.66	.04
Sex × PJ	−1.31	1.54	−.85		−0.08	0.08	−1.04	
Prime × PJ	−1.83	1.54	−1.19		−0.15	0.08	−1.96*	
Sex × Prime × PJ	−3.95	1.54	−2.57*	.04*	−0.12	0.77	−1.61	.02
R ²	.29				.28			
F	6.73†				6.35†			

* $p \leq .05$. † $p < .001$.

the jealousy slider as the dependent variable was conducted. All two- and three-way interactions were included in the analyses. The overall model was significant ($R^2 = .29$, $F_{7,117} = 6.73$, $p < .001$). R^2 for the main effects (.22) did not change significantly when the two-way interactions were added ($\Delta R^2 = .02$, $\Delta F_{3,188} = 1.01$, $p = .39$), but the ΔR^2 was significant when the three-way interaction was added ($\Delta R^2 = .04$, $\Delta F_{1,117} = 6.61$, $p < .001$). For an overview of all results, see Table 1.

There were no main effects of participant sex or prime ($B < 1.71$, $t < 1.14$, ns). As predicted, there was a main effect of preventive jealousy ($B = 9.40$, $t_{117} = 6.11$, $p < .001$). No other two-way interactions were significant, but there was a significant three-way interaction between participant sex, prime, and preventive jealousy ($B = -3.95$, $t_{117} = -2.57$, $p = .01$). To interpret the three-way interaction, simple effect analyses were performed. These showed that when exposed to the high-status rival, men high (+1 SD) and low (−1 SD) in preventive jealousy did not differ in their jealousy ($M = 75.72$ and $M = 71.11$, respectively, $B = 2.31$, $t_{117} = 0.81$, ns). However, when exposed to the low-status rival, men high and low in preventive jealousy did differ in their jealousy, i.e., men high (+1 SD) in preventive jealousy reported significantly more jealousy ($M = 93.01$) than men low (−1 SD) in preventive jealousy ($M = 65.28$; $B = 13.87$, $t_{117} = 3.70$, $p < .001$). Among women, only a main effect of preventive jealousy was found: women high (+1 SD) in preventive jealousy reported significantly more jealousy than women low (−1 SD) in preventive jealousy when exposed to the high-status rival ($M = 84.74$ and $M = 59.07$, respectively; $B = 12.83$, $t_{117} = 4.77$, $p < .001$), as well as when exposed to the low-status rival ($M = 81.59$ and $M = 64.43$, respectively; $B = 8.58$, $t_{117} = 2.94$, $p < .01$).

Multiple Adjective Rating Scale. A mean score of the 11 adjectives was computed (suspicious, betrayed, worried, distrustful, jealous, rejected, hurt, anxious, angry, threatened, and sad). Next, a regression analysis with participant sex (men vs women), prime (high- vs low-status) and preventive jealousy (standardized) as predictors was conducted. The overall model was significant ($R^2 = .28$, $F_{7,117} = 6.35$, $p < .001$). There were no main effects of participant sex or prime ($B < -0.08$, $t < -0.99$, ns), but there was a main effect of preventive jealousy ($B = 0.46$, $t_{117} = 6.00$, $p < .001$). There was a significant two-way interaction between prime and preventive jealousy ($B = -0.15$, $t_{117} = -1.96$, $p = .05$). No other two-way interactions were significant. The three-way interaction between participant sex, rival characteristics, and preventive jealousy was not significant ($B = -0.12$, $t_{117} = -1.61$, $p = .11$; see Table 1).

However, since the interaction between prime and preventive jealousy was significant, simple effects analyses were performed to deconstruct the three-way interaction. Simple effects analyses yielded results similar to those for the jealousy slider. That is, when exposed to the high-status rival, men high (+1 *SD*) and low (−1 *SD*) in preventive jealousy did not differ in their jealousy ($M = 2.91$ and $M = 2.72$, respectively; $B = 0.11$, $t_{117} = 0.75$, ns). However, when exposed to a low-status rival, men's jealousy scores did differ, with men high (+1 *SD*) in preventive jealousy reporting significantly more jealousy ($M = 3.69$) than men low (−1 *SD*) in preventive jealousy ($M = 2.37$, $B = 0.66$, $t_{117} = 3.50$, $p < .01$). Women's jealousy scores were not influenced by their rival's status, only by preventive jealousy. Women high (+1 *SD*) in preventive jealousy reported significantly more jealousy than women low (−1 *SD*) in preventive jealousy when exposed to a high-status rival ($M = 3.54$ and $M = 2.51$, respectively; $B = 0.52$, $t_{117} = 3.82$, $p < .001$) and when exposed to a low-status rival ($M = 3.59$ and $M = 2.45$, respectively; $B = 0.57$, $t_{117} = 3.91$, $p < .001$).

Discussion

The present study was designed to investigate whether a rival's status, expressed by clothing style, would evoke jealousy, particularly in men given the fact that status is a domain in which they compete with other men. Specifically, it was investigated whether rivals wearing high-status clothes would also evoke jealousy when participants were not aware of having been exposed to them. In addition, the influence of individual differences in preventive (trait) jealousy was taken into account. The results show that as predicted, women were not affected by their rival's status—there were no significant results of the subliminal primes for women. However, the expected main effect of preventive jealousy was found for women: those high in preventive jealousy reported more jealousy—after exposure to both the low-status and the high-status rival—on both measures of jealousy.

For men, an effect of the high-status subliminal prime was expected, as well as interactions with preventive jealousy. Although the results for preventive

jealousy were in line with the expectations, contrary to expectations, men high in preventive jealousy reacted with most jealousy to a *low-status* rival, as measured by the jealousy slider as well as the mean of the Multiple Adjective Rating Scale. Since this is in contrast with the literature (e.g., Dijkstra & Buunk, 1998, 2002), what might explain these results?

An explanation for the fact that the low-status rival evoked the most jealousy, especially among men high in preventive jealousy, can be found in the literature on jealousy, social comparison, and self-esteem threats (Broemer & Diehl, 2004; DeSteno, Valdesolo, & Bartlett, 2006). According to sociometer theory (e.g., Leary & Baumeister, 2000), one of the functions of self-esteem is to gauge one's status *vis-à-vis* one's relationship partners. A partner's interest in a rival signals that this rival is superior in some way to the self—and this threat to the self is translated into the emotion of jealousy, which in turn evokes action intentions to preserve the relationship. The loss of a partner to a romantic rival may lead to two kinds of losses (White, 1981): the loss of relationship rewards and self-esteem loss. Protecting oneself against these losses may lead to different evaluations of one's rival: whereas a high-status rival poses the biggest threat for relationship rewards, since he would be more likely in succeeding to seduce and take away one's partner, self-esteem is threatened most by a low-status rival.

This reasoning has been confirmed in several studies. For example, research by Nadler and Dotan (1992) suggested that whereas women seem most concerned with protecting their relationship in jealousy-evoking situations, men are mostly concerned with protecting their self-esteem. This result was replicated by Garcia, Gómez, and Canto (2001), who additionally manipulated the rival's characteristics. They found that men especially considered an infidelity a threat to self-esteem when the rival was presented as non-dominant, i.e., the opposite of what is considered "the ideal" for men. Moreover, DeSteno et al. (2006) found that participants' self-esteem decreased as a function of their partner's interest in a rival and that this decrease mediated the intensity of the jealousy the participants experienced. Most relevant to the present results, Broemer and Diehl (2004) reported that comparisons between oneself and an *inferior* rival also elevated participants' jealousy when differences between themselves and the rival were accentuated, thereby stressing one's own weaknesses.

In addition, there are indications from recent research that low self-esteem, or low mate value, is associated with increased preventive jealousy, especially with regard to behaviors such as monopolization and vigilance of a partner (Arnocky et al., 2012; Holden, Shackelford, Zeigler-Hill, Miner, Kaighobadi, Starratt et al., 2014). Research also showed that women married to men with low self-esteem tended to complain about their husbands' jealousy, possessiveness, and even abusive behavior (Shackelford, 2001). There thus seems to be an association between low self-esteem and vigilance within relationships, especially for men. It might thus be hypothesized that in the current study, the men high in

preventive jealousy might also suffer from relatively low self-esteem. As stated above, a partner's infidelity is costly to one's self-esteem (White, 1981), but especially to men who are hypersensitive to losing their partner to a rival. Losing one's partner to a low-status male would most likely make them feel "lower than the lowest." However, since there was no measure participants' self-esteem in the current study, future research should explicitly investigate the association between self-esteem and the influence of a rival's status, in addition to preventive jealousy. Moreover, participants' own self-evaluated status should also be included in future studies, and ideally, to be able to track participants' changes in self-esteem and investigate whether exposure to a low-status rival does indeed threaten the self, these measures should be included both before and after the experimental manipulations.

Limitations and Suggestions for Future Research

Like any experimental study, the current one also suffers from some limitations, which future research should take into account. For example, the study lacked a control condition, such as priming with only geometric figures, which would have provided us with baseline jealousy scores. This information would perhaps shed more light on the specific influence of the high-status male, since currently it is unknown whether this prime decreased or increased jealousy compared to a baseline. In addition, future research should consider not only participants' own mate value, but also discrepancies in partners' mate value. Research (e.g., Buss & Shackelford, 1997) has shown that perceiving one's partner to be of higher "value" than oneself leads to increased jealousy (Sidelinger & Booth-Butterfield, 2007), as well as heightened vigilance and possessiveness (Buss & Shackelford, 1997). Although there were no effects of relationship status in the current research, focusing future research solely on partnered individuals and investigating possible mate value discrepancies might offer additional insights into the relationship between a rival's characteristics, self-evaluations, and jealousy.

Additionally, the current study made use of a Western, educated, industrialized, rich, and democratic sample (see Henrich, Heine, & Norenzajan, 2010) of undergraduate students, which limits the generalizability of the results to other populations. Replication of the current study is recommended, both within a comparable sample and among individuals of varying ages and self-reported socio-economic status. Another limitation, and suggestion for future research, is the choice of stimuli materials for women. Research indicates that women who consume and flaunt luxury products are seen as more attractive, flirty, and ambitious, and evoke more competition from other women (Hudders, De Backer, Fisher, & Vyncke, 2014). Thus, rather than exposing women to rivals with different professions (a maid vs a business woman), it might be more effective to manipulate appearance related status, e.g., by exposing them to a

picture of a woman wearing an expensive dress and jewelry versus a woman wearing casual clothes and cheap jewelry.

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Note

1. Men ($n = 6$; M age = 23.0 yr., $SD = 2.4$) and women ($n = 14$, M age = 21.2 yr., $SD = 1.9$) took part in the pilot test and judged the high-status male prime as more attractive, more dominant, and as having a higher status ($F_{1,18} > 9.75$, $\eta^2 > 0.35$, $p < .01$) than the low-status male prime. Similarly, they judged the female high-status prime as more attractive, more dominant, and having a higher status ($F_{1,18} > 11.48$, $\eta^2 > 0.39$, $p < .01$) than the female low-status prime.

References

- Arnocky, S., Ribout, A., Mirza, R. S., & Knack, J. M. (2014). Perceived mate availability influences intrasexual competition, jealousy and mate-guarding behaviors. *Journal of Evolutionary Psychology*, 12, 45–64. doi: 10.1556/JEP.12.2014.1.3
- Arnocky, S., Sunderani, S., Miller, J. L., & Vaillancourt, T. (2012). Jealousy mediates the relationship between attractiveness comparison and females' indirect aggression. *Personal Relationships*, 19, 290–303. doi: 10.1111/j.1475-6811.2011.01362.x
- Attridge, M. (2013). Jealousy and relationship closeness: exploring the good (reactive) and bad (suspicious) sides of romantic jealousy. *SAGE Open*, 3(1), 1–16. doi: 10.1177/2158244013476054
- Barelds, D. P. H., & Dijkstra, P. (2003). Het meten van jaloezie [Measuring jealousy]. *Diagnostiek-Wijzer*, 2, 56–67.
- Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: a practical guide to priming and automaticity research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253–285). New York: Cambridge Univer. Press.
- Brase, G. L., & Richmond, J. (2004). The white-coat effect: physician attire and perceived authority, friendliness, and attractiveness. *Journal of Applied Social Psychology*, 34, 2469–2481. doi: 10.1111/j.1559-1816.2004.tb01987.x
- Broemer, P., & Diehl, M. (2004). Jealousy as a social comparison outcome: when similarity stings. *Journal of Experimental Social Psychology*, 30, 393–400.
- Buss, D. M. (1989). Sex differences in human mate preferences: evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, 12, 1–49.

- Buss, D. M., Larsen, R. J., Westen, W., & Semmelroth, J. (1992). Sex differences in jealousy: evolution, physiology, and psychology. *Psychological Science*, 3, 251–255.
- Buss, D. M., & Shackelford, T. K. (1997). From vigilance to violence: mate retention tactics in married couples. *Journal of Personality and Social Psychology*, 72, 346–361.
- Buunk, A. P. (1997). Personality, birth order and attachment styles as related to various types of jealousy. *Personality and Individual Differences*, 23, 997–1006.
- Buunk, A. P., Massar, K., & Dijkstra, P. (2007). A social cognitive evolutionary approach to jealousy: the automatic evaluation of one's romantic rivals. In J. P. Forgas, M. G. Haselton & W. von Hippel (Eds.), *Evolution and the social mind: evolutionary psychology and social cognition* (pp. 213–228). New York: Psychology Press.
- Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: nonconscious priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology*, 71, 464–478.
- Cousins, A. J., Fugère, M. A., & Franklin, M. (2009). Digit ratio (2D:4D), mate guarding, and physical aggression in dating couples. *Personality and Individual Differences*, 46, 709–713.
- Daly, M., Wilson, M., & Weghorst, J. (1982). Male sexual jealousy. *Ethology and Sociobiology*, 3, 11–27.
- De Miguel, A., & Buss, D. M. (2011). Mate retention tactics in Spain: personality, sex differences, and relationship status. *Journal of Personality*, 79, 563–586.
- DeSteno, D. A., & Salovey, P. (1996). Jealousy and the characteristics of one's rival: a self-evaluation maintenance perspective. *Personality and Social Psychology Bulletin*, 22, 920–932.
- DeSteno, D. A., Valdesolo, P., & Bartlett, M. Y. (2006). Jealousy and the threatened self: getting to the heart of the green-eyed monster. *Journal of Personality and Social Psychology*, 91, 626–641.
- Dijkstra, P., & Barelds, D. P. H. (2008). Self and partner personality and responses to relationship threats. *Journal of Research in Personality*, 42, 1500–1511. doi: 10.1016/j.jrp.2008.06.008
- Dijkstra, P., Barelds, D. P. H., & Groothof, H. A. K. (2013). Jealousy in response to online and offline infidelity: the role of sex and sexual orientation. *Scandinavian Journal of Psychology*, 54, 328–336. doi: 10.1111/sjop.12055
- Dijkstra, P., & Buunk, A. P. (1998). Jealousy as a function of rival characteristics: an evolutionary perspective. *Personality and Social Psychology Bulletin*, 24, 1158–1166.
- Dijkstra, P., & Buunk, A. P. (2002). Sex differences in the jealousy-evoking effect of rival characteristics. *European Journal of Social Psychology*, 32, 829–852.
- Ferguson, M. J., & Zayas, V. (2009). Automatic evaluation. *Current Directions in Psychological Science*, 18, 362–366. doi: 10.1111/j.1467-8721.2009.01668.x
- Frederick, D. A., & Haselton, M. G. (2007). Why is muscularity sexy? Tests of the fitness indicator hypothesis. *Personality and Social Psychology Bulletin*, 33, 1167–1183.
- Garcia, L. P., Gomez, J. L., & Canto, J. M. (2001). Relacion de celos ante una infidelidad: diferencias entre hombres y mujeres y características del rival [Jealous reactions to infidelity: differences between men and women and differences in rival's characteristics]. *Psicothema*, 13, 611–616.
- Geary, D. C. (2000). Evolution and proximate expression of human paternal investment. *Psychological Bulletin*, 126, 55–77.

- Griskevicius, V., & Kenrick, D. T. (2013). Fundamental motives: how evolutionary needs influence consumer behavior. *Journal of Consumer Psychology*, 23, 372–386. doi: 10.1016/j.jcps.2013.03.003
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33, 61–83. doi: 10.1017/S0140525X0999152X
- Hill, E. M., Nocks, E. S., & Gardner, L. (1987). Physical attractiveness: manipulation by physique and status displays. *Ethology and Sociobiology*, 8, 143–154. doi: 10.1016/0162-3095(87)90037-9
- Holden, C. J., Shackelford, T. K., Zeigler-Hill, V., Miner, E. J., Kaighobadi, F., Starratt, V. G., Jeffrey, A. J., & Buss, D. M. (2014). Husband's esteem predicts his mate retention tactics. *Evolutionary Psychology*, 12(3), 655–672.
- Hudders, L., De Backer, C., Fisher, M., & Vyncke, P. (2014). The rival wears Prada: luxury consumption as a female competition strategy. *Evolutionary Psychology*, 12, 570–587. doi: 10.1177/147470491401200306
- Kenrick, D. T., Delton, A. W., Robertson, T. E., Becker, D. V., & Neuberg, S. L. (2007). How the mind warps: a social evolutionary perspective on cognitive processing disjunctions. In J. Forgas, M. Haselton & W. Von Hippel (Eds.), *The evolution of the social mind: evolutionary psychology and social cognition* (pp. 49–68). New York: Psychology Press.
- Kenrick, D. T., Neuberg, S. L., Griskevicius, V., Becker, D., & Schaller, M. (2010). Goal-driven cognition and functional behavior: the fundamental-motives framework. *Current Directions in Psychological Science*, 19, 63–67. doi: 10.1177/0963721409359281
- Kenrick, D. T., Sadalla, E. K., Groth, G., & Trost, M. R. (1990). Evolution, traits, and the stages of human courtship: qualifying the parental investment model. *Journal of Personality*, 58, 97–116.
- Leary, M. R., & Baumeister, R. F. (2000). The nature and function of self-esteem: sociometer theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 1–62). San Diego, CA: Academic Press.
- Maner, J. K., Gailliot, M. T., Rouby, D. A., & Miller, S. L. (2007). Can't take my eyes off you: attentional adhesion to mates and rivals. *Journal of Personality and Social Psychology*, 93, 389–401. doi: 10.1037/0022-3514.93.3.389
- Maner, J. K., & Shackelford, T. K. (2008). The basic cognition of jealousy: an evolutionary perspective. *European Journal of Personality*, 22, 31–36.
- Massar, K., & Buunk, A. P. (2009). Rivals in the mind's eye: jealous responses after subliminal exposure to body shapes. *Personality and Individual Differences*, 46, 129–134.
- Massar, K., & Buunk, A. P. (2010). Judging a book by its cover: jealousy after priming with attractive and unattractive faces. *Personality and Individual Differences*, 49, 634–638.
- Massar, K., Buunk, A. P., & Dechesne, M. (2009). Jealousy in the blink of an eye: jealous reactions following subliminal exposure to rival characteristics. *European Journal of Social Psychology*, 39(5), 768–779. doi: 10.1002/ejsp.579
- McCulloch, K. C., Ferguson, M. J., Kawada, C. C. K., & Bargh, J. A. (2008). Taking a closer look: on the operation of nonconscious impression formation. *Journal of Experimental Social Psychology*, 44, 614–623. doi: 10.1016/j.jesp.2007.02.001

- Nadler, A., & Dotan, I. (1992). Commitment and rival attractiveness: their effects on male and female reactions to jealousy-arousing situations. *Sex Roles*, 26(7–8), 293–310. doi: 10.1007/BF00289913
- Nelissen, R. M. A., & Meijers, M. H. C. (2011). Social benefits of luxury brands as costly signals of wealth and status. *Evolution and Human Behavior*, 43(5), 343–355. doi: 10.1016/j.evolhumbehav.2010.12.002
- Quinlan, R. J., & Quinlan, M. B. (2007). Evolutionary ecology of human pair-bonds: cross-cultural tests of alternative hypotheses. *Cross-Cultural Research*, 41(2), 149–169. doi: 10.1177/1069397106298893
- Shackelford, T. K. (2001). Self-esteem in marriage. *Personality and Individual Differences*, 30, 371–380. doi: 10.1016/S0191-8869(00)00023-4
- Sidelinger, R. J., & Booth-Butterfield, M. (2007). Mate value discrepancy as predictor of forgiveness and jealousy in romantic relationships. *Communication Quarterly*, 55, 207–223. doi: 10.1080/01463370701290426
- Swami, V., Inamdar, S., Stieger, S., Nader, I. W., Pietschnig, J., Tranc, J., & Voracek, M. (2012). A dark side of positive illusions? Associations between the love-is-blind bias and the experience of jealousy. *Personality and Individual Differences*, 53, 796–800. doi: 10.1016/j.paid.2012.06.004
- Townsend, J. M., & Levy, G. D. (1990a). Effects of potential partners' physical attractiveness and socioeconomic status on sexuality and partner selection. *Archives of Sexual Behavior*, 19, 149–164.
- Townsend, J. M., & Levy, G. D. (1990b). Effects of potential partners' costume and physical attractiveness on sexuality and partner selection. *The Journal of Psychology*, 124, 371–389.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man* (pp. 136–179). New York: Aldine de Gruyter.
- White, G. L. (1981). A model of romantic jealousy. *Motivation and Emotion*, 5, 295–310. doi: 10.1007/BF00992549
- Workman, J. E., & Lee, S. H. (2011). Materialism, fashion consumers and gender: a cross-cultural study. *International Journal of Consumer Studies*, 35(1), 50–57. doi: 10.1111/j.1470-6431.2010.00935.x

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