



Review

Cite this article: Vaillancourt T. 2013 Do human females use indirect aggression as an intrasexual competition strategy? *Phil Trans R Soc B* 368: 20130080. <http://dx.doi.org/10.1098/rstb.2013.0080>

One contribution of 14 to a Theme Issue 'Female competition and aggression'.

Subject Areas:

behaviour, evolution

Keywords:

intrasexual competition, indirect aggression, human females

Author for correspondence:

Tracy Vaillancourt

e-mail: tracy.vaillancourt@uottawa.ca

Do human females use indirect aggression as an intrasexual competition strategy?

Tracy Vaillancourt

Counselling, Faculty of Education and School of Psychology, Faculty of Social Sciences, University of Ottawa, Ottawa, Ontario, Canada K1N 6N5

Indirect aggression includes behaviours such as criticizing a competitor's appearance, spreading rumours about a person's sexual behaviour and social exclusion. Human females have a particular proclivity for using indirect aggression, which is typically directed at other females, especially attractive and sexually available females, in the context of intrasexual competition for mates. Indirect aggression is an effective intrasexual competition strategy. It is associated with a diminished willingness to compete on the part of victims and with greater dating and sexual behaviour among those who perpetrate the aggression.

1. Introduction

The study of sexual selection among human females has primarily focused on two competition strategies used to attract mates: (i) self-promotion and (ii) the derogation of rivals. Self-promotion involves epigamic displays of physical attractiveness such as wearing make-up or sexy clothing to attract the attention of a potential partner [1–7]. The derogation of competitors involves making a rival seem less attractive or less appealing to members of the opposite sex [7,8], which is typically achieved by disparaging the competitor's appearance or by spreading rumours that question the fidelity or level of promiscuity of a rival [2]. Females attack other females principally on appearance and sexual fidelity because males value these qualities in their partners. Indeed, research on human mate preferences has clearly shown that males have a strong preference for young, attractive females [3,6,9–13] who are not licentious [9,14].

The derogation of rivals bears a striking similarity to what developmental psychologists have termed 'indirect aggression' [15–17], which is also known as 'social aggression' [18,19] and 'relational aggression' [20,21]. Indirect aggression is circuitous in nature and entails actions such as getting others to dislike a person, excluding peers from the group, giving someone the 'silent treatment', purposefully divulging secrets to others, and the use of derisive body and facial gestures to make another feel self-conscious. Interestingly, indirect aggression also includes behaviours that have been shown to be used by women around the world when attempting to reduce the mate value of a competitor—criticizing a competitor's appearance and spreading rumours about her sexual behaviour [9]. Although developmental psychologists have tended to *not* conceptualize females' use of indirect aggression as an intrasexual competition strategy, the central thesis of this paper is that it is an *effective* approach that is used primarily and ubiquitously by girls and women when they are at the peak of their reproductive value.

2. Who uses indirect aggression?

When comparing mean levels of direct forms of aggression, which includes physical aggression, there is a clear and pronounced sex difference favouring males across the lifespan [22,23]. When comparing sex differences in mean levels of indirect aggression, there is a slightly higher rate found among females during

childhood, adolescence and adulthood [22,23]. Importantly however, when examining the proportion of engagement in this type of aggression, research demonstrates that females preferentially use indirect aggression (e.g. 52% for girls versus 20% for boys in 15-year olds; [24]) over all other forms of aggression. When girls and women aggress against others, they almost invariably use indirect aggression.

According to Björkqvist [15], females prefer to use indirect aggression over direct aggression (i.e. verbal and physical aggression) because this form of aggression maximizes the harm inflicted on the victim while minimizing the personal danger involved. The risk to the perpetrator is lower because he/she often remains anonymous, thereby avoiding a counter-attack. As well, indirect aggression harms others in such a socially skilled manner that the aggressor can also make it appear as if there was 'no intention to hurt at all' [25, p. 118].

Campbell [26,27] has suggested that because females have a greater parental investment than males [28], the costs associated with direct aggression (i.e. physical injury and even death; [29,30]) are too great and for that reason, indirect aggression is used. For females, it is more important that they 'stay alive' [26] so that their offspring's chances of survival improves (and hence their own fitness). Historically among humans, and current in many low-socioeconomic regions around the world, offspring survival was/is inextricably linked to maternal survival [31,32].

In addition to being the preferred way of aggressing against others [33], research has also shown that females typically direct their indirect aggression at other females [34–36], and that the victimization of other females increases in relation to experimentally primed mating motives [37]. The use of indirect aggression also increases with age [22,38–40] and is used at a similar rate [41] by females during adolescence [22] and young adulthood [33]. The fact that indirect aggression is primarily used by teenage girls and young women, who direct their aggression at same-sex peers, is in keeping with the hypothesis that indirect aggression is used in the context of competing for mates. Adolescence and early adulthood correspond to a time when fertility is at its highest [42] and when competition for mates is especially salient [26,27]. The association between indirect aggression and age is similar to the positive link found between age and intrasexual competition. As an example, Massar *et al.* [43] reported that younger women gossiped more about rivals than older women did.

Given males' distinct preference for physically attractive females [3,6,9–13], it is not surprising that attractive adolescent girls [44] and women [34] fall victim to other females' indirect aggression at a higher rate than their less attractive peers. In fact, in one study, attractiveness increased the odds of being indirectly aggressed against by 35% for adolescent girls, while decreasing the odds by 25% for adolescent boys [44]. The poor treatment of attractive females by other females has been documented beyond the use of indirect aggression. For example, in the work place, women routinely discriminate against same-sex candidates, particularly attractive same-sex candidates, whereas men actively welcome such women [45,46]. When offering a request for forgiveness, women are less accepting of the apology and judge the quality of the apology as poorer when it is offered by an attractive woman than when it is offered by an unattractive woman. For men, the opposite is true—an apology offered by an attractive woman is not only well received, but it is also judged as being of higher quality [47].

Most studies examining links between attractiveness and derogation, discrimination and aggression have focused on facial beauty. Thinness is also a marker of attractiveness in females, in large part because a thin figure is associated with youthfulness [11,35,48], and hence greater reproductive value. Cross-cultural evidence supports the notion that a thin body shape is perceived as attractive, especially by women who reside in high-socioeconomic regions around the world [49]. The fact that girls and women value thinness more than boys and men [49] suggests that the drive to be thin is likely motivated by intrasexual competition [48,50–55].

Most girls and women express disappointment about their current body shape [56–58]. In effect, body dissatisfaction is so pervasive among adolescent girls and women (termed 'normative discontent' [59]) that the American Psychological Association has identified it as an important issue, worthy of serious attention [60]. Moreover, given how common body image issues are among adolescent girls and women, Miller & Vaillancourt [54] have warned researchers against using body dissatisfaction as a screener for eating disorder pathology [38]. In addition to being discontent about their current body shape, many girls and women also express a strong fear of being too fat [61]. For instance, in one epidemiological study of Canadian females aged 15–65, one in five endorsed the item 'I have a strong fear of being too fat', a fear that was associated with negative self-esteem and body image preoccupation [62].

Eating disorders such as anorexia nervosa and bulimia nervosa are characterized by body image distortions, intense fear of being fat and the use of compensatory behaviours (e.g. starvation, vomiting and exercising) to avoid weight gain or to achieve weight loss [63]. Eating disorders disproportionately affect adolescent girls and young women, with approximately 40% of eating disorders beginning in late adolescence [63]. It has been suggested that not only are eating disorders a direct consequence of intrasexual competition, but also females, not males, promote the culture of thinness [53].

Consistent with the hypothesis that body dissatisfaction and eating pathology arise from intrasexual competition, Faer *et al.* [52] found links between rivalry for mates and body dissatisfaction, drive for thinness and both bulimia nervosa and anorexia nervosa among female undergraduate students. In another study, Li *et al.* [48] reported that body dissatisfaction and restrictive eating attitudes were related to intrasexual competition cues for women, but not for men. Werner & Crick [64] found that women who were nominated by peers as being indirectly aggressive were more likely to self-report symptoms of bulimia nervosa than their less aggressive peers. It has been suggested that bulimia and other eating pathologies including the pursuit of thinness are an index of competitive behaviour [59].

In a recent experimental study, Ferguson *et al.* [60] found direct links between body dissatisfaction and intrasexual competition in young women. In this study, women were randomly exposed to two young attractive research assistants who were either (i) dressed in a manner that accentuated their thin figures (attire similar to that would be worn at a job interview) and wore make-up or (ii) dressed in non-form-fitting track pants (frumpy attire) with no make-up. In these two conditions, an attractive male was either present or not. Results were consistent with the concept that body dissatisfaction is born from intrasexual competition. Women who were exposed to the attractive research assistants reported greater body

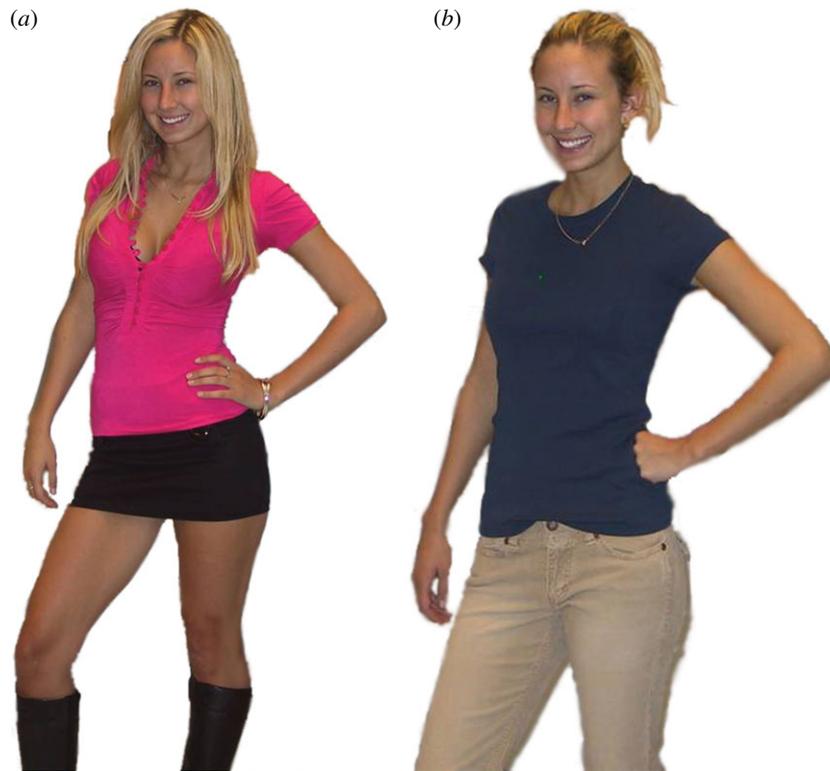


Figure 1. Confederate dressed in (a) a sexually provocative manner versus (b) a conservative manner.

dissatisfaction than those exposed to the frumpy research assistants. Moreover, this relation was ‘dramatically’ pronounced among women who were thin. Thin women would presumably be most threatened by the slim attractive research assistants because these women would be their most direct rivals. Comparing rates of body dissatisfaction across the experimental groups, Ferguson and co-workers also found that women in the attractive research assistant condition with an attractive man were the least satisfied with their bodies. Researchers have repeatedly demonstrated that same-sex peers influence the body image of girls and women more than the exposure to media depicting thin as beautiful [60,65–70].

If thinness is a marker for youth and attractiveness, which signals higher mate value, and indirect aggression is an intra-sexual competition strategy, then thin girls and women should be indirectly aggressed against more than their heavier peers. In a recent nationally representative study of American adolescents in which different types of peer victimization were examined in relation to weight status, Wang *et al.* [71] found that while overweight boys and obese girls were primarily bullied verbally by their peers and underweight boys were the targets of physical bullying, it was underweight girls who were most often victims of indirect aggression. Unfortunately, in this study, the sex of the perpetrator was not assessed.

The studies reviewed thus far suggest that being physically attractive places females at risk of being indirectly victimized by other females. Attractive rivals are threatening owing to their high mate value [34,72], and consequently, females attack other attractive females indirectly as a way of either intimidating their rivals [30], diminishing their rivals’ mate value [34] or improving their self-image, which is challenged by the presence of attractive competitors [43]. In addition to being intolerant of attractive females, there is evidence that females are intolerant of same-sex peers who are perceived as being too sexually available and aggress against such females using indirect aggression.

Considering males’ preference for females as long-term partners with no, or limited, sexual experience [9], it seems curious that females would be biased against ‘promiscuous’ rivals. On balance, should females not be pleased that their competitors are engaging in behaviour that debases their mate value? According to Baumeister & Twenge [73], females are threatened by promiscuous females because ‘sex is a limited resource that women use to negotiate with men, and scarcity gives women an advantage’ (p. 166). That is, females, not males, suppress the sexuality of other females and they do so by using ‘informal sanctions such as ostracism and derogatory gossip’ (p. 172). In other words, females punish other females who seem to make sex too readily available using indirect aggression [74–77]. There are some studies supporting this line of reasoning. For example, in a study of adolescents, Leenaars *et al.* [44] found that for girls and not boys, recent sexual behaviour was associated with increased indirect peer victimization—a finding that was, above all, present for older adolescent girls. In another study, Vaillancourt & Sharma [78] found very strong support for women’s intolerance of sexy peers. In their experiment, young women were randomly assigned in dyads to one of two conditions. In the first condition, the dyad’s conversation was interrupted by an attractive female confederate who was dressed in sexy clothing; whereas in the second condition, participants were interrupted by the same confederate who was dressed in a conservative manner (figure 1). Participants were secretly video-recorded (with audio) and their reactions to the presence of the confederate were coded by independent female raters blind to condition. Results of this experiment were striking—with the exception of two women, all of the participants who were coded as engaging in indirect aggression were assigned to the sexy condition.

In a follow-up experiment, Vaillancourt & Sharma [78] demonstrated that the sexy confederate from their first study was perceived as a sexual rival. Indeed, the women in this experiment demonstrated a clear preference to not wanting to

introduce the sexy confederate to a boyfriend or to allow him to spend time alone with her. They also did not want to be friends with the sexy confederate. Bleske & Shackelford [79] also found that women, and not men, were less willing to become friends with a member of the same sex if the person was described as sexually promiscuous, and argued that the reason was owing to the fact that 'promiscuous women threaten other women's efforts to attract and retain a desirable long-term mate by triggering men's desire for sexual variety and casual sex' (p. 411). Given this established mating preference for males [3], it seems reasonable that it would be in a female's best interest to avoid girls and women who appear to be sexually available. Associating with such females may (i) lower a person's own mate value (guilty by association), (ii) result in the poaching of one's romantic partner [34,73,80] or (iii) induce a feeling of jealousy because they are perceived to be obtaining something that is valued (i.e. the attention of males).

It is unclear from the research literature if mate poaching by 'sexy' rivals is actually a legitimate concern. However, attractive females should be of concern insofar as they have been shown to be more successful at mate poaching than their less attractive peers [80], which in turn, has been linked to greater mating success [81–83]. Attractive females should also be of concern because they are able to directly reduce the mate value of competitors. For example, Fisher & Cox [4] found that the derogation of a rival's appearance was most successful when the gossip was attractive—men, and not women, debased their attractiveness estimation of a woman only if the woman was disparaged by an attractive woman. These results suggest that despite being more frequent victims of indirect aggression [34,44], attractive women may nevertheless have a tactical advantage over their less attractive peers.

The studies reviewed above suggest that indirect aggression is used by adolescent girls and women in the context of intrasexual competition. In §3, the evidence concerning how effective indirect aggression is as an intrasexual competition strategy is reviewed.

3. Is indirect aggression an effective intrasexual competition strategy?

An intrasexual competitive strategy can be deemed effective if an individual gains access to their preferred mate or if an individual reduces the opportunity of a rival to secure access to a desired mate (hence increasing her/his own chances of succeeding). Consistent with this position, there are two areas of evidence supporting the hypothesis that indirect aggression is an effective intrasexual competition strategy: (i) the use of indirect aggression is associated with more dating and/or sexual behaviour and (ii) indirect aggression directed at a female rival reduces the target's desire or ability to compete for mates, thus eliminating the competition.

Concerning the first area of support, several studies have reported links between the use of indirect aggression and increased dating behaviour and sexual activity. For example, White *et al.* [84] showed that adolescent girls who used indirect aggression tended to have had sexual intercourse at an earlier age, whereas victimized adolescent girls had sex at a later age. Earlier onset of mating behaviour has been shown to confer females with a fitness advantage [85]. Gallup *et al.* [86] found that female college students who reported perpetrating high levels of indirect aggression in adolescence also reported

dating at an earlier age than their less aggressive peers. As was the case with the adolescent girls in White *et al.*'s [84] study, the girls in this study who reported being victimized in adolescence by other girls, also reported dating at a later age. Pellegrini & Long [87] also found that dating popularity was associated with indirect aggression use for adolescent girls [88]. In a longitudinal study of adolescents, Arnocky & Vaillancourt [89] found that the use of indirect aggression, as nominated by peers, predicted being in a dating relationship 1 year later even when controlling for age, prior dating history, peer-rated social status and peer-rated physical attractiveness. Again, consistent with findings from Gallup *et al.* [86] and White *et al.* [84], peer victimization was negatively associated with dating status (concurrently and longitudinally).

Concerning the second area of support, several studies have documented the negative sequelae associated with peer victimization (direct and/or indirect). Concurrent and longitudinal associations include markers of low fitness such as depression, anxiety, low self-esteem, somatic complaints, loneliness, peer rejection, school dropout and suicide, to name a few (see [90] for review). What is more, longitudinal research provides strong support for peer victimization as a cause of poor health and self-image problems [90], and that the link is qualified by the sex of the victim. For instance, Kim *et al.* [91] and Kaltiala-Heino *et al.* [92] reported that peer-victimized adolescent girls were at a greater risk for suicidal ideation than adolescent boys. Rueger *et al.* [93] found that for girls, and not boys, internalizing problems persisted even after the bullying had stopped. Regarding indirect peer victimization, Klomek *et al.* [94] found that for adolescent girls, indirect peer victimization *at any frequency* was associated with suicide attempts, whereas for adolescent boys, only frequent indirect peer victimization was associated with suicide attempts. In a study by Carbone-Lopez *et al.* [95], lower self-esteem was related to being the victim of indirect aggression for adolescent girls but not for adolescent boys. In an earlier study, Paquette & Underwood [36] reported that not only did girls worry about indirect aggression more than boys did, but they were also significantly more distressed by it than boys were.

Females' pronounced negative reaction to peer victimization, and in particular indirect peer victimization, is consistent with the 'tend-and-befriend' hypothesis [70]. Specifically, Taylor and co-workers have argued that females' biobehavioural response to stress is not one that principally involves 'fight-or-flight'. Rather, the response involves a pattern of 'nurturant activities that are designed to protect the self and offspring that promote safety and reduce distress' (i.e. tending) and the 'creation and maintenance of social networks that may aid in this process' (i.e. befriending; p. 411). Moreover, Taylor *et al.* [70] have argued that this sex-specific response to stress has evolved from differential parental investment. That is, females' stress responses have selectively developed to capitalize on the survival of the mother and her offspring [26,27].

The idea that females, in particular, create and maintain social groups to 'manage stressful situations' [70] may explain why females are so sensitive to the effects of indirect aggression. It may also explain why females, more so than males, are so good at detecting the cues associated with indirect aggression. For example, Benenson *et al.* [96] found that in addition to being more willing to use indirect aggression (i.e. social exclusion) than men, women were also better at picking up on social exclusion cues and their heart rates increased more than men's when being socially excluded. Being sensitive

to cues of indirect aggression has likely been associated with increased survival. Throughout history, females have been mostly responsible for the care and survival of their offspring [31]; a charge which presumably would be made easier if the female was supported by other females [31].

4. Conclusion

Accordingly to Fisher & Cox [4], intrasexual competition need not be operating at the conscious level, rather competitors 'must be actively behaving in a manner that draws them closer to attaining the wanted resource' (p. 141; see also [31]). A clear way that indirect aggression serves an individual's goal is by reducing her same-sex rivals' ability, or desire, to compete for mates. This is typically accomplished in a concealed

way which diminishes the risk of a counterattack. Although indirect aggression is used effectively by girls and women in a manner that reduces the aggressor's risk, it is not used without peril. Indeed, the derogation of a rival, which represents the most common way of aggressing against others indirectly [94], carries the risk of (i) calling men's attention to the rival and thus increasing the number of competitors [4], (ii) signalling to others that you are unkind which may inadvertently lower your own mate value [5], and (iii) leading to a confrontation by the target which may escalate to physical aggression [97]. These risks notwithstanding, the benefits of using indirect aggression seem clear—fewer competitors and greater access to preferred mates, which in ancestral times would have been linked to differential reproduction rates, the driving force of evolution by sexual selection [98].

References

- 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)
- 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, 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)
- Fisher M, Cox A. 2009 The influence of female attractiveness on competitor derogation. *J. Evol. Psychol.* **7**, 141–155. (doi:10.1556/JEP.7.2009.2.3)
- 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)
- Symons D. 1979 *The evolution of human sexuality*. New York, NY: Oxford University Press.
- Walters S, Crawford CB. 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)
- Buss D, Dedden L. 1990 Derogation of competitors. *J. Soc. Pers. Relationships* **7**, 395–422. (doi:10.1177/0265407590073006)
- Buss DM. 1989 Sex differences in human mate preferences: evolutionary hypotheses tested in 37 cultures. *Behav. Brain Sci.* **12**, 1–14. (doi:10.1017/S0140525X00023992)
- Grammer 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)
- Singh D. 1993 Adaptive significance of female physical 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 waist-to-hip ratio (WHR) and female attractiveness. *Pers. Individ. Dif.* **16**, 123–132. (doi:10.1016/0191-8869(94)90116-3)
- 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)
- Shackelford TK, Buss DM, Bennett K. 2002 Forgiveness or breakup: sex differences in responses to a partner's infidelity. *Cogn. Emotion* **16**, 299–307. (doi:10.1080/02699930143000202)
- Björkqvist K. 1994 Sex differences in physical, verbal, and indirect aggression: a review of recent research. *Sex Roles* **30**, 177–188. (doi:10.1007/BF01420988)
- Feshbach ND. 1969 Sex differences in children's modes of aggressive responses toward outsiders. *Merrill Palmer Q.* **15**, 249–258.
- Lagerspetz KMJ, Björkqvist K, Peltonen T. 1988 Is indirect aggression typical of females? Gender differences in aggressiveness in 11- to 12-year-old children. *Aggr. Behav.* **14**, 403–414. (doi:10.1002/1098-2337(1988)14:6<403::AID-AB2480140602>3.0.CO;2-D)
- Cairns RB, Cairns BD, Neckerman HJ, Ferguson LL, Gariépy J. 1989 Growth and aggression. I. Childhood to early adolescence. *Dev. Psychol.* **25**, 320–330. (doi:10.1037/0012-1649.25.2.320)
- Galen BR, Underwood MK. 1997 A developmental investigation of social aggression among children. *Dev. Psychol.* **33**, 589–600. (doi:10.1037/0012-1649.33.4.589)
- Crick NR, Grotpeter JK. 1995 Relational aggression, gender, and social–psychological adjustment. *Child Dev.* **66**, 710–722. (doi:10.2307/1131945)
- Crick NR. 1995 Relational aggression: the role of intent attributions, feelings of distress, and provocation type. *Dev. Psychopathol.* **7**, 313–322. (doi:10.1017/S0954579400006520)
- Archer J. 2004 Sex differences in aggression in real-world settings: a meta-analytic review. *Rev. Gen. Psychol.* **8**, 291–322. (doi:10.1037/1089-2680.8.4.291)
- 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**, 1185–1229. (doi:10.1111/j.1467-8624.2008.01184.x)
- Österman K, Björkqvist K, Lagerspetz KMJ, Kaukiainen A, Landau SF, Frączek A, Caprara GV. 1998 Cross-cultural evidence of female indirect aggression. *Aggr. Behav.* **24**, 1–8. (doi:10.1002/(SICI)1098-2337(1998)24:1<1::AID-AB1>3.0.CO;2-R)
- Björkqvist K, Lagerspetz KMJ, Kaukiainen A. 1992 Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggr. Behav.* **18**, 117–127. (doi:10.1002/1098-2337(1992)18:2<117::AID-AB2480180205>3.0.CO;2-3)
- Campbell A. 1999 Staying alive: evolution, culture, and women's intrasexual aggression. *Behav. Brain Sci.* **22**, 203–214. (doi:10.1017/S0140525X99 001818)
- Campbell A. 2004 Female competition: causes, constraints, content, and contexts. *J. Sex Res.* **41**, 16–26. (doi:10.1080/00224490409552210)
- Trivers RL. 1972 Parental investment and sexual selection. In *Sexual selection and the descent of man, 1871–1971* (ed. BG Campbell), pp. 180–230. Chicago, IL: Aldine Pub. Co.
- Daly M, Wilson M. 1988 *Homicide*. Hawthorne, NY: A. de Gruyter.
- Vaillancourt T. 2005 Indirect aggression among humans: social construct or evolutionary adaptation? In *Developmental origins of aggression* (eds RE Tremblay, WH Hartup, J Archer), pp. 158–177. New York, NY: Guilford Press.
- Hrdy SB. 1999 *Mother nature: a history of mothers, infants, and natural selection*. New York, NY: Pantheon.
- Sear R, Mace R. 2008 Who keeps children alive? A review of the effects of kin on child survival. *Evol. Hum. Behav.* **29**, 1–18. (doi:10.1016/j.evolhumbehav.2007.10.001)
- Hess NH, Hagen EH. 2006 Sex differences in indirect aggression: psychological evidence from young adults. *Evol. Hum. Behav.* **27**, 231–245. (doi:10.1016/j.evolhumbehav.2005.11.001)

34. Arnocky S, Sunderani S, Miller JL, Vaillancourt T. 2012 Jealousy mediates the relationship between attractiveness comparison and females' indirect aggression. *Pers. Relationships* **19**, 290–303. (doi:10.1111/j.1475-6811.2011.01362.x)
35. Gallup AC, Wilson DS. 2009 Body mass index (BMI) and peer aggression in adolescent females: an evolutionary perspective. *J. Soc. Evol. Cultur. Psychol.* **3**, 356–371.
36. Paquette JA, Underwood MK. 1999 Gender differences in young adolescents' experiences of peer victimization: social and physical aggression. *Merrill Palmer Q.* **45**, 242–266.
37. Griskevicius V, Tybur JM, Gangestad SW, Perea EF, Shapero 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)
38. Miller JL, Vaillancourt T, Hanna SE. 2009 The measurement of 'eating-disorder-thoughts' and 'eating-disorder-behaviors': implications for assessment and detection of eating disorders in epidemiological studies. *Eat. Behav.* **10**, 89–96. (doi:10.1016/j.eatbeh.2009.02.002)
39. Vaillancourt T, Miller JL, Fagbemi J, Côté S, Tremblay RE. 2007 Trajectories and predictors of indirect aggression: results from a nationally representative longitudinal study of Canadian children aged 2–10. *Aggr. Behav.* **33**, 314–326. (doi:10.1002/ab.20202)
40. Underwood MK, Beron KJ, Rosen LH. 2009 Continuity and change in social and physical aggression from middle childhood through early adolescence. *Aggr. Behav.* **35**, 357–375. (doi:10.1002/ab.20313)
41. Verona E, Sadeh N, Case S, Reed A, Bhattacharjee A. 2008 Self-reported use of different forms of aggression in late adolescence and emerging adulthood. *Assessment* **15**, 493–510. (doi:10.1177/1073191108318250)
42. Dunson DB, Colombo B, Baird DD. 2002 Changes with age in the level and duration of fertility in the menstrual cycle. *Hum. Reprod.* **17**, 1399–1403. (doi:10.1093/humrep/17.5.1399)
43. Massar K, Buunk AP, Rempt S. 2012 Age differences in women's tendency to gossip are mediated by their mate value. *Pers. Individ. Dif.* **52**, 106–109. (doi:10.1016/j.paid.2011.09.013)
44. 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)
45. Agthe M, Spörrle M, Maner J. 2011 Does being attractive always help? Positive and negative effects of attractiveness on social decision making. *Pers. Soc. Psychol. Bull.* **37**, 1042–1054. (doi:10.1177/0146167211410355)
46. Luxen MF, Van De Vijver FJR. 2006 Facial attractiveness, sexual selection, and personnel selection: when evolved preferences matter. *J. Organiz. Behav.* **27**, 241–255. (doi:10.1002/job.357)
47. Phillips AE, Hranek C. 2012 Is beauty a gift or a curse? The influence of an offender's physical attractiveness on forgiveness. *Pers. Relationships* **19**, 420–430. (doi:10.1111/j.1475-6811.2011.01370.x)
48. Li NP, Smith AR, Griskevicius V, Cason MJ, Bryan A. 2010 Intrasexual competition and eating restriction in heterosexual and homosexual individuals. *Evol. Hum. Behav.* **31**, 365–372. (doi:10.1016/j.evolhumbehav.2010.05.004)
49. Swami V *et al.* 2010 The attractive female body weight and female body dissatisfaction in 26 countries across 10 world regions: results of the international body project I. *Pers. Soc. Psychol. Bull.* **36**, 309–325. (doi:10.1177/0146167209359702)
50. Abed RT. 1998 The sexual competition hypothesis for eating disorders. *Br. J. Med. Psychol.* **71**, 525–547. (doi:10.1111/j.2044-8341.1998.tb01007.x)
51. Abed R, Mehta S, Figueredo AJ, Aldridge S, Balson H, Meyer C, Palmer R. 2012 Eating disorders and intrasexual competition: testing an evolutionary hypothesis among young women. *Sci. World J.* **2012**, 290813. (doi:10.1100/2012/290813)
52. Faer LM, Hendriks A, Abed RT, Figueredo AJ. 2005 The evolutionary psychology of eating disorders: female competition for mates or for status? *Psychol. Psychother. Theory Res. Pract.* **78**, 397–417. (doi:10.1348/147608305X42929)
53. Mealey L. 2000 Anorexia: a 'losing' strategy? *Hum. Nat.* **11**, 105–116. (doi:10.1007/s12110-000-1005-3)
54. Miller JL, Vaillancourt T. 2011 Rethinking the eating disorder continuum: a categorical approach to abnormal eating. In *Handbook of behavior, food and nutrition* (eds RR Watson, C Martin), pp. 1411–1429. New York, NY: Springer.
55. Vaillancourt T, Miller JL, Sharma A. 2010 'Tripping the Prom Queen': female intrasexual competition and indirect aggression. In *Indirect and direct aggression* (ed. K Österman), pp. 17–32. Frankfurt, Germany: Peter Lang Publishing Group.
56. Ackard DM, Fulkerson JA, Neumark-Sztainer D. 2007 Prevalence and utility of DSM-IV eating disorder diagnostic criteria among youth. *Int. J. Eat. Disord.* **40**, 409–417. (doi:10.1002/eat.20389)
57. Cash TF, Morrow JA, Hrabosky JI, Perry AA. 2004 How has body image changed? A cross-sectional investigation of college women and men from 1983 to 2001. *J. Consult. Clin. Psychol.* **72**, 1081–1089. (doi:10.1037/0022-006X.72.6.1081)
58. McVey G, Tweed S, Blackmore E. 2004 Dieting among preadolescent and young adolescent females. *Can. Med. Assoc. J.* **170**, 1559–1561. (doi:10.1503/cmaj.1031247)
59. Rodin J, Silberstein L, Striegel-Moore R. 1984 Women and weight: a normative discontent. *Nebr. Symp. Motiv.* **32**, 267–307.
60. Ferguson CJ, Munoz ME, Contreras S, Velasquez K. 2011 Mirror, mirror on the wall: peer competition, television influences, and body image dissatisfaction. *J. Soc. Clin. Psychol.* **30**, 458–483. (doi:10.1521/jscp.2011.30.5.458)
61. Piran N, Gadalla T. 2007 Eating disorders and substance abuse in Canadian women: a national study. *Addiction* **102**, 105–113. (doi:10.1111/j.1360-0443.2006.01633.x)
62. Park J, Beaudet MP. 2007 Eating attitudes and their correlates among Canadian women concerned about their weight. *Eur. Eat. Disord. Rev.* **15**, 311–320. (doi:10.1002/erv.741)
63. American Psychiatric Association. 2000 *Diagnostic and statistical manual of mental disorders: DSM-IV-TR*, 4th edn (text revision edn). Washington, DC: American Psychiatric Association.
64. Werner NE, Crick NR. 1999 Relational aggression and social-psychological adjustment in a college sample. *J. Abnorm. Psychol.* **108**, 615–623. (doi:10.1037/0021-843X.108.4.615)
65. Clark L, Tiggemann M. 2008 Sociocultural and individual psychological predictors of body image in young girls: a prospective study. *Dev. Psychol.* **44**, 1124–1134. (doi:10.1037/0012-1649.44.4.1124)
66. Dohnt HK, Tiggemann M. 2005 Peer influences on body dissatisfaction and dieting awareness in young girls. *Br. J. Dev. Psychol.* **23**, 103–116. (doi:10.1348/026151004X20658)
67. Jones D, Vigfusdottir T, Lee Y. 2004 Body image and the appearance culture among adolescent girls and boys. *J. Adolesc. Res.* **19**, 323–339. (doi:10.1177/0743558403258847)
68. McCabe MP, Ricciardelli LA. 2005 A prospective study of pressures from parents, peers, and the media on extreme weight change behaviors among adolescent boys and girls. *Behav. Res. Ther.* **43**, 653–668. (doi:10.1016/j.brat.2004.05.004)
69. Mills JS, Miller JL. 2007 Experimental effects of receiving negative weight-related feedback: a weight guessing study. *Body Image* **4**, 309–316. (doi:10.1016/j.bodyim.2007.04.004)
70. Taylor SE, Klein LC, Lewis BP, Gruenewald TL, Gurung RAR, Updegraff JA. 2000 Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychol. Rev.* **107**, 411–429. (doi:10.1037/0033-295X.107.3.411)
71. Wang J, Iannotti RJ, Luk JW. 2010 Bullying victimization among underweight and overweight U.S. youth: differential associations for boys and girls. *J. Adolesc. Health* **47**, 99–101. (doi:10.1016/j.jadohealth.2009.12.007)
72. Dijkstra P, Buunk BP. 2002 Sex differences in the jealousy-evoking effect of rival characteristics. *Eur. J. Soc. Psychol.* **32**, 829–852. (doi:10.1002/ejsp.125)
73. Baumeister RF, Twenge JM. 2002 Cultural suppression of female sexuality. *Rev. Gen. Psychol.* **6**, 166–203. (doi:10.1037/1089-2680.6.2.166)
74. Artz S. 1998 *Sex, power, and the violent school girl*. Toronto, Canada: Trifolium Books.
75. Campbell A. 1982 Female aggression. In *Aggression and violence* (eds PE Marsh, A Campbell), pp. 135–150. Oxford, UK: Blackwell.
76. 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)
77. Marsh P, Paton R. 1986 Gender, social class and conceptual schemas of aggression. In *Violent transactions: the limits of personality* (eds A Campbell, JJ Gibbs), pp. 59–85. Oxford, UK: B. Blackwell.

78. Vaillancourt T, Sharma A. 2011 Intolerance of sexy peers: intrasexual competition among women. *Aggress. Behav.* **37**, 569–577. (doi:10.1002/ab.20413)
79. Bleske AL, Shackelford TK. 2001 Poaching, promiscuity, and deceit: combatting mating rivalry in same-sex friendships. *Pers. Relationships* **8**, 407–424. (doi:10.1111/j.1475-6811.2001.tb00048.x)
80. Sunderani S, Arnocky S, Vaillancourt T. 2013 Individual differences in mate poaching: an examination of hormonal, dispositional, and behavioral mate-value traits. *Arch. Sex Behav.* **42**, 533–542. (doi:10.1007/s10508-012-9974-y)
81. Davies APC, Shackelford TK, Hass RG. 2010 Sex differences in perceptions of benefits and costs of mate poaching. *Pers. Individ. Dif.* **49**, 441–445. (doi:10.1016/j.paid.2010.04.014)
82. Schmitt DP, Buss DM. 2001 Human mate poaching: tactics and temptations for infiltrating existing mateships. *J. Pers. Soc. Psychol.* **80**, 894–917. (doi:10.1037/0022-3514.80.6.894)
83. Arnocky S, Vaillancourt T. In press. Mate poaching and mating success in humans. *J. Evol. Psychol.*
84. White DD, Gallup AC, Gallup GG. 2010 Indirect peer aggression in adolescence and reproductive behavior. *Evol. Psychol.* **8**, 49–65.
85. Wood JW. 1994 *Dynamics of human reproduction: biology, biometry, demography*. Hawthorne, NY: Aldine de Grueter.
86. Gallup AC, O'Brien DT, Wilson DS. 2011 Intrasexual peer aggression and dating behavior during adolescence: an evolutionary perspective. *Aggress. Behav.* **37**, 258–267. (doi:10.1002/ab.20384)
87. Pellegrini AD, Long JD. 2003 A sexual selection theory longitudinal analysis of sexual segregation and integration in early adolescence. *J. Exp. Child Psychol.* **85**, 257–278. (doi:10.1016/S0022-0965(03)00060-2)
88. Connolly J, Pepler D, Craig W, Taradash A. 2000 Dating experiences of bullies in early adolescence. *Child Maltreat.* **5**, 299–310. (doi:10.1177/107755950005004002)
89. Arnocky S, Vaillancourt T. 2012 A multi-informant longitudinal study on the relationship between aggression, peer victimization, and dating status in adolescence. *Evol. Psychol.* **10**, 253–270.
90. McDougall P, Vaillancourt T. Submitted. The long-term outcomes of peer victimization in school: pathways to adjustment and maladjustment. *Am. Psychol.*
91. Kim Y, Koh Y, Leventhal B. 2005 School bullying and suicidal risk in Korean middle school students. *Pediatrics* **115**, 357–363. (doi:10.1542/peds.2004-0902)
92. Kaltiala-Heino R, Rimpelä M, Marttunen M, Rimpelä A, Rantanen P. 1999 Bullying, depression, and suicidal ideation in Finnish adolescents: school survey. *Br. Med. J.* **319**, 348–351. (doi:10.1136/bmj.319.7206.348)
93. Rueger SY, Malecki CK, Demaray MK. 2011 Stability of peer victimization in early adolescence: effects of timing and duration. *J. School Psychol.* **49**, 443–464. (doi:10.1016/j.jsp.2011.04.005)
94. Klomek A, Marrocco F, Kleinman M, Schonfeld I, Gould M. 2008 Peer victimization, depression, and suicidality in adolescents. *Suicide Life Threat. Behav.* **38**, 166–180. (doi:10.1521/suli.2008.38.2.166)
95. Carbone-Lopez K, Esbensen F, Brick B. 2010 Correlates and consequences of peer victimization: gender differences in direct and indirect forms of bullying. *Youth Violence Juvenile Justice* **8**, 332–350. (doi:10.1177/1541204010362954)
96. Benenson JF, Markovits H, Hultgren B, Nguyen T, Bullock G, Wrangham R. 2013 Social exclusion: more important to human females than males. *PLoS ONE* **8**, e55851. (doi:10.1371/journal.pone.0055851)
97. Campbell A. 2013 The evolutionary psychology of women's aggression. *Phil. Trans. R. Soc. B* **368**, 20130078. (doi:10.1098/rstb.2013.0078)
98. Darwin C. 1871 *The descent of man and selection in relation to sex*. London, UK: Murray.