



treatment, or using derisive body and facial gestures to make the rival feel badly about herself and thus less willing to compete. Studies have shown that even though indirect aggression is covert, it is nevertheless effective at inflicting harm on targets, *particularly female targets*, who are able to pick up on the subtle nuances which comprise this form of negative behavior [Vaillancourt, 2005]. Moreover, recent evidence suggests that women are more likely than men to engage in this type of behavior when they face a social threat [e.g., Benenson et al., 2011].

Research on human mate preferences clearly demonstrates that males show a strong preference for young, attractive females [Buss, 1989; Buss and Schmitt, 1993; Grammer and Thornhill, 1994; Singh, 1993, 1994; Singh and Young, 1995]. In reaction to this predilection, females derogate rivals who imbue these qualities. Indeed, studies have shown that females are particularly intolerant of attractive peers, using indirect aggression against them at a greater rate than their less attractive peers [e.g., Leenaars et al., 2008]. Moreover, at times when females are maximally fertile (time of ovulation), they are the most derogating of competitors; rating female faces as less attractive [Fisher, 2004].

In addition to being intolerant of physically attractive peers, we hypothesize that women are particularly intolerant of *sexy* attractive peers. According to Baumeister and Twenge [2002], a double standard of sexual morality exists in which women “stifle each other’s sexuality because sex is a limited resource that women use to negotiate with men, and scarcity gives women an advantage” (p. 166). In their review of relevant literature, Baumeister and Twenge found support for their theory that females, and not males, suppress the sexuality of other females. Females accomplish this by “punishing” other females who seem to make sex too readily available “through informal sanctions such as ostracism and derogatory gossip” (p. 172). In other words, females used indirect aggression to suppress the sexuality of other females.

We examined the predication that women would “punish” other women who appear to make sex too readily available by randomly assigning young women in dyads (with a friend or with a stranger) to one of two conditions (Study 1). In the first condition, women were exposed to a conservatively dressed attractive female confederate. In the second condition, they were exposed to the same confederate dressed in sexy clothing. We hypothesized that most, if not all, women would express negative, derogative reactions (indirect aggression) toward the attractive confederate when her appearance emphasized sexually evocative qualities.

We further hypothesized that these negative reactions would be particularly pronounced in the presence of a female friend rather than a stranger. This hypothesis was based on research demonstrating that female friendships are characterized by high intimacy which includes making social comparisons and gossiping about others [Dunbar et al., 1997; Hornstein, 1985]. As well, we expected that women would be more comfortable expressing themselves negatively in the presence of a friend rather than a stranger.

We also conducted a manipulation validation study (Study 2) by randomly assigning women to one of the three conditions in which they independently rated (1) a photograph of the conservatively dressed confederate from Study 1, (2) a photograph of the provocatively dressed confederate (sexy-thin) from Study 1, or (3) a manipulated photograph of the provocatively dressed confederate from Study 1 in which she appeared overweight (sexy-fat). Consistent with the idea that the sexy confederate from Study 1 was in fact viewed as a sexual rival, we hypothesized that women would be less willing to introduce her to their current or future boyfriend(s), or have their current or future boyfriend(s) spend time alone with her than the attractive conservative confederate or the sexy-fat confederate. We also hypothesized that compared to the conservatively dressed confederate, women would not want to introduce their partner or allow him to spend time with the sexy-fat woman because her sexy clothing would be perceived as an indicator of sexual availability and hence would be threatening<sup>1</sup> [Abbey et al., 1987].

According to Buss et al. [2000], successful retention of one’s mate hinges on one’s ability to prevent the partner from defecting or being unfaithful, and fending off rivals who may be interested in mating with that partner. Disparaging a sexy attractive woman (Study 1) or not allowing your partner to meet or spend time with such a woman (Study 2) is mate guarding (i.e., intrasexual competition).

Finally, we hypothesized that women would be less likely to want to have the sexy-thin or the sexy-fat confederate as a friend, compared to the conservatively dressed confederate. This hypothesis was based on the idea that a woman would not want to associate with a woman who appears too sexually available because it would reduce her own

<sup>1</sup>It has been shown that the presence of an intrasexual competitor does indeed represent a threat to fidelity [see Arnocky, Sunderani, Miller, & Vaillancourt, in press; Kenrick, Neuberg, Zierk, & Krones, 1994].

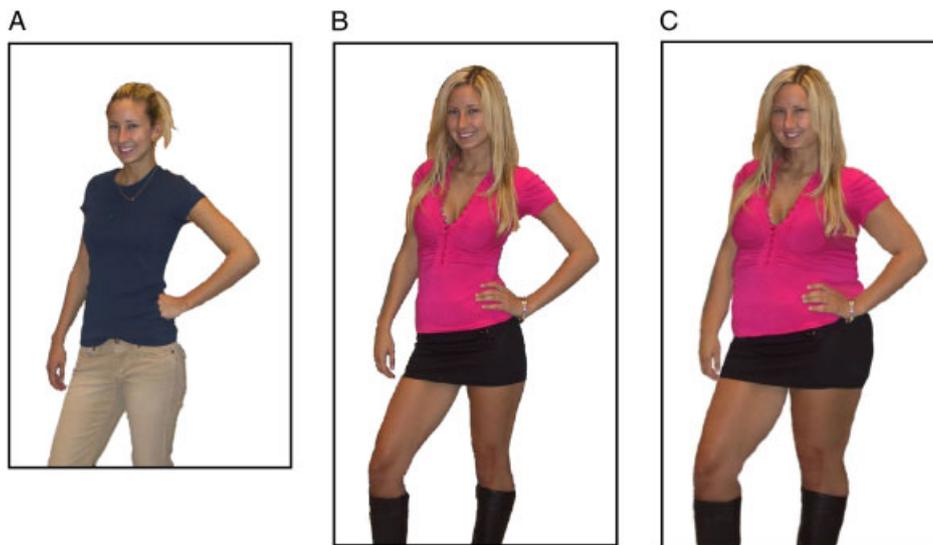


Fig. 1. Confederate dressed conservatively (A), provocatively (sexy-thin) (B), and provocatively (sexy-fat) (C).

mate-value (she too would be seen as promiscuous). As well, having a sexy woman as a friend might mean that the woman would have to be constantly on guard to ensure that her partner does not cheat on her with this seemingly sexually available person.

## STUDY 1

### Methods

**Participants.** Eighty-six heterosexual women ranging in age from 19 to 23 years ( $\text{Mean} \pm \text{SE} = 20.14 \pm 0.26$ ) from varying ethnic backgrounds participated in Study 1. The women were recruited from a mid-size university located in southern Ontario, Canada.

**Procedure.** A two (friendship, stranger) by two (conservative, provocative) experimental design was implemented. Participants were paired together in dyads to create two participant conditions—friendship and stranger dyads, based on having or not having an existing friendship with the woman they were paired with. Participants were then randomly assigned to the two experimental conditions. In the first (conservative) condition ( $n = 40$ ; 20 friends and 20 strangers), participants were exposed to an attractive, conservatively dressed 21-year-old Caucasian female confederate (independently rated as attractive by 20 female undergraduate students on a scale from 1 to 10,  $\text{Mean} \pm \text{SE} = 8.6 \pm 0.25$ ) who embodied qualities considered attractive from an evolutionary perspective [low waist-to-hip ratio, clear skin, large breasts; Buss, 1989; Buss and Schmitt, 1993; Grammer and Thornhill, 1994; Singh, 1993, 1994; Singh and Young,

1995] (Fig. 1A). In the second (sexy) condition ( $n = 46$ ; 23 friends and 23 strangers), the same female confederate was dressed in a sexually provocative manner (Fig. 1B).

In both conditions, the confederate's behavior and mannerisms were standardized. Each trial was run with the confederate knocking on the door the same number of times, taking the same number of steps across the room and between the dyad (who was waiting for a moderated discussion on how women handle conflict in friendships to begin), and using the same script to ask the dyad the whereabouts of the study's experimenter. The confederate then left the laboratory with the experimenter, a South Asian woman in her late 20s dressed conservatively across conditions. Before and after the experimenter and confederate exited the room the participants were unknowingly video and audio recorded using equipment that captured their individual reactions of their exposure to the confederate.

**Coding of observational data.** Video clips of participants' individual reactions of their exposure to the confederate were randomly presented to 13 primarily Caucasian women (mean age = 23,  $\text{SE} = 0.74$ ) blind to condition, who classified and rated participants on two dependent variables: (1) whether or not they thought the participant was exhibiting bitchy<sup>2</sup> behavior (i.e., indirect aggression) and (2) if so, how bitchy her reaction was on a scale from 0 to 10 (0, not bitchy; 10, extremely bitchy).

<sup>2</sup>Because the terms indirect aggression and derogation are scientific terms we asked participants to rate reactions using the colloquial term "bitchy" and provided them with a comprehensive list of what these behaviours entailed (see list provided in main text).

A participant's reaction was coded as bitchy if 70% or more of the coders identified it as so ( $n = 36$ ). A reaction was coded as not bitchy if 70% or more of the coders deemed it to not be ( $n = 42$ ). Cases in which neither threshold was achieved were coded as "unsure" ( $n = 8$ ). Bitchy behavior (use of indirect aggression) included negative facial expressions (e.g., looks of disgust, eye rolls), dismissive/avoidant behavior, "once-overs/death stares", body posture, back biting or mocking, sarcastic tone of voice, and fake smiles. To avoid capturing facial expression unrelated to the exposure to the confederate, 30 sec of tape were reviewed from the point of the confederate's entrance into the room. If participants were still expressing a reaction toward the confederate after the 30 sec, the coding time was extended accordingly (Mean  $\pm$  SE = 38.39  $\pm$  7.79 sec).

In addition to coding the video clips on a universal impression of derogation, the data were also coded using the Facial Action Coding System [FACS; Ekman and Friesen, 2003]. FACS is a specialized and rigorously validated method of taxonomizing facial expressions. The system describes facial behavior and expressions of emotions with a series of muscle contractions termed *action units*. Two trained and certified FACS raters independently applied the FACS to each videotape, while remaining blind to the experimental condition ( $\kappa$  varied from 0.85 to 1.00 across coding categories). Following the application of the FACS, each coder's results were analyzed using the Emotion Facial Action Coding System [EmFACS; Ekman et al., 2002], a rule-based approach for assigning emotions to particular combinations of action units. The specific emotions coded for were: happiness, sadness, anger, contempt, surprise, disgust, and rage.

FACS raters also coded for the presence of the following behavior: (1) whether participants exchanged a glare with each other as a way of conveying information about the confederate ("exchanging information"), (2) if they looked at the confederate up and down ("once-overs"), (3) whether they said something negative about the confederate when she left the room ("negative verbal comments"), and (4) if they laughed at the confederate ("laughed"). The  $\kappa$  score was 1.00 for all these coding categories.

**Manipulation check.** At the end of the study, participants were asked to share their thoughts about what they felt the purpose of the study was. None of the participants identified the interruption by the confederate as a planned, strategic part of the study, nor were they able to identify the confederate's role in the study.

## Results

$\chi^2$  analyses, one-way analysis of variance (ANOVA), and multilevel modeling were used to assess the hypotheses proposed for Study 1. Given the number of analyses conducted,  $P < .01$  was used as an indicator of statistical significance.

### Bitchy Classification

Examining participants' global negative reactions (bitchy or not bitchy) to the confederate we found striking differences by condition ( $\chi^2(2) = 51.71$ ;  $P < .0001$ ; see Table I). Specifically, when women were rated as bitchy, all but 2 were in the sexy condition. And of those rated as not bitchy, most were in the conservative condition. The remaining eight women's reactions were coded as unsure (two in the conservative condition and six in sexy condition).

### Bitchy Ratings

When we examined how bitchy the women's reactions were on a scale from 0 to 10, we found a statistically significant main effect for condition (sexy vs. conservative;  $F(1, 82) = 64.00$ ,  $P < .0001$ ), a marginal effect for type of dyad (friends vs. strangers;  $F(1, 82) = 4.10$ ,  $P < .05$ ), and no interaction between conditions ( $F(1, 82) = 1.67$ ,  $P = .20$ ). Women in the sexy condition were rated as being bitchier (Mean  $\pm$  SE = 3.40  $\pm$  0.28) than women in the conservative condition (Mean  $\pm$  SE = 0.20  $\pm$  0.27) and women in friendship dyads were rated as being slightly bitchier (Mean  $\pm$  SE = 2.20  $\pm$  0.28) than women in stranger dyads (Mean  $\pm$  SE = 1.40  $\pm$  0.28) (Fig. 2). The effect size for the sexy condition was large (Cohen's  $d = 1.74$ ) and for the dyad condition small (Cohen's  $d = 0.34$ ).

Because participants' reactions were nested within dyads, interactions between dyad and condition were also examined using multilevel modeling with participants' global negative reactions (level of bitchiness) as the outcome. Excluding those in the unsure group and controlling for the type of dyad,

**TABLE I. Relative Frequency of "Bitchy" Classification by Experimental Condition**

	Conservative condition ( $N = 40$ )	Sexy condition ( $N = 46$ )
Bitchy	2 (5.0%)	34 (74%)
Not bitchy	36 (90%)	6 (13%)
Unsure	2 (5.0%)	6 (13%)

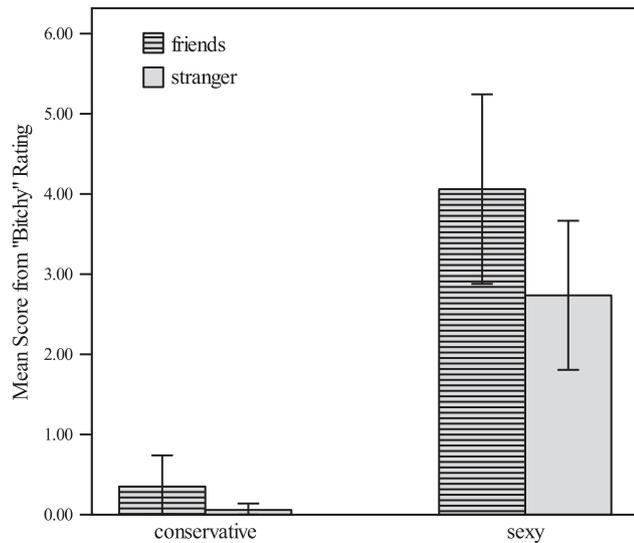


Fig. 2. Mean bitchy scores by condition (sexy vs. conservative) and dyad (friends vs. strangers).

we found that again, condition (sexy vs. conservative) was a statistically significant correlate of outcome ( $OR = \exp(4.651) = 104.69$ ,  $SE \pm 2.60$ ;  $P < .001$ ). Unfortunately, we could not test the initial hypothesis that women would behave more poorly when with a friend in the sexy condition (i.e., the interaction between condition and type of dyad) because the model did not converge.

**EmFACS**

Examining emotions coded with EmFACS across the sexy and conservative conditions we found that of the 11.6% ( $n = 10$ ) of the total sample that displayed true happiness all were assigned to the conservative condition ( $\chi^2(1) = 13.01$ ,  $P < .001$ ). Moreover, of the 12.8% ( $n = 11$ ) of the total sample that displayed anger, all were assigned to the sexy condition ( $\chi^2(1) = 10.97$ ,  $P < .001$ ). There were no other statistically significant findings for EmFACS identified reactions by conditions (friends vs. stranger or sexy vs. conservative) and no interactions between conditions.

**Other Negative Behavior**

As seen in Table II, when examining whether participants exchanged a look with their partner as a way of conveying information about the confederate we found notable differences by condition ( $\chi^2(1) = 11.59$ ,  $P < .001$ ) with far more women looking to each other to exchange information in the sexy condition than in the conservative condition. As well, women in the sexy condition were far

TABLE II. Relative Frequency of Other Negative Behavior by Experimental Condition

Type of behavior	Conservative condition (N = 40)	Sexy condition (N = 46)
Exchanging information	1 (2.5%)	14 (30%)
Once-overs	10 (25%)	39 (85%)
Negative verbal comments	0 (0%)	12 (26%)
Laughed	3 (7.5%)	21 (46%)

more likely to have looked the participant over than those in the conservative condition ( $\chi^2(1) = 31.19$ ,  $P < .0001$ ). We also found that negative comments were only made about the confederate in the sexy condition,  $\chi^2(1) = 12.13$ ,  $P < .001$ . For example, one woman implied that the confederate was dressed to have sex with one of her professors and another said that the confederate’s “boobs were about to pop out”. Importantly, all comments about the confederate were made *after* she left the room with one exception. One woman said “What the fuck is that?” directly to the confederate after blatantly looking her up and down while showing disgust.

Finally, we found that participants laughed about the confederate when she left the room far more often in the sexy condition than in the conservative condition ( $\chi^2(1) = 15.48$ ,  $P < .001$ ), and when with a friend than with a stranger ( $n = 5$ ;  $\chi^2(1) = 11.33$ ,  $P < .001$ ).

**STUDY 2**

**Methods**

**Participants.** Sixty-six women ranging in age from 17 to 28 years (Mean  $\pm$  SE = 18.70  $\pm$  0.04) from varying ethnic backgrounds participated in the manipulation validation study. They were recruited from a mid-size university located in southern Ontario, Canada.

**Procedure.** To verify the evolutionary significance of the exposure to the sexy confederate, women were randomly assigned to one of the three conditions. In all three conditions, participants were asked to rate a color photograph of the confederate from Study 1. Specifically, they were asked to rate the woman’s level of attractiveness (cuteness) and sexiness in the photograph using a scale of 1–10 with 1 = not at all descriptive and 10 = extremely descriptive. Participants were also asked to rate how likely, on a scale of 1 to 7 with 1 = extremely unlikely and 7 = extremely likely, would they

introduce her to their boyfriend (current or future) and how likely would they let their boyfriend (current or future) spend time alone with her. In the first condition (conservative), a photograph of the conservatively dressed confederate was provided (Fig. 1A). In the second condition (sexy-thin), a photograph of the sexy dressed confederate was provided (Fig. 1B). Finally, in the third condition (sexy-fat), a photograph of the sexy dressed confederate was manipulated so that she appeared overweight (Fig. 1C).

## Results

ANOVA was used to examine participants' perception of the confederate from Study 1. Given the number of analyses conducted,  $P < .01$  was again used as an indicator of statistical significance. As expected, Student–Newman–Keuls post-hoc tests confirmed that even though participants rated the conservative confederate as cuter than the other two women ( $F(2, 61) = 13.72, P < .001$ , partial  $\eta^2 = .31$ ), they nevertheless were less likely to introduce the sexy-thin confederate to their boyfriend ( $F(2, 63) = 24.98, P < .001$ , partial  $\eta^2 = .44$ ), or let him spend time alone with her ( $F(2, 63) = 8.81, P < .001$ , partial  $\eta^2 = .22$ ) than the sexy-fat or conservative confederate (see Table III for all Means, SE, and post-hoc comparisons). Moreover, participants also rated the sexy-thin confederate as being sexier than the sexy-fat and conservative confederates ( $F(2, 61) = 9.74, P < .001$ , partial  $\eta^2 = .24$ ), with the post-hoc test revealing that the mean ratings on sexy for the sexy-fat and conservative confederates were not statistically significantly different from one another.

Finally, consistent with our initial hypothesis, we found that women reported being less likely to be friends with the sexy-thin or sexy-fat confederate than the conservatively dressed confederate ( $F(2, 63) = 23.66, P < .0001$ , partial  $\eta^2 = .43$ ).

## DISCUSSION

Although the ultimate reason women derogate rivals is unknown, we strongly suspect that the use of indirect aggression by human females is rooted in evolutionary history. It has been noted in the nonhuman animal literature that female reproductive competition is most intense within species in which males invest heavily in their offspring (with some exceptions see Clutton-Brock, 2007). In humans, males are invested in their offspring, albeit to a lesser extent than females, and because they invest they also tend to be selective in terms of who they mate with on a long-term basis [Kenrick et al., 1990]. This choosiness puts pressure on females to compete for the most desirable mates and the form this competition takes is often the derision of perceived rivals [Campbell, 2002; Vaillancourt, 2005].

Using an experimental design, results of Study 1 provide support for the hypothesis that women do engage in intrasexual competition and that the form it takes is indirect aggression. In the presence of an attractive female who defied social convention by dressing in a sexually provocative manner, almost all women randomly assigned to this condition aggressed against her. The women in this condition were more likely to roll their eyes at the confederate, look her up and down, stare at her without conveying any emotion, and show anger while she was in the room. When the confederate left the room, many of them laughed at her, ridiculed her appearance, and/or suggested that she was sexually available. In contrast, when the same attractive confederate was dressed conservatively, the women assigned to this condition behaved well. They greeted her in a friendly manner, and *none of them* discussed her when she left the room.

Baumeister and Twenge [2002] hypothesized that women “stifle each other’s sexuality” as a way of maintaining advantage in the negotiation of resources. Females who make sex readily available

TABLE III. Means, Standard Errors, and Post-Hoc Results by Experimental Condition

	Condition 1 conservative ( <i>N</i> = 33)	Condition 2 sexy-thin ( <i>N</i> = 33)	Condition 3 sexy-fat ( <i>N</i> = 33)	S-N-K Post-hoc analysis
How likely would you introduce her to your boyfriend?	4.73* (.29)**	1.86 (.29)	2.95 (.29)	1 > 2, 3 and 3 > 2
How likely would you let your boyfriend spend time alone with her?	3.38 (.29)	1.68 (.28)	2.55 (.28)	1 > 2, 3 and 3 > 2
How likely would she be a friend of yours?	5.41 (.30)	2.73 (.30)	3.14 (.30)	1 > 2, 3
How sexy is she?	4.70 (.46)	6.77 (.44)	4.18 (.44)	2 > 1, 3
How cute is she?	7.60 (.47)	4.68 (.45)	4.55 (.45)	1 > 2, 3

\*Mean; \*\*standard error.

compromise the power holding position of the group. It is therefore in the best interest of the group to punish those who violate this unspoken rule/convention. Results from Study 1 suggest that the non-verbal chastisement of violators is an almost universal phenomenon among women who are at the height of their reproductive value, a time in which women are most likely to compete with each other for access to desirable mates [Campbell, 1995, 1999].

Results of Study 1 raise the question about why might women use indirect means rather than overt behavior to aggress against one another (as only one of the participants did in this study). It has been suggested that females use indirect rather than overt aggression because it represents a presumably safer and more effective intrasexual competition strategy [Campbell, 1995, 1999; see also Bjorkqvist, 1994]. Physical aggression runs the risk of injury or death, which historically (and currently in some places around the world), would have hindered the reproductive success of a female by increasing the vulnerability of her offspring. In terms of effectiveness, there is a convincing literature delineating the negative effects indirect aggression has on those who fall victim, which is particularly pronounced in females [e.g., Card et al., 2008].

In Study 2, we examined whether the sexy confederate from Study 1 was in fact viewed as a sexual rival by women. Results from this study provided additional support for our intrasexual competition among women hypothesis. Women independently rated the sexy-thin confederate from Study 1 as the sexiest of the three women. They were also *two times* less likely to want to introduce their boyfriend to her or have him spend time alone with her compared to the conservative confederate who was rated as being the most attractive (cute) of the three women (although she was the same person in all three photos). Notably, women were also less likely to introduce the sexy-fat confederate to their boyfriend or allow him to spend time with her than the thin attractive, but conservatively dressed, confederate. It is clear from the research literature that larger women are not perceived by men as being attractive. In fact, studies consistently demonstrated that women with large breasts and a low waist-to-hip ratio are preferred by men for both short-term and long-term relationships [e.g., Singh, 1993, 1994; Singh and Young, 1995]. However, this finding is consistent with evidence that women are threatened by, disapprove of, and punish women who appear and/or act promiscuous [Baumeister and Twenge, 2002]. Recently, Griskevicius et al. [2009] reported

that for women, mating motives increased indirect aggression use, a finding consistent with Benenson's [2009] idea that human females constantly compete with one another to initiate and maintain a long-term partnership with a mate. The form this competition takes is indirect aggression. Across human history, females have relied heavily on the investment of males for the provision of resources and for the protection of themselves and their offspring [Benenson, 2009, p. 269]. Having a mate defect often indicates fewer resources for the woman and her offspring.

Finally, consistent with our initial hypothesis, we found that women reported being less likely to be friends with the sexy-thin or sexy-fat confederate than the conservative confederate. Bleske and Shackelford [2001] examined mating rivalry in same-sex friendships and found that women, but not men, were less willing to be friends with a woman who was described as sexually promiscuous. We suspect that women who appear sexually available are not perceived as "safe" friends—they are expected to be mate poachers and they likely devalue a person's mate value (guilty by association). More studies examining this specific hypothesis are needed.

### Limitations and Future Directions

Although the effect sizes of this study were large, there are limitations that ought to be considered. First, it is possible that participants were reacting to a norm violation, although there were no differences between the two conditions on the facial expression surprise. Women certainly dress provocatively in a university context; however, most research assistants (the role played by the confederate in Study 1) would likely not be dressed in such a sexy manner. Nevertheless, we suspect that it would be rather difficult to assess this alternative norm violation hypothesis in a plausible way. For example, the confederate could be dressed as a clown (norm violation) and we would expect a reaction from participants but we would also expect them to be suspicious of the intent of the study therefore compromising validity.

Second, we did not assess the effects of ovulatory cycle on women's behavior (Study 1) or ratings (Study 2). Fisher [2004] found that the time of ovulation was related to women rating other women as less attractive, suggesting that intrasexual competition may increase during times of peak fertility. Durante et al. [2008] found shifts in clothing choice related to ovulation with women showing greater

preference for revealing clothing near ovulation. These authors suggested that this shift in clothing preference may reflect an increase in “female–female competition near ovulation” (p. 1451). Replicating the findings of this study taking into account a woman’s menstrual cycle seems warranted.

Third, future studies ought to consider the role dating status has on intrasexual competition. Intrasexual competition is highest when people are not in a committed relationship [e.g., Daly and Wilson, 1988]. However, as Benenson [2009] argues, for females, this competition extends beyond the courtship because females need to maintain their partner’s “loyalty” which discourages the diversion of resources to other females.

## CONCLUSION

Most studies on intrasexual competition across species have focused on males, and most studies on humans have not taken an experimental approach in which participants are randomized to different conditions. To our knowledge, Study 1 is the first experimental study to assess female intrasexual competition through the use of indirect aggression. We found strong empirical support (effect size; Cohen’s  $d = 1.74$ ) for the hypothesis that women would be particularly intolerant of a sexy peer and that this intolerance would take the form of indirect aggression. With few exceptions, the women in the sexy condition behaved badly, aggressing against a woman whose only indiscretion was to be dressed in a sexually evocative manner. They also behaved more poorly with a friend than with a stranger.

In Study 2, we attempted to verify whether the sexy confederate was perceived as a sexual rival. Consistent with this idea, we hypothesized that women would not want to introduce her to their boyfriend or allow him to spend time with her. We also hypothesized that they would not let their partner spend time with the sexy-fat confederate because her sexy clothing would likely be perceived as a sign of sexual availability. Manipulating the appearance of the sexy confederate to by making her appear overweight but still sexually provocative, we found strong support for this sexual rival hypothesis (effect size; partial  $\eta^2 = .44$ ). We also asked participants how likely they would be friends with her, hypothesizing that they would be less inclined if she was dressed provocatively. Results strongly supported this hypothesis (effect size; partial  $\eta^2 = .43$ ).

Taken together, the results of this study provide support for the idea that women do engage in intrasexual competition through the use of indirect aggression.

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## REFERENCES

- Abbey A, Cozzarelli C, McLaughlin K, Harnish J. 1987. The effect of clothing and dyad sex composition on perceptions of sexual intent: Do women evaluate these cues differently. *J Appl Soc Psychol* 17:108–126. DOI: 10.1111/j.1559-1816.1987.tb00304.x.
- Archer J. 2009. Does sexual selection explain human sex differences in aggression? *Behav Brain Sci* 32:249–311. DOI: 10.1017/S0140525X09990951.
- Arnocky S, Sunderani S, Miller JL, Vaillancourt T. (2011). Jealousy mediates the relationship between attractiveness and females’ indirect aggression. *Personal Relationships*.
- Barber N. 1995. The evolutionary psychology of physical attractiveness: Sexual selection and human morphology. *Ethol Sociobiol* 16:395–424. DOI: 10.1016/0162-3095(95)00068-2.
- Baumeister RF, Twenge JM. 2002. Cultural suppression of female sexuality. *Rev Gen Psychol* 6:166–203. DOI: 10.1037//1089-2680.6.2.166.
- Benenson JF. 2009. Dominating versus eliminating the competition: Sex differences in human intrasexual competition. *Behav Brain Sci* 32:268–269. DOI: 10.1017/S0140525X0999046X.
- Benenson JF, Markovits H, Thompson ME, Wrangham RW. 2011. Under threat of social exclusion, females exclude more than males. *Psychol Sci* 22:538–544. DOI: 10.1177/0956797611402511.
- Bjorkqvist K. 1994. Sex differences in physical, verbal and indirect aggression: A review of recent research. *Sex Roles* 30:177–188.
- Bleske AL, Shackelford TK. 2001. Poaching, promiscuity, and deceit: Combating mating rivalry in same-sex friendships. *Personal Relationships* 8:407–424. DOI: 10.1111/j.1475-6811.2001.tb00048.x.
- Buss DM. 1988. The evolution of human intrasexual competition: Tactics of mate attraction. *J Pers Soc Psychol* 54:616–628. DOI: 10.1037/0022-3514.54.4.616.
- Buss DM. 1989. Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behav Brain Sci* 12:1–49. DOI: 0.1017/S0140525X00023992.
- Buss DM, Dedden LA. 1990. Derogation of competitors. *J Soc Pers Relat* 7:395–422. DOI: 10.1177/0265407590073006.
- Buss DM, Schmitt DP. 1993. Sexual strategies theory: An evolutionary perspective on human mating. *Psychol Rev* 100:204–232. DOI: 10.1037/0033-295X.100.2.204.

- Buss DM, Shackelford TK, Choe J, Buunk BP, Dijkstra P. 2000. Distress about mating rivals. *Pers Relat* 7:235–243. DOI: 10.1111/j.1475-6811.2000.tb00014.x.
- Campbell A. 1995. A few good men: Evolutionary psychology and female adolescent aggression. *Ethol Sociobiol* 16:99–123. DOI: 10.1016/0162-3095(94)00072-F.
- Campbell A. 1999. Staying alive: Evolution, culture and women's intra-sexual aggression. *Behav Brain Sci* 22:203–252. DOI: 10.1017/S014025X9900181.
- Campbell A. 2002. *A Mind of Her Own: The Evolutionary Psychology of Women*. Oxford: Oxford University Press.
- Card NA, Stucky BD, Sawalani GM, Little TD. 2008. Direct and indirect aggression during childhood and adolescence. A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Dev* 79:1185–2008. DOI: 10.1111/j.1467-8624.2008.01184.x.
- Clutton-Brock TH. 2007. Sexual selection in males and females. *Science* 318:1882–1885. DOI: 10.1126/science.1133311.
- Daly M, Wilson M. 1988. *Homicide*. New York: Aldine de Gruyter.
- Darwin C. 1871. *The Decent of Man and Selection in Relation to Sex*. London: John Murray.
- Dunbar RIM, Duncan NDC, Marriott A. 1997. Human controversial behavior. *Hum Nat* 8:231–246. DOI: 10.1007/BF02912493.
- Durante KM, Li NP, Haselton MG. 2008. Changes in women's choice of dress across the ovulatory cycle: Naturalistic and laboratory task-based evidence. *Pers Soc Psychol Bull* 34:1451–1460. DOI: 10.1177/0146167208323103.
- Ekman P, Friesen WV. 2003. *Unmasking the Face: A Guide to Recognizing Emotions From Facial Expressions*. Cambridge: Marlor Books.
- Ekman P, Friesen WV, Hager JC. 2002. *The Facial Action Coding System*. London: Research Nexus.
- Fisher ML. 2004. Female intrasexual competition decreases female facial attractiveness. *Proc R Soc Lond Biol Lett* 271:283–285. DOI: 10.1098/rsbl.2004.0160.
- Fisher M, Cox A. 2009. The influence of female attractiveness on competitor derogation. *J Evol Psychol* 7:141–155. DOI: 10.1098/rsbl.2004.0160.
- Gallup AC, Wilson DS. 2009. Body mass index (BMI) and peer aggression in adolescent females: An evolutionary perspective. *J Soc Evol Cult Psychol* 3:356–371. Retrieved from <http://137.140.1.71/jsec/>
- Geary DC. 2010. *Male, Female: The Evolution of Human Sex Differences*, 2nd edition. Washington, DC: American Psychological Association.
- Gramer K, Thornhill R. 1994. Human (*homo sapiens*) facial attractiveness and sexual selection: The role of symmetry and averageness. *J Comp Psychol* 108:233–242. DOI: 10.1037/0735-7036.108.3.233.
- Griskevicius V, Tybur JM, Gangestad SW, Perea EF, Shapiro JR, Kenrick DT. 2009. Aggress to impress: Hostility as an evolved context-dependent strategy. *J Pers Soc Psychol* 96:980–994. DOI: 10.1037/a0013907.
- Hornstein GA. 1985. Intimacy in conversational style as a function of the degree of closeness between members of a dyad. *J Pers Soc Psychol* 49:671–681. DOI: 10.1037/0022-3514.49.3.671.
- Kenrick DT, Sadalla EK, Groth G, Trost MR. 1990. Evolution, traits, and the stages of human courtship: Qualifying the parental investment model. *J Pers* 58:97–116. DOI: 10.1111/j.1467-6494.1990.tb00909.x.
- Kenrick DT, Neuberg SL, Zierk K, Krones J. 1994. Evolution and social cognition: Contrast effects as a function of sex, dominance, and physical attractiveness. *Pers Soc Psychol Bull* 20:210–217. DOI: 10.1177/0146167294202008.
- Leenaars LS, Dane AV, Marini ZA. 2008. Evolutionary perspective on indirect victimization in adolescence: the role of attractiveness, dating and sexual behavior. *Aggr Behav* 34:404–415. DOI: 10.1002/ab.20252.
- Schmitt DP, Buss DM. 1996. Strategic self-enhancement and competitor derogation: Sex and context effects on the perceived effectiveness of mate attraction tactics. *J Pers Soc Psychol* 70:1185–1204. DOI: 10.1037/0022-3514.70.6.1185.
- Singh D. 1993. Adaptive significance of female attractiveness: Role of waist-to-hip ratio. *J Pers Soc Psychol* 65:293–307. DOI: 10.1037/0022-3514.65.2.293.
- Singh D. 1994. Is thin really beautiful and good? Relationship between physical attractiveness and waist-to-hip ratio. *Pers Individ Diff* 16:123–132.
- Singh D, Young RK. 1995. Body weight, waist-to-hip ratio, breasts, and hips: Role in judgments of female attractiveness and desirability for relationships. *Ethol Sociobiol* 16:483–507. DOI: 10.1016/0162-3095(95)00074-7.
- Symons D. 1979. *The Evolution of Human Sexuality*. New York: Oxford University Press.
- Vaillancourt T. 2005. Indirect aggression among human: Social construct or evolutionary adaptation? In Tremblay RE, Hartup WW, Archer J (editors). *Developmental Origins of Aggression*. New York: Guilford, pp 158–177.
- Walters S, Crawford C. 1994. The importance of mate attraction for intrasexual competition in men and women. *Ethol Sociobiol* 15:5–30. DOI: 10.1016/0162-3095(94)90025-6.
- Wilson M, Daly M. 1985. Competitiveness, risk taking and violence: The young male syndrome. *Ethol Sociobiol* 6:59–73. DOI: 10.1016/0162-3095(85)90041-X.