VICTIMIZATION AND AGGRESSION

UNDERSTANDING FEMALE AGGRESSION AND MALE VICTIMIZATION FROM AN EVOLUTIONARY PSYCHOLOGICAL PERSPECTIVE

By

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Preface

This dissertation consists of studies that have been previously published or are presently under review for publication in peer-reviewed scientific journals. Chapter 2 contains an article that is presently under review for publication. The author of the dissertation is the primary author of Chapter 2. Contributions consisted of reviewing the existing literature, developing the theoretical proposal, data analysis and manuscript preparation. The second author of the manuscript is the thesis supervisor, Tracy Vaillancourt. The data presented in Chapter 2 are based on secondary data analysis from Vaillancourt (2001).

Chapter 3 contains the published article: Arnocky, S., Sunderani, S., Miller, J., & Vaillancourt, T. (*in press*). Jealousy mediates the relationship between attractiveness comparison and females' indirect aggression. Personal Relationships. doi: 10.1111/j.1475-6811.2011.01362.x. Copyright (2011) John Wiley & Sons, Inc. The authors of this published article retain the rights without further permission from the publisher to use the published version of this article for personal and internal institutional use, not limited to but including use within a dissertation. For chapter 3, the author of this dissertation is the primary author, with his contributions including developing the theoretical proposal, participating as part of a team involved in the data collection, conducting analyses, and manuscript preparation. The second author of this article was Shafik Sunderani, who assisted in the data collection and preparation of the final manuscript. The third author of this article was Jessie L. Miller, who organized and oversaw the ethics proposal and data collection in collaboration with the dissertation supervisor Tracy Vaillancourt, who was the fourth author. Data were collected at McMaster University in the fall of 2006 as a part of a larger project on females' mental and physical health.

Chapter 4 contains an article that is presently under review for publication. The dissertation author is the primary author on this manuscript. Contributions include theory development, ethics submission and data collection, data analyses, and manuscript preparation. The second author is the thesis supervisor. Data were collected at the University of Ottawa in the fall of 2010 by the first and second authors.

Abstract

In this dissertation I examine female aggression as a competitive strategy for achieving reproductive success, with the ultimate goal being to highlight the evolutionary underpinnings of female aggression and the implications for male victims. In Chapter 1 of this dissertation, an evolutionary theory of female aggression is presented and applied to indirect aggression among females and domestic violence perpetration within cross-sex relations. In Chapter 2 intrasexual competition for mates is considered by examining longitudinal links between aggression and dating behaviour among male and female adolescents. Results indicated that indirectly aggressive boys and girls were significantly more likely to have a dating partner at 1-year follow-up. Adolescents who reported being victimized by their peers were significantly less likely to have a dating partner at follow-up.

In Chapter 3 the evolutionary theory of female aggression is extended to mate-guarding behaviour. Results demonstrated that when adult females who were in heterosexual dating relationships perceived female competitors as being more physically attractive than them, they were more likely to engage in indirect aggression toward peers and toward their partner. These links were mediated by romantic jealousy. Women perceiving themselves as more attractive than peers reported being targets of females' peer-aggression more frequently. The findings of chapters 2 and 3 suggest that females actively compete to attain and retain mates.

Chapter 4 of this dissertation examines the implications for male victims of female aggression within romantic relationships. We found that male victims of female partner violence were lower in testosterone than were non-victimized males. Participants held more negative attitudes (i.e., stigma) toward male versus female victims. Men in our sample were less likely to consider female aggression as "abusive", were less likely to seek-help, and were more likely to minimize their perceived victimization. These findings suggest threats to male dominance and greater stigma likely reinforce males' minimization and concealment of victimization.

Taken together, this dissertation contributes to the field of aggression by empirically demonstrating evolutionary-based motives and functions of female aggression as a strategy for bolstering reproductive fitness.

For Lindsay.

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CHAPTER 1

GENERAL INTRODUCTION

Female aggression was once considered a rare occurrence unworthy of empirical study (for review, see Björkqvist, 1994). Over the past 20 years, however, it has become evident that female aggression is not uncommon, and that such behaviour can burden society by imposing significant mental, physical, and social costs upon victims and perpetrators.

Accordingly, researchers have attempted to determine the mechanisms underlying female aggression. Factors such as learning and observation (Reiss & Roth 1993), socialization, as well as cultural influence have all been implicated in females' use of aggression (Vaillancourt, 2005). However, as Buss and Duntley (2006) noted, these theories cannot provide a *complete* explanation of female (or male) aggression because they are not consistent across cultural and historical contexts (see also Buss & Shackelford, 1997a). Some researchers have begun to consider female aggression from the perspective of evolutionary theory. In the following chapters I argue from an evolutionary psychological perspective that females' use of aggression is an adaptive strategy for solving sexual conflicts with (1) same-sex rivals during intrasexual competition and (2) with opposite-sex romantic partners during intersexual conflict (Campbell, 1995, 1999, 2004; Vaillancourt, 2005; Vaillancourt, Miller & Sharma, 2010). I begin by describing female aggression within two of the most commonly observed interpersonal contexts in which aggression occurs: peer relationships and romantic

relationships. I follow by highlighting the need to consider each of these aggressive contexts within the framework of evolutionary theory.

The Scope of Female Aggression

Female peer aggression is typically directed toward same-sex conspecifics, most often in the form of *indirect aggression* (Björkqvist, 1994; Gallup, O'Brien, White, & Wilson, 2009). Indirect aggression (also termed relational aggression and social aggression) is characterized by hurting others through purposeful manipulation of and harm to interpersonal relationships, such as through social exclusion or rumor spreading (Archer & Coyne 2005; Björkqvist, 1994; Hess, & Hagen, 2006; Crick & Grotpeter, 1995; Lagerspetz, Björkqvist, & Peltonen, 1988; Crick, 1995, 1996; Vaillancourt, Miller, Fagbemi, Cote, & Tremblay, 2007). Although indirect aggression is used by males and females (Card et al., 2008), it is the conflict strategy most commonly used by females against their peers (e.g., Björkqvist, Lagerspetz, & Kaukiainen, 1992; Crick, 1995, 1996; Crick & Grotpeter, 1995; Feshbach, 1969, 1971; Vaillancourt, et al., 2007), and it accounts for proportionally more aggression among females than males (Vaillancourt et al. 2010). Females often report both perpetrating and being targeted by indirect peer aggression more frequently than their male counterparts (e.g., Bjorkqvist, 1994; Crick & Grotpeter, 1995; Lagerspetz, Björkqvist, & Peltonen, 1988; Vaillancourt et al., 2007). Although much of this body of research has been accrued in Western society, some crosscultural studies have replicated this sex difference (e.g., French, Jansen, & Pidada, 2002; Österman et al., 1998).

The use of aggression by females extends beyond peer-relations. In self-reports of partner directed *unilateral* aggression, the proportion of male and female involvement is roughly equal (e.g., Archer, 2000; Kar & O'Leary, 2010; Dobash, Dobash, Wilson, & Daly, 1992; Straus, 2009), with as many as 30% of females reporting perpetrating dating and marital violence (Arias, Samios, & O'Leary, 1987; O'Leary et al., 1989). Female aggression toward romantic partners is multifarious and can entail slapping, kicking, spitting, hitting, and name-calling (see Straus, 2009). Females also report using indirect (relational) aggression toward their partners (Linder, Crick, & Collins, 2002). Where the sexes truly diverge is in the use of extreme aggression such as homicide. Females are far less likely to kill their romantic partner, and usually do so as a form of self-protection (Daly & Wilson, 1988; Dobash et al., 1992). Like female peer-aggression, female aggression toward romantic partners has been observed in many cultures (e.g., George, 1994; Straus, 2004). Given the prevalence and cross-cultural ubiquity, it is not surprising that researchers have begun to consider evolutionary origins of female aggression toward both peers and partners.

Theoretical Framework

Over human evolutionary history, the capacity for successful reproduction depended upon one's ability to compete with intrasexual rivals for desirable mates, to counter mate poaching attempts, and to prevent a mate from cheating and or defecting from the relationship (Buss, 2007). Those who were able to successfully navigate the complexities of reproduction were able to pass on their genes and become ancestors. As such, we have inherited the physiological and behavioural characteristics that allowed for the resolution of recurrent adaptive problems.

A number of researchers have suggested that aggression evolved, in part, as a solution to the issues of intra- and inter-sexual competition (e.g., Archer, 2009; Buss & Shackelford, 1997a; Daly & Wilson, 1988; Vaillancourt, 2005; Wilson & Daly, 1985;). It has been theorized that intrasexual competition is governed by differential obligatory parental investment. The theory suggests that the sex that invests most in offspring will be choosier in selecting mates, and thus members of the opposite sex must compete for mating access (Trivers, 1972). In most sexually reproducing species, females are choosier than males, and males are more competitive (Trivers, 1972). However, human males (compared to males of most other mammalian species) engage in considerable bi-parental care, investing time, energy, and resources toward their offspring (see Buunk & Fisher; 2009). We can expect both sexes to be discriminating in their long-term mate choice, and thus both sexes to compete with same-sex conspecifics for access to mates (Buunk & Fisher, 2009; Campbell, 2004; Griskevicuis et al., 2009; Vaillancourt, 2005; Vaillancourt & Sharma, in press).

Those females who could secure the most reproductively viable mates (e.g., males who will invest in offspring, provide resources, care, etc) would have had the greatest opportunity of producing surviving offspring. For instance, it has been noted that in both preindustrial and industrial societies, the ability of a female to secure a high status male was linked to more surviving offspring compared to females with lower status partners (Bereczkei & Csansky, 1996; Voland & Engel, 1990). The logic that males will be

selective of their long-term mates, in conjunction with the fact that females' reproductive fitness can be amplified by attracting and retaining a highly valued male forms the basis for the existence of female intrasexual competition (Buunk & Fisher, 2009; Campbell, 1999; Vaillancourt, 2005). Research by Griskevicius et al. (2009) supported this contention by showing that both males' and females' use of aggression is motivated by mating and status goals.

Campbell (1995, 1999, 2004) has argued that when high quality males are scarce, females who thwart intrasexual rivals through *indirect aggression* can increase their chances at successful reproduction, while avoiding the costs of physical conflict (see Björkqvist, 1994; Campbell, 1999; 2004). Researchers have noted the efficacy of social harassment and ostracism among other primate species, where dominant females harass subordinate females and can sometimes cause enough stress that subordinate females fail to come into estrus or may spontaneously abort pregnancies (Campbell, 1995). Among humans, victims of indirect aggression have more depression, lower self-esteem, and are at greater risk for school drop-out and suicide (e.g., Crick et al., 1999; Marr & Field, 2001; Miller & Vaillancourt, 2007; Owens, Slee & Shute, 2000). Moreover, the use of indirect aggression is related to more perceived popularity (Zimmer-Gembeck, Geiger, & Crick, 2005; Vaillancourt & Hymel, 2006). By quelling rivals, one not only detracts from the reproductive fitness of a same-sex competitor, but also simultaneously increases their own standing within the social hierarchy.

Recent evidence has supported the hypothesis that females may use indirect aggression upon perceiving a threat to their reproductive capacity. For instance,

Benenson, Markovits, Emery Thompson, and Wrangham (2011) found that females employed indirect aggression more than males when they believed that an exclusionary alliance had been made against them. The establishment and maintenance of social bonds among females are critical to offspring survival among some nonhuman primates (Silk, Alberts, & Altmann, 2003), and have also been hypothesized to have been fundamental to human female's offspring survival during the Pleistocene (Hrdy, 2005). Indirect aggression may therefore be a reactionary tactic utilized against intrasexual rivals in response to a reproductive threat.

Thwarting intrasexual rivals is not the only reproductive challenge that may be satisfied through aggressive means. Evolutionary theorists have considered intimate partner violence (IPV) as a strategy for solving intersexual conflict (Buss & Shackelford, 1997b; Daly & Wilson, 1988). Sexual strategies theory (Buss & Schmitt, 1993) dictates that conflict between individual males and females will occur in a predictable manner when one person's sexual strategy interferes with the sexual strategy of another. For a female, her partner's infidelity can lead to the division of emotional, financial, and social resources, and such division is detrimental to her reproductive fitness (Buss & Shackelford, 1997b). In order to strategically interfere with a partners conflicting sexual strategy, a female might utilize mate guarding tactics including aggressive behaviours.

Researchers have already considered male physical, psychological, and sexual aggression toward a female romantic partner as mate retention tactics meant to deter or a punish infidelity (see Buss & Duntley, in press). Yet researchers have only recently begun to consider female aggression toward intimate partners as mate retention effort.

Graham-Kevan and Archer (2009) found that both males and females who had lower mate value (and were thus at greater risk of being out-competed for their current mate by more viable same-sex competitors) were more likely to use control tactics and physical aggression against their partners.

Moreover, female aggression toward romantic partners presents a unique challenge to male victims, as it has been hypothesized that it undermines male dominance (George, 1994; Hines & Douglas, 2009). Male dominance is viewed as being fundamental to status hierarchy formation as well as a male's ability to attract and retain a mate (Puts, Gaulin, & Verdolini, 2006). Campbell (1995) suggested that ancestrally (and in modern times), females preferred to mate with dominant males because they had more resources to allocate toward offspring and were more physically fit than other males. In males, both prenatal and circulating testosterone levels (as indicators of male dominance) are associated with having more lifetime sex partners (Honekopp, Voracek, & Manning, 2006; Pollet, der Meil, Cobey, & Buunk, 2011). The evolutionary significance of male dominance in conjunction with the defeat of victimization presents a unique challenge to males. Hence an equally important goal within this dissertation was to understand sex differences in victimization as related to markers of dominance, as well as in societal perceptions of male victims and of males' willingness to identify as such.

Outline of Empirical Chapters

The evolutionary theory of female aggression was used to frame each of the following chapters. In Chapters 2 and 3, females' indirect aggression was examined as an

intrasexually-competitive strategy used to bolster reproductive fitness. It has been suggested that indirect aggression revolves, in part, around contesting for and maintaining mating opportunities (Benenson, 2009; Gallup et al., 2009, Pellegrini & Long, 2003; Vaillancourt, 2005). Recently, researchers have found cross-sectional evidence that indirect aggression is related to adaptive dating outcomes (e.g., Gallup, O'Brien, & Wilson, 2011), whereas peer-victimization is negatively related to dating (Gallup et al., 2009). However, the cross-sectional nature of previous studies designs has precluded directional conclusions about females' aggression and dating status. Chapter 2 of this dissertation builds on these initial cross-sectional findings by examining whether the perpetration of aggression predicted subsequent dating behaviour among adolescents using a longitudinal design carried out over the course of one year. We found that for both boys and girls, the perpetration of indirect aggression was positively related to having a dating partner at follow-up. Conversely, being a victim of peer-aggression was negatively related to having a dating partner at follow-up.

Chapter 3 builds upon these findings by examining female aggression as a potential mate-guarding strategy within existing dating relationships. We hypothesized that females' self-perceived attractiveness (a notable female mate-value characteristic, see Buss, 1988) would relate negatively to her indirect aggression use toward romantic partners and peers. We further sought to examine the role of jealousy as a mediator to this relationship. Jealousy has been hypothesized to be one of the central psychological mechanisms underlying mate-guarding strategies (Buss, 1988, 1994; Daly, Wilson, & Weghorst, 1982; Symons, 1979). We found that females who perceived themselves as

being less physically attractive than their same-sex peers (thus perceiving greater reproductive threat) were more likely to engage in indirect aggression toward their partners and peers. Moreover, these relationships were partially mediated by jealousy.

Chapter 4 builds on these findings by examining the unique challenges associated with male victimization in heterosexual romantic relationships. Male victimization by a female romantic partner runs counter to the stereotypical male role of masculinity and dominance (Hines & Douglas, 2009). We found that male victimization (by a female romantic partner) was related to low levels of a biological correlate of dominance (testosterone). We also found that more negative attitudes were held toward male victims versus female victims of IPV. Given the importance of male dominance as well as the stigma associated with male victimization, we also found men to report a greater likelihood that they would conceal victimization, and a lower likelihood that they would seek help if they were ever to be victimized by a female partner.

Summary of Thesis Contributions

The studies presented in this dissertation have important theoretical and practical implications for aggression research. Chapters 2 and 3 explore female indirect aggression as a mating strategy. Each of the investigations provided unique insight into how females compete with one-another and with their romantic partners. The studies answer questions pertaining to the efficacy of indirect aggression for having a dating partner in the future, whether physical aggression is similarly effective, whether females who perceive themselves to be less valuable as a mate engage in more indirect aggression

toward peers and romantic partners, whether they selectively target more desirable females for victimization, and whether jealousy plays a role in their aggressive behaviour.

The answers to these questions have significant theoretical value. Evolutionary theorists have long focused on male aggression. This focus mirrors that of aggression researchers on the whole, who have until recently, all but ignored female aggression. Although some have challenged the predominant assumption of female passivity, little empirical work has supported their claims. The present body of work lays out clear evolutionary-based predictions that provide insight into who uses indirect aggression, how and why it is utilized.

The findings of these studies also have applied implications. Strides toward reducing aggression among adolescents cannot be taken without first establishing a firm understanding of the origins of aggression. Those seeking to develop anti-bullying and dating violence programs and campaigns will benefit from a clearer understanding of why females aggress against one-another, and against their romantic partners. Indeed, practitioners (policy-makers, school administrators, educators) ought to consider such empirical findings when developing programs aimed at reducing aggression.

Chapter 4 examined the effects of female aggression toward male romantic partners. Male victims of female partner violence have been neglected by aggression researchers. The findings suggested that male victims of female aggression face a number of unique challenges. Rather than applying models of female victimization to males, practitioners seeking to treat male victimization would benefit from considering such

challenges. How these results can be implemented into practice are discussed within Chapters 4 and 5of this dissertation.

CHAPTER 2

Arnocky, S., & Vaillancourt, T. (Submitted July 2011). A multi-informant longitudinal

study on the relationship between aggression, peer victimization, and

adolescent dating status.

A multi-informant longitudinal study on the relationship between aggression, peer victimization, and dating status

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Abstract

Adolescent peer-aggression has recently been considered from the evolutionary perspective of intrasexual competition for mates. We tested the hypothesis that peer-nominated physical aggression, indirect aggression, along with self-reported bullying behaviours at Time 1 would predict Time 2 dating status, and that Time 1 peer- and self-reported peer victimization would negatively predict Time 2 dating status. Participants were 310 adolescents who were in grades 6 through 9 (ages 11-14) at Time 1. Results showed that for both boys and girls, peer-nominated indirect aggression was predictive of dating one year later, after controlling for age, peer-rated attractiveness, and social status, as well as initial dating status. For both sexes, self-reported peer victimization was negatively related to having a dating partner at Time 2. Findings are discussed within the framework of intrasexual competition.

Keywords: intrasexual competition, aggression, bullying, victimization, dating, adolescents

Intrasexual competition among adolescents: A multi-informant longitudinal study on the

relationship between aggression, peer victimization, and dating status

"Kyle's life took a devastating turn when a 16-year-old boy, jealous that Kyle was dating his previous girlfriend, came to his house and started a fight.... The boy came from behind and flipped him upside down onto his head.... shattering one of [Kyle's] vertebrae into eight pieces" *Boy paralyzed after fight over girl, 2003*

Introduction

Kyle's story is consistent with investigations of adolescent peer-aggression being used as a strategy for intrasexual competition (Benenson, 2009; Gallup, O'Brien, & Sloan-Wilson, 2011; Leenaars, Dane, & Marini, 2008; Vaillancourt, 2005). Intrasexual competition is a key tenet of Darwin's (1871) theory of sexual selection, wherein members of the same-sex rival each other for mating access to members of the opposite sex. Competitors who are successful in thwarting rivals are expected to gain a reproductive advantage, increasing the chance of passing their genes on to subsequent generations.

Recently, Griskevicius et al. (2009) found that both males' and females' use of aggression can be motivated by status and mating goals. From an evolutionary perspective, aggression may provide individuals with a competitive advantage by solving problems related to accessing status, resources, and mates (e.g., Archer, 2009; Buss & Shackelford, 1997; Daly & Wilson, 1988; Wilson & Daly, 1985). Indeed, in many societies males gain status through the use of aggression, and higher status males are typically more desirable to females (Griskevicius et al., 2009; Li & Kenrick, 2006). Similarly, females have been shown to derogate female rivals (Vaillancourt & Sharma, 2011), and this behaviour has been found effective in reducing male perceptions of the victimized females' level of attractiveness (Fisher & Cox, 2009). Approximately 85% of adolescent peer aggression occurs between same-sex conspecifics (Gallup, O'Brien, White, & Wilson, 2009). In considering adolescent peer-aggression as a behavioural strategy meant to benefit one's own reproductive fitness, the present study tests the hypothesis that adolescent victims of peer aggression will be less likely to have a dating partner in the future (one year later), whereas perpetrators of peer aggression will be more likely to have a dating partner.

The necessity of intrasexual competition

In humans as in most mammalian species, females invest more obligatory parental resources in offspring than do males (Trivers, 1972) and are thus choosier when selecting their mates (Geary, 2000). This higher selectivity, in turn, leads males to compete (sometimes fiercely and violently) for access to selective females (Campbell, 1995; Daly & Wilson, 1988). The theory of differential parental investment has aided our understanding of why males more than females engage in violent and risky behaviour, typically against other males (Wilson & Daly, 1985).

It is critical to note, however, that unlike many other species, *most* human males also participate in parental care and invest heavily in their offspring (compared to other mammalian species; Buunk & Fisher, 2009; Geary, 2000). Moreover, most males enter into and prefer monogamous relationships as opposed to relying solely on short-term sexual encounters (Miller, Putcha-Bhagavatula, & Pedersen, 2002). Important to the present study, this finding has also been shown in adolescents, most of whom date monogamously (e.g., Thornton, 1990). Campbell (2004) suggested that "monogamy and biparental care reduce fitness variability among males. In pure form, they constrain a man's reproductive success to that of his partner" (pp. 17). Accordingly, we can expect both sexes to be discriminating in their mate choice, and that both sexes will compete with same-sex conspecifics for access to the highest quality mates (Buunk & Fisher, 2009; Campbell, 2004; Griskevicuis et al., 2009; Vaillancourt, 2005).

The ability to succeed in intrasexual competition may be especially useful during adolescence. In this developmental period, one's social interactions shift from same-sex friendships that are typical of childhood relationships to more cross-sex interactions and friendships (Collins, Welsh, & Furman, 2009). Increased time is allocated during adolescence to dating-related thoughts and behaviours (Furman, 2002), and as many as one third of adolescents become involved in dating relationships (Teenage Research Unlimited, 2006), which last on average between 6 and 12 months (Connolly & McIsaac, 2008). Although at first glance modern adolescent dating may seem unrelated to overall reproductive success, Gallup et al. (2011) astutely noted that over human evolutionary history, adolescent cross-sex relationships would have likely have been linked closely to pregnancy.

Today, adolescent monogamous dating relations remain the most opportune scenario for engaging in sexual activity (Manning, Longmore, & Giordano, 2000). Adolescent girls perceive firm social norms that sexual behaviour should not occur outside of dating relations (Collins et al., 2009); females who engage in sexual activity outside of committed relationships are often chastised and degraded (Baumeister &

Twenge, 2002; O'Sullivan & Meyer-Bahlburg, 2003). Therefore, it is reasonable to presume that regardless of an adolescent's adoption of a short or long-term mating strategy, sexual behavior most likely occurs within a dating context. Furthermore, for early adolescents, having a dating partner provides social status and assists with "fitting in" (Collins et al., 2009). Being in a quality dating relationship during adolescence has also been linked to later involvement in committed relationships during adulthood (Seiffge-Krenke & Lang, 2002) and greater odds of being married or cohabiting before the age of 25 (Raley, Crissey, & Muller, 2007). This literature suggests that adolescent dating has historically (and may still) confer reproductive benefits in the way of sexual access, status, and future dating opportunity.

Adolescent peer-aggression as a form of intrasexual competition

Researchers have proposed that the prevalence and cross-cultural ubiquity of adolescent aggression may be fundamentally linked to intrasexual competition (e.g., Campbell, 1995; Gallup, O'Brien, White, & Sloan-Wilson, 2009; Gallup, et al., 2011; Vaillancourt, 2005). Adolescent aggression typically takes two forms: direct/physical and indirect/relational aggression. *Direct aggression* involves physical harm or associated threats or challenges (Archer & Coyne, 2005). Researchers have firmly established that direct aggression is a male-typical competitive strategy (e.g., Daly & Wilson, 1988). For males lacking in status or resources (i.e., low mate-value), opportunity for reproduction may hinge on their ability to contest other males, even at the risk of physical injury (Daly & Wilson, 1988). Direct aggression can be considered a tactic that is employed when there are minimal moral constraints and few legal sanctions (Archer, 2009; Courtwright, 1996; Ruff, 2001). Under these circumstances, males can increase their status utilizing the threat of violence (Archer, 1994; 2000; Daly & Wilson, 1988).

For females, mere access to a mate is less reliant upon intrasexual competition (Archer, 2009), and so they typically have more to lose in terms of reproductive fitness from potential physically damaging confrontations (Daly & Wilson, 1989). Campbell (1999, 2004) has suggested that females' greater parental investment also increases the costs associated with direct aggression; for females it is more important to remain alive in order to rear their offspring (see also Björkqvist, 1994).

Although males are more directly aggressive than females, it is important to establish that direct aggression is comparatively rarer than less costly aggressive acts (Björkqvist, Osterman, & Lagerspetz, 1994). Moreover, the use of direct aggression by boys and girls decreases significantly by adolescence (e.g., Bjorkqvist, 1994; Côté, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006), while the use of indirect aggression represents a more common tactic that peaks and remains stable through the teenage years in both sexes (e.g., Card, Stucky, Swalani, & Little, 2008; Miller, Vaillancourt & Boyle, 2009). Indirect aggression (also termed relational and social aggression) is characterized by hurting others through purposeful manipulation of and harm to interpersonal relationships, such as through social exclusion or rumor spreading (Crick & Grotpeter, 1995; Lagerspetz, Björkqvist, & Peltonen, 1988). Indirect aggression might also hold significant adaptive value for male and female perpetrators (Archer & Coyne, 2005; Björkqvist, 1994; Björkqvist, Lagerspetz, & Kaukiainen, 1992; Lagerspetz et al., 1988; Vaillancourt, 2005). This often covert strategy is functional because it poses less danger to the perpetrator than direct aggression and yet harms the victim (Björkqvist, 1994). Indirect aggression is also harder to identify and thus retaliation, social and legal consequences are evaded more easily (Björkqvist 1994). It has been shown that both males and females engage in derogation of intrasexual rivals by targeting their status, attractiveness, or reputation (Buss & Dedden, 1990; Fisher, 2004), making indirect aggression a potentially useful competition tactic for reproductive opportunity. *The competitive efficacy of adolescent peer-aggression*

Buss and Dedden (1990) have argued that successful intrasexual competition hinges upon rendering oneself more desirable to members of the opposite sex by (a) causing rivals to be less appealing and/or (b) enhancing one's own appeal. Such competition might also hinge upon excluding your target from mating opportunities (e.g., Daly & Wilson, 1988). Preliminary evidence suggests that adolescent aggression may relate to each of these conditions.

First, peer victimization (whether it be direct and/or indirect) is known to be associated with circumlocutory markers of low fitness (Gallup, O'Brien, White, & Sloan-Wilson, 2009) such as depression, anxiety, low self-esteem, somatic and cognitive problems, loneliness, peer rejection, social dissatisfaction, school dropout, and suicide (e.g., Swearer, Espelage, Vaillancourt, & Hymel, 2010). Gallup et al. (2009) found that college males who reported being victimized in adolescence had fewer lifetime sex partners and fewer sex partners per year. Interestingly, victimized females had an earlier onset of sexual activity and more lifetime partners (Gallup et al., 2009). The authors posed two possible interpretations of their findings: (1) attractive females were more

frequently victimized by other females as they pose the greatest threat to other females (e.g., Arnocky, Sunderani, Miller, & Vaillancourt, in press; Hill & Buss, 2006; Vaillancourt & Sharma, in press), and (2) female victims were low in status and therefore yielded to the sexual wills of males.

Second, the use of direct or indirect aggression during adolescence could result in elevations in social status and/or self-esteem (Archer, 1994; Daly & Wilson, 1988; Gallup et al., 2011; Vaillancourt & Hymel, 2006). Indirect aggression is associated with peer acceptance among both males and females (Salmivalli, Kaukiainen, & Lagerspetz, 2000; Vaillancourt & Hymel, 2006). For instance, Pellegrini and Long (2003) found that indirectly aggressive females and socially-dominant males in grades 6 – 8 were more likely to be invited to a hypothetical party by members of the opposite sex in the future. Given the finding that indirect aggression may be related to cross-sex social interactions, it is not also surprising that researchers have found that self-reported bullies (who presumably would be engaging in more direct and indirect aggression toward peers) were more likely to be dating earlier in life, more likely to be currently dating, engaged in more advanced dating behaviours such as spending time with opposite-sex others, and engaged in a wider array of dating activities in contrast with a less-aggressive (non-bullying) comparison group (Connolly, Pepler, Craig, & Taradash, 2000).

In their examination of the potential reproductive benefits associated with adolescent peer aggression, Gallup et al. (2011) collected retrospective accounts of university students' previous aggression use and dating behaviours. The authors found that females who perpetrated higher levels of indirect aggression were more likely to

have begun dating earlier, and indirectly aggressive males (non-physical aggression) reported having had more total dating partners. Earlier onset of mating behaviour provides females with a fitness advantage (Gallup et al., 2011; Wood, 1994). For males, having multiple partners is associated with reproductive success (Jokela, Rotkirch, Rickard, Pettay, & Lummaa, 2010).

Although the aforementioned studies provide valuable evidence of a relationship between aggression and reproductive fitness indicators, the cross-sectional and retrospective nature of their design is a limitation that precludes conclusions about the directionality of this relationship. Accordingly, understanding the efficacy of adolescent aggression in achieving *later* reproductive benefits (i.e., being more likely to have a dating partner at follow-up), as well as the role of victimization in limiting *later* reproductive fitness (i.e., being less likely to have a dating partner at follow-up) is the topic of the present study.

The current study

As adolescents allocate significant time and energy toward attracting members of the opposite sex and because successfully attracting a partner holds significant adaptive value, competitiveness among same-sex peers during this developmental period can be expected (Gallup et al., 2011). In the present study, we tested the hypothesis that aggression would positively predict adolescents' dating status at follow-up (1 year later; H1). We also expected that adolescent victimization would negatively predict having a dating partner at follow-up (H2) and that these effects would remain significant in light of necessary control variables. Specifically, when testing H1 and H2 we controlled for Time

1 dating status, and Time 1 physical attractiveness and social status. Time 1 dating was controlled for in order to ensure that regardless of whether a participant was dating initially, their use of aggression in having a partner at follow-up would be unbiased. We also controlled for participant physical attractiveness and social status as rated by their peers. Recently, Ha, Overbeek, Rutger, and Engels (2010) found that adolescent boys desire to date physically attractive girls, and that girls desire to date physically attractive, high-status boys. Thus, attractive, high status boys and attractive girls likely have more opportunity to engage in dating behaviour.

Adolescent peer aggression and victimization are typically measured using selfreport methods although it has been argued that peer-reports are superior to self-reports (and teacher reports) for the assessment of aggression (see Crick, Casas, & Mosher, 1997 for review). Yet regarding victimization, Juvonen, Nishina, and Graham (2001) noted that "...self-reports should be relied upon because it is children themselves who are in the best position to know whether they are victimized" (Juvonen, Nishina, & Graham, 2001, pp. 105-106). Accordingly, we elected to use both peer reports of direct aggression, indirect aggression, and peer-victimization, along with self-reports of bullying perpetration and victimization.

Materials and Method

Sample size calculation

A sample size estimate for logistic regression was calculated according to Peduzzi, Concato, Kemper, Holford, and Feinstein (1996). The following guideline for a minimum number of cases was employed:

N = 10 k / p

Where *p* was the smallest of the proportions of negative or positive cases (p = .63 based on recent findings by Connolly, Pepler, Craig, & Taradash (2000) that 232 of the 366 (63%) students in their sample of early adolescent Canadians were dating) and *k* was the number of independent variables (17). This calculation yielded a minimum sample requirement of 269 students. We elected to overshoot this projection due to some anticipated attrition over the 12 month testing period.

Participants

Participants were 350 adolescents in grades 6 - 9 ($M_{age} = 12.5$ years, SD = 1.00) at Time 1. An approximately equal percentage of boys (49.2%) and girls (50.8%) participated in the study. Participants were also asked to identify who they were dating in order to control for reciprocal dating as a possible violation of independence within the sample.¹ Participants were recruited from five elementary schools and one high school located in a small Canadian town. Parental consent was obtained for those individuals who had agreed to participate in the study. The participation rate was 97% of the entire student population for this town. At Time 2, 89% of the students from the original sample participated (attrition rate = 40 students). The sample was reduced because some participants had changed schools, were absent on the day of data collection, had parents who did not give their consent, declined to take part, or did not complete the questionnaires correctly. We found no significant differences regarding Time 1 study

¹ Twenty of the 350 participants were dating another participant at Time 1 (10 couples). In order to determine whether these pairings violated assumptions of independence, we also ran our analysis without these participants in the sample. Results did not vary from those reported below.
variables between those who did versus did not continue on with the study through Time 2.

Measures

Sociometric ratings of aggression, victimization, attractiveness, and status. A revised class play procedure (Masten, Morison, & Pellegrini, 1985) was used to obtain peer-nominations of (a) overt/direct aggression, (b) indirect aggression, and (c) matevalue characteristics (physical attractiveness and sociometric popularity). The Revised Class Play is a psychometrically valid procedure in which students were asked to list an unlimited number of their same-sex and opposite-sex peers in their class (grades 6 and 7) or grade (grades 8 and 9) who exemplified the descriptions. Participants could only nominate other student who had consented to participate in the study (and who had parental consent). Each indicator was then standardized by class (grades 6-7) or grade (grades 8-9) in order to account for variation in group sizes.

Three items comprised the direct aggression subscale: "Who threatens other people to get their way?", "Who starts fights and arguments with others?", and "Who hits others?" which were internally consistent ($\alpha = .88$). The indirect aggression subscale was comprised of the following four items: "Who spreads mean rumours about someone to get others to stop liking the person?", "Who will make someone feel bad or look bad by making a face, or turning away, or rolling their eyes?", "Who tells others to stop liking a person to get even with them?", and "Who tries to control or dominate a person by keeping them out of the group?" which were internally consistent ($\alpha = .86$). Victimization included 10 items such as "Who gets picked on?" and "Who gets hit or

pushed?" (α = .95). Attractiveness was measured using the item "Who is good looking or attractive?" and social status was measured using the item "Who are the most popular people in your grade?"

Self-reports of bullying and victimization. A 5-item self-report measure of bullying and bully-victimization behaviour was used (Olweus, 1999). The self-report bullying measure consisted of the following two items: "How often have you taken part in bullying other students this semester?" and "About how many times have you taken part in bullying other students at school during the past week?" The inter-item correlation was r = .68. The victimization scale consisted of the following three items: "How often have you been bullied in school?", "How often have you been bullied by being left out and you end up being alone at recess?" and "About how many times have you been bullied at school during the past week". The victimization scale was internally consistent ($\alpha = .77$). Because each item used different response options along a 5-point Likert-type scale, we standardized each item in order to align the metric.

Dating status. Because dating status is a variable that may be less obvious to peers in the classroom (i.e., if an adolescent was dating a student at another school, if the adolescents were keeping their relationship a secret etc.) we used a self-reported of dating status at both Time 1 and Time 2. Participants answered 'yes' or 'no' the question "Are you going out with someone now?" Respondents who checked 'yes' were coded with a 1, and participants who checked 'no' were coded with a 0.

Results

Descriptive statistics

We first ran a series of *t*-tests exploring potential sex differences among our variables of interest. We found that girls ($M_{female} = 0.26 \text{ SD} = 2.10$) were more likely to be nominated by their peers as perpetrators of indirect aggression than were boys ($M_{male} = -0.60 \text{ SD} = 1.30$), t(1, 309) = 4.50, p < 0.001, d = 0.49, whereas boys ($M_{male} = 0.53 \text{ SD} = 6.30$) were more likely to be nominated as perpetrators of direct aggression than were girls ($M_{female} = -1.34 \text{ SD} = 3.61$), t(1, 308) = -3.20, p < 0.01, d = -0.36. We therefore considered interactions between sex and aggression in our analyses. Results from a one-way ANOVA showed that participants differed by grade on Time 2 dating such that grade 9 students were more likely to have entered into dating relationships compared to every other grade, F(3, 277) = 11.60, p < 0.001. Given these results, we controlled for participant age in all subsequent analyses. Students did not differ significantly by grade on any other variable.

Table 1 presents descriptive statistics and inter-correlations for each of the study variables. We found that participant attractiveness (r = .18, p < .01) and social status (r = .16, p < .01) correlated with having a dating partner at Time 2. As hypothesized, higher use of indirect aggression at Time 1 was associated with having a dating partner at Time 2, (r = .25, p < .01). Time 1 physical aggression was correlated with Time 1 dating (r = .20, p < .01) but not Time 2 dating, (r = .06, ns). Self-reported victimization was also negatively correlated with Time 2 dating (r = .10, p < .01).

Longitudinal Analysis

As the criterion variable was dichotomous (dating versus not dating), a binary logistic regression was used to model participants' dating status at Time 2. We tested

each of our hypotheses simultaneously. Participants' age, sex, physical attractiveness, social status scores, and Time 1 dating status were entered as control variables on Step 1 along with our mean-centered predictors: indirect aggression, direct aggression, and self-reported bullying perpetration, peer-reported victimization, and self-reported victimization. In order to determine whether sex moderated the relationships between our predictors and Time 2 dating status, we also entered five corresponding sex-by-predictor interaction terms on Step 2 (see table 2). Goodness of model fit is reported using the Hosmer and Lemeshow chi-square (where a non-significant chi-square represents adequate fit).

In logistic regression, the variance of a dichotomous criterion depends on the frequency distribution of that variable. For this reason, there is no universallyconventional analog to the R^2 derived from OLS regression. Rather, a number of logistic R^2 indices have been proffered as *approximations* to OLS R^2 . To this end we report Nagelkerke's R^2 along with the logistic classification scores. At the predictor level, we report unstandardized coefficients and the corresponding odds ratios Exp(B). Our results indicated that our model provided good fit to the data, Hosmer and Lemeshow $\chi^2(8, N =$ 266) = 7.32, p = ns. At Step 1, the prediction success (classification) rate was 84%, Nagelkerke pseudo $R^2 = .25$, and at Step 2 (interactions with sex) the prediction success (classification) rate was 82%, Nagelkerke pseudo $R^2 = .29$. *Age, social status, attractiveness, and future dating status*

Of our control variables, we found that age (B = 0.57, p < .01) significantly predicted Time 2 dating, consistent with the results reported above. For every year

increase in age, participants were 1.80 times more likely to be in a dating relationship at Time 2 than were younger participants, controlling for all other variables in the model. We also tested whether physical attractiveness and social status, as known correlates of dating desirability in adolescence, would predict dating behaviour. We found that individuals' attractiveness was related to Time 2 dating status (B = 0.74, p < .01, Exp(B) = 2.10). We did not find a statistically significant interaction by sex, suggesting that attractiveness matters for both boys and girls in having a dating partner. We did not find an effect for Time 1 dating status, nor did we find an overall effect or an interaction by sex for status.

Aggression and future dating status

In support of our first hypothesis, indirect aggression significantly predicted individuals' dating status at Time 2, (B = 0.53, p < .001, Exp(B) = 1.70). We did not find a significant sex X indirect aggression interaction, suggesting that indirect aggression predicts later dating status for both boys and girls. Contrary to our initial prediction, we did not find an overall effect for physical aggression (B = -0.09, ns) or self-reported bullying (B = 0.13, ns) on Time 2 dating status. However, we did find a significant physical aggression X sex interaction. To further explore the physical aggression X sex interaction, we re-examined our model dummy-coding for sex. We found that for girls, physical aggression had no effect on dating status (B = 0.04, ns). For boys, physical aggression negatively predicted Time 2 dating status (B = -0.26, p < .01). This finding was contrary to our initial prediction that direct physical aggression would be a maletypical competitive strategy beneficial to later dating status.

Victimization and future dating status

Within the same regression equation we concurrently tested our second hypothesis that peer-victimization would negatively predict having a dating partner at follow-up. In support of H1, we found that self-reported experiences with being bullied negatively predicted Time 2 dating, (B = -0.72, p < .01, Exp(B) = 0.5). We did not find a significant interaction by sex. We found that peer-nominated victimization did not predict Time 2 dating outcomes, above and beyond our controls; nor was there a significant interaction.

Discussion

Researchers have proposed that aggression during adolescence may be employed as an intrasexual competition strategy for gaining reproductive opportunities (e.g., Gallup et al., 2009; Leenaars et al., 2008; Vaillancourt, 2005). However, longitudinal models testing the efficacy of aggression in securing reproductive opportunities have been neglected, with most research in the area focusing on cross-sectional relationships between aggression and dating (or related behaviours). This is problematic insofar as researchers cannot be certain that aggression actually leads to any sort of reproductive advantage (the crux of the entire hypothesis). Accordingly, we tested the premise that (1) use of direct aggression, indirect aggression, and bullying behaviours would facilitate having a dating partner at a later time, controlling for relevant individual-level (initial dating status, physical attractiveness, and social status) and demographic factors (age), and that (2) peer-victimization would relate to a reduced likelihood of having a future dating partner. Consistent with findings suggesting that attractive individuals tend to be reproductively advantaged in terms of sexual opportunity, dating opportunity, and choice of mating strategy (Rhodes, Simmons, & Peters, 2005; Krebs & Adinolfi, 1975; Walster, Aronson, Abrahams, & Rottmann, 1966), we found that both male and female adolescents who were rated by their peers as being physically attractive were more likely to have a dating partner at Time 2. Interestingly, we did not find an effect for social status for either boys or girls beyond a simple bivariate correlation. This relationship may have been weak given that individuals across social strata engage in dating behaviour. Perhaps status may relate more strongly to more restrictive reproductive variables, such as number of sexual partners (positively for males, negatively for females) and romantic partner quality or mate value. This is an area that future longitudinal work would benefit from exploring.

Recall that successful intrasexual competition hinges upon rendering oneself more desirable to members of the opposite sex by causing rivals to be less appealing and/or enhancing one's own appeal (Buss & Dedden, 1990). The use of aggression has been proposed to be a natural expression of dominance that is likely to impose costs upon rivals and, ultimately, to benefit the perpetrator with more access to dating opportunities (Gallup et al., 2011). In testing our first hypothesis that aggressiveness would predict dating status at follow-up, we did not find the expected positive relationship between male perpetration of direct aggression and subsequent dating status. This finding is similar to that of Gallup et al (2011), who also failed to find physical aggression as a factor beneficial to males' dating and sexual behaviour. Perhaps this finding can be

explained by the differential perceptions of males and females with regard to just how attractive male violence is. Recent research has found that males misunderstand what females prefer with respect to physical aggression. For instance, Vandello, Ransom, Hettinger, and Askew (2010) found that males believed females prefer (find more attractive) a male who responds to intrasexual conflict aggressively. In reality, females reported a strong preference for a non-aggressive response by the male. Moreover, Vandello et al. (2009) found that males who over-perceived females' support of physical aggression were more likely to report having used aggression in real life.

If females prefer males who are not physically aggressive during interpersonal conflict, then we might actually expect this behaviour to be unrelated or negatively related to dating status. Indeed, when we explored the weighted effects of sex we found that for boys, the perpetration of physical aggression at Time 1 negatively predicted having a dating partner at Time 2. In modern human society, direct aggression is negatively sanctioned in order to promote within-group cohesiveness. This likely represents a drastic shift from the longstanding mammalian trend for aggression to enhance reproductive success. It seems logical that the evolved tendency to aggress directly for reproductive opportunity has become vestigial in group-based societal living conditions, and is now often counterproductive (as shown by the results of the present study). As noted by Buss and Shackelford (1997) "the hypothesis that aggression sometimes serves the adaptive function of status elevation does not imply that this strategy works in all groups" (pp. 610). One interesting hypothesis as to why some females find male intrasexual violence unattractive is that it may be a particularly salient

cue to the violent male's willingness to engage in intimate partner violence (IPV). Ozer, Tschann, Pasch, and Flores (2002) found that males who were aggressive toward peers were also more aggressive toward their dating partners (peer-aggressive boys engaged in more sexual aggression and dating violence). Like intrasexual violence, partner violence is also used as a strategy for thwarting someone else's reproductive strategy (in this case a romantic partners) when it conflicts with one's own.

Perhaps if male violence toward peers functions as an indicator of risk for partner violence, then we would expect these females to avoid selecting violent males as dating partners. This is an interesting avenue for future researchers to undertake. For instance, female participants might be exposed to the same scenario employed by Vandello et al. (2009) in which a male violently confronts another male. Researchers might then have females rate their fearfulness of the male, their beliefs that he would be more controlling/dominant in a romantic relationship, and their interested in dating him. Future research could further explore individual differences in females' attraction to intrasexually-aggressive males; identifying which factors predict a female's interest in a 'bad boy.'

In support of H1 we found a positive significant relationship between Time 1 indirect aggression and Time 2 dating status, controlling for all other predictors. The use of indirect aggression can decrease the social standing and perceived desirability of intrasexual competitors (Fisher & Cox, 2009; Vaillancourt & Hymel, 2006). Presumably, this action might grant the aggressor greater access to desirable dating partners. In line

with this hypothesis, our findings suggest that indirect aggression perpetration can ultimately benefit the individual in terms of having a dating partner.

In support of our second hypothesis, results showed that for both boys and girls, self-perceived peer-victimization predicted *not* having a dating partner at follow-up. Perhaps the low status associated with victimization makes these individuals less appealing to members of the opposite sex (Vaillancourt, 2005). Peer victimization likely reduces the social standing of the target (e.g., spreading rumors about promiscuity; Buss & Dedden, 1990; Leenaars et al., 2008), and some victims might remove themselves from competition altogether for fear of being further victimized, or because of the negative symptoms associated with their victimization, such as depression or social anxiety renders them unable to compete (Vaillancourt, 2005). Peer victimization might also deter others from seeking to date the victims out of fear of being victimized themselves. If victims are socializing less with other students (both same and cross-sex students) then the opportunity to establish such relationships will be lessened. It follows that other non-victimized individuals ought to be more desirable within the social hierarchy.

Our findings contribute to and build upon the existing cross-sectional literature on adolescent sexual (White et al., 2010) and dating behaviour (Gallup et al., 2011) by showing that regardless of initial dating status, physical attractiveness, and social status, indirectly aggressive adolescents were significantly more likely to have a future dating partner, whereas bullied adolescents were significantly less likely to have a future dating partner. Taken together, our findings support the hypothesis that peer-aggression during

adolescence may fulfill the dyadic function of benefiting one's own adaptive fitness outcomes, and detracting or deterring the fitness of intrasexual competitors (Buss & Dedden, 1990; Gallup et al., 2011).

Limitations and future directions

Although the present study supports evolutionary hypotheses of adolescent peeraggression by showing longitudinal relationships between victimization, aggression, and dating status there are nevertheless limitations that may be addressed by future research. Although dating activity has been a primary focus of evolutionary theories of adolescent aggression and victimization (Gallup et al., 2011; Pellegrini & Long, 2003), some researchers have also examined the onset of sexual activity. For instance, historically, males who could gain sexual access to a number of females would have been more reproductively successful (Campbell, 1999). If aggression can assist males in gaining sexual access to females, or if victimization can limit it, then the evolutionary hypothesis of aggression as a form of intrasexual competition would be further supported. Gallup et al. (2009) showed that male victimization in adolescence was negatively correlated with lifetime number of sex partners as well as the number of sex partners per year. Access to multiple sex partners has been linked to male reproductive success (Jokela et al., 2010). Our study was limited in the reproductively relevant outcomes examined. We did not collect information on adolescent sexual activity (e.g., have they had sexual intercourse, onset of first sexual encounter, and/or number of sex partners). Future longitudinal research might consider variables such participation in and degree of sexual activity, number of sexual partners, as well as the length of both sexual and dating relationships.

We also recognize that while in this and other studies, the constructs of bullying, indirect aggression, and peer-victimization (typically combined direct and indirect aggression) have been examined in relation to dating outcomes (Connolly, Pepler, Craig, & Taradash, 2000), that sexually coercive aggression has generally been neglected. Evolutionary theories suggest that sexually coercive behaviours may have evolved in part due to benefits to reproductive fitness (e.g., Goetz & Shackelford, 2006). The prevalence of such acts during adolescence (Jackson, Cram, & Seymour, 2000) suggests that future research in this area should consider the role of sexually-aggressive acts during this developmental timeframe.

Our study employed age as a control variable, presuming that as children gain pubertal maturity they will also become more interested in affiliating with the opposite sex. It is possible that both aggression and reproductively-relevant behaviors are instead a function of this pubertal development. Future research ought to consider a more comprehensive measure of pubertal development as a control or as a potential moderator to this relationship, perhaps through self-report ratings of the Tanner stages (e.g., Brooks-Gunn, Warren, Rosso, & Gargiulo, 1987). However, the relationship between puberty, hormones, and aggression is in and of itself complex. For instance, while testosterone relates to social dominance, it is inversely related to aggression in adolescent boys (Schall, Tremblay, Soussignan, & Susman, 1996).

Conclusion

A number of researchers have proposed that adolescent peer-aggression may be an expression of competition for reproductive opportunity. However, existing research on

the issue has been cross-sectional in nature, precluding any directional conclusions about the relationship between aggression, victimization, and dating behaviour. We conducted a longitudinal study examining if peer-aggression predicted future dating while controlling for a number of relevant demographic (age, sex) and individual-level (physical attractiveness, social status) factors. We found evidence that victimization related to a lack of a dating partner at follow-up, whereas perpetrating indirect aggression (but not physical or bullying) predicted having a dating partner at follow-up. This finding suggests that indirect aggression may have evolved as a behavioural strategy to benefit reproductive viability. The growing body of literature supporting this theory should compel researchers and educators to consider the potential ultimate causes of adolescent aggression in developing their intervention strategies.

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	M/SD	1	2	3	4	5	6	7	8	9	10
1. Participant Age	12/1.00										
2. Participant Sex		.01									
3. Time 1 Dating		15**	06								
4. Time 2 Dating		.28**	05	.12							
5. Attractiveness	0.02 / 0.10	.01	07	.15*	.18**						
6. Status	0.03 / 0.10	.00	08	.20**	.16**	.80**					
7. PR Indirect Agg.	-0.16 / 1.80	02	24**	.16**	.25**	.18**	.25**				
8. PR Physical Agg.	0.43 / 4.20	.05	.18**	.20**	.06	.24**	.34**	.46**			
9. SR Bully	0.01 / 0.91	.13*	.16**	06	.08	01	06	.00	02		
10. PR Victim	-0.04 / 2.20	06	.14*	.02	.06	15**	17**	.09	.11*	05	
11. SR Victim	0.01 / 0.82	.00	.12*	11	10	04	04	05	.04	.20**	.15*

Table 1. Descriptive statistics and bivariate correlations among variables. Note that SR = Self-report and PR = Peer-report

*p < .05 (two-tailed) **p < .01 (two-tailed)

	В	S.E.	Wald	Exp (B)
Step One				
Participant age	0.469*	0.21	5.13	1.60
Participant sex	-0.09	0.24	0.14	0.92
SR Time 1 dating status	0.60	0.46	1.74	1.80
PR Physical attractiveness	0.36	0.32	1.13	1.40
PR Social status (popularity)	0.25	0.34	0.55	1.28
PR Indirect aggression	0.40**	0.15	7.35	1.50
PR Physical aggression	-0.11	0.07	2.90	0.90
SR Bully perpetration	0.14	0.22	0.40	1.15
PR victimization	0.12	0.11	1.13	1.12
SR Bully victimization	-0.87**	0.34	6.81	0.42
Step Two				
PR Attractiveness X sex	-0.06	0.32	0.04	0.94
PR Status X sex	-0.02	0.35	0.01	0.98
PR Indirect agg. X sex	-0.16	0.14	1.19	0.86
PR Physical agg. X sex	0.15*	0.06	5.78	1.17
SR Bully perp. X sex	-0.06	0.22	0.09	0.94
PR Victimization X sex	-0.09	0.11	0.66	0.91
SR Bully victim X sex	-0.21	0.34	0.38	0.81

Table 2. The longitudinal effects of aggression and victimization on dating status at follow-up

*p < .05, **p < .01

CHAPTER 3

Arnocky, S., Sunderani, S., Miller, J., & Vaillancourt, T. (in press). Jealousy mediates the

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Jealousy mediates the relationship between attractiveness comparison and females' indirect aggression

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Abstract

Indirect aggression is considered an evolutionarily adaptive mechanism that can improve female mating success. It has been hypothesized that indirect aggression toward romantic partners and peers is used more frequently by females who make appearance-based comparisons and that these relationships are mediated by jealousy. Females (N = 528) currently in romantic relationships were surveyed. Results confirmed females who made more frequent appearance comparisons aggressed more often toward partners and peers. Low-comparing females reported being more frequent targets of peer indirect aggression. Jealousy partially mediated the relationships between making frequent attractiveness comparisons and indirect aggression. Results are discussed as effort allocated toward deterring partner defection and fending off rivals, and the role of emotion as a motivational influence for aggression.

Throughout human evolutionary history both males and females have had to contend with threats to their reproductive success. Owing to concealed ovulation and the internal fertilization process of reproduction, a female's infidelity translates into paternity uncertainty for males (Buss, 2004). Although females are not faced with this particular dilemma,

This research was supported by the Social Sciences and Humanities Research Council of Canada and the Canadian Institutes of Health Research. a partner's infidelity can lead to the undesirable division of financial, social, and emotional resources (Buss & Shackelford, 1997a). Infidelity can also lead to termination of the relationship equating to a loss of investment, resources, and parenting assistance (see Buss, 1994/2003; Fisher, 1992, for reviews). For these reasons, both males and females have a vested interest in attempting to retain a desirable mate. Buss, Shackelford, Choe, Buunk, and Dijkstra, (2000) suggested the successful retention of one's mate hinges on two important factors: (a) preventing a partner's attempts at defection and infidelity and (b) fending off rivals who may be interested in mating with that partner.

One manner by which these goals may be satisfied is through the strategic use of aggressive tactics. Empirical findings support the hypothesis that aggression directed toward one's mate and/or potential competitors is employed as a form of mate retention in response to reproductive threat (Buss, 1994/2003; Daly & Wilson, 1988). Hitherto research on the use of aggressive tactics within the context of intimate pair bonds has

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focused disproportionately on males' use of aggression as a mate-retention tactic. This focus reflects an androcentric bias toward perceiving females as victims of aggression and, by extension, as targets rather than perpetrators of mate retention efforts. This bias is likely perpetuated by the field's initial focus on physical aggression, which males have been shown to perpetrate more ruthlessly and with greater consequence than females (see Archer, 2004; Archer & Côté, 2005; Card, Stucky, Sawalani, & Little, 2008). Yet in situations of adult interpersonal conflict, physical aggression seems a rare exception (Bjorkqvist, 1994). Conversely, when the perpetration of indirect aggression is considered, the female role has been elucidated as more than one of passivity and unprovoked victimization (see Bjorkqvist, 1994; Campbell, 1999; Hess & Hagen, 2006, for review). This study breaks from the tradition of conceptualizing females as victims by exploring female jealousy and the perpetration of indirect aggression as predicted by the frequency with which participants compared the quality of their physical appearance to the appearances of other females.

Indirect aggression is conceptualized as a form of aggression in which a perpetrator attempts to harm the target while concurrently trying to obscure their intent (Bjorkqvist, Lagerspetz, & Kaukianen, 1992; Hess & Hagen, 2006). Indirect aggression is prevalent in peer relationships (e.g., Bjorkqvist, 1994; Richardson & Green, 2006). Related to this construct is romantic relational aggression. Romantic relational aggression has been identified as a form of aggressive behavior that causes harm by damaging romantic relationships or feelings of acceptance and love (Linder, Crick, & Collins, 2002). These behaviors are often (but not necessarily) indirect in nature. An example of romantic relational aggression is flirting with another person to make one's partner jealous. Although the behavior is salient, the intent may or may not be obscured by the actor.

Several researchers have called for the use of the umbrella term *indirect aggression* to describe indirect and relational aggression (also social aggression; Archer & Coyne, 2005; Bjorkqvist, 2001; Vaillancourt, 2005). This suggestion is supported by empirical work demonstrating that indirect aggression and relational aggression are more similar than different and should be considered from an integrative framework (Archer & Coyne, 2005). In this study, we use the term *indirect aggression* for the ease of reading but highlight that when discussing aggression directed at a peer, the type of aggression assessed was indirect and when directed at a romantic partner the type of aggression assessed was relational.

In contrast to physical aggression, indirect aggression is unique in that females engage in these behaviors as often as males (Bjorkqvist, 1994; Linder et al., 2002). Similarly, some males report being victimized at rates equal to or exceeding the victimization of females (Linder et al., 2002). As Bjorkqvist (1994) noted, being physically weaker than males, females must develop indirect modes by which to achieve their goals. In this way, indirect aggression may be an evolutionarily adaptation (Campbell, 1999; Vaillancourt, 2005). Indirect aggression is functional because it poses less danger to the perpetrator than physical aggression and yet is effective in its ability to inflict harm on the victim. Indirect aggression has the added benefit of being difficult to detect and therefore one can more easily evade social and even legal consequences (Bjorkqvist 1994; Campbell, 1999; Vaillancourt, 2005), making it a potentially useful mate-retention tactic. Indeed, there is already some existing evidence that suggests that indirect aggression may be perpetrated against romantic partners and peers as an attempt to facilitate mating success.

Evolutionary rationale for indirect aggression toward partners

Aggression toward one's romantic partner can serve the evolutionarily adaptive function of mate retention (Buss & Shackelford, 1997b). Although most research in this area has focused on physical violence, importantly, this theory does not limit itself solely to physical aggression. For instance, Buss (1994/2003) argued that the primary function of psychological aggression toward one's romantic partner, which conceptually includes direct and indirect behaviors (Doherty & Berglund, 2008), is to cause a partner to feel less valuable, to reduce self-perceived mate value, and to make the victim feel fortunate to have secured their current partner in an attempt to reduce the chances of the partner leaving the relationship. How might indirect aggression accomplish this? Indirectly aggressive behaviors (e.g., flirting with another person in front of one's partner, threatening to terminate the relationship) convey disinterest in the current relationship and belief that there are better alternative mates available, which would likely reduce the victim's perception of their own value as a mate. Relational victimization is known to relate to both lower self-esteem (Prinstein, Boergers, & Vernberg, 2001) and depression (Linder et al., 2002), both of which are indicative of reduced perceptions of own mate value (Brase & Guy, 2004; Kirsner, Figueredo, & Jacobs, 2003). Furthermore, the Mate-Retention Inventory, a measure of various tactics used by males and females to retain a mate, measures some behaviors that are consistent with indirect aggression such as telling others terrible things about one's partner so that they would not like him or her.

Typically, the frequency with which one engages in mate retention efforts (especially cost-inflicting efforts such as aggressive behavior) can be predicted by low mate value of the perpetrator (Miner, Starratt, & Shackelford, 2009). Indirect aggression has not yet been considered in this light. However, evidence suggests indirect aggression might serve the same function as other forms of partner-directed aggression: to promote depression, low self-esteem, and other mental states that might counter extrapair mating attempts (Buss, 1994/2003).

Evolutionary rationale for indirect aggression in peer relations

Indirect aggression toward peers has been related to mate competition behavior in females, with the ultimate goal being to increase reproductive opportunity and eliminate threats to reproductive success (Campbell, 1999; Fisher, 2004; Griskevicius et al., 2009; Leenaars, Dane, & Marini, 2008; Vaillancourt, 2005; Vaillancourt, Miller, & Sharma, 2010). For instance, an earlier onset of sexual behavior has been observed in aggressive females (White, Gallup, & Gallup, 2010).

Moreover, females more frequently use indirectly aggressive tactics to derogate physically attractive female competitors (Fisher, 2004; Leenaars et al., 2008). For instance, Vaillancourt and Sharma (2008) showed that almost all females (> 90%) randomly exposed to an attractive female confederate dressed in provocative (sexy) clothing, engaged in "bitchy" behavior toward the confederate compared to those exposed to the same confederate dressed in nonprovocative attire. Ultimately, the consequences of frequent indirect attacks by other females might result in a reduction in mate value of the target and subsequently a reduced desire for the target female by potential suitors. Obtaining a romantic partner does not necessarily signify an end to intrasexual competition. Interlopers abound (e.g., Schmitt & Buss, 2001), and females who perceive other females as a significant threat to their relationship should act in accord with an intrasexually competitive strategy. As we have outlined above, this threat likely equates to the perpetration of indirect aggression toward peers.

Given that perpetual attempts at retaining one's mate would have detracted from other important functions in ancestral times (Graham-Kevan & Archer, 2009), it should be expected that humans who could approximate the necessity for mate retention activities based on the likelihood of their partner's infidelity and/or defection would have been more reproductively successful (Buss, 1988). Several studies show that the presence of attractive intrasexual competitors represents such a threat to fidelity. For instance, males who are exposed to physically attractive females rate their satisfaction with their current relationship lower compared to males exposed to average targets (Kenrick, Neuberg, Zierk, & Krones, 1994). Considering this differential rating, one factor that should indicate the necessity of mate retention effort is the ability to assess one's own value as a mate relative to intrasexual competitors.

Evaluations of one's own physical attractiveness can be influenced via social comparison mechanisms (e.g., How attractive am I compared to other females?), and such comparisons aid in determining one's relative value within the local mating market. Making social comparisons relates to self-reported intrasexual competition in females (Buunk & Fisher, 2009). Moreover, when a competitor is evaluated as being more desirable than oneself on an important mate-value characteristic, the associated reproductive threat becomes salient and mate retention effort may be activated in the threatened partner (e.g., Buss et al., 2000). We hypothesize that females who more frequently make attractiveness-based comparisons will behave more aggressively toward others. Moreover, we believe that this link will be mediated by jealousy.

The existing literature suggests that the link between attractiveness comparison and mate retention effort should be mediated by (an) affective trigger(s). Emotions promote motivations by acting as a signal of specific problems or goals that need to be addressed (Maner et al., 2005). Social comparisons can affect females' self-perceived attractiveness, and these females tend to exhibit increased levels of jealousy (Buss & Haselton, 2005; Dijkstra & Buunk, 1998). For instance, in multinational samples, Buss and colleagues (2000) found that females were significantly more distressed over rivals who surpassed them on facial and bodily attractiveness. The authors suggest that jealousy might be related to relevant domains of self-evaluation such as physical attractiveness and contend that this self-evaluative process may be critical to determining emotional reactions to rivals.

It has been suggested that romantic jealousy may have evolved to alert the individual of the need to engage in mate retention behaviors (Buss, 1988, 1994; Daly, Wilson, & Weghorst, 1982; Symons, 1979). Similarly, in males, jealousy (possessiveness, jealousy over a partner's casual interactions with others) increases alongside risk of partner infidelity (Haselton & Gangestad, 2006). In considering this research, we expect that jealousy/possessiveness will mediate the relationship between one's orientation toward attractiveness comparison and the perpetration of indirect aggression toward partners and peers.

This study examines heterosexual, dating females' attractiveness comparison in relation to their use of indirect aggression toward their romantic partner and peers. We elected to focus the present study on females because: (a) individual differences in the use of materetention tactics by females is a neglected area of research and (b) in terms of attracting mates, the aforementioned literature clearly demonstrates that physical attractiveness matters more for females. Furthermore, because many romantic relationships may be mutually aggressive (Anderson, 2002) and because victimization by a romantic partner can also incite jealousy (Buss, 1994/2003), consideration was given to controlling for the effects of victimization in our analyses. Specific hypotheses are delineated below.

Hypotheses

- H1: Females in heterosexual dating relationships who report greater physical attractiveness comparison will be more likely to perpetrate indirect (relational) aggression toward their romantic partner.
- H2: Females who report greater physical attractiveness comparison will be more likely to perpetrate acts of indirect aggression outside of the romantic relationship (i.e., toward peers) compared to females who make fewer attractiveness comparisons.
- H3: Romantic jealousy will mediate the relationship between attractiveness comparison and indirect aggression toward one's romantic partner.
- H4: Romantic jealousy will mediate the relationship between attractiveness comparison and indirect aggression directed toward peers.

Method

Participants

Our sample consisted of female respondents who were currently in heterosexual romantic relationships (N = 558). Participants ranged in age from 16 to 29 years (M = 20 years, SD = 2.68). To avoid a selection bias by study major (i.e., only 1st-year introductory psychology students), participants were recruited from the university student center and were compensated \$5.00 for participation. Less than 5% of the females approached to take part in this study declined to do so.

Measures

Social comparison of physical attractiveness

Comparison of one's own physical attractiveness to the attractiveness of intrasexual competitors was assessed using the Dieting Peer Competitiveness (DPC) scale (Huon, Piira, Hayne, & Strong, 2002). Participants were instructed to report on their tendency to compare their physical attractiveness in an upward manner to same-sex others. The DPC scale is beneficial in that it is specifically designed to capture overall attractiveness as well as body weight and shape comparisons in female participants. The 5-point Likert scale is anchored at 1 (not at all like me) and 5 (extremely like me). The original measure consisted of two distinct factors: (a) body shape and weight social comparisons and (b) food intake (Huon et al., 2002). For the current research, only the first subscale consisting of five items was used. The specific items in the comparison subscale of the DPC are: "I do not like wearing a swimming costume because I don't think I look as good as the other girls," "When I look at my slim friends I wish I could look just like them," "Before going to a party I spend a long time worrying about whether I will look as attractive as some of my friends," "I feel happier about my figure when I am with someone who is larger than myself," and "I look at other girls' figures to see how well I measure up." In this study, the measure was internally consistent $(\alpha = .83)$. The DPC has been shown to relate strongly to body dissatisfaction (Huon et al., 2002), suggesting that the comparisons measured are likely upward (rather than downward) in nature.

Indirect (relational) aggression and victimization in the romantic relationship

Items from the Measure of Aggression and Victimization (Linder et al., 2002; Morales & Crick, 1998) were employed to assess self-reported jealousy, relational aggression, and physical and relational victimization along a 5-point Likert scale from 0 (*never*) to 4 (*always*). This scale is the only known measure of relational aggression in romantic relationships. Importantly the items comprising this measure address issues of context sensitivity and normative/non-normative behavioral distinctions that are common to alternative measures of aggression in romantic relations (see Follingstad, 2007).

Relational aggression ($\alpha = .70$) was assessed by averaging participant responses to the following five items: "I try to make my romantic partner jealous when I am mad at him," "I have cheated on my romantic partner because I was angry at him," "I give my romantic partner the silent treatment when he hurts my feelings in some way," "If my romantic partner makes me mad, I will flirt with another person in front of him," and "I have threatened to break up with my romantic partner in order to get him to do what I wanted." As opposed to alternative measures of direct psychological aggression in romantic relations that often include more mundane and normative behaviors such as "my partner was insensitive to my feelings" to which most people are exposed (Follingstad, 2007), the items used in this study: (a) represent more serious indirect violations of the relationship (e.g., cheating and flirting out of anger, relationship termination threats meant to incite desirable partner behaviors) and (b) provide a context-specific rationale for the relationally aggressive action engaged in; two factors that are important for the accurate assessment of psychological forms of aggression and that many other scales lack (Follingstad, 2007).

Given that victimization relates strongly to the perpetration of aggression in romantic relations, relational and physical victimization were included as control variables. The following four items¹ were used to assess indirect victimization ($\alpha = .75$): "My romantic partner tries to make me feel jealous as a way of getting back at me," "My romantic partner has threatened to break up with me in order to get me to do what he wants," "My romantic partner doesn't pay attention to me when he is mad at me," and "When my romantic partner wants something, he will ignore me until I give in." Physical victimization/threat of physical victimization ($\alpha =$.81) was assessed using three items: "My romantic partner has pushed or shoved me in order to get me to do what he wants," "My romantic partner has tried to get his/her own way through physical intimidation," and "My romantic partner has threatened to physically harm me in order to control me." Of particular interest was the assessment of physical intimidation, which is considered critical to physical partner violence by victim advocacy groups (Pence & Paymar, 1986). Both fear of violence and the experiences of violence have negative effects on victims (Golding, 1999) and so were included as control variables.

Indirect aggression and victimization in peer relations

Indirect aggression and victimization were assessed using the Indirect Aggression Scale-Aggressor and Victimization versions (IAS-A, IAS-V; Forrest, Eatough, & Shevlin, 2005). Each version of the IAS consists of 35 items. The IAS-A measure was designed specifically to assess frequency of indirect aggression within interpersonal relationships. The respondent's average score across the IAS-A items is a representation of one's level of indirect aggression perpetrated within the social environment. The scaling consists of a 5-point Likert scale anchored at 1 (never) and 5 (always). Example items are: "talked about others behind their backs," "excluded others from a group," "made other people not talk to others," "been bitchy toward others," and "snubbed others in public." This study found the total indirect aggression score to be internally consistent ($\alpha = .94$). The IAS-V was included as a control measure to partial out any effect of social victimization that might otherwise lead to the use of this form of aggression. Items in the IAS-V are identical to the IAS-A, only presented with the participant as the target of each act rather than the perpetrator. In the present sample, the IAS-V was internally consistent $(\alpha = .90).$

Romantic jealousy

Romantic jealousy was assessed using two items from the Measure of Aggression and Victimization (Linder et al., 2002; Morales & Crick, 1998) using a 5-point Likert scale from 0 (never) to 4 (always). Given that this study is the first to examine the mediating role of jealousy to the relation between perceived mate value and aggression, we employed an indicator of jealousy that is (a) known to exist in college dating relationships (Hansen, 1985) and (b) has been shown to fluctuate alongside relationship threat (Haselton & Gangestad, 2006). Specifically, jealousy/possessiveness was assessed by averaging participant responses to the following two items: "It bothers me if my romantic partner wants to spend time with his friends" and "I get jealous if my romantic partner spends time with his friends, instead of just being alone with me." The item-correlation was r = .78. We were particularly interested in jealousy as distress over time spent with others because college students often expect romantic partners to give up close friendships, especially with others of the opposite sex (Hansen, 1985), and time spent with others outside of the romantic dyad is a particular situation that may

We omitted a fifth item "When my romantic partner is mad at me, he won't invite me to do things with our friends" from the subscale as we believed it would confound with the indicator of jealousy over time spent with friends outside of the relationship. Principal components analysis using a varimax rotation and no fixed number of factors confirmed that the four items utilized comprise a single victimization factor with loadings between .76 and .85.

directly or indirectly promote extrapair mating opportunities.

Results

Descriptive findings

Descriptive statistics and bivariate correlations for each measure are provided in Table 1. Indirect victimization by peers correlated negatively with the use of indirect aggression toward peers. Although jealousy was significantly correlated with both perpetration and victimization, the strongest correlations were with the perpetration of indirect aggression toward romantic partners, followed by indirect victimization.

Analytic approach

We examined the simple effects of attractiveness comparison on indirect aggression toward both partners (H1) and peers (H2) as well as the role of jealousy in mediating these relationships (H3 and H4, respectively). For each analysis, we used bootstrapping procedures as outlined by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002). The mediated (*indirect*) effect is the reduction of the effect of the predictor variable on the criterion upon inclusion of the mediating variable. Thus, the indirect effect is equal to the initial effect of X on Y (the total effect) minus the effect of X on Y with the mediator included in the model (the direct effect; Baron & Kenny, 1986). Preacher and Hayes (2008) suggest the bootstrapping method is superior to alternative methodologies because it does not enforce the assumption of a normally distributed sample. Bootstrapping procedures might also relate to increased power and reduced Type I error rate (MacKinnon et al., 2002). For each analysis in this study, 1,000 bootstrapping samples were derived. These results are reported in the first four columns of Table 2 (rows 1 and 2). We next explored whether these results held upon the inclusion of victimization control variables. and these results can be found in columns 3 and 4 of Table 2. All coefficients reported herein are unstandardized.

Attractiveness comparison and perpetration of aggression toward romantic partner

To test jealousy as a mediator of relationships between attractiveness comparison and aggression, we first had to determine if

2 3 5 1 4 6 1. Attractiveness comparison: M = 1.85, SD = 1.06, range = 4.00.28** 2. Jealousy: M = 1.90, SD = 0.91, range = 5.003. Indirect aggression toward partner: .53** .26** M = 1.79, SD = 0.70, range = 4.50.19** .37** .24** 4. Indirect aggression toward peers: M = 1.89, SD = 0.46, range = 2.86.43** .54** .17** 5. Indirect victimization by partner: .30** M = 1.51 SD = 0.72, range = 5.00 .33** .47** .59** 6. Physical victimization by partner: .13** .22** M = 1.17, SD = 0.48, range = 4.67-.15** -.22** -.38** 7. Indirect victimization by peers: $-.25^{**}$ $-.25^{**}$ $-.14^{*}$ M = 1.23, SD = 0.71, range = 3.00

Table 1. Descriptive statistics and bivariate intercorrelations among variables

p < .05 (two-tailed). p < .01 (two-tailed).

and peers								
	Indirect ag to partner contr	ggression (without :ols)	Indirect ag to peers (contr	ggression (without ols)	Indirect a to partne conti	ggression er (with tols)	Indirect ag to peers contr	gression (with ols)
	1. Total effect model	2. Mediation model	3. Total effect model	4. Mediation model	5. Total effect model	6. Mediation model	7. Total effect model	8. Mediation model
 Attractiveness comparison Jealousy Indirect victimization by partner Physical victimization by 	0.18**	0.08* 0.37**	0.08**	0.05* 0.11**	0.03** 0.28** 0.24**	0.01 0.24** 0.29** 0.25**	0.04*	0.01 0.09**
partner 5. Indirect victimization by peers Total explained variance (R^2 adj)	.07	.29	.03	.07	.34	.43	-0.34** .15	-0.34** .17
Note. Unstandardized regression coefficients * $p < .05$ (two-tailed). ** $p < .01$ (two-tailed)	are reported. 1).							

veen attractiveness comparison and indirect aggression perpetrated against partners	
on the relationship	
effects of jealousy	
The mediating ϵ	5
Table 2.	and peers

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females who made more frequent attractiveness comparisons were indeed more likely to report jealousy. Results indicated that attractiveness comparison significantly predicted jealousy, b = 0.25, p < .001.

Each mediation model was first tested while excluding the victimization covariates. The hypothesis that more frequent attractiveness comparisons would predict perpetration of indirect (relational) aggression toward romantic partners was examined and results are shown in row 1 of Table 2 (H1). We found that attractiveness comparison had a total effect on indirect aggression toward romantic partners of b = 0.18, p < .001. However, when we included jealousy in the model, we found that the direct effect of attractiveness comparison on indirect (relational) aggression was reduced, b = 0.08, p < .01. Jealousy significantly predicted indirect aggression toward one's romantic partner, b = 0.37, p < .001. Jealousy partially mediated the link between attractiveness comparison and indirect aggression, Sobel test: z = 3.93, p <.001, bootstrapping: 95% CI [0.015, 0.043]) partially supporting H3. The mediation model contributed .29 toward explained variance $(R^2 \text{ adj}).$

Attractiveness comparison and perpetration of aggression toward peers

Next, we explored the effect of attractiveness comparison on the perpetration of indirect aggression toward peers (H2). We found that attractiveness comparison had a significant total effect in predicting indirect aggression toward peers, b = 0.08, p < .001. With jealousy included in the model, the effect of attractiveness comparison was reduced, b =0.05, p < .01. Jealousy significantly predicted indirect aggression toward peers, b = 0.11, p < .001. Jealousy acted as a partial mediator of the link between attractiveness comparison and indirect aggression toward the romantic partner (Sobel test: z = 5.91, p < .001; bootstrapping: 95% CI [0.014, 0.029]) partially supporting H4. The mediation model contributed .07 toward explained variance $(R^2 \text{ adj}).$

Attractiveness comparison and aggression controlling for levels of victimization

Next, we ran each set of analyses while controlling for victimization. Attractiveness comparison scores were entered simultaneously with physical and indirect victimization as control variables in predicting indirect aggression toward one's romantic partner. Both physical (b = 0.24, p < .001) and indirect victimization (b = 0.28, p < .001) predicted the perpetration of indirect aggression by females. Controlling for physical and indirect victimization, we found that attractiveness comparison significantly predicted the perpetration of relationally aggressive acts toward one's romantic partner, b =0.03, p < .001, again supporting H1. In this model, jealousy was predictive of the perpetration of indirect (relational) aggression toward the romantic partner, b = 0.24, p <.001 (Table 2, column 6, row 2). With jealousy included in the model, the relationship between attractiveness comparison and perpetration of indirect aggression toward the romantic partner was significantly reduced from b = 0.03, p < .001 to b = 0.01, p <.05, providing evidence of partial mediation (Sobel test: z = 4.69, p < .001; bootstrapping: 95%, CI [0.006, 0.016]), partially supporting H3. The mediation model contributed .43 toward explained variance $(R^2 \text{ adj}).$

We again examined the relationship between attractiveness comparison and perpetration of indirect aggression toward peers, this time controlling for indirect peer victimization. We found that being indirectly victimized by one's peers negatively predicted the perpetration of indirect aggression, b =-0.34, p < .001, suggesting that females who were victims are not likely to self-report perpetrating indirect aggression toward peers. As predicted, attractiveness comparison significantly predicted perpetration of indirect aggression against others, supporting H2 (b =0.04, p < .05). Jealousy was then included as a mediator to the relationship between attractiveness comparison and indirect aggression toward peers. In this model, jealousy was predictive of the perpetration of indirect aggression toward peers, b = 0.09, p < .001. With jealousy included in the model, the relationship between attractiveness comparison and perpetration of indirect aggression was significantly reduced from b = 0.04, p < .05 to b = 0.01, *ns*, providing evidence of full mediation (Sobel test: z = 3.43, p < .001; bootstrapping: 95%, CI [0.010, .037]) and supporting H4. The mediation model contributed .17 toward explained variance (R^2 adj).

We also tested whether females who made fewer attractiveness comparisons were more likely to be indirectly victimized by peers. Controlling for perpetration, females who were lower in attractiveness comparison were more likely to be indirectly victimized by peers, b = -0.02, p < .001. This finding indicates that females who least frequently make physical attractiveness comparisons are more often the targets of indirect aggression from peers and supports an evolutionary hypothesis of indirect aggression as the targets female competition are most likely those who pose the greatest threat to the perpetrators (e.g., Leenaars et al., 2008).

Discussion

This study was designed to investigate several evolutionarily informed hypotheses regarding social comparison of physical attractiveness and indirect aggression. We hypothesized that females who frequently compare their physical appearance to attractive others would utilize indirect and relational forms of aggression more frequently (e.g., Campbell, 1999; Vaillancourt, 2005; Vaillancourt et al., 2010).

We found that females who made more frequent attractiveness comparisons were more likely to engage in aggressive behaviors toward their romantic partners and their peers, supporting H1 and H2, respectively. This finding remained when we included relevant victimization control variables. The observation that high attractiveness comparison females engaged in greater indirect aggression is not surprising given that the making of such comparisons is highly correlated with body dissatisfaction (Huon et al., 2002). These females might perceive themselves as being low on the mate value characteristic of physical attractiveness, meaning that the proportion of higher value competitors is greater.

The finding that these females aggressed against their partners (H1) appears to be consistent with findings by Graham-Kevan and Archer (2009), who found that low-matevalue females were more likely to be physically aggressive and to control their partners. We suggest that females who might perceive themselves as being of low mate value will perceive greater threat to their relationship because there are more appealing alternatives for their mate to potentially choose from. Even females with a relatively low-mate-value partner should still have a vested interest in guarding their male partners against female rivals. Parental investment theory (Trivers, 1972) suggests that females are obligated to invest a considerable amount of time toward pregnancy and lactation in order to increase the chances of their child surviving. Males, conversely, are able to invest more effort toward attracting additional mates, which can ultimately lead to desertion. Indeed, human males appear to engage in infidelity more often than females (e.g., Blow & Hartnett, 2005; Greeley, 1994; Schmitt, 2003; Wiederman, 1997). Although in general males are known to become more distressed by sexual infidelity than are females (Daly & Wilson, 1988), it remains in the best interest of the committed female to prevent these sexual infidelities because of the related risk of redirection of time, parenting effort, and resources as well as defection away from the original dyad. Indeed, it has been proposed that a female's jealousy varies with the threat that she perceives in a male partner's infidelity (Harris, 2003), and this jealousy would not be so if male extrapair mating had no deleterious effect on his partner.

Similarly, we found that females who make attractiveness comparisons were more aggressive toward peers (H2). Our results support the hypothesis that females who may perceive themselves as being of lower mate value tend to engage in intrasexual competition with other females. It has been hypothesized that
these acts of indirect aggression aid in retaining access to a desirable mate by reducing the mate value of the target (Vaillancourt, 2005; Vaillancourt et al., 2010). This mate retention can be accomplished by using indirectly aggressive methods to reduce the social standing of the target (e.g., spreading rumors about promiscuity; Buss & Dedden, 1990; Leenaars et al., 2008) and by reducing the rivals' willingness to compete because of the negative symptoms associated with indirect victimization, such as depression or social anxiety (Vaillancourt, 2005).

The use of indirect aggression can also be employed to increase standing within the social hierarchy (Leenaars et al., 2008; Vaillancourt & Hymel, 2006). Indirect aggression is associated with future perceived popularity (Zimmer-Gembeck, Geiger, & Crick, 2005), and social status is inextricably tied to competition for mates (see Vaillancourt, 2005). Presumably, increasing one's social standing can often result in decreasing a rival's social standing, granting the aggressor greater access to "better pickings" within the mating market. In line with this, we also found that females who do not frequently make attractiveness comparisons were more likely to report being indirectly victimized by their peers, suggesting that females who see themselves as being of higher value may be more frequently targeted. Thus, females likely aggress against those who pose the greatest threat to their relationship. This is an interesting avenue for future research to explore.

To the best of our knowledge, this is the first study to test romantic jealousy as a mediator to the relationship between attractiveness comparison and mate retention efforts. We hypothesized that jealousy would account for the links between attractiveness comparison and aggression toward both partners (H3) and peers (H4). We found that the observed relationship between social comparisons and aggression perpetrated toward both romantic partners and peers was partially mediated by romantic jealousy. Over human evolutionary history, females risked the loss of a monogamous partner by way of infidelity or defection from the relationship. Because males place

considerable value on the physical attractiveness of females (Fisher, 2004), the perception that intrasexual competitors are of greater physical attractiveness is a salient cue to incite greater jealousy among females. Thus, jealousy prompted by perceiving a threat to the relationship seems to be an adaptive function that initiates behaviors meant to prevent a mate's infidelity or defection from the dyad (Buss et al., 2000). Attractiveness comparison was associated with a fairly small effect size $(R^2 \text{ adj} = .03 - .07)$ before including jealousy in the model, upon which explained variance increased (R^2 adj = .07-.29). Moreover, inclusion of the control variables further increased the effect sizes (R^2 adj = .17-.43). Although in general females compete most readily on the mate value characteristic of physical attractiveness (Fisher, 2004), there are other desirable traits that females may compete on (e.g., interpersonal responsiveness) that would likely increase the total explained variance.

Limitations

This study was limited by our focus on female participants. We elected to study a large sample of females because indirect forms of aggression are preferentially utilized by females. Moreover, little research has focused on the mate retention efforts of females, especially in regard to aggressive behavior. However, adult males also utilize indirect aggression, and future research should address the ultimate causes of these behaviors in males. We suspect that males making frequent comparisons with intrasexual competitors will also be more likely to engage in these behaviors. However, the focus of comparison might differ because females place less emphasis on male physical attractiveness (e.g., Buss, 1994/2003). We suggest that males will likely place a greater emphasis on status comparisons (money, job, athletic ability comparisons).

Another limitation, which is characteristic of most studies on indirect aggression toward peers, is that the measure we employed did not explicitly measure aggression toward *only* same-sex peers and thus cannot be considered solely as a measure of intrasexual competition. This limitation is true of other empirical studies that have tested evolutionary hypotheses of female indirect aggression as an indicator of intrasexual competition using scales developed for the peer relations field (e.g., Leenaars et al., 2008; White et al., 2010). This said, the benefit of using a wellvalidated measure seems to outweigh this particular cost given that a strong body of evidence suggests that most peer aggression is directed toward same-sex individuals, and we would suspect a similar pattern of results had we instructed participants to only report on aggression toward other females. For instance, Gallup, O'Brien, White, and Wilson (2009) found that 85% of peer aggression is directed toward those of the same sex.

This study is the first to test jealousy as a mediator of the link between relationship threat and mate retention effort. To do so, we used an indicator of romantic jealousy that focused on the partner spending time with others outside of the relationship, which has previously shown to be a good indication of jealousy in college dating relations (Hansen, 1985). However, jealousy is a complex and multifaceted construct. To evaluate the robustness of these initial findings, future research might explore potential relationships between various types of jealousy such as reactive, preventive, and anxious jealousy (Buunk, 1997) as well as evaluate potential differences in the effects of emotional versus sexual jealousy (see Buss, 2000; Harris, 2003). The use of a more sophisticated, broader measure of jealousy would likely relate to a greater mediating effect on the attractiveness comparison-aggression relationship. Future research might also consider the role factors such as attachment style in affecting this relationship. We suspect that females who are insecurely attached to their partner might be more attentive to threats to the romantic dyad, especially those of the anxious-preoccupied type.

Conclusion

Females preferentially use indirect and relational tactics to aggress against their romantic

partners and peers (Bjorkqvist, 1994; Linder et al., 2002; Vaillancourt, 2005). However, little empirical research has addressed the potential reasons behind female aggression. Following human evolutionary psychology, we contend that females who make more frequent physical attractiveness comparisons might perceive themselves to be at particular risk of partner infidelity or defection from the relationship because of the saliency of higher quality intrasexual competitors. It follows that these females experience a greater amount of jealousy and mate retention efforts, arguably because of an inherently greater level of relationship threat that is associated with these comparisons. Although the focus of this study was indirect aggression, it would be interesting for future work to consider positiveinducement forms of mate retention (e.g., gift giving, providing sexual favors, and attempts at appearance improvement) in relation to attractiveness comparison and jealousy.

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CHAPTER 4

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victimization by an intimate partner: Links to testosterone levels, stigmatization, and

help-seeking among male victims

Sex differences in victimization by an intimate partner: Links to testosterone levels, stigmatization, and help-seeking among male victims

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Abstract

Sex differences in the relation between intimate partner violence (IPV) and testosterone, stigma, perceptions of what is "abusive", minimization/concealment of victimization, and help-seeking behaviour were examined in a sample of 166 (89 female and 77 male) undergraduate students. Results indicated that male targets of IPV had lower levels of testosterone than male non-targets. Participants of either sex held more negative attitudes toward male versus female targets. Male compared with female participants were less likely to consider hypothetical aggressive acts perpetrated against them as abusive. When asked to think about how they would respond if they felt "abused" by their partner, male participants reported being more likely to minimize and less likely to disclose and seek help compared to females. Results are discussed in terms of the social emphasis on males to be dominant and highlight the need to consider the unique challenges faced by male victims.

Keywords: intimate partner violence (IPV), male victims, stigma, testosterone, help-seeking

Sex differences in victimization by an intimate partner: Links to testosterone levels, stigmatization, and help-seeking among male victims

It is becoming increasingly clear that males are not the sole perpetrators of intimate partner violence (IPV; Archer, 2000; Kar & O'Leary, 2010; Straus, 2009). In the United States, females in romantic relationships physically assault an estimated 835,000 males each year (Thoennes & Tjaden, 2000). Similar findings were reported in a recent Canadian study which stated that more than half a million males were violently victimized by a female romantic partner between 1999 and 2004 (Statistics Canada, 2006). In spite of the growing body of evidence highlighting female-perpetrated partner violence, the issue of male victimization remains divisive and relatively neglected among researchers and practitioners. The victimization of males is so contentious that George (1994) termed it the "Great Taboo"; he believed the controversy was due to stereotypical ideologies of masculinity and femininity that inherently run counter to male victimization.

Because of gender role stereotypes, some researchers have suggested that victimized males face a different set of challenges than victimized females (e.g., Hines & Douglas, 2009, 2010a, 2010b) and that studies of battered females will not suffice in providing a theoretical framework for understanding males who are targeted by female aggression (e.g., George, 1994). Hines and Douglas (2009) argued that societal expectations of male dominance and the potentially greater stigma faced by male targets will likely make it more difficult to identify and treat targeted males and aggressive females (see also Gilbert, 2002). For instance, societal expectations of males to be

physically dominant and masculine may ultimately deter them from reporting being targeted by female aggression, as it may be considered emasculating (Hines & Douglas, 2009). There is a clear need to improve the study, identification, and treatment of targeted males. It is important to begin to understand how males differ from females in terms of their biological correlates, victimization stigma, as well as in their ability and willingness to identify themselves as a victim and to subsequently seek help.

Intimate partner violence and dominance

The perpetration of IPV by males has been deemed a power and control tactic used to dominate a partner and to penalize her undesirable behaviour (Hamberger, Lohr, Bonge, & Tonlin, 1997; Yllö, 1993). When reports of females' perpetration of partner violence first came to light it was presumed by many that such behaviours were an expression of self-defense (Dobash & Dobash, 1977; Hamberger & Potente, 1994). Selfdefense is clearly an important predictor of some females' use of violence against intimate partners (e.g., Stuart et al., 2006); however, it is short-sighted to assume it is the sole motivation for all females' aggression. Indeed, self-defense explains only a minimal proportion of females' partner-directed aggression (Felson & Messner, 1998; Sarantakos, 1999). Similar to males, females cite jealousy, anger, punishing their partner's infidelity, and attempts at controlling or dominating their partner as motives for their aggressive behaviour (Arnocky, Sunderani, Miller, & Vaillancourt, in press; Babcock, Miller, & Siard, 2003; Cascardi & Vivian, 1995; Dasgupta, 2002; Graham-Kevan & Archer, 2009; Hettrich & O'Leary, 2007; Hines & Malley-Morrison, 2001; Stets & Hammons, 2002). In accordance with these motives, females in both dating and married/cohabiting

relationships report perpetrating unilateral acts of partner violence at rates similar to males (Arias & Johnson, 1989).

Females' domination and control over a partner run counter to societal expectations of the masculine gender role as being dominant (George, 1994; Hines & Douglas, 2009). Gender roles refer to the degree to which an individual adopts the gender specific behaviour ascribed by their culture (Matsumoto & Juang, 2004). For instance, Brogden and Nijhar (2004) found that males who were victimized by their partners reported feeling their masculinity had been undermined by their victimization.

Dominance and masculinity have a bidirectional relationship with testosterone (see Baucom, Besch, & Callahan, 1985; Mazur & Booth, 1998; Penton-Voak & Chen, 2004; Sellers, Mehl, & Josephs, 2007). High dominance is linked to higher testosterone which in turn is linked to higher dominance (Mazur, 2005). Of relevance to the current study is the finding that the loss of dominance or status is linked to a reduction in testosterone (Bernhardt, Dabbs Jr., Fielden, & Lutter, 1998; Kreuz, Rose, & Jennings, 1972; Mazur, 1985; 2005; Mazur & Lamb, 1980; Vaillancourt et al., 2009). Considering this research, we hypothesized that males who were aggressively targeted by their female partners would have lower testosterone levels than males who are not victimized (Hypothesis 1). The relation between social defeat (victimization), dominance, and testosterone is less straightforward among females. Some researchers have found an association between aggression, status, and testosterone in females (Cashdan, 2003; see also Kemper, 1990), while others have not (e.g., Dabbs, Ruback, Frady, Hopper, & Sgoutas, 1988). Moreover, although Vaillancourt et al. (2009) recently reported that bullied girls had lower testosterone levels than non-bullied girls, the few studies that have examined testosterone in relation to competition and social defeat in females have shown an inconsistent pattern of results (e.g., Bateup, Booth, Shirtcliff, & Granger, 2002; Kivlighan, Granger, & Booth, 2005). Given these discrepancies, we did not predict a relationship between being the target of a partners' aggression and testosterone in females. The demonstration of a biological correlate of low dominance among targeted males may in turn provide insight into their stigmatization. Males who do not reflect the dominant stereotypical gender role are often stigmatized (e.g., Gannon, Glover, & Abel, 2004; Lemelle & Battle, 2004). Given the postulation that female aggression toward males is linked to markers of low dominance and masculinity, we also expected male targets of partner violence to experience more stigmatization than female targets (Hypothesis 2).

Stigmatization of male victims

Steinmetz (1977) noted that in post-Renaissance France and England, husbands believed to have been abused and/or dominated by their wives were derided and shamed. In modern society, it is argued that males who experience female aggression are similarly stigmatized (George, 1994). Social stigma refers to disapproval of an individual's characteristics or beliefs that are perceived to be against cultural norms (Goffman, 1963; Link & Phelan, 2001). Stigma toward those with undesirable traits can even occur within the marginalized group itself. For instance, overweight individuals (a stigmatized group) strongly associated 'thin people' with 'pleasant' and 'overweight people' with 'unpleasant' on an implicit association task (Rudman, Feinberg, & Fairchild, 2002). It is

possible that even targeted males may hold a stigma against males who are the targets of female partner violence.

It may be less stigmatizing for a female to be a target of partner violence than it is for a male to be similarly targeted (see George, 1994). Whereas historical and anecdotal evidence seems to support such an argument, little research has empirically explored the stigmatization of male targets. One exception has been the study of people's attributions of blame toward male targets of sexual assault. Smith, Pine, and Hawley (1988) compared students' judgments of male and female targets of heterosexual and homosexual rape. The authors found that males who were sexually assaulted by a female were considered more likely to have encouraged the episode and to have derived more sexual pleasure and less stress from it compared to males targeted by other males or to females targeted by either males or females. Researchers studying women's stalking behaviour have reported similar findings. Males who were stalked by females are seen as being more responsible for their situation than are females exposed to male's stalking behaviour (Phillips, Quirk, Rosenfeld, & O'Connor, 2004). Similarly, Sheridan, Gillette, Davies, Blaauw and Patel (2003) argued that there is a general lack of concern for males who are targeted and those males are perceived as having more control over their stalker. Although each of these studies have demonstrated differences in how male and female targets are viewed (i.e., males are less likely than females to be seen as a victim), these studies fell short of assessing whether male targets were indeed stigmatized.

Research specific to partner violence has shown that university undergraduate raters exposed to vignettes in which a man was targeted by a woman rated the

victimization as being less serious than identical vignettes depicting a woman being targeted by a man (Harris & Cook, 1994). Based on this research, we predicted that abused men would be more stigmatized than abuse women (Hypothesis 2).

Minimization and help-seeking

Failure to conform to masculine gender roles (and the potential for facing related stigma) can create psychological conflict and strain (O'Neil, 1990). If male targets of female aggression are indeed stigmatized more than female targets of male aggression (as we hypothesized), we might also expect fewer help-seeking behaviours on the part of targeted males. According to McNeely, Cook, and Torres (2001), a number of targeted males have suggested that they would not have sought help even if they believed help existed for them.

Information supporting an underreporting of males' victimization comes primarily from crime and arrest-related data. Stets and Straus (1992) found females call police after a partner assault 10 times more often than males. Similarly, Brown (2004) reported that females were more likely to have the police arrest an abusive partner. Several researchers have attempted to explain this underreporting. Some males might accept their partner's aggression and remain in the relationship because they perceive their partner's aggression as being less serious (Adler, 1981; Levant, 1992) or if they are in denial of being victimized (Davis, 2004). A number of researchers have also suggested that targeted males will avoid seeking help due to fear of ridicule, shame, humiliation, embarrassment, or being labeled the initiator of the aggression (Hines & Douglas, 2009; Langley & Levy, 1977; Machietto, 1992; McNealy et al., 2001; O'Brien, Hunt, & Hart, 2005; Steinmetz,

1980). It is not surprising then, that males appear to report their own victimization less than females do and to not view female aggression against them as a crime (Dutton & Nicholls, 2005). We hypothesized that males, compared to females, would consider fewer aggressive acts perpetrated by their partners as constituting abuse and victimization (Hypothesis 3). We also hypothesized that males exposed to a hypothetical scenario in which they perceived themselves to have been victimized/abused would also be more likely to minimize/conceal their victimization and less likely to seek help than females (Hypothesis 4).

Current Study

The existing literature on male targets of female aggression has identified four potential sex differences. We examined whether male targets of female aggression had lower levels of daily circulating testosterone as a marker of low dominance (Hypothesis 1). Researchers have also suggested that males who are aggressed against by female partners may face greater stigma than females who are aggressed against by male partners; we measured negative attitudes toward male versus female targets (Hypothesis 2). We then asked males and females to consider themselves as being the targets of various aggressive acts and to identify which acts would make them feel victimized if it were to occur. We expected that in general, males would be less likely than females to consider various aggressive acts perpetrated against them as "abusive" (Hypothesis 3) and would be more likely to minimize and less likely to seek help for those acts deemed abusive (Hypothesis 4). We expected these attitudinal differences (more stigma, more minimization and less help-seeking among males) to exist broadly between the sexes, rather than only among targets. Therefore, we controlled for participants' actual experiences with partner aggression in their relationship rather than limiting our sample only to targeted males and females.

Method

Participants

Participants were 166 undergraduate university students between the ages of 18 and 30 (M_{age} = 22, SD = 2.3). Of these students, 89 were female and 77 were male. Students were recruited from common areas on a university campus. In order to participate, individuals had to be in a heterosexual dating relationship at the time of participation. Individuals in long distance relationships were excluded from the study. Our final sample consisted of Caucasian (78%), Arab (7%), Southeast Asian (6%), South Asian (3%), Asian (2%), Black (2%), and Latin American (2%) individuals. Participants were compensated \$20 for their time.

Measures

Testosterone. Following procedures by Vaillancourt et al. (2008, 2009),

participants were instructed to supply one saliva sample in the morning (within 20 minutes of waking) and to produce another sample in the late afternoon (at 16:00) across 2 days for a total of 4 saliva samples. Participants were asked to passively drool into polyethylene tube-shaped vials manufactured by Nalgene Co. All saliva samples were stored at -20 °C until assayed for testosterone. For a detailed description of assaying procedures see Vaillancourt et al. (2008, 2009). All of the saliva samples were highly correlated. As a result, all 4 samples were aggregated to create an overall composite

measure of testosterone, $\alpha = 0.80$. Testosterone scores were log transformed (base of 10). Because testosterone is correlated with certain relationship and health variables, we also asked participants to report on (1) dating length, (2) cigarette use, (3) use of psychotropic or steroid medication, (4) average waking time, and (5) sample provision time in order to reduce potential confounds with respect to the testosterone (Vaillancourt et al., 2008, 2009). Testosterone units were measured in picograms per ml (pg/ml).

Aggression by an intimate partner (*CTS2*). The CTS2-victimization scale is a 39-item self-report instrument designed to measure the extent to which individuals in a dating, cohabiting, or marital relationship were aggressed against by their current partner (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). The measure includes four partner aggression subscales: psychological, physical, sexual, and physical injury from partner assaults. The response scale ranged from never, once, twice, 3 to 5 times, 6 to 10 times, and more than 10 times in the past 12 months. If the behaviour did not happen in the past 12 months, participants were asked if it had ever happened prior to the past 12 months. Each subscale is separated in terms of minor and severe acts of aggression. Following Straus and Gelles (1986) we were interested in severe acts, which are defined as acts that have a relatively high probability of causing harm (see Straus et al., 1996). In the present study, each aggression subscale was internally consistent: psychological victimization ($\alpha = .76$), physical victimization ($\alpha = .82$), sexual victimization, ($\alpha = .86$), and physical injury ($\alpha = .97$).

Stigmatization of partner violence victims. We developed a measure of negative attitudes held toward targets of partner violence, termed the *Partner Violence*

Stigma Scale (PVSS; Appendix A). Using a 7-point Likert-type scale (1 = "strongly" disagree" 7 = "strongly agree"). The eight items assessed 3 important aspects of social stigma: Stereotyping (linking victimization to negative attributes), attribution assumptions (attaching blame to the individuals condition), and social avoidance (see Link, Yan, Phelan, & Collins, 2004). Specifically we measured participants' beliefs about negative qualities of people experiencing partner violence (e.g., victims are unattractive, liars, weak) as well as a dimension of shamefulness and blame toward victims (e.g., should be ashamed of themselves, they deserve what they get, they provoke the behaviour), and an avoidance and social sanction dimension of stigma against victims of partner violence (avoiding friendship with a victim of partner violence). Each of the stigma items contributed to a single factor with item loadings ranging between .56 and .77. The items contributed 45.12% toward explained variance and were internally consistent at $\alpha = .82$. In order to test sex differences in the stigmatization of victims, half of the males and half of the female in the sample were randomly assigned to receive the measure in reference to victimized men and the other half of the sample was randomly assigned to receive the measure in reference to victimized women.

Conceptualizations of victimization. We developed the *Minimization and Help-Seeking Scale* (MHSS) to examine whether males and females conceptualize aggressive acts differently and whether sex differences exist in individuals' responses to perceived victimization. Using a pool of aggressive acts commonly observed in partner violence measures, we compiled a list of five physically aggressive acts, seven psychologically aggressive acts, and two sexually aggressive acts (Appendix B). Participants were

instructed to checkmark any action(s) that, if directed toward them by their partner, would elicit feelings of victimization or abuse. The number of endorsed items was then summed to create a score representative of how many items were considered abusive.

Reactions to hypothetical victimization. To assess how individuals would respond to feelings of victimization, participants rated their potential *reactions* to feeling victimized/abused by imagining themselves being the target of one of the acts that they had selected as being abusive. Each item was anchored on a 7-point Likert-type scale (1 = "strongly disagree" 7 = "strongly agree"). These reaction items loaded on two distinct factors: help-seeking/disclosure (e.g., "I would seek assistance from an organization that helps victims", "I would tell my family and/or friends about what happened") and minimization/concealment ("I would give them one more chance before leaving them", "I would lie about the seriousness of what happened"). Principle component analysis using a varimax rotation showed that four items loaded on minimization/concealment ($\alpha = .69$) with factor loadings ranging between .37 and .80 and contributed 29% toward explained variance. Three additional items loaded on a factor termed help-seeking/disclosure $(\alpha = .71)$ with loadings ranging between .41 and .86 and contributed 25% toward explained variance. This method allowed us to measure gender differences in how individuals would respond when they *feel* victimized/abused as opposed to when they are exposed to one of the acts which may or may not be considered as "abuse" by the victim. Note that in order to use this measure, participants must have selected at least one act which would make them feel like a victim of abuse. In this study, all participants met this criterion.

Results

Descriptive statistics

In our examination of testosterone and actual experiences with victimization in the current relationship (CTS scores), we found that males and females self-reported being targeted for similar amounts of physical, psychological, and sexual aggression, and being injured by their partners to similar degrees. Using an independent samples *t*-test, none of the victimization variables varied significantly by sex (ts = -0.20 to -1.20, ns). As a validity check on our composite testosterone measure, we observed higher amounts of circulating testosterone in male versus female participants, (t = -6.70, p < .001, d = -1.42; $M_{female} = 5.8$, SD = 0.43, $M_{male} = 6.5$, SD = 0.55). Descriptive statistics for each study variable are presented in Table 1.

Hypothesis 1: Testosterone correlations with male targets of partner aggression

We tested Hypothesis 1 that lower testosterone would be observed among targeted compared to non-targeted males. Due to the cross-sectional nature of the design as well as the bi-directionality of the testosterone-dominance hypothesis (Mazur, 2005), we explored associations between circulating testosterone levels and being the target of intimate partner violence in the current relationship (severe levels) using partial correlations controlling for smoking behaviour, medication use, dating length, average wake time, and sample provision time. We found that, for males, low testosterone was associated with being the target of: Severe psychological aggression (r = -.25, p < .05) severe physical aggression (r = -.25, p < .05), severe sexual aggression (r = -.30, p < .01),

and severe partner induced injury (r = -.34, p < .01). We did not find any statistically significant correlations between female target status and testosterone¹.

Hypothesis 2: Stigma against male targets

We expected individuals to hold greater negative attitudes (i.e., more stigma) toward targeted males versus females. Moreover, we did not expect one's own exposure to partner aggression to influence their own negative attitudes held toward victims of IPV (i.e., we expected targeted males to be stigmatized more regardless of participants' own experiences). Using a one-way ANOVA, we explored differences in stigma toward male versus female targets of partner violence. We found that participants rated targeted males significantly more negatively than they did targeted females, (*F*[1, 160] = 8.02, *p* < .001, *d* = -.77; *M*_{female} = 1.7, *SD* = 0.98, *M*_{male} = 2.5, *SD* = 1.10). This result held true regardless of the participants' own CTS scores (physical, psychological, sexual, and injury).

Hypothesis 3: Males conceptualize "victimization and abuse" differently than females

We next modeled the number of acts that males and females believed would make them feel like a victim of abuse if they were ever to be subjected to such treatment by their partners. Controlling for actual experiences with victimization (CTS scores), we employed the negative binomial regression model to test this hypothesis. We selected this procedure for analyzing count data over poisson regression given that for each

¹ Correlations between being the target of partner perpetrated aggression and low testosterone remained significant when the control variables (1) dating length, (2) cigarette use, (3) use of psychotropic or steroid medication, (4) average waking time, and (5) sample provision time were not included in the analysis.

criterion variable, the frequency data were positively overdispersed (95% LL's = 3.3 to 8.6, 95% UL's = 3.4 to 10.2), and the number of occurrences was not limitless. In support of Hypothesis 3, we found that males considered fewer of each type of act (physical, psychological, sexual, and total acts) as being abusive if directed toward them than did females. Specifically, the total acts model showed a significant sex difference (likelihood ratio $\chi^2 = 27.59$, df = 2, p < .0001), where males differed from females in total acts considered abusive (B = -0.28, p < .0001). We also found males to endorse fewer physical (likelihood ratio $\chi^2 = 9.51$, df = 2, p < .001, B = -0.25, p < .0001), psychological, (likelihood ratio $\chi^2 = 16.22$, df = 2, p < .001, B = -0.29, p < .0001), and sexual acts, (likelihood ratio $\chi^2 = 8.47$, df = 2, p < .001, B = -0.31, p < .0001) than did females. Interestingly, we also found a significant effect for actual CTS scores, whereby participants with higher total CTS scores were less likely to perceive aggressive acts against them as abusive, (B = 0.02, p < .05). See figure 1 for mean differences in the frequency of endorsed acts.

Hypothesis 4: Males are less likely to disclose and more likely to conceal feelings of victimization

We also tested whether males and females would respond differently to perceived feelings of victimization and abuse. A Hotelling's T² two-group between-subjects multivariate analysis of variance (MANOVA) was employed to examine help seeking and concealment after hypothetical experiences with victimization. The predictor variable was participant sex. We included participants' CTS victimization scores as covariates.

Assumptions of error variance equality between groups were met for each of the outcome variables.

Using Wilks's criterion the sex difference in the composite outcome variable was statistically significant (Wilks's λ , F [2, 147] = 21.01, p < 0.001, $\eta_p^2 = .23$). Univariate ANOVAs were conducted on each dependent measure to determine the nature of the significant multivariate effect. We found that females were significantly more likely to seek help (F = 20.31, p < .0001, d = 1.67; $M_{\text{females}} = 5.3$, SD = 1.03, $M_{\text{males}} = 3.4$, SD = 1.23) than were males, and that males were significantly more likely to conceal/minimize their victimization (F = 26.42, p < .0001, d = -0.99; $M_{\text{females}} = 2.7$, SD = 1.31, $M_{\text{males}} = 4.0$, SD = 1.31) than were females.

Discussion

We explored sex differences in males' and females' experiences with and perceptions of intimate partner violence. We tested the following four hypotheses derived from the existing literature on intimate partner violence: (1) targeted males would have lower circulating testosterone levels than less frequently-targeted males(2) negative stereotypical attitudes (i.e., stigma) would be held more toward targeted males than females, (3) males would be less likely than females to consider specific acts of partnerperpetrated aggression as being victimizing and abusive, and (4) males compared to females would report being more likely to minimize/hide a partner's aggression and less likely to seek help when they consider themselves to have been victimized.

First, we found that males who were targeted by severe acts of psychological, physical and sexual aggression, and who sustained physical injury from their partners had

significantly lower levels of circulating testosterone than less frequently targeted males. This finding held when controlling for dating length, wake time, the time the sample was provided, and medication use (known correlates of testosterone). It has been shown that a male's dominance is bi-directionally related to his testosterone levels, whereby increased testosterone promotes increased dominance, and increased dominance promotes increased testosterone. Conversely, low dominance and social defeat are linked bi-directionally to low testosterone (Mazur, 2005; Mehta & Josephs, 2006). Our finding supports the contention that targeted males have lower testosterone (and hence may be less dominant) than non-targeted males. The finding has implications for the stigmatization of male targets of female aggression. Male dominance is a valued sex role in modern society, and those who do not display this trait are often stigmatized (e.g., Gannon et al., 2004; Lemelle, & Battle, 2004).

Second, a number of researchers have described the potential for stigmatization of male targets of partner violence by females (George, 1994; Hines & Douglas, 2009; Steinmetz, 1977-78). However, to date no empirical research has examined difference in levels of stigmatization for male versus female targets. We provided our sample with a measure of negative attitudes toward targets of partner aggression. Half of the sample responded to the questions while considering male targets and half the sample answered the questions in regard to female targets (randomly assigned). We found that our sample stigmatized males significantly more than females, and this stigmatization held regardless of the participant's own experiences with their partners' aggression.

Third, given our hypothesis that males would be stigmatized to a greater extent than females, we also expected males to minimize their perceptions of victimization more and seek help less than females. To test this hypothesis, participants were provided a list of 14 acts of maltreatment common to existing measures. Participants indicated any number of these acts that would make them feel like a "victim of abuse." We found that males considered significantly fewer acts as being abusive than did females. This lesser consideration of a partners' aggression as victimizing may be a function of physical and emotional differences between the sexes. Female physical aggression may be less physiologically damaging to male targets. The lessened threat to physical safety may lead some males to disregard their victimization to some degree. Similarly, males raised to express their masculinity in the form of emotional invulnerability might be less apt to regard a female partner's psychological aggression as hurtful. Another possibility is that males do experience these acts as painful; however, because of to their understanding of the societal expectation of masculinity and dominance and the stigma that is associated with identifying as a victim, they are less willing or even unwilling to acknowledge their true beliefs, even in an anonymous questionnaire. Future research might consider sex differences in what is considered victimizing by exploring specific extremely damaging acts such as stabbing or shooting a partner or hitting them with a car. These acts would be mutually physically damaging to males and females, and so may provide further insight into the reasons behind these initial sex differences. Moreover, while we did observe a significant sex difference, it is noteworthy that males still considered many acts as abusive.

Fourth, participants were instructed to consider being the target of one of the "abusive" acts that they believed would make them feel like a victim of abuse, and then responded to minimization and help-seeking scales. In support of Hypothesis 4, we found that males were significantly more likely to minimize their victimization and less likely to seek help, even under conditions where they *feel like they have been victimized*. The use of our MHS-scale conferred benefits that an examination of actual male victimization would not have allowed. We purposely examined hypothetical victimization (rather than actual victimization) in order to (1) control for the sex difference between males and females in considerations of a partner's aggression as abusive and (2) to examine individuals' beliefs about how they would respond regardless of whether they have ever experienced victimization. The latter point was important because we suspected that male attitudes toward stigmatization of victims and help seeking existed regardless of their own victimization status. That is, it does not take being victimized for a male to develop an attitude toward minimization and less help-seeking behaviour.

The observation that males minimize more and seek help less when they feel abused is likely a function of the stigma associated with violation of the stereotypical gender role. Case reports have suggested that men fear disclosure for fear of ridicule and embarrassment (McNealy et al., 2001). Thus, individuals seeking to provide effective treatment to male victims must consider discretion and confidentiality issues which are likely very salient to male victims. It is also likely that males understand that help from family, friends, and various social services simply does not exist for male victims to the extent that it does for females. This shameful reality only serves to reinforce the male victim's assumptions that their victimization is less serious and less worthy of them seeking assistance.

Taken together, our findings showed that males differ from females in their experiences with partner aggression. These differences are seen both biologically (i.e., testosterone levels) and psychologically/behaviourally (i.e., in perceptions of what is victimizing, in minimization, and in help-seeking). It seems intuitive that these differences may be related, in part, to differences in gender role expectations and the differential degree of stigma faced by males when they fail to meet these gendered requirements.

Limitations

One limitation of the present study was the constraint of the sample to university students who were currently in a dating relationship. Although dating violence in college samples is certainly a tremendously important social issue (O'Leary, 1999; Straus, 2004), our findings should be replicated among community samples of varying ethnicities, incomes, and age groups. This limitation may be especially applicable to our finding that students in our sample stigmatized male targets of partner violence more than female targets. For instance, university educated individuals tend to be more affluent, and those who are more affluent have been found to be less empathic toward others (Piff, Kraus, Cote', Cheng, & Keltner, 2010). It will be of interest for future research to determine whether this finding might translate into greater stigmatization of targets (especially male targets) by university educated individuals.

Another limitation regards our measure developed to examine men's versus women's willingness to disclose and help-seek when aggressed against. We developed a measure which prompted participants to consider feeling victimized before selecting how they would respond. Theoretically, this methodology allowed us to control for the anticipated sex differences that we observed in feeling "abused/victimized" after being aggressed against (i.e., if one does not feel victimized then they have no reason to seek help). However, our measure did not take into account which specific "abusive" act the participant thought of when responding to the help-seeking and minimization questions. If feelings of abuse exist on a continuum, those imagining experiences of "less severe" abuse (e.g., being called names versus being attacked with a weapon) might report fewer help-seeking behaviours. This aspect of our measure does not seem to impact participants' reporting, as females were more likely than men to consider psychological (i.e., presumably the "less severe") acts as abusive. If considering less severe acts in any way reduced one's likelihood of help-seeking then it should have been more prevalent amongst females, and thus would have made the observed sex difference (that males seek less help and engage in greater minimization) less salient. The fact that we still observed significant sex differences in help-seeking and minimization reinforce the validity of our findings. Still, the measure might be improved by prompting participants to consider a specific act of victimization (e.g., being hit by one's partner) and then constraining the sample to only those who endorsed that they would feel "abused/victimized" by that act. Adopting this methodological variation in future research may help to underscore the findings of the present study.

Conclusion

The findings of the present study provide the first empirical evidence that male targets of female aggression face unique challenges that ought to be addressed by researchers, policy-makers, and practitioners alike. Male targets seem to diverge from societal expectations of dominance, and face significantly more stigma from their peers than female targets. In essence, it is more socially acceptable for a female to be a target of abuse than it is for a male. These findings highlight a potential reason why males reported a greater willingness to minimize their perceived victimization, either by not identifying the act as aggressive or by hiding their exposure to such acts, and reported being less likely to seek help if they were ever to feel victimized. Researchers need to replicate these findings and develop distinct models of male victimization that are based upon objective research rather than on what are understood of female victimization. Research on male targets of partner aggression needs to increase in order to effectively inform policy makers and practitioners, who in turn must consider the unique challenges facing male targets, and develop better screening and treatment options for targeted males.

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Table 1

Descriptive statistics among study variables.

	Ν	М	SD
Sex	166		
Testosterone	159	6.10	0.55
Target of physical aggression	166	0.44	1.90
Target of psychological aggression	166	0.67	1.90
Target of sexual aggression	166	0.16	1.13
Partner Induced Injury	166	0.14	1.25
Stigmatization of targets of aggression	165	2.10	1.04
Acts considered "Abusive"	143	10.06	3.62
Willingness to Minimize	153	3.00	1.44
Willingness to Help-seek	153	4.49	1.21

Figure 1: Significant sex differences in males' versus females' consideration of acts as being "abusive" if done to them. Note the mean number of acts endorsed for each subscale will vary based upon the number of items included in each subscale.



Acts Considered "Abusive" if Done to You

Figure 2: Significant sex differences in males' versus females' willingness to minimize/conceal victimization as well as to seek help for victimization.



Appendix A. Partner violence stigma scale (PVSS). Presented is the version assessing stigma against males (females in brackets).

<u>Instructions:</u> Please rate your agreement with each statement using the scale below. There are no right or wrong answers and your responses are anonymous. This scale applies to heterosexual (man + woman) relationships. In this scale, the term "abuse" refers to being exposed to some level of physical, psychological, or sexual aggression by one's romantic partner.

1	2	3	4	5	6	7
0	0	0	0	0	0	Ο
I strongly						I strongly
disagree						agree

1. _____ Men (Women) who are abused by their romantic partners should be ashamed of themselves.

2. _____ Men (Women) who are abused by their romantic partners are weak.

3. _____ Men (Women) who stay with abusive partners deserve what they get.

4. _____ Men (Women) who are abused by their romantic partners probably cannot attract anyone better.

5. _____ Men (Women) who are abused by their romantic partners are not men (women) I want to be friends with.

6. _____ Many men (women) who say they are abused by their romantic partners are probably lying or exaggerating.

7. _____ When a woman (man) hits her (his) partner, it is most likely in self-defence.

8. _____ When a woman (man) hits her (his) partner, it was most likely provoked.

Appendix B. Minimization and Help-Seeking Scale (MHSS).

PART A:

<u>Instructions:</u> Please check off (\checkmark) any of the actions that, if your partner did to you, would make you feel like a victim of abuse.

- _____ Slapped me across the face
- _____ Called me hurtful names
- _____ Hit me with an object or weapon
- _____ Kicked me
- _____Told me I could not go out with family or friends
- _____ Forced me to perform a sexual act
- _____ Pushed or shoved me
- _____ Insulted me on purpose
- _____ Insulted my intelligence
- _____ Talked me into doing something sexual that I initially did not want to do
- _____ Swore at me
- _____ Treated me like I was inferior
- _____ Shamed me in public
- _____ Choked me

PART B:

<u>Instructions:</u> Sometimes people have varying responses to conflict within their relationship. Using the scale below, please rate your level of agreement with each statement. Questions refer to your relationship with your current partner, or if you are single, to your most recent romantic relationship.

1	2	3	4	5	6	7
0	0	0	0	0	0	Ο
I strongly						I strongly
disagree						agree

1. _____ If my partner did something I checked above, I would seek assistance from an organization that helps victims.

2. _____ If my partner did something I checked above, I would NOT seek assistance from my family or friends.

3. _____ If my partner did something I checked above, I would give them one more chance before leaving them.

4. _____ If my partner did something I checked above, I would be reluctant to tell anyone for fear of being blamed.

5. _____ If my partner did something I checked above, I would be embarrassed to let anyone know.

6. _____ If my partner did something I checked above, I believe there are organization that could help me.

7. _____ If my partner did something I checked above, and the police were called, I would lie about the seriousness of what happened.

8. _____ If my partner did something I checked above, I would tell my friends and family about what happened.

Concealment/Minimization = items 2,4,5,7 Disclosure/help-seeking = 1,3,8

CHAPTER 5

GENERAL DISCUSSION

Interpersonal aggression is a major social problem associated with significant emotional, physical, and economic costs (Hoel, Einarsen, & Cooper, 2003; Laing & Bobic, 2002). Accordingly, researchers have attempted to gain a better understanding of the characteristics of perpetrators and victims, the contexts in which aggression occurs, and the outcomes of victimization. Evolutionary theorists have contributed to this research effort by arguing that human aggression is linked to competition and conflict over the proliferation of one's genes (Buss & Shackelford, 1997a; Daly & Wilson, 1988; Darwin, 1871; Trivers, 1972). My program of research has contributed to this literature by considering the understudied issues of female intra- and inter-sexual competition.

Studies 1 and 2 provided evidence of female indirect aggression being utilized as a competitive strategy for reproductive opportunities. In Study 1, we examined whether physical aggression, indirect aggression, and victimization in peer relationships were associated with future dating status among adolescent boys and girls using a longitudinal design. Existing research suggests that because of its surreptitious nature, indirect aggression may be a particularly efficacious strategy for thwarting intrasexual rivals (Campbell, 1995, 1999, 2004; Vaillancourt, 2005). Correlational support of this hypothesis has been found (Gallup et al., 2009, 2011). However, the cross sectional nature of existing studies has hampered directional interpretations. Results of Study 1 showed that indirect aggression at Time 1 predicted having a dating partner at Time 2, while controlling for a number of dating-relevant variables. This result provided the first

longitudinal support for the hypothesis that indirect aggression can benefit perpetrators in terms of having access to partners. Whereas the perpetration of indirect aggression was beneficial to dating status in our sample, evolutionists have argued that adolescents on the losing end of intrasexual competition (i.e., victims) suffer a loss of status, as well as a host of mental, physical, and social consequences that make them less desirable as dating partners (e.g., Vaillancourt, 2005). The results of Study 1 supported this claim also, showing that self-reported victimization was negatively associated with having a dating partner at follow-up.

Although the focus of this dissertation was on female and not male aggression per se, it is interesting to note that male physical aggression negatively predicted Time 2 dating status. At first glance, this finding may seem to argue against our overarching concept of aggression as a strategy for intrasexual competition. One possible explanation of this finding is that the evolution of morality has created social norms and laws against the use of physical aggression that can detract from its efficacy. Morality can be understood as providing reciprocal benefits in the social regulation of conflicts (see Daly & Wilson, 1988; Shermer, 2004). Breaches of morality (especially those that confer advantage to the perpetrator e.g., "cheating" in social transactions) are often punished in order to maintain the cohesiveness of the group (Daly & Wilson, 1988).

The punishment of direct physical combat is evident in some primate species. For instance, among Japanese Macaques, the dominant male will punish those males who attack others (see Aureli, Cords, & van Schaik, 2002). Archer and Coyne (2005) argued that among humans, direct physical aggression may be employed more as a competitive

strategy in situations where there are few moral restraints and the rule of law is weak (see also, Courtwright, 1996; Ruff, 2001). Perhaps this is one reason why adolescent boys shift to greater use of indirect aggression, which is more covert and seemingly difficult to punish (Björkqvist, 1994; Côté, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006).

Study 2 builds on findings from Study 1 by focusing on indirect aggression as a *mate retention strategy* among adult females. Study 2 also goes beyond Study 1 by testing evolutionary-based hypotheses about the roles of individual differences in mate-value and emotion (jealousy) as factors pertinent to the decision to employ indirect aggression. Aggression can be costly to the perpetrator (Bjorkqvist, 1994; Graham-Kevan & Archer, 2009) and thus it is feasible that humans have developed cognitive strategies for determining the need to aggress (i.e., humans do not aggress indiscriminately, Griskevicius et al., 2009). Given males' strong preference for mating with physically attractive females (Buss, 1994/2003), it follows that perceiving oneself as being less physically attractive than competitors infers a reproductive risk to females. A male mated to a less-desirable female may be more willing to defect from the pair-bond. Accordingly, a perception of one's own physical attractiveness as being low signals a greater need for effort allocated toward retaining one's mate (e.g., Kenrick, Neuberg, Zierk, & Krones, 1994).

We found that women who perceived themselves to be of lower physical attractiveness compared to their female peers (termed attractiveness comparison) were more likely to perpetrate indirect peer aggression. This finding supported the hypothesis that females of lower mate-value may be especially prone to engaging in intrasexual

competition, presumably in order to reduce their competitors' ability to steal their mate. Moreover, we found this relation was partially mediated by jealousy. A number of researchers have suggested that jealousy is an affective trigger of mate-retention behaviours (Buss, 1988, 1994; Daly, Wilson, & Weghorst, 1982; Symons, 1979). Study 2 was the first study to provide empirical evidence of this relation. Interestingly, we also found that females do not aggress against just any competitor. Rather, females who perceived themselves to be of greater physical attractiveness reported more frequently being the targets of other females' indirect aggression (see also Leenaars, Dane, & Marini, 2008).

Females who perceived themselves as being less attractive than competitors were also more likely to aggress against their romantic partners (i.e., intersexual competition). Perhaps this tactic is meant to stifle activities such as infidelity, which runs counter to one's own reproductive success (i.e., male infidelity; see sexual strategies theory, Buss & Schmitt, 1993). Jealousy partially mediated this relationship, suggesting that aggression toward a romantic partner may be emotionally motivated in those females who perceive a threat to their relation.

Study 3 builds on this finding by further exploring female aggression within romantic relationships from the perspective of the male victim. Researchers continue to debate the extent of females' aggression toward intimate partners in terms of its frequency, severity, and consequences (which some argue are more detrimental to female versus male victims, see Dobash & Dobash, 2004). I contend that such debate is misguided. There is a growing body of evidence that females and males both perpetrate

unilateral partner-directed aggression (see Straus, 2009). Moreover, the finding that females sometimes perpetrate aggression in order to dominate, control, or punish a partner) suggests that some males are truly victimized within romantic relationships (Felson & Messner, 1998; Sarantakos, 1999). Focusing only on issues of sexual symmetry (i.e., whether or not fewer males are victimized or whether their victimization is "less damaging") may detract from the fact that males can be significantly damaged by female aggression (see Hines & Douglas, 2009).

Male victimization by a female counters his sense of dominance (Hines & Douglas, 2009), which is fundamental to his status and mating capacities (Campbell, 1995). We found that victimized men had significantly lower testosterone than nonvictimized men, a finding that did not apply to women in our sample. Participants in our sample held more negative attitudes toward male versus female victims, regardless of their own victimization status. When asked to consider which of a list of aggressive acts would make them feel "like a victim of abuse" if done to them by a partner, men endorsed significantly fewer acts. When asked to consider being exposed to an act which they did consider to be abusive, men were significantly more likely than women to conceal their victimization, and were significantly less likely than women to seek help.

These findings can be understood in light of the social defeat hypothesis (Björkqvist, 2001; Selten & Cantor-Graae, 2005; Rohde, 2001). Researchers have likened human aggression and victimization to the dominance and subordination that is commonly observed in animal models of hierarchical status negotiation (Bjorkqvist, 2001). I suggest that male victimization by a female within the context of a romantic

relationship is a clear instance of social defeat, whereby the male is to some degree subordinated (i.e., the victim) by a dominating (i.e., aggressive) female. Typically those human males who experience social defeat have lower testosterone than do non-defeated males (Bernhardt, Dabbs Jr., Fielden, & Lutter, 1998). Our finding of low testosterone among male victims compared to non-victims supports this hypothesis.

Social defeat entails a reduction in status, and is associated with mental and physical health correlates that are detrimental to the male's ability to survive and procreate (see Björkqvist, 2001). To propitiate status loss and stigmatization, male victims may attempt to minimize or conceal their victimization and avoid identifying as a victim. This idea was evidenced by our finding that males were more apt to minimize and conceal victimization and less likely to seek help than females, most likely in order to preserve societal perceptions of their own dominance.

These findings have several implications for male victims of female domestic aggression. First, the reluctance of males to identify as victims likely affects the reporting of male experiences with female aggression, where an underreporting of current prevalence and incidence rates is possible. Second, there are considerably fewer services offered specifically to male victims as compared to female victims (e.g., Tsui, Cheung, & Leung, 2010). Assuming that males can or should deal with victimization on their own is a bias that feeds into the further stigmatization of males who want to seek help. For instance, Brown and Clay (2005) found that nearly 25% of male callers to a domestic violence hotline reported that when they sought services for victimization by a female "they were either denied the same services available to females, not believed, referred to

batterer's intervention programs and/or ridiculed for allowing a woman to 'beat them up.' And over half of the callers in this study didn't know where to seek help" (Brown & Clay, 2005, p.6). Third, males who are victimized may require services that offer additional discretionary assurances compared to those required for female victims due to the stigma associated with male victimization. Perhaps service providers seeking to help male victims would benefit from advertising their assurances of discretion and non-judgment. *Limitations and Future Directions*

This research made important contributions to the fields understanding of female aggression and male victimization. Nevertheless, there are limitations to the studies presented within this dissertation that must be acknowledged. Common to all three studies, our reliance upon student samples derived from a Western country limits the generalization of our findings. We would expect our findings to apply cross-culturally to the extent that humans from various parts of the world have faced the same recurrent adaptive problems related to mating, dominance, and hierarchy negotiation. Indeed aggression is ubiquitous across all human societies, including those previously believed to live harmoniously such as the !Kung San of the Kahalari (see Daly & Wilson, 1988). Female indirect aggression is also prevalent cross-culturally (e.g., French, Jansen, & Pidada, 2002), and likely serves similar functions for sexual competition across human societies (Vaillancourt, 2005). Based on the findings of the present dissertation, future research would benefit from exploring 1) the efficacy of indirect aggression to a wider array of relationship formation and sexual behaviour variables, and 2) the individual

differences in female aggression as related to various indices of mate-value, relationship stability, and jealousy.

Studies 2 and 3 were also limited by the cross-sectional nature of their design. Future research can build upon these initial findings by employing experimental, quasiexperimental, or longitudinal designs. For instance, Study 2 can be extended to an experimental manipulation of one's own mate-value or of infidelity threat. Jealousy and aggression could be measured pre and post manipulation. By experimentally inducing a threat to one's relationship in this manner, controlled alterations in aggressive tendency can be measured.

Another limitation was the use of self-report data. In Study 1, self-reports were combined with peer-reports in order to provide a more comprehensive perspective on each adolescent's aggression, victimization, attractiveness, and status. In Studies 2 and 3 we relied solely on self-reports. Self-report data are susceptible to a number of biases such as the overestimation of one's positive characteristics and the underestimation of one's negative characteristics. Although these and other potential limitations can be problematic (Arnold & Feldman, 1981; Howard & Dailey, 1979), the benefits of using self-report in terms of accruing large and diverse sample sizes are desirable and may help to offset some individual variation in reporting bias.

Finally, Study 3 was limited by our examination of trait testosterone. Although testosterone assessments are generally reliable across days and weeks, there is notable variation during different time points within each day (Dabbs, 1990). As well, testosterone has been shown to be sensitive to context (state testosterone). For instance,

male defeat in social competition is linked to subsequent reductions in testosterone (Bernhardt et al., 1998). Future behavioural research in the area of male victimization would benefit from the use of more controlled experimental studies of testosterone in relation to male victimization. For instance, an interesting avenue for future research may be to measure pre and post levels of testosterone in relation to a victimization prime (e.g., imagining victimization by a female).

Conclusion

Collectively, the studies in this dissertation tested the evolutionary basis of females' aggression within peers and romantic relationships, and the unique challenges faced by male victims of such aggression. The results of the first two studies provided evidence to support the evolutionary hypothesis that human female behaviour is influenced by mechanisms that promote active mating competition rather than passive mate selection (see also Campbell, 1995, 1999, 2004; Vaillancourt, 2005). Results of the third study showed that female aggression toward male partners was related to lower levels of testosterone in victimized men, and that victimized men have more to lose by identifying and seeking help as a victim (i.e., facing significantly more stigma). This dissertation furthers evolutionary theories of intra- and inter-sexual aggression as an adaptation for dealing with reproductive challenges (Buss & Shakelford, 1997a; Daly & Wilson, 1988; Darwin, 1871) by focusing on issues of female perpetration and male victimization within an evolutionary psychological framework.

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