

# Considering Evolutionary Perspectives on Teen Dating Violence

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## ABSTRACT

Teen dating violence (TDV) has received increasing research attention. Within the last year, its study has become particularly relevant with the uptick in online aggressive behaviors and interpersonal violence associated with COVID-19 lockdowns. While timely, TDV is not a new phenomenon nor is it unique to human relationships. This paper applies evolutionary theory to current understandings of TDV. First, TDV is oriented within the evolutionary context of adolescence as a developmental period. Next, the adaptive roots of TDV are considered, considering the perspectives of evolutionary theory and developmental genetics. Within the context of adolescence, what might be the evolved function of aggressing against a romantic or sexual partner? Lastly, implications for future research, prevention, and intervention are discussed. This paper highlights the importance of considering TDV from an evolutionary perspective.

## KEYWORDS

Teen Dating Violence, Adolescence, Aggression, Evolution

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## I. CURRENT PERSPECTIVES ON TEEN DATING VIOLENCE

Teen Dating Violence (TDV) affects roughly 1 in 3 adolescents (e.g., Exner-Cortens et al., 2021). The prevalence rates of TDV are staggering, especially considering the importance of healthy relationships to healthy overall physical, social, and emotional development (Shonkoff & Phillips, 2000). TDV (also referred to as adolescent dating violence or youth dating violence) is conceptualized as a subtype of intimate partner violence that includes any aggressive, violent, threatening, or manipulative behavior perpetuated by a current or former partner, occurring within the context of adolescent romantic or sexual relationships (Center for Disease Control, 2014; 2020). Most studies of TDV include individuals between 11 and 18 years old, with some researchers extending their samples to include youth in their early 20s

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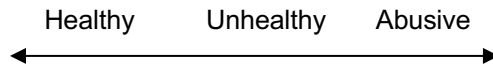
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## Teen Dating Violence

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(Breiding et al., 2014; Center for Disease Control, 2014; Chen et al., 2018; Smith et al., 2018). TDV ranges in severity, falling between unhealthy and abusive on a continuum of relationship health (see Figure 1; PREVnet, 2021).



**Figure 1.** Continuum of relationship health (PREVnet, 2021)

Within the last two years, the study of teen dating violence (TDV) has increased to match the uptick in online aggressive behaviors and interpersonal violence associated with COVID-19 lockdowns (Holfield, 2021). Prevalence rates vary by subtype (see Table 2). TDV can manifest as physical, emotional, psychological, sexual, and cyber subtypes, with many of these behaviors occur concurrently within adolescent relationships (see Table 1; PREVnet, 2021). Estimates also vary by study, as researchers in the field have yet to agree on a “gold standard” for TDV measurement (Exner-Cortens et al., 2016; Tomaszewska & Shuster, 2021). For example, as would be expected, studies using broader measurements yield higher prevalence rates across subtypes of TDV (Wincentak et al., 2017). Regardless, prevalence estimates indicate that TDV affects a considerable number of adolescents (see Table 2). Due to uncertainty around what is in/appropriate in adolescent dating relationships, coupled with other risk factors contributing to involvement (e.g., history of family violence, minority status), prevalence rates may underreport the frequency of TDV (Center for Disease Control, 2022; Leadbeater et al., 2018).

**Table 1.** Subtypes of Teen Dating Violence<sup>ab</sup>

Subtype	Definition	Examples(s)	Co-Occurring Subtypes
Physical	Use (or threat) of physical force	Hitting, kicking, punching, shoving, choking, use of weapon	Sexual (Vagi et al., 2015)
Emotional/ Psychological	Verbal or nonverbal manipulation, control, undermining, or belittling	Insults, threats, controlling behavior, restricting access to external support	Physical (Cornelius & Resseguie, 2007)
Sexual	Use (or attempted use) of force to partake in non-consensual sexual activity or to limit sexual agency	Sexual harassment, coercion, controlling sexual behavior	Cyber (Zweig et al., 2013)
Cyber	Use of online/digital contexts to perpetrate emotional, psychological, or sexual violence	Unwanted sexual text messaging, online harassment, public posting of sexual images	-

<sup>a</sup>(Center for Disease Control, 2020)

<sup>b</sup>(Semenza & Grosholz, 2022)

<sup>c</sup>(PREVnet, 2022)

**Table 2.** Estimate of TDV Prevalence Rates in North America

Subtype	Overall %	Perpetration		Victimization	
		Male	Female	Male	Female
Physical	7% <sup>c</sup> -20% <sup>a</sup>	12% <sup>a</sup>	25% <sup>a</sup>	12% <sup>c</sup> -21% <sup>a</sup>	
Emotional/psychological		9.3% <sup>c</sup>		28% <sup>c</sup> -29% <sup>b</sup>	
Sexual	9% <sup>a</sup>	10% <sup>a</sup>	3% <sup>a</sup>	8% <sup>a</sup>	14% <sup>a</sup>
Cyber		7.8% <sup>c</sup>		17.5% <sup>c</sup>	

<sup>a</sup>(Center for Disease Control, 2020)

<sup>b</sup>(Semenza & Grosholz, 2022)

<sup>c</sup>(PREVnet, 2022)

Teen dating violence has multiple short- and long-term physical, social, and health related implications. The research is clear: health risks are greatest amongst teens who experience multiple forms of TDV and lowest amongst those who experience none at all (Vagi et al., 2015). It is associated with higher rates of substance use, suicidality (and attempts), depression, physical injury, sexually transmitted infections, risky sexual behavior, unhealthy or disordered eating and poorer educational outcomes (Ackard et al., 2007; Banyard & Cross, 2008; Eaton et al., 2007; Exner-Cortens et al., 2013). Not only does TDV impact health, relationship quality, and quality of life in the present, but it is also associated with negative long-term outcomes related to mental and physical health, family formation, parenting capacity, and socio-economic security (Collins et al., 2009; Karney et al., 2009). TDV is also associated with involvement in future relationship violence (PREVnet, 2021; Exner-Cortens et al., 2013). Engagement in TDV is complicated by the frequent overlap between the roles of perpetrator and victim in adolescent relationships (PREVnet, 2021). As such, TDV—like other forms of aggressive behavior—is both dynamic and heterogenous, characteristics that render its research and intervention particularly challenging.

## II. APPLYING EVOLUTIONARY PERSPECTIVES

Violence and aggression within the context of romantic or sexual relationships is not a new or isolated phenomenon. Its ubiquity suggests potential evolutionary mechanisms at work. As such, there is utility in exploring and applying evolutionary theory in relation to TDV. The current paper is the first to consider the application of evolutionary theory and developmental genetics to TDV. The cross-cultural, cross-historical, and cross-species proliferation of general aggression suggests that subtypes of aggressive behaviors are rooted in evolution (Volk et al., 2012). To address social challenges imposed by aggression within human relationships, it is important to consider the evolutionary contexts and histories from which these behaviors emerge, interact, and are sustained (Narvaez et al., 2022). Studies of general aggression and cross-cultural prevalence rates (see Table 3) suggest that TDV may be rooted in human evolution, and therefore benefit from the application of evolutionary psychology to its study to understand its underlying mechanisms and design effective prevention and intervention efforts.

Research supports an overlap between aggressive behavior, such as bullying, and engagement in TDV (Barbaro & Shackelford, 2016). Meta-analytic research suggests that bullying perpetration is related to TDV perpetration, even after adjusting for covariates (Zych et al., 2021). Specifically, longitudinal research suggests that experiences of peer bullying and victimization are positively associated with subsequent use of both physical and relational aggression in romantic relationships (Foshee et al., 2015; Niolon et al., 2015; Jouriles et al., 2009; Leadbeater et al., 2008). These results suggest that bullying, aggression, and TDV may reflect different behavioral manifestations, elicited by varying contexts, of the same underlying constructs or dispositions (Zych et al., 2021). Longitudinal investigations of aggression suggest underlying mechanisms linking peer aggression and dating violence, including socialization in aggressive peer contexts (Williams et al., 2008) and genetically influenced individual differences in anger, hostility, internalizing symptoms, and substance use (Chen et al., 2018; Vagi et al., 2013). As such, the theoretical and empirical support for the evolutionary and genetic bases of other aggressive behavior may also apply to TDV.

**Table 3.** Overview of Examples of Cross-Cultural Prevalence Rates

Country	Subtype	Prevalence		Relevant Citations
		Victimization (%)	Perpetration (%)	
Australia	Physical	11.3-15.6	-	Brown et al., 2009
Canada	Physical	11.8	7.3	Exner-Cortens et al., 2021
	Emotional	27.8	9.3	
	Sexual	-	-	
	Cyber	17.5	7.8	
Europe <sup>a</sup>	Physical	0.8-32.9	2.1-46.0	Tomaszewska & Shuster, 2021
	Emotional	5.6-95.5	7.0-97.0	
	Sexual	2.4-41.0	1.6-43.6	
	Cyber	0.6-48.0	3.4-8.13	
Israel	Physical	32.8-41.4	-	Sherer & Sherer, 2007
	Emotional	13.3-35.3		
	Sexual	21.7-46.4		
	Cyber	-		
South Africa	Overall		33.0	Boafo, 2011
Thailand	Physical	41.2-41.9	-	Pradubmook-Sherer, 2009
	Emotional	46.7-49.2		
	Sexual	43.2-46.7		
	Cyber	-		

<sup>a</sup>Includes: Belgium, Bulgaria, Cyprus, Denmark, Germany, Italy, Norway, Portugal, Spain, UK

When evaluating the evolutionary perspective, it is important to beware the naturalistic fallacy (e.g., Al-Jbouri & Volk, 2021; Hawley, 2014). Evolutionary and/or genetic underpinnings do not render these behaviors condoned, desirable, or unchangeable. Rather, through the application of evolutionary theory, it may be possible to understand mechanisms and etiologies in a way that compliments and augments other models (e.g., social learning theory, theories of intersectionality).

While the focus of this review is to consider evolutionary perspectives, it is important to note that TDV emerges because of a confluence of biological, environmental, and socially constructed factors (Chester & DeWall, 2018).

### III. ADOLESCENCE: A UNIQUE DEVELOPMENTAL CONTEXT

Contemporary evolutionary psychology acknowledges and incorporates developmental science so that the importance of epigenesis, plasticity, developmental niches, and historical contexts are considered when studying evolutionarily based behavior (Narvaez et al., 2022). Recognizing the distinct developmental and/or evolutionary tasks of different life periods is critical. In this vein, Semenza and Grosholz (2022) offer three key factors that differentiate the characteristics of teen dating violence from adult intimate partner violence. First, adolescent relationships tend to possess (but not always) less differentiated power imbalances compared to adult relationships, as neither partner is financially or materially reliant on the other, nor is one partner reliant on the other for resource provision for offspring. Second, both parties in adolescent relationships tend to be relatively inexperienced coping with conflict in romantic relationships. Third, adolescent relationships are disproportionately influenced by peers and peer group norms (Semenza & Grosholz, 2022).

To appreciate what might differentiate TDV from interpersonal violence in adulthood, it is important to orient these behaviors within the evolutionary context of adolescence as a developmental period. Dawkins (2016) discusses the selection of genes for their ability to optimally exploit practical opportunities: specifically, he suggests that genes in younger bodies are presented with practical opportunities that differ from those presented to genes in older bodies—in other words, patterns of genetic and epigenetic expression vary by developmental stage. For example, Dawkins (2016) explains that genes in younger bodies are selected to perform optimally to outcompete those in parental bodies: “When a gene is sitting in a juvenile body its practical opportunities will be different from when it is sitting in a parental body. Therefore, its optimum policy will be different in the two stages in its body’s life history” (p. 178). As a result, the developmental patterns of today’s adolescents may be rooted in millions of generations of natural selection (Ellis et al., 2012) favoring genes that can successfully exploit the practical opportunities of adolescent bodies. It is important then to consider the numerous developmental changes and tasks that facilitate adolescence as the transition from childhood to reproductive maturity.

Physically, adolescents experience rapid growth and sexual maturation corresponding to reproductive capabilities (Dick et al., 2016). Psychologically, adolescents develop the sophisticated theory of mind necessary for increasingly intimate social tactics and relationships, including romance and manipulation (Volk et al., 2012). Neurologically, adolescents experience asynchronous patterns of brain development that favor impulsivity, risk-taking, and reward-seeking over cognitive control, long term planning and consideration of future negative consequences (Steinberg, 2004; Steinberg et al., 2009). Social networks expand, with increasing importance placed on peer relationships and social status, as well as a heightening of sensitivity and reactivity to peer relationships (Steinberg, 2008; Ellis et al., 2012).

Adolescence also marks the initiation of dating relationships, establishing an individual's romantic and sexual trajectories. There are developmental differences that characterize adolescent relationships as different from those of adults, in terms of timing, length, quality, risk, reward, and dissolution (Leadbeater et al., 2018). Further, these romantic relationships are qualitatively different from adults' relationships in that they are characterized by exploration, learning, less monogamy, and more casualness (Bekaert & Appleton, 2021; PREVnet, 2021). Opportunities for promiscuity and competition are high during adolescence, as most individuals have yet to establish stable partnerships and the opportunities for romantic or sexual relationships are maximally open. Against this social backdrop, adolescents are able to determine their sexual status and desirability as well as their preferences and mate attraction tactics (Ellis et al., 2012; Weisfeld & Coleman, 2005). Research suggests that all of these changes associated with puberty reflect a suite of adaptations, naturally selected to maximize the reproductive and competitive capacities necessary for sexual success (Harden, 2014). As such, adolescence represents a unique developmental period for the emergence of dating violence.

Teen dating violence emerges from the overall historical context of evolution. Within this context, it is important to remember the gene as the unit of evolutionary selection (Dawkins, 2016; Coen, 1999). Evolution and developmental genetics are therefore inherently connected through the processes of evolution acting on genes and genes acting on development (Coen, 1999). To further investigate TDV, then, it becomes important not only to consider broad evolutionary influences, but also influences at the level of the gene upon which selection pressures act. As with most complex behavior, TDV might be the result of polygenetic influences expressed (or not expressed) indirectly over the course of development.

On top of the more distal influences of evolutionary selection, proximal influences at the level of the individual also unfurl during adolescent development. The physical and psychological changes associated with puberty could be seen to signify a "second critical period" at the level of individual genetic development. For example, adolescents experience changes in neural connections that are highly malleable to social influences (Hanson & Holmes, 2014). These new connections form against the backdrop of the aforementioned developmental asymmetry; in other words, despite the peaking of physical and sexual maturity, the brain continues to develop past adolescence into early adulthood, especially with regards to systems of cognitive and emotional regulation (Bekaert & Appleton, 2021).

#### IV. THE EVOLUTION OF TDV

Within the context of adolescence, what might be the evolved function of aggressing against a romantic or sexual partner? The answer may lie in Dawkins' (2016) discussion of selected traits that would ensure genetic propagation. To begin, TDV occurs within the context of a coupled adolescent relationship, whether romantic, sexual, or both. Dawkins (2016) provides the evolutionary rationale for entering into a coupled relationship: it benefits the rearing of helpless human young and maximizes the chances of continued gene survival in the bodies of offspring. In a similar way, aggression between partners may have served unique functions for adolescents in



ancestral populations (Griskevicius et al., 2015), functions that also would have helped to ensure the continued survival of shared genes.

### Resources, Reputation, and Reproduction

Aggressing against a partner may also serve the same general function as other subtypes of aggression: to maximize benefits and minimize costs. The three Rs—Resources, Reputation, and Reproduction (Volk et al., 2014)—may offer a useful lens for considering the adaptive functions of TDV. These three Rs have been applied to bullying behavior but have yet to be fully applied to TDV. As such, this section draws on adult DV research as well as studies on bullying and aggression in adolescent populations to inform how the evolutionary perspective may be applied to the study of TDV. For example, in adult populations, the role of these focal evolutionary goals can be illustrated by the rates of intimate partner violence, which demonstrate the highest rates occurring between individuals with significant age differences (Peters et al., 2002): in other words, individuals who may be at elevated risk of having dramatically different priorities regarding resources, reputation, and reproduction. For young adult and adolescent samples, reproduction is the most frequently researched goal from an evolutionary perspective, though it is important to consider the role of resources and reputation as potential adaptive goals related to TDV. Individuals may want to attain and maintain access to valued evolutionary benefits, but also avoid sharing them. These three Rs categorize the valued assets that contribute to genetic survival and may influence adolescent engagement in TDV.

### Resources

From an evolutionary perspective, TDV may arise from conflict surrounding the access or allocation of resources. For example, in adult populations, disagreements over money and time (i.e., too much time spent with in-laws) are among two of the top four sources of contention in romantic relationships (Connolly, 2020; Orbuch et al., 2012). As such, TDV may be the result of discrepancies in partners' desired allocation of coveted resources. TDV might also arise as a method for forcing partners to invest in an individual's specific interests. Adolescents may be evolutionarily predisposed to aggress against partners that are not devoting sufficient resources to their romantic partnership or interests. TDV may represent a tactic for ensuring the continued allocation of monetary and physical resources: for example, a partner may employ aggression within their relationship to ensure their partner continues to provide financial support or gifts. TDV may also reflect a method of controlling a partner's time and energy. Through the use of aggressive behavior, an individual may be able to limit the amount of time that a partner spends with their own family or friends in order to minimize external threats to resource provision while also maximizing the time that the partners can spend together. These associations are based on evolutionary theory but have yet to be empirically investigated or tested.

### Reputation

TDV may also be a method of control related to the evolutionary goal of reputation. Romantic involvement is associated with status in adolescence. TDV may then represent a method of partner maintenance. TDV may also play a role in promoting reputation in the broader peer group through signaling. Research with adults suggests that intimate partner violence in general may be a way for individuals to control their partner's behavior in social settings and manage social impressions of both their partner and their partnership in the broader peer group (Foshee et al., 2007; World Health Organization, 2012). In adolescence, Bravo and colleagues (2017) discuss how a romantic partner's unfavorable behavior in the peer group may lead to tension in the relationship. TDV may then be an efficacious way of curtailing undesirable partner behavior that may negatively influence social reputation. For example, TDV may be enacted to punish or prevent a partner from embarrassing an individual in social situations and "ruining" their reputation. Conversely, in more private settings, TDV may represent a tactic for reducing potential discrepancies in partners' reputations. Specifically, the World Health Organization (2012) identifies intimate partner violence as particularly prevalent when there are disparities between partner education or status (echoed by the work of Peters et al. (2002) discussed above); in other words, as a way of either asserting dominance over a partner with a better social reputation or as displacement of discomfort about being with a partner with a lower social reputation. Research on adult samples by Kubicek and colleagues (2015) support that aggressing against a partner is an effective way of lowering that partner's self-esteem, perhaps levelling the reputational playing field between two partners. Reputation may be a particularly salient evolutionary goal for early adolescents (LaFontana & Cillessen, 2010), for whom reputational slights or threats are more likely to translate into conflict than for later adolescents or early adults (Ingram, 2019). Reputational goals may also represent a point of tension for adolescent heterosexual couples when considered in conjunction with reproductive goals due to the idea of the "sexual double standard". Research suggests that not only do boys possess more permissive attitudes around sexual activity than girls do (Petersen & Hyde, 2010), but also that their reputations tend to benefit from being sexually active, whereas girls' reputations tend to suffer from it (i.e., slut shaming) (Lefkowitz et al., 2014). This gendered discrepancy in the effects of sex on reputation may contribute to the higher rates of sexual TDV perpetrated by males.

### Reproduction

Reproduction is the most frequently theorized and researched aspect of TDV from an evolutionary perspective. In adults, partner violence is theorized to support certain reproductive goals such as prevention of mate defection, deterrence of sexual infidelity, and the reacquisition of former mating partners (Buss & Duntley, 2011). Reproduction might be an important motive in adolescence, considering the emergence of sexuality as a fundamental developmental process and highly salient reward during this period (Harden, 2014; Schlegel, 1995). Though it may seem counterintuitive, the use of TDV may facilitate control over one's partner, leading to continued sexual access (Capaldi et al., 2004; Wilson & Daly, 1998). In addition to its



potential for control, TDV might be the result of both conflicting interests between partners. As with the adaptive goal of reputation, TDV may allow individuals to exert control over a mate with higher mate value than themselves, ensuring continued faithfulness, sexual access, and investment of resources through the use of violence (Buss & Duntley, 2011; Volk et al., 2014). This notion is consistent with work that suggests that adolescents who employ aggressive behavior, such as bullying, have sex more frequently and with more partners (Provenzano et al., 2018; Dane et al., 2017; Volk et al., 2015).

More generally, TDV might reflect the persistence of ancestral populations' "Battle of the Sexes" (Dawkins, 2016), in line with parental investment theory (Trivers, 1972) that suggests underlying sex differentiated tactics and mechanisms. Consistent with general sex differentiated patterns of aggression, women tend to engage in lower intensity, more psychological methods of intersexual aggression (Volk et al., 2012), while men tend to engage in more physical aggression (Nivette et al., 2019). Specific to TDV, some studies report girls' perpetration of serious psychological abuse at four times the rate of boys' perpetration for the same subtype of behavior (Taylor & Mumford, 2014). The research suggests that girls are more likely to be sexually victimized, while boys are more likely to perpetrate sexual TDV (Wincetak et al., 2017). The research on cyber-TDV suggests similar patterns, with females reporting greater levels of sexual cybervictimization and males reporting greater levels of sexual cyber-TDV perpetration; however, females reported greater levels of non-sexual cyber-TDV perpetration (Zweig et al., 2013). Overall, cisgender boys and girls report similar levels of victimization (12 - 21% compared to 11 - 37%), while non-binary youth reported significantly higher levels of victimization (25 - 42%). Rates of perpetration seem to follow similar patterns, with cisgender adolescents perpetrating less than their non-binary peers (Exner-Cortens et al., 2021). The discrepancy in prevalence rates between cisgender and non-binary youth suggest represents an important avenue for future research (see Table 4).

Sexual jealousy is hypothesized to play an important role in TDV for both males and females, its underpinnings reflecting the different threats to gene survival experienced by males versus females in ancestral populations. For men, sexual jealousy may have been selected as an anti-cuckoldry tactic. As discussed by Dawkins (2016), internal fertilization contributes to paternal uncertainty and cuckoldry risk. Cuckoldry—the inadvertent rearing of another man's offspring—is the ultimate cost or threat to the selfish gene (Dawkins, 2016; Goetz et al., 2008). With female infidelity as the context from which cuckoldry would have emerged in evolutionary history, it follows that natural selection may have favored the survival of genes promoting anti-cuckoldry, such as those related to sexual jealousy (Goetz et al., 2008). As previously mentioned, genes for sexual jealousy in females may also have been favored, but for different reasons than for males. Women cannot be cuckolded; however, their fitness can be jeopardized by abandonment. Considering TDV as a potential mechanism of control, aggressing against a male partner might be an effective tactic for ensuring the continued provision of resources for oneself and one's offspring (Campbell, 2002; Weisfeld & Woodward, 2004). Despite the underlying functional differences of sexual jealousy, it remains a potentially powerful antecedent to TDV in adolescence due to adolescents' sensitivity to social cues as well as their developing systems of emotional regulation (Casey et al., 2005).

Some researchers suggest that TDV research should de-emphasize sex differences, as prevalence rates are high across sex and subtype (Leadbeater et al., 2018). Sex differences, as theoretically supported by evolutionary theory, offer insight into who may be targeted, who may perpetrate, and by what subtype of TDV. This information is valuable for identifying which groups of adolescents may be at greater risk of involvement and may inform intervention efforts tailored towards minimizing perpetration for perpetrators and maximizing protective factors for victims.

### Costs and Benefits

As with any trait or behavior, it is important to consider the evolutionary benefits and costs of TDV. These costs and benefits are not consciously weighed by an individual, but rather are a gamble made by genes over successive generations (Dawkins, 2016). For example, Haselton and Nettle (2006) propose that males are hypersensitive to cues of their partners' infidelity. Goetz and colleagues (2008) write that this sensitivity may motivate "more false positives [...] than false negatives [...]" because the ancestral benefits of the former error outweigh the ancestral costs of the latter error." In other words, it may make more sense for an individual to aggress against their partner more often, as the benefits of preventing or punishing infidelity would be higher than behaving too leniently and allowing a partner to be unfaithful. From an adaptive perspective, there are two major costs to aggressing against a partner in adolescence. The first would be the risk of losing access to that partner's resources, reputation, and reproduction: that the aggressive behavior would result in driving the partner away (Bekaert & Appleton, 2021). The second major cost of partner aggression would be the potential detrimental effects on wellbeing, for both the aggressor and victim (PREVnet, 2021), insofar as those negative effects on wellbeing may also influence access to resources, reputation, and reproduction. It may be that TDV proliferates because engagement often results in short-term benefits (romantic partner, status, access to sex, etc.), followed by long-term costs (continued patterns of violence in relationships, mental health concerns, etc.), a trade-off (short-term pleasure vs. long term pain) to which adolescents are particularly vulnerable.

Many of the specific benefits have been outlined by the emphasis on resources, reputation, and reproduction. Some research on adolescents suggests that the benefit of being in a romantic partnership in and of itself is enough to outweigh any potential costs. For example, in a study by Martsolf and colleagues (2012) adolescents reported that violent relationships are "sometimes seen as preferable to no relationship at all." Broadly, an overarching benefit to TDV from a genetic perspective may be the value in sharing a body with genes related to aggression, as they may facilitate the survival of other genes within the same body. To paraphrase Dawkins' (2016) analogy: aggressive genes may be the sort of genes that other genes "want on their rowing team". Similarly, genes that support aggression tend to be a "safe" gamble placed by genes in order to maximize reproductive success in an unknown environment (Dawkins, 2016). The proliferation of TDV, as well as more general aggressive behaviors, supports this idea.

## V. OLD GENES, NEW USES

The overlap between general aggression and TDV may be further supported by Coen's (1999) assertion of evolution "putting old genes to new uses". Specifically, TDV might be the result of the mobilization of aggressive genes that were initially beneficial in different contexts. In other words, genes that led an individual to be successful in intrasexual competition may also prove to be beneficial in gaining control intersexually. This reasoning fits into Coen's (1999) description of evolutionary genetic "tinkering": that aggression as an effective tactic for warding off competitors could easily be co-opted, or tinkered, to become an effective tactic in mate retention. It follows then, that behaviors such as TDV, bullying, and general aggression would co-occur, as they may represent different facets of the same strategy applied to different settings. The opportunities for the successful emergence, manifestation, and transference of these strategies may differ from adolescent to adolescent, however, dependent on individual differences and environmental variation. It is important to consider the genetic underpinnings of TDV, as evidence suggests that not only is partner violence transmitted intergenerationally (Ehrensaft et al., 2003), but also that much of the variance in intimate partner violence in adulthood can be attributed to genetic factors (Barnes et al., 2013).

### Evolutionary Variation: The Example of MAOA

In the case of TDV, individual differences may refer to evolutionary variations in gene expression indirectly implicated in such evolutionarily influenced factors as personality, temperament, emotion regulation, and sensitivity to environmental input. Variation in the length of gene expression related to these traits—graded responses, rather than merely "on" and "off"—can influence behavioral outcomes (Coen, 1999). Review work by Palumbo and colleagues (2018) highlights the epigenetic regulation of genes within the neuroendocrine, serotonergic and oxytocinergic pathways, implicated in the variation of individual sensitivity to different forms of aggression. These specific genes include nuclear receptor subfamily 3-group C-member 1 (NR3C1), oxytocin reception (OXTR), solute carrier-family 6 member 4 (SLC6A4), and monoamine oxidase A (MAOA) (Palumbo et al., 2018). Research on the expression of MAOA has been ongoing for the last twenty years, suggesting its expression is related to aggressive behavior in general, particularly in conjunction with certain environmental risk factors such as childhood abuse and maltreatment (Retz et al., 2004; Stuart et al., 2014; Zhang et al., 2017). In the case of this specific gene, less expression—lower levels of transcription—indirectly influences levels of the neurotransmitters serotonin, dopamine, and norepinephrine (Belsky & Pluess, 2009; Popova, 2006; Pinto et al., 2010), all three of which are implicated in sensation seeking and sensitivity to reward and punishment (Carver et al., 2008; Frank et al., 2007). There is further support for underlying epigenetic mechanisms of intimate partner violence broadly, with research suggesting that if a mother has experienced violence while pregnant, her offspring may exhibit greater methylation of genes associated with predispositions towards antisocial behavior (Radtke et al., 2011). These examples provide evidence for the indirect effects of gene expression that, all other things being equal, may predispose certain adolescents to being more

aggressive, reactive, or less able to regulate emotional responses, potentially contributing to engagement in TDV. The example of MAOA considers operation at the level of gene expression; however, the expression of different genes is always occurring in conjunction with other genetic influences, as well as with environmental input.

## VI. ENVIRONMENTAL INFLUENCE

### Differential Susceptibility

In addition to variability between individuals' gene expression, individuals experience evolutionarily rooted variability in their sensitivity to environmental influence. Differential susceptibility describes this variability as the idea that certain individuals are more susceptible or sensitive to environmental influence than others (Belsky et al., 2007). From an evolutionary perspective, an argument could be made for the adaptivity of either, with some environments favoring individuals whose behaviors and responses are stable across environmental contexts, while other individuals may be more successful if they are able to be influenced more readily by their environmental contexts. Simons and colleagues (2011) describe an example of differential susceptibility in relation to general aggression. They found that the common variants of the dopamine receptor gene and the serotonin transporter gene interact with social conditions to predict aggressive behavior in a differentially susceptible manner. For example, when social conditions were adverse, individuals possessing these genetic variations were more aggressive than other genotypes; however, in environments that were more favorable, individuals with this variation demonstrated less aggression than other genotypes (Simons et al., 2011). As such, not only might genetic variations in general aggression influence TDV, but they may also interact with genetic variations in differential susceptibility, indirectly impacting the role of the environment in the expression of those "aggressive" genes.

## VII. INTEGRATING EVOLUTION AND DEVELOPMENTAL GENETICS

Biological inheritance speaks of an individual's genetic history: the genetic variation that they have inherited more proximally from their family lineage. This variation may play out in an individual's observable traits such as personality, temperament, and reactivity, as well as differential susceptibility. These individual factors then interact with not only the developmental stage of adolescence but also environmental context, including immediate environment as well as embedded cultural environments. Evidence suggests that these factors are also associated with general aggression, but that there are distinct adaptive pressures that may render TDV a unique subtype of aggressive behavior.

Regardless of an individual's differential susceptibility, the environment plays an important role in promoting or preventing engagement in TDV. Certain environments may offer conditions that elicit TDV more frequently than others

(Rothman et al., 2015). For example, adolescents who experience family violence, such as child abuse or interparental violence, are more likely to be involved in TDV (PREVnet, 2021). Similarly, adolescents with aggressive friends are more likely to be involved in TDV, especially if their friends engage in TDV in their own romantic relationships (PREVnet, 2021). In addition, substance use and abuse are also associated with engagement in TDV and is yet another risk behavior highly influenced by the peer group, further complicating the role of peers in supporting TDV (PREVnet, 2021). At a broader environmental level, certain cultures also foster environments that are more conducive to TDV engagement. As with cross cultural differences in monogamy versus promiscuity (Dawkins, 2016) certain cultural contexts may be more permissive or encouraging of TDV behavior. For example, cultures and subcultures that are more entrenched in static gender norms, particularly those related to hegemonic masculinities, are more likely to condone TDV in that they may encourage men to behave aggressively towards female partners; conversely, these environments tend to also discourage men from seeking help if they are victimized by female partners, allowing female partners to continue aggressing against men (World Health Organization, 2012). In this way, predispositions towards aggressive interpersonal behavior may be culturally re-enforced, which offers additional explanation for the emergence and persistence of TDV. Considering the role of the environmental as it interacts with evolutionary influences offers exciting opportunities not only for future research but also for targeting TDV through prevention and intervention efforts.

### VII. FUTURE DIRECTIONS AND IMPLICATIONS

TDV is a nascent area of research, with much of its basis pulled from the existing research on bullying and aggression, and for good reason: research suggests that there is significant overlap between individuals who engage in TDV and those who engage in other forms of aggressive behavior (Connolly et al., 2000; Pellegrini, 2001; Niolon et al., 2015; Foshee et al., 2014; Walters & Espelage, 2018). Additionally, research suggests that general aggression is associated with sexual success, potentially creating a cycle of TDV in which aggressive individuals tend to have more sexual relationships, and subsequently engage in more aggressive behaviors within those relationships (Arnocky & Vaillancourt, 2012; Basile et al., 2009; Barbaro & Shackelford, 2016; Dane et al., 2017; Volk et al., 2012). As such, TDV might be the result of similar, if not the same, underlying evolutionary processes as general aggression. For example, Volk and colleagues (2012) support this idea, suggesting two potential paths for men: while aggressive behaviors may be elicited in romantic relationship-specific contexts for some, other men may use these bullying behaviors within their romantic relationships because they engage in them outside of their romantic relationships as well. It is important then, to continue to explore the pathways that lead to TDV and to draw upon the research on general aggression and bullying, as it may offer insight into TDV as well. As such, TDV from an evolutionary perspective presents many avenues for future research (see Table 4).



**Table 4.** Summary of Future Directions for TDV

Area	Topics
Measurement/Design	<ul style="list-style-type: none"> <li>• Conceptual and methodological clarification and consistency in measurement<sup>a</sup></li> <li>• Creation of evolutionarily informed definitions and/or scales</li> </ul>
Evolutionarily- informed samples	<ul style="list-style-type: none"> <li>• Cross-cultural comparisons</li> <li>• Cross-historical or archival samples</li> <li>• Studies with non-human primates</li> </ul>
Genetic/epigenetic underpinnings	<ul style="list-style-type: none"> <li>• Genotypic and phenotypic associations with perpetration and victimization</li> <li>• Personality</li> <li>• Gene x Environment</li> <li>• Consideration of LGBTQSNIA+ relationships</li> </ul>
Outcomes	<ul style="list-style-type: none"> <li>• Pursuit and attainment of evolutionary goals (3 Rs)</li> <li>• Associations with costs/benefits</li> <li>• Overlap between subtypes of TDV and/or across aggressive behavior<sup>b</sup></li> <li>• Longitudinal work to tease apart risk factors/antecedents/outcomes<sup>b</sup></li> </ul>
Intervention	<ul style="list-style-type: none"> <li>• Identify prosocial means of attaining TDV's goals</li> <li>• Use evolutionary frameworks to design research questions, projects, and intervention projects</li> </ul>

<sup>a</sup>Exner-Cortens et al., 2016

<sup>b</sup>Zych et al., 2021

The application of evolutionary perspectives to the study of TDV provides practical implications as well. While an evolutionarily informed TDV intervention has yet to be designed or tested, there is a wealth of theoretical research on general aggression that suggests that the application of evolutionary perspectives may be helpful in reducing such anti-social behaviors. For example, the Meaningful Roles intervention (Ellis et al., 2012) suggests replacing high power antisocial behaviors with high power prosocial behaviors to reap the same social benefits, without incurring the costs of bullying and victimization. A TDV intervention could be designed based upon similar principles. The use of evolutionarily informed TDV research also allows teachers, parents, and policy makers to be cognizant of the evolutionary goals that may encourage its persistence and help to inform prevention and intervention efforts that may emphasize healthier relationship and conflict resolution patterns. This research could also augment existing prevention and intervention efforts.

## VII. CONCLUSION

TDV is a serious public health concern, affecting 1 in 3 North American adolescents who have been involved in dating relationships (Exner-Cortens et al., 2021; Center for Disease Control, 2019). It affects adolescents' individual physical



and emotional health, as well as relationship quality across the lifespan. It persists globally and is a challenging behavior to reduce. This review is the first to apply evolutionary perspectives to TDV. It adds to the literature by connecting TDV research to other research on aggressive behavior, using evolutionary theory as a means of highlighting broader patterns between aggressive behavior in adolescence. This review extends the existing research on aggression by focusing on TDV as a prevalent, but still understudied, form of antisocial behavior specifically amongst adolescents. Not only is this review unique in its connections to the extant aggression research, but also its use of developmental genetics to support the evolutionary perspective. The importance of this review lies in its elucidation of evolutionary factors that contribute to the global persistence of TDV, as well as its directions for future theoretical and empirical work in this area.

The evolutionary perspective also offers direction for social change: Dawkins (2016), emphasizes the anomalous human capacity to rebel against one's selfish genes. In the words of Bjorklund (2003), a propensity for TDV may be "prepared not preformed". As a result, the evolutionary and genetic predispositions that certain individuals possess for engaging in TDV can be amenable to prevention and intervention efforts. Evolutionary perspectives can also offer meaningful insights into genetic differences related to personality, differential susceptibility, and aggression that may be useful in targeting individuals at-risk for engagement in TDV. Evolutionary research may also provide useful information for tailoring prevention and interventions not only to individual differences, but also to environmental contexts which may provide favorable cost-benefit ratios for engagement in TDV. For example, applying evolutionary perspectives may allow for the identification of environments that reward TDV with reproduction, reputation, or resources, and for the design and implementation of efforts that may reduce the rewards associated with TDV by replacing such antisocial behavior with more prosocial strategies (e.g., Ellis et al., 2012). In order to maximize these efforts, it is first important to understand the science that uniquely positions adolescents to engage in TDV and the environments which may elicit this engagement. The science highlights the uniqueness of adolescence as a life stage and the role of the "evolutionary history of the organism, involving countless previous generations of natural selection... biological inheritance... cultural heritage and experience" (Coen, 1999, p. 180). As such, it is key to address TDV from the perspective of evolutionary theory in future research, prevention, and intervention. The theories put forward in this review suggest some of the underlying goals and mechanisms of TDV for future research and intervention.

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