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# Violent Video Gaming, Parent and Child Risk Factors, and Aggression in School-Age Children

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VIOLENT VIDEO GAMING, PARENT AND CHILD RISK FACTORS, AND  
AGGRESSION IN SCHOOL-AGE CHILDREN

By

Erin L. Romanchych

A Dissertation  
Submitted to the Faculty of Graduate Studies  
through the Department of Psychology  
in Partial Fulfillment of the Requirements for  
the Degree of Doctor of Philosophy at the  
University of Windsor

Windsor, Ontario, Canada

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Violent Video Gaming, Parent and Child Risk Factors, and Aggression in  
School-Age Children

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14 September 2018

## DECLARATION OF ORIGINALITY

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## ABSTRACT

The present study examined links between children's violent video game exposure and aggression, and the influence of parent and child risk factors (i.e., children's negative affect and hostile attribution bias, parental monitoring, and children's gender).

Participants were 122 Canadian parent-child dyads (99 unique parents) including children between 7 and 10 years of age (41 girls, 81 boys; 72 mothers, 26 fathers). Parents completed pencil-and-paper questionnaires assessing children's violent video game exposure, aggressive behaviour, negative affect, and parental monitoring of children's media use (i.e., parental involvement, limit setting, and communication). Children completed pencil-and-paper questionnaires assessing violent video game exposure and hostile attribution bias. Parents' perceptions about children's video gaming and links with aggression were also explored during semi-structured interviews with 15 of the parents (10 mothers, 5 fathers). The analyses revealed that higher levels of parent-reported children's violent video game exposure predicted higher levels of aggression. In addition, higher levels of children's negative affect predicted higher levels of children's aggression. Children's negative affect was found to mediate the relation between children's violent video game exposure (parent report) and aggression, such that higher levels of children's violent video game exposure indirectly related to higher levels of children's aggression, through higher levels of negative affect. Children's hostile attribution bias was not predictive of children's aggression, nor did it mediate the link between children's violent video game exposure and aggression. In terms of parental monitoring, higher levels of children's violent video game exposure were related to higher levels of parental involvement and communication. None of the parental

monitoring variables (i.e., parental involvement, limit setting, and communication) were related to children's aggression. The relation between children's violent video game exposure and aggression did not vary based on levels of parental monitoring or children's gender. Results from the thematic analysis of the interview data supported these findings. Parents believed that exposure to children's violent video games would increase their risk of engaging in real world violence and imitating aggressive or violent behaviours from the video games. Parents also reported that children experienced negative reactions, such as aggression, to playing video games -- including violent video games. Parents thought that children's reactions to playing violent video games varied based on children's temperament, and that children might be at greater risk of experiencing negative reactions if they had certain traits (e.g., overly emotional, angry). In terms of parental monitoring, parents were more likely to monitor children's gaming if parents, themselves, were interested in gaming or if children were playing games with violent content. Parents were more likely to discuss gaming with their children when children played video games with violent content. Similarly, parents tended to set limits on the content children were exposed to (i.e., violent games); however, most children were exposed to violence in video games. Overall, these findings identify parent and child factors (i.e., children's negative affect, parental involvement and communication) that may mitigate or exacerbate the effects of playing violent video games, which can be useful for education on media use, intervention programs, and directions for future research.

## DEDICATION

To my parents – From an early age, you instilled the words in me: “I hope you never lose your sense of wonder...I hope you dance” (Lee Ann Womack, I hope You Dance). This sense of wonder has carried me through this journey and led me to follow my dreams. I am so proud to have you as my parents; your unconditional love and support helped me to face some of the bumps along the way. You both inspired me to dream big and to not let anything get in the way of what I want. Thank you for always being there for me when I needed it, and celebrating with me at every milestone along the way!

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I am so grateful for my incredibly supportive friends and family who have been with me all the way. To my husband, Julian – thank you for your patience (I know, I required lots of this!), understanding, and years of encouragement, but most importantly for the late night trips for chocolate to keep me going! This would not have been possible without you. To my family – for reminding me that ‘there is no mountain too big’ and providing me the best place to come home to. And to my friends – for appreciating the demandingness of this journey, keeping me grounded in the bigger picture, and coming to visit me when I needed it the most. We did it!!

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## CHAPTER I

### Introduction

#### Context and Objectives of the Present Study

The relation between violent video gaming and children's aggression has garnered public concern (Academy of Pediatrics, 2016; Anderson, Gentile, & Buckley, 2007; Boak, Hamilton, Adlaf, Henderson & Mann, 2016; Carnagey, Anderson, & Bartholow, 2007; Kirsh, 2006; Kepes, Bushman, & Anderson, 2017). Over the past decade, and even more recently, the amount of media violence children and youth are exposed to has dramatically increased, with some children consuming close to 12 hours of media per day (Academy of Pediatrics, 2016; Boak et al., 2016; Carnagey et al., 2007; Gentile, Lynch, Linder, & Walsh, 2004; Rideout, Foehr, & Roberts, 2010; Zaman, Nouwen, Vanattenhoven, de Ferrerre, & Van Looy, 2016). In a national survey of 5,756 Canadian children, almost 60% of boys in grades three to six and 33% of girls in grade three reported playing video or computer games almost every day (Canadian Teachers' Federation, 2003). In a more recent study of video game use in 10,000 youth in Ontario, 86% reported playing video games with 25% playing daily or almost daily (Boak et al., 2016).

As the amount of media exposure continues to increase, the proportion of children's exposure to violent content in media is also increasing. Sixty-nine percent of media targeted to children under the age of 13 contains some form of violence (Wilson et al., 2002) and the most popular media across television, film, and video games includes substantial amounts of violence (Anderson et al., 2003). Video games that are rated as violent or inappropriate for children have become more easily accessible to children (Anderson et al., 2003; Saleem & Anderson, 2012), with children as young as 8 years old

accessing video games rated appropriate for youth ages 17 and older (Canadian Teachers' Federation, 2003; Gentile, 2009). In fact, Canadian boys in grades three to six reported that their favourite video game was Grand Theft Auto, which was rated for individuals 17 and older (Canadian Teachers' Federation, 2003).

More concerning is that children and adolescents' reports of playing violent video games may be predictive of aggressive behaviour (Coyne, 2016; Gentile, Li, Khoo, Prot, & Anderson, 2014; Gentile, Reimer, Nathanson, Walsh, & Eisenmann, 2014b; Möller & Krahe, 2008). In addition, research has revealed that playing violent video games may have significant negative effects on children and adolescents, including bullying and cyberbullying (Dittrick, Beran, Mishna, Hetherington, & Shariff, 2013; Olson et al., 2009), and increased anger and hostility (Gentile et al., 2004). Thus, with an increasing number of youth playing violent video games, and evidence to suggest that higher exposure to video game violence may be associated with higher aggressive behaviour, the effects of playing violent video games is concerning and warrants further investigation to examine the predictors of the negative effects of violent video game play in youth.

The American Psychological Association Task Force on Media Violence (2015) reported that the link between violent video gaming and aggression has been well studied in young adults, but there is a dearth of research examining the effects of playing violent video games in children and adolescents. This is surprising, especially as research has shown that children may be more susceptible to the effects of playing violent video games than adolescents and young adults, due to their immature moral reasoning and problem solving skills (Anderson, Buckley, & Carnagey, 2008a; Anderson et al., 2010; Eisenberg & Fabes, 1998; Funk, Baldacci, Pasold, & Baumgardner, 2004; Huesmann,

1998). So far, the majority of the limited research with children suggests that playing violent video games is associated with more aggression (e.g., Anderson et al., 2007; Bender, Plante, & Gentile, 2017; Coker et al., 2015; Gentile et al., 2014; Gentile et al., 2014b; Przybylski, 2014). However, at present, few studies have examined the effects of violent video games on children younger than 10 years old (APA, 2015).

Furthermore, few studies have examined known parental risk factors for aggression (e.g., poor parental involvement, limit setting, and parental communication) in understanding the links between violent video game play and aggression in youth (APA, 2015; Bender et al., 2017). The existing studies suggest that children who play violent video games show lower levels of aggression when their parents set more limits, engage in more effective communication, or are more actively involved in children's media use (e.g., Anderson et al., 2007; Wallenius & Punamäki, 2008; Gentile et al., 2014b; Wallenius, Punamäki, & Rimpelä, 2007). However, very few studies have examined the influence of parental monitoring on the effects of playing violent video games in children under 10 years old.

In terms of children's individual differences, the effects of personality traits and temperament in the link between violent video gaming and aggression have been more often studied in young adults than in children. In a sample of adolescents (aged 13 to 14), trait hostility was found to mediate the relation between violent video gaming and physical aggression, such that higher levels of violent video game exposure were indirectly related to higher levels of physical aggression, through higher levels of trait hostility (Gentile et al., 2004). It is, therefore, possible that individual differences, specifically hostile attribution bias and negative affect, may be influential in

understanding the effects of playing violent video games and aggression in children, but the existing research is limited to children under 10 years of age and further empirical support is needed.

The General Aggression Model (GAM; Anderson & Bushman, 2002) -- which uses a developmental approach and incorporates social, biological, cognitive, and information-processing theories -- has been applied to the understanding of the effects of playing violent video games on aggression in children. According to this model, personological factors (e.g., gender, age, temperament) interact with situational factors, such as playing violent video games, and can result in aggressive behaviour by increasing aggressive cognitions, aggressive affect, and physiological arousal (Anderson & Bushman, 2002; Anderson et al., 2007). Of the few studies that have examined the links between violent video gaming and aggression in children, playing violent video games has been associated with increased aggressive behaviour and aggressive cognitions, as well as decreased prosocial behaviour (Anderson et al., 2007; Anderson et al., 2010; Greitemeyer & Mügge, 2014).

The present study had three objectives. First, this study aimed to confirm the existence of the link between playing violent video games and aggression in children ages 7 to 10 years old. Most of the research examining the link between violent video gaming and aggression has focused on young adults and undergraduate student samples, despite research indicating that school-age children may be more susceptible to effects on aggressive behaviour (Anderson et al., 2010; APA, 2015). Therefore, the present study contributed to the literature by examining the relation between violent video gaming and aggression in children ages 7 to 10 years old, an understudied population.

Second, there is a dearth of research considering the influence of known risk factors for aggression in the relation between violent video gaming and aggression in children. Researchers have identified a gap in the literature regarding understanding the mechanisms in the link between playing violent video games and aggression, as well as considering the interactions between individual and contextual factors. This is especially important because media violence may be an important risk factor for aggression, but one that can be easily influenced by contextual factors (Bender et al., 2017). Therefore, the GAM was applied to the present study to investigate risk factors, such as hostile attribution bias, temperament, and parental monitoring (i.e., parental involvement, limit setting, and communication related to media use) to determine if they influenced the effects of playing violent video games on aggression in children.

Third, an in-depth understanding of parents' perceptions of children's violent video gaming habits was obtained through qualitative interviewing. The present study contributed to the existing literature by collecting qualitative accounts of parents' perceptions about children's video game play and habits to gain a more comprehensive understanding of the parent and child risk factors that may be associated with children's video game habits and behaviours.

In the following chapter, relevant theories and research findings related to childhood aggression, media violence exposure, and violent video gaming are presented. First, research related to childhood aggression is reviewed. The GAM (Anderson & Bushman, 2002) is presented as an integration of social, cognitive, and information-processing theories by using a developmental approach to understanding childhood aggression. Next, research findings linking media violence and aggression are presented,

including factors that influence the effects of media violence on aggression, such as parental monitoring. The literature review concludes with empirical findings relevant to violent video gaming and aggression, and a discussion of the potential links with additional risk factors (i.e., children's negative affect, hostile attribution bias, parental monitoring). Finally, study questions and hypotheses are presented.

## **Review of the Literature**

### **Definitions of Aggression**

Over the past few decades, childhood aggression researchers have used the term 'aggression' inconsistently, resulting in ambiguity around the specific behaviours examined in the research (Olson, 2004). Human aggression is loosely defined as physical, verbal, psychological, or emotional behaviour intended to cause harm to another individual (Anderson & Huesmann, 2003; Anderson et al., 2007; Kirsh, 2006). More recently, aggression has been considered a homogenous construct that varies along a severity continuum from mild (e.g., punching, hitting) to severe (e.g., shooting; Anderson & Huesmann, 2003; Anderson et al., 2007). At the high end of the continuum is 'violence' (i.e., the most severe form of physical aggression, such as murder or aggravated assault; Anderson & Huesmann, 2003; Anderson et al., 2007). All violent behaviours are considered aggressive, however, most aggression is not violent (Anderson & Huesmann, 2003).

Aggression is typically the result of the interaction between personological factors (i.e., individual differences, such as temperament, attitudes, and behavioural tendencies) and situational factors (i.e., cues in the present situation that either increase or decrease aggressive behaviours, such as provocation or the presence of violence; Anderson &

Huesmann, 2003). Intra-individual factors that can affect the likelihood of the individual engaging in aggressive behaviour include aggressive emotions (i.e., feelings related to the onset and consequences of aggression, such as anger or guilt), aggressive personality traits (i.e., individual differences predisposing to aggression, including negative affect), physiological arousal (e.g., heart rate and blood pressure), and aggressive cognitions (i.e., hostile attribution bias; Kirsh, 2006). Thus, aggression appears as a result of a combination of cognitive, affective, and physiological processes that interact with an individual's personality characteristics and the specific situation (Anderson & Bushman, 2002). It is, therefore, important to consider individuals within their specific contexts in order to understand aggressive behaviours.

### **Childhood Aggression**

The developmental trajectory of aggression is typically consistent among children, with aggression first appearing during infancy. Infants can differentiate between various emotions and, specifically, they can detect anger in other humans' facial expressions (Ekman & Friesen, 1975). During toddlerhood, demonstrations of aggression are usually instrumental, as children use aggressive behaviour to get their needs met (Kirsh, 2006). In a study of physical aggression during the infancy/toddler years (i.e., aged 0 to 3,  $N = 502$ ), approximately 15% of children showed increases in high levels of physical aggression, indicating that physical aggression appears to begin during infancy and toddlerhood (Tremblay et al., 2004). As children enter the school-age period, physical aggression is the most prevalent type of aggression seen, as children engage in more aggression against authorities, rather than instrumental aggression (as shown in earlier development). During the school-age period, alternative forms of aggression may

begin (e.g., relational aggression) and gender differences become more apparent (Kirsh, 2006). Beginning in the preschool years, boys tend to use physical aggression more than girls, whereas girls tend to show higher levels of relational aggression than boys (Leschied, Cummings, Van Brunschot, Cunningham, & Saunders, 2001). Although this pattern is relatively consistent throughout childhood and into adolescence, during the school-age period, these gender differences become wider, and across development, men become more likely than women to use violent aggression (Anderson & Huesmann, 2003; Kirsh, 2006; Leschied et al., 2001). Although aggression varies in purpose and type throughout development, most researchers have found that aggression is relatively stable.

In one of the most cited studies of the stability of aggression, Olweus (1979) reviewed 16 longitudinal studies comprised of all men or mixed gender samples. The findings revealed that beginning around age 3, aggression appears to develop in a linear fashion (i.e., five year stability coefficient,  $r = .69$ ), with greater aggressive behaviour in 8- to 9-year-old children significantly related to higher levels of aggression in 10- to 14-year-old youth. Olweus (1979) compared the stability of aggression to that of intelligence. However, despite the stability of aggression during childhood, Olweus (1979) found that overall levels of aggression declined over time (i.e., 10 year stability coefficient,  $r = .60$ ) as most youth became nonaggressive throughout development. Although this is a widely cited study, correlating aggression at two time points may ignore the individual discontinuities in the development of aggression (Haapasalo & Tremblay, 1994). Using a developmental psychopathology framework, research has employed trajectory analyses to differentiate developmental pathways of aggression.

In a study of 1,037 boys who were repeatedly assessed for aggression between ages 6 and 15, four developmental trajectories were revealed (Nagin & Tremblay, 1999). The majority of this sample showed a decline in aggression throughout childhood, but a substantial minority of children demonstrated chronic, stable aggression. The ‘lows’ consisted of 15 to 25% of the sample, and showed consistently low levels of aggression. ‘Moderate level desisters’, involving 50% of the sample, engaged in modest levels of aggression at age 6, which substantially declined by age 10 to 12. Similarly, ‘high level desisters’ (20 to 30% of the sample) began with a high level of aggression at age 6, and by age 15, they showed much less aggressive behaviour. The trajectory that is most concerning is the ‘chronics’, children who showed consistently high levels of aggression throughout childhood and adolescence. Although only 5% of the boys in the sample followed this trajectory, this group of children is of greatest interest to aggression researchers because these children appear to not have learned how to regulate their aggressive behaviour in early childhood (Nagin & Tremblay, 1999), and are most at risk for violence in adolescence and into adulthood (Broidy et al., 2003). In fact, the strongest predictor of aggression and violence at later ages is aggression during childhood (Anderson & Huesmann, 2003; Broidy et al., 2003; Gentile & Bushman, 2012; Huesmann, 1986; Nagin & Tremblay, 1999).

### **Theories of Aggression**

**General Aggression Model.** Social, social-cognitive, and information-processing theories of aggression vary in the extent to which they account for biological, social, cognitive, and information-processing factors involved in the development of aggression in children. However, each of these separate theories lack some component relevant to

the development of childhood aggression. For example, the social learning theory (Bandura, 1973; 1986) fails to account for active cognitive processes, while cognitive and information-processing theories (Berkowitz, 1989, 1993; Crick & Dodge, 1994; Heusmann, 1986, 1988) do not describe the mechanisms by which differences in cognitions develop or the effects of environmental factors in the development of aggression (Kirsh, 2006). As such, Anderson and Bushman (2002) developed a unified theory of aggression using a biosocial-cognitive developmental approach, called the General Aggression Model (GAM). The GAM posits that experiences shape individuals' knowledge structures, which influence the way individuals perceive social situations, experience emotions, and behave. From this theory, aggression is conceptualized using a 'person in the situation' framework (Anderson & Bushman, 2002). Person variables related to the individual, the situation, the individual's internal state, and the outcomes interact in a cyclical manner to produce aggression. The model posits that person and situation inputs influence cognitive, arousal, and affective internal states (i.e., called "routes"), which affect an individual's responses and behaviour in specific situations. Thus, an individual's thoughts, feelings, or physiological arousal are thought to mediate the relation between any person or situation variables that increase the risk of aggression (such as violent video gaming) and aggressive behaviour (Anderson & Bushman, 2002).

Person variables include the characteristics that an individual brings to a situation (e.g., personality traits and attitudes; Anderson & Bushman, 2002; Anderson & Carnagey, 2014). These variables are typically stable components of an individual's personality, thoughts, and feelings. Examples of person variables associated with aggression, include hostile attribution bias (Crick & Dodge, 1994), gender (e.g., Anderson & Huesmann, 2003), self-efficacy (i.e., thinking that one can successfully enact the aggression; Huesmann, 1988), and positive attitudes towards violence (e.g., Anderson et al., 2007; Funk et al., 2004). On the other hand, situation variables involve the environment with which the individual is currently in; therefore, these variables are context dependent. Examples include frustration, provocation, drugs, pain, cues for aggression, and violent video games (e.g., Anderson & Bushman, 2002; Anderson & Carnagey, 2014).

The mechanisms by which person and situation variables interact and influence the individual's present internal state are called "routes". Anderson and Bushman (2002) identified three pathways that person and situational variables can combine and influence an individual's present internal state, including: a) cognition; b) affect; and, c) arousal. For example, trait hostility and exposure to violent films can cumulatively increase individuals' aggressive thoughts (Anderson, 1997), aggressive affect (i.e., anger; Bushman, 1995), and aggressive behaviour (Bushman, 1995). The cognitive route involves person and situation variables interacting to increase the accessibility of aggressive cognitions in memory. When an individual repeatedly accesses aggressive cognitions, it makes it easier to access aggressive cognitions in the future. If aggressive cognitions are accessed, but not to the extent of activating the knowledge structure, a

priming effect occurs, that results in a temporary increase in aggressive thoughts (Anderson & Bushman, 2002; Anderson & Carnagey, 2014). With respect to the affective route, person and situational variables combine and produce negative moods and emotions (e.g., state hostility and anger). For example, violent movies can increase hostile feelings and anger (Anderson, 1997). The final route involves an increase in physiological arousal, a transfer of arousal from other stimuli (e.g., feeling aroused towards someone or something unrelated to what caused the spike in arousal, such as playing a violent video game), and reinterpreting that arousal as anger. An increase in arousal can strengthen the individual's present action tendency. If the individual is predisposed to respond in an aggressive manner, an increase in arousal can increase the likelihood of the individual behaving aggressively (Anderson & Carnagey, 2014). All three routes are inter-connected, so for example, hostile attributions may increase the likelihood of hostile feelings being more easily accessible, and vice versa (Anderson & Bushman, 2002). In two samples of undergraduate students ( $N = 53$ ;  $N = 66$ ), participants who watched a violent film reported higher levels of hostility and aggressive thoughts (Anderson, 1997). Cognitive, affective, and arousal states influence the manner in which individuals perceive and interpret situations, and ultimately, guide their behaviour (Anderson, Carnagey, Flanagan, Benjamin Jr., Eubanks, & Valentine, 2004).

**Risk and protective factors.** The GAM employs a developmental approach in predicting the multicausality of aggression by considering the effects of risk and protective factors (Anderson, Gentile, & Dill, 2012). Risk factors for aggression include any experience or personological traits (e.g., temperament) that increase the likelihood that the individual will behave aggressively (Anderson et al., 2007; Anderson et al., 2012;

Gentile & Bushman, 2012; Kirsh, 2006). On the other hand, protective factors serve to reduce the effects of children's exposure to risks, and thereby, reduce the likelihood of the individual engaging in aggressive behaviour (Anderson et al., 2007; Anderson et al., 2012; Gentile & Bushman, 2012). Childhood aggression is not caused by any one risk factor. For example, playing violent video games on their own do not directly cause children to become aggressive. It is the accumulation and interaction of multiple risk factors that increases children's risk for aggression and is more likely to lead to aggressive behaviour (Anderson et al., 2012; Gentile & Bushman, 2012; Kirsh, 2006).

Risk factors are often described within a cumulative risk model (Masten, 2001), in which each additional risk factor experienced by a child will increase the child's risk for future problematic behaviour (Rutter, 2000). Typically, risk factors are not experienced in isolation, and many children who are exposed to at least one risk factor often experience other risk factors (Masten, 2001; Olson, 2004). Risk factors appear to be multiplicative, such that the likelihood of aggression increases as the amount of risk factors increase (Gentile & Bushman, 2012). In a study by Gentile and Bushman (2012) of 430 children aged 7 to 11 assessing the impact of multiple risk factors on aggression, the findings revealed that once children experienced at least five risk factors, their risk of aggression was predictable with 84% accuracy. Therefore, children who experience multiple risk factors are at a heightened risk for developing aggressive behaviours throughout childhood and into adolescence (Campbell, Shaw, & Gilliom, 2000). In the GAM, risk and protective factors are conceptualized within personological (e.g., gender, temperament, positive attitudes towards violence) and situational factors (e.g., exposure to violent video games), as well as, environmental modifiers (e.g., parenting practices).

Environmental modifiers are factors that are long-lasting and influence what an individual learns, their beliefs, and typical moods. They can either increase or decrease the likelihood that an individual will engage in aggression (Anderson & Huesmann, 2003).

***Personological risk factors.*** Personological factors involve aspects of an individual's personality, cognitive structures, and emotional tendencies that can affect behaviour through interacting with situational risk factors (Anderson & Huesmann, 2003). Common personological risk factors related to aggression are temperament (Kirsh, 2006; Olweus, 1980; Thomas & Chess, 1977), beliefs and attitudes about the appropriateness of aggression (Anderson & Huesmann, 2003), and hostile attribution bias (Anderson & Huesmann, 2003; Crick & Dodge, 1994; Dodge & Tomlin, 1987; Nasby, Hayden, & DePaulo, 1980).

***Temperament.*** Temperament is the manner in which children approach novel environments or react and respond to stimuli in their environment, and is essentially the core of children's personality (Kagan, 1988; Kagan & Snidman, 1991; Kirsh, 2006). Although temperament is thought to be stable throughout one's life, it can vary based on environmental experiences. For example, children with a shy temperament whose parents are social and outgoing may become more outgoing over time (Kagan, 1988; Kagan & Snidman, 1991; Kirsh, 2006). Within the aggression literature, the majority of the research has examined three profiles of temperament, including the following: a) easy temperament; b) difficult temperament; and, c) slow-to-warm-up temperament (Kagan, 1982; Kirsh, 2006; Thomas & Chess, 1977). Children with an easy temperament typically display high levels of positive affect, easily adapt in novel environments, and have

normative patterns of eating and sleeping. In contrast, children with a difficult temperament are often highly active, experience difficulty transitioning in new situations, have a negative affect that can result in behaving in a reactive manner (e.g., kicking and screaming), and have difficulty sleeping and eating (Kagan, 1982; Kirsh, 2006). Finally, children who are classified as slow-to-warm-up demonstrate a slower pace in their activity levels, require additional time to adapt in new environments, and tend to express some negative affect (Thomas & Chess, 1977). Difficult temperament, including negative affect, is a risk factor for aggression throughout childhood (Olweus, 1980). In a sample of 504 children followed from birth to 3 years old (i.e., 5 to 42 months), Tremblay et al. (2004) found that maternal report of difficult temperament (e.g., easily upset, difficult to soothe, fussy, and moody) in 5-month-old infants was strongly related to high levels of physical aggression one year later. Furthermore, difficult temperament, including irritability, has been shown to have long lasting effects throughout childhood. In a study of 1,721 school-age children (aged 7 to 8 years) who were studied from age 1, children who showed stable, high levels of aggression throughout their early childhood tended to have difficult temperament (e.g., irritable and uncooperative) as reported by their parents (Kingston & Prior, 1995). Therefore, children's temperament, including specific dimensions such as negative affect, is a personological risk factor that may interact with situational factors and contribute to the development of aggression in children.

*Beliefs about aggression.* Children's beliefs about aggression as appropriate behaviour can increase their risk for engaging in more chronic aggression (Anderson & Huesmann, 2003). In a study by Guerra, Huesmann, Tolan, Van Acker, and Eron (1995), beliefs about the appropriateness of aggression were assessed across a two-year span in

1,935 school-age children (aged 6 to 11). Children who were more likely to believe that aggression was appropriate behaviour were significantly more likely to behave aggressively across the two years. In fact, the effects of normative beliefs about aggression on aggressive behaviour appear to be stronger for 10-year-old children, as compared to younger children (Huesmann & Guerra, 1997). Therefore, school-age children appear to be particularly sensitive to the influence of aggressive beliefs, and further, acceptance of aggressive beliefs has shown to increase children's risk of aggression (Guerra et al., 1995).

*Hostile attribution bias.* Hostile attribution bias, which is assuming hostile intent of other's behaviour in neutral situations is related to aggression in children (Anderson & Huesmann, 2003; Crick & Dodge, 1994; MacBrayer, Milich, & Hundley, 2003; Nasby et al., 1980). Aggressive children often rely on aggressive scripts, schemas, and stereotypes when they determine the intent of others' behaviour (Dodge & Tomlin, 1987). In a study of aggressive ( $N = 32$ ) and nonaggressive ( $N = 42$ ) youth aged 11 to 13, youth were asked to imagine a hypothetical situation in which a peer provoked them and they had to assume the peer's intention. Aggressive youth tended to interpret their peer's behaviour as hostile and ignore any situational cues that might have suggested otherwise (Dodge & Tomlin, 1987). Further, a hostile outlook can perpetuate a self-fulfilling prophesy (Anderson et al., 2008a), such that children who believe that the world is a hostile place elicit hostile behaviours from others, which in turn, validates their beliefs about their world being a hostile place (Saleem & Anderson, 2012). Therefore, having a hostile worldview may bias children's interpretations of neutral situations, and further, increase their risk of engaging in aggressive behaviour.

***Situational risk factors.*** Following the GAM, the interaction between personological risk factors, such as those described above (i.e., temperament, beliefs about aggression, and hostile attribution bias), and situational risk factors (e.g., provocation, observing violence) increase children's likelihood of aggression (Anderson & Bushman, 2002). Provocation has been well studied in the literature and when individuals are provoked (e.g., other's insult them, aggress towards them, or interfere with their goal attainment; Anderson & Huesmann, 2003), their risk for responding in an aggressive manner increases. In fact, provocation is one of the strongest situational risk factors for predicting aggression in humans (Berkowitz, 1993). Other aversive situational factors include experiencing pain and feeling negative emotions (Anderson & Huesmann, 2003). Aversive stimuli, such as exposure to a weapon can increase aggression through 'priming' effects (i.e., Anderson & Huesmann, 2003). Situational stimuli can also increase arousal levels, which in turn, activate behavioural tendencies (Berkowitz, 1993). For example, arousal from feeling anger or frustration from one stimulus can be transferred to another stimulus in the environment, resulting in the individual misperceiving where the arousal originated (i.e., excitation transfer; Zillmann, 1979; 1988). Heightened levels of arousal, for example from playing a violent video game, can then lead the individual to incorrectly displace their aggressive tendencies toward other people who were not the cause of their arousal (Anderson & Huesmann, 2003), due to this misattribution of the cause of the arousal. When situational risk factors, such as those described above, interact with personological risk factors, the GAM proposes that the risk for aggression increases. In addition, according to the GAM, environmental modifiers, which are factors in the environment that can have long-lasting effects by influencing the

information children learn, their beliefs, and their moods (e.g., parenting practices), can interact with situational and personological factors to influence aggression (Anderson & Huesmann, 2003).

*Parenting practices.* Olweus (1995) identified a number of parenting factors that contribute to child bullies who use physical aggression, including the following: a) lack of involvement and warmth towards children; b) inadequate limit setting and permissiveness regarding children's aggression; and, c) power-assertive discipline. As such, parents may have a highly influential role in reducing children's aggressive behaviour. Much of the research examining the effects of parenting practices on children's behaviour examines parenting styles based on two dimensions: warmth and hostility, and permissiveness and control (Kirsh, 2006). By crossing these two parenting dimensions, Baumrind (1971) described four parenting styles. Authoritative parents demonstrate high levels of warmth and balance flexibility and control. Parents using an authoritarian style show low levels of warmth and lack in responsiveness, but exert high levels of control over their children. Permissive parents show warmth, but lack in control and supervision of their children. Finally, uninvolved parents do not exert any control or warmth, and are often hostile toward their children (Baumrind, 1971). Authoritative parents typically have children with higher levels of social, emotional, and cognitive skills; whereas, children of parents who use permissive and uninvolved parenting styles tend to demonstrate the highest levels of aggression (Baumrind, 1971; Masten et al., 1999; Pettit, Harrist, Bates, & Dodge, 1991).

Patterson (1982) suggested that coercive home environments characterized by high levels of arguing and aggression among family members and children, consistently

high levels of family conflict (e.g., threats of aggressive retaliation), and use of aggression as a means to solve conflict, are associated with children who are highly aggressive, defiant, and dysregulated. Although parenting styles are associated with children's behavioural outcomes, it may be that parenting style indirectly influences children's development through specific parenting practices (i.e., the specific parenting behaviours that are driven by parents' socialization goals; Darling & Steinberg, 1993).

Parental monitoring is the extent to which parents are aware of and supervise their children's whereabouts, daily activities, and interactions outside of the home (Kirsh, 2006). Parents who are less involved with their children tend to have children who exhibit more problem behaviours, including aggression, than parents who are more involved in their children's lives (Amato & Rivera, 1999; Gryczkowski, Jordan, & Mercer, 2010; Stormshak, Bierman, McMahon, & Lengua, 2000). In a study of 994 parents who participated in the National Survey of Families and Households (Amato & Rivera, 1999), the role of parental involvement in children and adolescents' (aged 5 to 18) behaviour were examined. The results revealed that higher levels of both maternal and paternal involvement in children's lives were related to lower levels of problem behaviours both at school and at home (e.g., suspended from school and running away from home). Similarly, in a study of school-age children (Gryczkowski et al., 2010), aged 6 to 12 years old, higher levels of parental involvement were related to lower levels of externalizing behaviour in young boys, and poor parental monitoring was related to higher levels of externalizing behaviour in young girls. Therefore, parental monitoring, including parental involvement, appears to be related to children's aggressive behaviour throughout childhood, and may have different effects on aggression for boys and girls.

In addition to parental involvement, the manner in which parents set limits on their children's behaviours (Houck & LeCuyer-Maus, 2002) has been related to children's aggression. When parents set clear and consistent limits, children tend to show lower levels of behaviour problems (Baumrind, 1971). In contrast, parents who use inconsistent and punitive or corporal punishment typically have children who show higher levels of aggression (Deater-Deckard, Dodge, Bates, & Pettit, 1996; Gershoff, 2002; McNamara, Selig, & Hawley, 2010; Travillion & Snyder, 1993). In fact, early coercive parenting (e.g., at 5 months old) can have long-term effects by increasing children's risk for aggression during the preschool and school-age periods of development (Tremblay et al., 2004). These findings reinforce the importance of parents' limit setting and involvement as being appropriate to children's individual characteristics and including a balance between control and warmth, as parenting practices appear to have consequences for children's behaviour.

Parenting practices and the manner in which parents interact with their children may influence children's hostile attribution bias, and in turn, affect their aggressive behaviour. Children may learn how to interpret social situations based on parents' modeling of social interactions (MacBrayer et al., 2003; MacKinnon-Lewis, Rabiner, & Starnes, 1999; McDowell, Parke, & Spitzer, 2002; Nelson & Coyne, 2009; Healy, Murray, Cooper, Hughes, & Halligan, 2015). Research findings have suggested that poor parenting practices are associated with greater hostile attribution bias (Healy et al., 2015; Nelson & Coyne, 2009; Weiss, Dodge, Bates, & Pettit, 1992). In a sample of parents and children, assessed between ages 1 to 5, more parental negative commands and control were related to greater hostile attribution bias in children (Healy et al., 2015). Similar

findings were reported in school-age children ( $N = 242$ ; aged 8 to 9; Nelson & Coyne, 2009) and their fathers. Paternal psychological control predicted greater hostile attribution bias in boys, whereas for girls, paternal corporal punishment predicted more hostile attribution bias. Furthermore, research has found that positive parenting practices may protect children from developing hostile attribution bias. In the study conducted by Nelson and Coyne (2009), paternal warmth and responsive parenting were associated with lower levels of hostile attribution bias in both girls and boys. Therefore, the manner in which parents interact and guide their children may influence children's development of hostile attribution bias, and in turn, affect children's aggression.

### **Media Violence Exposure**

Recently, the amount of media violence children and youth are exposed to has been increasing with some children spending more time with media than sleeping or attending school (Boak et al., 2016; Carnagey et al., 2007; Rideout et al., 2010). Media violence can be defined as media that demonstrates characters intentionally harming other characters who would prefer to avoid harm (Anderson et al., 2008b). Although recent technological advances in media have used three dimensions to create virtual reality and high levels of interactivity (e.g., in video games; Groebel, 2002), much of the research on media violence exposure is focused on passive (e.g., television viewing), rather than interactive media (e.g., video gaming). Furthermore, due to media appearing more realistic, children exposed to violent media experience a merging of the virtual representation of violence with their own realities (Groebel, 2002). Children can be exposed to violent media that does not necessarily contain blood and gore as long as the character's behaviours and motives are aggressive or violent. As children are consuming

more media and are able to access violent media more easily, researchers, politicians, parents, and the general public have become increasingly concerned with the effects of media violence exposure on children's development (Kepes et al., 2017).

In a nationally representative survey of 2,002 American children and adolescents, aged 8 to 18, the average youth reported spending more than 7.5 hours per day, 7 days per week, using media, including television, film, Internet, and video or computer games (Rideout et al., 2010). This is roughly equivalent to the amount of time children spend sleeping and attending school. In fact, youth between the ages 11 to 14 were the group exposed to the most media, consuming almost 12 hours per day, with children ages 8 to 10 following closely, consuming almost 8 hours of media daily (Rideout et al., 2010). In a national sample of 5,756 Canadian children in grades 3 to 10, almost 60% of boys in grade 3 to 6 play video or computer games everyday and 33% of girls in grade 3 play video games every day (Canadian Teachers' Federation, 2003). Similarly, in a sample of more than 10,000 Ontario students in grades 7 to 12, 86% reported playing video games, with 25% playing daily or almost daily. More concerning, 10% of youth reported playing video games for five hours or more each day (Boak et al., 2016). Youth are spending up to 50% more time with media than on their homework, family activities, playing outside, or interacting with friends (Groebel, 2002). Overall, both the total amount of media content consumed and the amount of time spent with media have dramatically increased over the past decade across numerous countries (Boak et al., 2016; Carnagey et al., 2007; Gentile et al., 2004; Groebel, 2002; Rideout et al., 2010).

Children report consuming violent media for the purposes of developing and maintaining friendships, seeking sensations, being able to defy restrictions, regulating

their emotions, escaping from reality, engaging in vicarious aggression, and feeling empowered and satisfied (Cantor, 1998; Kirsh, 2006). Therefore, as media violence is universal, the amount consumed by children has dramatically increased, and is potentially rewarding to children, it is now even more important for researchers and clinicians to understand the risk factors that may increase children's likelihood of experiencing aggression as a result of exposure to violent media. In general, most of the research findings reveal that individuals exposed to high levels of media violence tend to become more aggressive and violent, see the world as a scary place, become more desensitized to violence and feel less sympathetic toward victims of violence, become more interested in watching violent media, and are less likely to engage in prosocial behaviours and relationships (Coker et al., 2015; Coyne, 2016; Gentile & Anderson, 2003; Gentile et al., 2014; Gentile et al., 2014b; Grizzard, Tamborini, Sherry, & Weber, 2016; Krahé, Möller, Huesmann, Kirwil, Felber, & Berger, 2011; Przybylski, 2014; Zaman et al., 2016).

### **Theories of Media Violence and Aggression**

In order to understand effects of children's exposure to media violence, it is crucial to understand children at their developmental level. Children's level of cognitive development influences the information they encode and evaluate in their environment. There are a number of mental operations that children undergo when processing media information (Wilson, 2007). For example, when watching a television program, children first need to attend to the cues on the screen. Then, they have to organize the information into a coherent story and make inferences from any implicit cues. Children rely on previous experiences and knowledge from memory to understand the information from the program, and then, finally, they evaluate the program. These multiple operations vary

in their quality based on children's cognitive development. By age 7 or 8, children are able to evaluate media in multiple domains, including the genre, the production methods, and the source of the message being delivered through the program. As children become older, they may assume media programs, including video games, are realistic if they illustrate characters and situations that are possible in reality, and may have difficulty separating out fantasy from reality (Wilson, 2007). In addition, prior to adolescence, children are still developing their moral reasoning (Eisenberg & Fabes, 1998), so the values supported in violent media may have a stronger impact on younger children than adolescents. Until children have developed moral reasoning skills, they are less likely to feel guilty about engaging in aggression and are more likely to use behaviour in violent video games as a model for appropriate and acceptable behaviour (Funk et al., 2004; Skalski & Fitzpatrick, 2007). Children appear to be more susceptible than adolescents to developing cognitive scripts of aggressive behaviour as an appropriate solution to solving conflict (Huesmann, 1998). In a meta-analysis of children and adolescents (Paik & Comstock, 1994), the largest effect sizes for violent television exposure on antisocial behaviour were found with preschool children (age 5 or younger,  $r = .46$ ), followed by school-age children (aged 6 to 11,  $r = .22$ ) and adolescents (aged 12 to 17,  $r = .22$ ). In a more recent longitudinal study of children and adolescents, the link between violent video game exposure was stronger in primary school aged children compared to children in secondary school (Gentile et al., 2014). Therefore, young children may be especially susceptible to the effects of exposure to media violence.

**General Aggression Model.** Exposure to violent media can increase children's risk of aggression through both observational and direct learning of aggressive behaviour

(Bandura, 1986; Bandura, Ross, & Ross, 1963), believing that aggression is an acceptable means to solving social problems (Crick & Dodge, 1994), and developing and maintaining aggressive scripts (Huesmann, 1986). Further, the outcomes of aggressive scripts can be reinforcing (e.g., receiving points in video games for killing others; Anderson & Bushman, 2002; Kirsh, 2006). Although the GAM is not a specific model of media effects, it is often used to integrate previous theories (e.g., social learning and social-cognitive theories), to provide a model for predicting individuals at risk for aggression (Anderson et al., 2004).

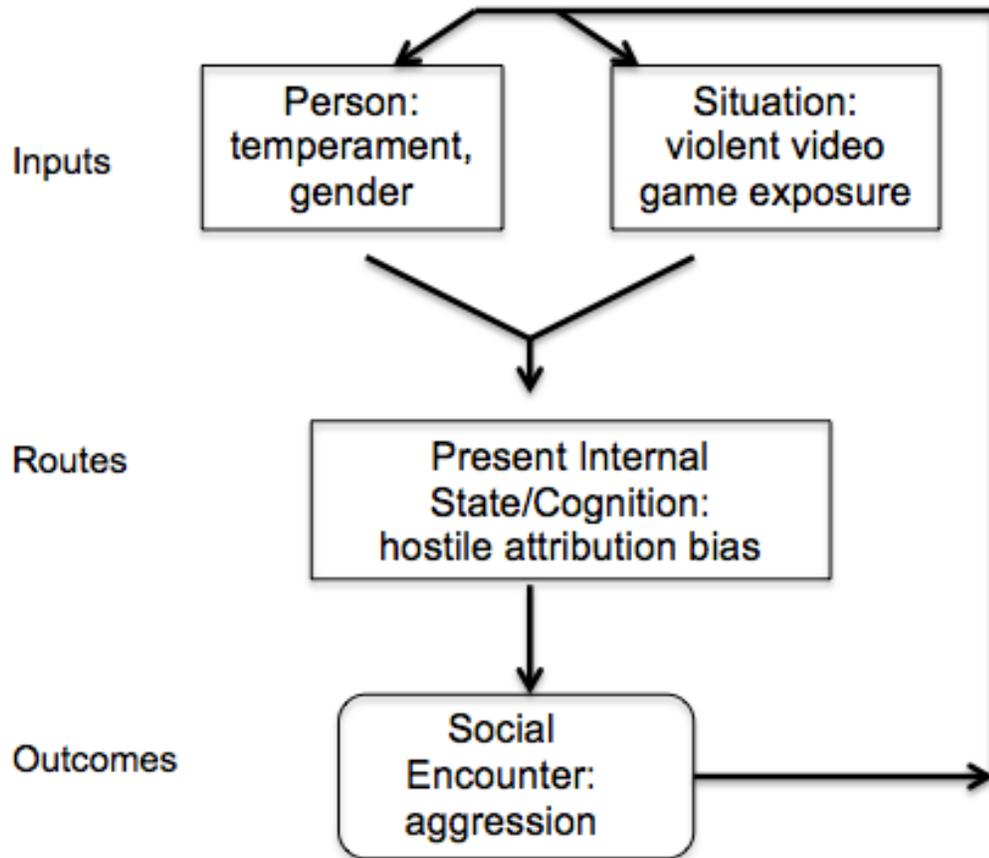
According to the GAM, violent media can increase individuals' risk for immediate aggressive behaviour via increases in aggressive cognitions, aggressive affect, and physiological arousal (Anderson & Bushman, 2002; Anderson et al., 2004). This model proposes that exposure to media violence is a situational factor that interacts with personological factors (e.g., temperament) and activates children's aggressive thoughts, increases their physiological arousal, and triggers an immediate behavioural reaction (e.g., imitating observed violent behaviours), resulting in short-term increases in aggression (Anderson & Bushman, 2002; Anderson et al., 2003). In a meta-analysis of 54 independent studies of children and adults, playing violent video games was associated with higher levels of aggressive behaviour, aggressive cognitions, hostile affect, and physiological arousal (Anderson & Bushman, 2001). Across the research, experimental findings consistently demonstrate that following even a brief exposure to violent scenes, youth immediately show more aggressive behaviour, including physical aggression, aggressive thoughts, or aggressive emotions, and less empathy and prosocial behaviour

than those who do not watch violent media (Anderson et al., 2003; Anderson, Bushman, Donnerstein, Hummer, & Warburton, 2015).

In the long-term, the GAM suggests that repeated exposure to violent media can lead to aggressive-supporting beliefs, attitudes, scripts, and expectations. When individuals rehearse these aggressive cognitions they become automatically accessible (Anderson et al., 2003; Anderson & Carnagey, 2014) and can lead to increases in children's aggressive personality (Anderson et al., 2004). For example, repeated exposure to media violence can result in repeated access to aggression scripts, and as a result, aggressive scripts become more easily activated in future situations (Anderson & Huesmann, 2003). In addition, repeated exposure to violence in a fun and entertaining manner (i.e., through media) can desensitize individuals to aggression when individuals no longer experience fear or anxious reactions to violence (Anderson & Carnagey, 2014; Krahe et al., 2011). Thus, through repeated exposure to media violence individuals can develop aggressive scripts that are positively reinforced in media violence, so individuals become more likely to respond to violence with aggression and are less likely to engage in any sympathetic or helping behaviour towards victims of violence (Saleem & Anderson, 2012). Research findings have revealed that when individuals are exposed to media violence, they are more likely to have increased tolerance for violence, are more willing to engage in aggressive behaviour, and show less empathy for victims of violent acts (Anderson et al., 2003; Bushman & Anderson, 2009). Further, it appears that these findings are consistent across differences in age, gender, and personality type (Saleem & Anderson, 2012), and remain significant after controlling for the fact that aggressive children likely prefer violent media more than less aggressive youth (Anderson et al.,

2003; Kirsh, 2006). The present study extends the current empirical research evaluating the GAM by examining the links between person (i.e., temperament, gender) and situation variables (i.e., violent video game play), cognitions (i.e., hostile attribution bias), environmental modifiers (i.e., parental involvement, limit setting, and communication about media use), and social outcomes (i.e., aggression; see Figure 1).

**Links between media violence and aggression.** In a sample of 54 adolescents (aged 13 to 17) with either a diagnosis of a disruptive behaviour disorder or no psychiatric diagnosis, the effects of watching violence on television and playing violent video games in relation to receiving a disruptive behaviour diagnosis were examined (Kronenberger et al., 2005). Parents of the adolescents completed questionnaires of their adolescents' behaviour and media exposure. Then, the adolescents were interviewed to discuss their frequency and duration of media exposure in the past week. The results indicated that watching more violent television programs and playing more violent video games was associated with a diagnosis of a disruptive behaviour disorder, even after controlling for intelligence, gender, and age (Kronenberger et al., 2005). Similarly, in a sample of children (aged 10 to 11) Coker et al. (2015) found that higher levels of exposure to media violence were significantly related to higher levels of aggressive behaviour, while controlling for children's mental health, nonmedia exposure to violence, and sociodemographic factors. Therefore, in the long term, exposure to violent video games



*Figure 1.* Applying the GAM to examine links between temperament, gender, violent video gaming, hostile attribution bias, and aggression in the present study.

can increase individuals' risk for developing an aggressive personality or pervasive behavioural problems (Anderson & Bushman, 2001, 2002; Anderson et al., 2003; Anderson et al., 2004; Anderson & Huesmann, 2003; Kronenberger et al., 2005).

There is substantial consistency across researchers and scientific experts that media violence is a situational risk factor for aggressive behaviour; however, the extent of the effects of exposure to media violence may vary based on gender (Anderson & Bushman, 2002; Anderson et al., 2007; Anderson et al., 2015; Bushman & Anderson, 2007; Freedman, 1984; Huesmann, Moise-Titus, Podolski, & Eron, 2003). In a meta-analysis of 217 studies, a significant association between exposure to television violence and aggression ( $r = .31$ ) was reported, with boys more susceptible to the effects on aggression than girls and children under the age of 5 showing the highest levels of aggression, followed by school-age children (aged 6 to 11) and adolescents (aged 12 to 17; Paik & Comstock, 1994). Paik and Comstock (1994) also found that the effects of exposure to television violence on aggression were stronger for boys than girls. Thus, although both men and women appear to show effects of exposure to violent media on aggressive behaviour, these effects may be stronger for men, compared to women.

Correlations between media violence and aggression are typically in the small to moderate range (Anderson et al., 2003; Coker et al., 2015; Paik & Comstock, 1994), but when they are compared to medical effects, the effects of violent media exposure and aggression are argued to be almost comparable to the effects of smoking and lung cancer (Bushman & Anderson, 2001). The research suggests that media violence is one of many risk factors for aggression, though the correlation between exposure to violent media and aggression is not perfect, nor is it a necessary and sufficient cause of aggressive

behaviour (Bushman & Anderson, 2001, 2015). Despite this, the effects of media violence on aggression are larger than many other known risk factors for aggression, including low intelligence, child abuse (Office of the Surgeon General, U.S., 2001), prior involvement with physical fighting, physical victimization, low parental involvement, gender, and having a hostile attribution bias (Gentile & Bushman, 2012; Hopf, Huber, & Weiß, 2008).

The effects of repeated exposure to violent media during childhood can extend into later childhood, adolescence, and even adulthood. Longitudinal findings reveal that exposure to violent media in early childhood is a unique predictor of long-term aggression, after controlling for other risk factors, such as intelligence, socioeconomic status, and parenting practices (e.g., nurturance and punishment; Coker et al., 2015; Huesmann et al., 2003). Eron (1982) conducted two large-scale longitudinal studies of the effects of television violence on aggression in children in the United States, and in Finland, Poland, and Australia, across three years. In all countries, early television violence exposure was predictive of aggression three years later. Consistent with these early findings, Hopf et al. (2008) conducted a longitudinal study with 314 German adolescents, at age 12 and 14 years old. On both occasions, the participants completed a media questionnaire in which they rated the frequency of watching horror and violent films from a list of 19 well-known films and the frequency of playing violent electronic games from a list of 16 games, both from 0 to more than 30 times throughout their lives. In addition, they rated the frequency of watching television violence during the past two weeks. The results revealed that higher frequency of exposure to total media violence at age 12 was a stronger predictor of delinquency two years later than adolescents' beliefs

about aggression and their socioeconomic status. When the various types of media violence (i.e., television violence, violent electronic games, and horror-violence-films) were examined separately, higher frequency of playing violent video games throughout their lives was a better predictor of later delinquency than frequency of watching television violence over the past two weeks (Hopf et al., 2008). Similarly, in a longitudinal study of 467 adolescents and their parents in the United States, viewing television violence predicted adolescents' relational aggression. Furthermore, these long-term findings were consistent among both boys and girls (Coyne, 2016). Taken together, these findings demonstrate that early exposure to violent television has implications at least into adolescence, and furthermore, exposure to violent video gaming may have greater effects on behavioural outcomes than television violence.

In addition to exposure to violent content in media as a risk factor for later aggression, the frequency with which individuals are exposed to media has also been well studied. For example, a study conducted in New Zealand, examined the relation between excessive television viewing during childhood and aggressive behaviour in adulthood 26 years later (Robertson, McAnally, & Hancox, 2013). Participants were individuals born in Dunedin between 1972 and 1973, who were assessed regularly from birth to age 26, with an initial sample size of 1,037 individuals and a final sample size of 980 individuals. Child and adolescent television viewing was measured by parent and child reports of the mean number of hours of television watched per weekday between ages 5 and 15. Both male and female adults who spent more hours viewing television during childhood were more likely to have a criminal record, be diagnosed with an antisocial personality disorder, and show more aggressive personality traits, than those who watched less

television. With respect to violent video games, in a U.S. sample of children aged 10 to 11, the effect between violent video game exposure and aggression increased when children played increasingly more video games (Coker et al., 2015).

In a recent qualitative study of children's perceptions of negative or problematic consequences of using technology (e.g., computer usage, Internet usage, and online gaming), participants included children ages 9 to 16 across nine European countries, who participated in focus groups and interviews (Smahel, Wright, & Cernikova, 2015). Themes coded from the focus groups and interviews were divided into physical health and mental health categories. The results were consistent across countries, and within the mental health category, children reported behaving aggressively during or following exposure to various types of media (e.g., playing violent online games; viewing scary, gory, or sexual content online; participating or viewing social networking sites), including hitting objects (e.g., keyboard or computer screen), swearing at other individuals, and physically aggressing against any individuals who interfered with their activity (Smahel et al., 2015). Therefore, much of the research suggests that exposure to violent media, as well as repeated exposure to violence in media, are important risk factors for later behavioural outcomes, including aggression. Furthermore, children, themselves, are noticing increases in their aggressive behaviour following exposure to violent media.

**Factors in the relation between media violence and aggression.** Media violence appears to negatively affect most individuals across all ages; however, the effects are not necessarily the same for all individuals (Anderson et al., 2003). It appears that certain personological characteristics and situational factors may influence the effects

of exposure to media violence by exacerbating or mitigating the effects (Anderson & Bushman, 2002; Kirsh, 2006). Children who are exposed to media violence, but have numerous protective factors or are not exposed to additional risk factors appear to be less at risk for aggression, compared to children with a number of risk factors and few protective factors. Thus, according to a risk and resiliency model, the amount of exposure to media violence alone may not be effective in predicting children at risk of aggression because media exposure may differentially influence children based on their combination of risk and protective factors (Gentile & Bushman, 2012). Researchers have called for future research to increase our understanding of the effects of risk factors in combination with exposure to media violence on children's outcomes (Kirsh, 2006). In fact, few studies have examined the relation among children's personal factors, exposure to media violence, and behavioural outcomes (Browne & Hamilton-Giachritsis, 2005). Therefore, in order to better understand the effects of exposure to media violence on children's aggression, researchers need to use a risk and resiliency model to examine aggression as a contextual, dynamic, and continuous behaviour (Kirsh, 2006) by examining some of the known risk and protective factors of aggression, including children's personality traits, temperament, and parenting practices.

***Personality.*** An individual's personality, involving temperament, beliefs, attitudes, perceptions and expectations, can interact with situational variables, such as exposure to media violence, and influence behaviour. For example, individuals who enjoy watching violent media score higher on measures of neuroticism, psychoticism, sensation-seeking, and sensitivity to reward (Aluja-Fabregat & Torrubia-Beltri, 1998; Lynn, Hampson, & Agahi, 1989). In a study of 210 American college students, those who

scored higher on a measure of psychoticism appeared to be more accepting of violence as an appropriate and effective manner to solve conflict, compared to those who scored lower on the psychoticism scale (Zillmann & Weaver III, 1997). Furthermore, in a study conducted in Ireland of 2,000 children aged 11 to 16, boys who scored higher on a scale of psychoticism viewed more television violence, and boys who enjoyed watching more television violence scored higher on measures of aggression (Lynn et al., 1989). Although the research is limited, especially in children, the current findings suggest that personality may influence an individual's media violence habits and contribute to aggressive behaviour.

***Parental monitoring.*** The manner in which parents interact with their children (e.g., parental involvement, limit setting, and communication) and the style of parenting that parents use with their children may influence the effects of media violence exposure. For example, results from the multisite cohort National Study of Early Child Care and Youth Development in the United States assessed the relations between parenting quality and children's television screen-time in a sample of 874 mother-child dyads (Sebire & Jago, 2013). The dyads participated in interaction tasks, which were coded for various parenting factors (e.g., emotional support, mutual involvement, stimulation of cognitive development, structure, guidance, and hostility) and children reported the number of hours spent watching television, including videos and DVDs, on a typical weekday and on weekends. The results revealed that parents who provided security and support, and structure, but also flexible guidance were more likely to have children who watched less than two hours of television per day (Sebire & Jago, 2013).

Parental monitoring (i.e., the extent to which parents supervise and are aware of their children's activities, friends, and daily lives; Kirsh, 2006) has been examined as a situational factor that can influence the effects of exposure to media violence on children's aggression. In the third wave of a study on children's media habits, a nationally representative sample of children and adolescents ages 8 to 18 from the United States ( $N = 2,002$ ) completed questionnaires and a subsample ( $N = 702$ ) completed a week long diary of their media use, including television, computer, video games, music, print, cell phones, and movies (Rideout et al., 2010). The purpose was to examine children and adolescents' media habits, changes over time in media usage, and the effects of media on children and adolescents. In terms of parental monitoring, 16% of children and adolescents reported that they do not have to follow any rules related to the content and frequency of media that they can consume, while only 30% indicated that their parents monitored their video gaming. The results of this study also revealed that when parents set limits on their children's media consumption, children spent less time engaging with media. When children and adolescents reported that their parents have some limits around media use, they spent on average approximately three hours less with media per day, than children who did not experience limits on their media use (Rideout et al., 2010). Other research has found that when parents set limits on children's media use, children are less aggressive (Gentile et al., 2004; Gentile & Bushman, 2012). In a large study of children in grades 3 to 5 in the United States (Gentile et al., 2014b), when parents engaged in greater monitoring of children's screen time and media violence, children's frequency of screen time, media violence, and aggressive behaviour decreased. These findings suggest that parents may mitigate the harmful effects of media violence

exposure through their parental monitoring, including parental involvement, limiting children's media exposure, and engaging in discussions about children's perceptions and interpretations of the violent content (Anderson et al., 2003; Nathanson & Cantor, 2000).

***Parental mediation.*** Parental mediation, an intervention strategy in which parents interfere with children's violent media exposure (Nathanson, 1999, 2007), has recently been found effective for reducing the negative effects of exposure to violent media, including aggression. Nathanson (1999) surveyed 394 parents and children, in grades 2 to 6, to examine the relation among parental mediation, exposure to television violence, and children's aggression. The results revealed that when parents negatively discussed violent content in television programs, children placed less importance on watching violent shows and held more negative attitudes towards aggression. On the other hand, when parents covieved violent television with their children, but did not engage in discussions about the violent content, children held more positive attitudes towards aggression (Nathanson, 1999). When parents actively engaged in discussions with their children about the violent content observed in media (e.g., explain to their children that the violent television program is not real or that the violent characters are not being kind), children demonstrated less aggressive behaviour (Nathanson, 1999, 2007). In addition, when parents consistently set limits on children's frequency and type of media exposure (i.e., restrictive mediation; Nathanson & Cantor, 2000; Nathanson, 1999, 2007), children tended to behave less aggressively (Nathanson, 2007). Thus, the manner in which parents engage in children's exposure to media violence has implications for children's interest and attitudes towards aggressive behaviour.

Interestingly, although parental monitoring of children's media use may help to mitigate children's risk of aggression, parents' own concerns about media violence, the frequency that they think their children view violent content, and their own parenting practices may influence the likelihood of parents' monitoring their children's media use (Rasmussen, Coyne, Martins, & Densley, 2017; Valkenburg, Krmar, Peeters, & Marseille, 1999; Valkenburg, Piotrowski, Hermanns, & de Leeuw, 2013). Rasmussen et al. (2017) found that in a sample of 247 youth (aged 8 to 18) and their parents, parents were more likely to set rules about children's exposure to media violence when they were concerned about their children being negatively affected by the violent content. Parents were additionally more involved in children's media use when they thought their children preferred media with violent content. Moreover, parents' own parenting practices, such as maintaining a balance between children's autonomy and providing support, controlling their children's behaviour, or using inconsistent limit setting, may influence the link between children's media violence exposure, parental monitoring and mediation, and children's behaviour (Valkenburg et al., 2013). Therefore, parents may be more likely to monitor or mediate their children's media violence exposure if they are concerned about the effects of being exposed to violent content or if they think their children prefer violent media.

Various personological and situational factors, including parental monitoring, parental mediation, and children's temperament and personality characteristics, have been shown to influence the effects of exposure to media violence (Aluja-Fabregat & Torrubia-Beltri, 1998; Gentile et al., 2004; Gentile et al., 2014b; Gentile & Bushman, 2012; Kirsh, 2006; Lynn et al., 1989; Nathanson, 1999, 2007; Nathanson & Cantor, 2000;

Rasmussen et al., 2017; Rideout et al., 2010; Sebire & Jago, 2013; Slater, Henry, Swaim, & Anderson, 2003; Strasburger & Donnerstein, 1999; Zillmann & Weaver III, 1997).

However, these findings are limited to primarily television violence and very few studies have considered the effects of personological and situational factors in school-age children. Therefore, additional empirical support is needed to better understand the effects of personological, situational factors, and environmental modifiers in influencing the outcomes of children's exposure to other forms of media violence, such as violent video gaming.

### **Violent Video Gaming**

Video games were first released during the 1970's, but it was not until the 1990's that violent video games became popular, with first-person shooter and third-person fighter games gaining interest, such as Grand Theft Auto and Call of Duty. Recently, there has been an increase in worldwide attention from researchers, politicians, educators, and parents of the effects of violent video game play on youth based on concerns regarding the interest in violent video games by youth who have committed horrific and tragic shooting sprees (e.g., Columbine school shooting, Colorado theatre shooting; Anderson et al., 2007; Carnagey et al., 2007; Kepes et al., 2017; Kirsh, 2006). This increase in attention has led to important discussions surrounding the impact of violent video game use among individuals of all ages, considerations of appropriate limits to children's exposure to violent video game play, and education for parents about the effects of exposure to violence in video games (Academy of Pediatrics, 2016; APA, 2015). The United States Federal Bureau of Investigation report (O'Toole, 2000) revealed that high-risk youth spend a great deal of time playing violent video games and

appear more interested in the violent content than the actual video game. Thus, the effects of playing violent video games has become an international concern and may have implications for individuals, families, schools, and society.

Violent content may be found in any number of video games, including sports games, racing games, and of course, shooting games (Kirsh, 2006). Most of the research in this area identifies the level of violence in video games based on ratings determined by the Entertainment Software Rating Board (ESRB), or by the participant or experimenter's personal judgment. ESRB ratings are industry-based ratings that provide information regarding video game content and are determined by video clips of the game submitted by the game publisher (Anderson et al., 2007). Commonly used ESRB ratings in video games include: E for everyone, indicating that the video game is suitable for individuals aged 6 and older, and may contain minimal cartoon, fantasy, or mild violence; T for teen, recommending that the game is suitable for individuals aged 13 and older, and may contain violence, suggesting themes, crude humor, minimal blood; M for mature, suggesting that content is suitable for individuals aged 17 and older, and may contain intense violence, blood and gore, sexual content, and strong language. This rating system has been considered useful because the appropriateness of games is age-based and there are a number of content descriptors that can be used to help describe the content in the game (Kirsh, 2003). However, there are several flaws in the rating system, including that the E rating is ambiguous, so parents are left on their own to determine whether or not the game is appropriate for their children's age (Kirsh, 2003). In fact, Thompson and Haninger (2001) found that 30% of E-rated video games contained intentional violence; therefore, children as young as six may be exposed to violence in video games.

Moreover, not all types of violence or scenes of aggression are captured by the video game ratings and descriptors, so as a result, the ratings of violent video games may not sufficiently represent the specific content of the game (Krantz, Shukla, Knox, & Schrouder, 2017).

Across the past decade, the amount of time children and adolescents spend playing video games has substantially increased, from 26 minutes daily in 1999 to 49 minutes daily in 2004 and 1 hour and 13 minutes daily in 2009 (Rideout et al., 2010). In samples of Ontario children and adolescents, 10% of youth reported playing video games for 5 hours or more per day (Boak et al., 2016). Further, children as young as 2 years old are playing video games, with children ages 2 to 7 playing video games for approximately 43 minutes daily and children ages 8 to 12 playing for approximately one hour per day (Gentile & Walsh, 2002). In a study of 1,178 American children and adolescents (aged 8 to 18), 88% of youth reported playing video games at least occasionally, and the average reported frequency of playing video games was three to four times per week, with boys playing around 16.4 hours per week and girls playing 9.2 hours per week (Gentile, 2009). Similarly, 60 to 86% of Canadian children reported playing video games, and 25% playing daily or almost daily (Boak et al., 2016; Canadian Teachers' Federation, 2003). Much of the research suggests that there is a gender difference in terms of video game play, with boys playing more video games than girls; however, this gender difference may decrease as children become older (APA, 2015). In general, more children and adolescents are playing video games on any typical day, and those who do play video games, tend to play for longer period of time than previously found (Boak et al., 2016; Rideout et al., 2010). Further, there are more options of video

games for children to choose from, with only approximately half of children receiving limits on the kinds of games they are allowed to play (Gentile, 2009) and many games containing at least some violent content (Anderson et al., 2003; Saleem & Anderson, 2012). Therefore, video games, especially those that are rated as violent or inappropriate for youth have become more easily accessible to children.

Approximately 60% to 86% of children and adolescents report playing violent video games (Boak et al., 2016; Canadian Teachers' Federation, 2003). In a study by Rideout et al., (2010) more than half (56%) of 8- to 18-year-olds surveyed reported having played Grand Theft Auto (i.e., a first-person shooter video game that involves action, crime, and violence, such as killing and blowing up human beings and objects), Grand Theft Auto is one of the most controversial video games and has an M rating (i.e., suitable for ages 17 and older). Fifty-six percent of 8- to 10-year-olds and 60% of 11- to 14-year-olds reported playing it. Grand Theft Auto was especially popular among boys, with 70% of all 8- to 18-year-old boys reporting having played it (this includes 38% of 8- to 10-year-old boys and 74% of 11- to 14-year-old boys). In Canadian boys between grades three to six, Grand Theft Auto was rated as their favourite game (Canadian Teachers' Federation, 2003). Grand Theft Auto is rated appropriate for children ages 17 and older; however, children as young as eight years old reported playing it. Similarly, Gentile (2009) found that 22% of youth aged 8 to 11 owned M-rated video games. Compared to girls, boys were more than twice as likely to own an M-rated video game. In a sample of children aged 11 to 16, 48.8% reported playing at least one M-rated video game (e.g., Grand Theft Auto), with more boys (67.9%) than girls (29.2%) playing video games rated as inappropriate for their age (Olson et al., 2009). Despite the variation of

adolescents' reported access to violent video games, there is consensus that children as young as 8 years old are accessing video games rated appropriate for youth ages 17 and older, and as a result, young children are being exposed to violence in video games.

Even more of a concern is the finding that children aged 9 to 16 reported higher levels of aggression after being exposed to more violent media (Smahel et al., 2015). This is consistent with research that playing violent video games is both directly related to engaging in physical fighting and indirectly related with physical aggression through trait hostility (Gentile et al., 2004). Thus, with an increasing number of youth playing violent video games and evidence to suggest that exposure to video game violence is associated with aggressive behaviour, more research is needed to examine the predictors of the negative effects of playing violent video games in youth.

### **Violent Video Gaming and Aggression**

The effects of playing violent video games on children and adolescents' aggressive behaviour are more concerning than the effects of watching television violence for a number of reasons (Arriaga, Esteves, Carneiro, & Monteiro, 2008; Carnagey et al., 2007; Carnagey & Anderson, 2005; Dill & Dill, 1998; Funk et al., 2004; Gentile & Anderson, 2003; Kopf et al., 2008). First, video games are qualitatively different than other forms of media, including television and film because video games are more interactive, so individuals feel immersed in the action. Playing violent video games involves actively engaging in violent behaviours that are immediately rewarded (e.g., points, sound effects, winning levels, accessing new levels; Carnagey et al., 2007; Carnagey & Anderson, 2005; Dill & Dill, 1998; Funk et al., 2004). In contrast, in television and film, individuals passively observe violent behaviours, and violence is

reinforced vicariously (i.e., the viewer observes characters in the programs being rewarded for their violence; Carnagey & Anderson, 2005; Dill & Dill, 1998; Funk et al., 2004). When individuals are actively involved in violence, compared to passively observing it, there is a greater chance of learning violent and aggressive behaviour.

Second, repeatedly playing violent video games allows individuals to continuously practice all of the steps involved in successfully committing a violent or aggressive act. In violent video games, players practice violent acts by shooting objects or people repeatedly until they win. When these violent behaviours are consistently rewarded, individuals are positively reinforced for engaging in violence, increasing their learning of aggressive behaviour (Gentile & Anderson, 2003). Third, children may identify more with the characters they are playing in the video games, especially in first-person shooter games, than characters they observe in television or film. This may increase the likelihood of children imitating the character's behaviour and actively rehearsing aggressive scripts (Arriaga et al., 2008; Carnagey et al., 2007; Gentile & Anderson, 2003), thereby increasing the likelihood that children will access aggressive scripts in social interactions. For these reasons, violent video games are expected to produce greater effects on an individual's aggressive behaviour than simply observing violent acts in television programs or films.

The majority of the research examining the effects of violent video game play has examined the impact of violent content in video games on behaviour and has focused on aggressive outcomes in young adults. For example, Barlett, Harris, and Baldassaro (2007) found a significant increase in aggression in an undergraduate student sample ( $N = 99$ ) after playing a violent video game for 15 minutes. Similarly, in a sample of 91 female

undergraduate students, brief exposure to playing a violent video game increased their aggression (Anderson & Murphy, 2003). These findings appear consistent with the few studies that have examined effects of video game violence in children (e.g., Anderson et al., 2007; Irwin & Gross, 1995; Silvern & Williamson, 1987; Slater et al., 2003). In a study of 161 children, aged 9 to 12, Anderson et al. (2007) found that children showed higher levels of aggression after playing a violent video game, compared to children who played a nonviolent video game.

Effect sizes for video game violence and aggressive or violent behaviour appear similar to effects reported for gang membership and aggression, and are larger than prior physical violence, general media violence use, and substance use as predictors of aggression (Anderson et al., 2007; Anderson & Bushman, 2002; Office of the Surgeon General, US, 2001). The average effect sizes of violent video game play on aggression in young adults ranges from small ( $r = .15$ ; Sherry, 2001) to medium ( $r = .27$ ; Anderson & Bushman, 2001). Similarly, in a meta-analysis of the effects of violent video game play on aggression in children and adolescents (Anderson, 2004), the average effect size across 32 independent studies involving 5,420 participants was small ( $r = .20$ ; Cohen, 1988). Anderson et al. (2010) conducted a meta-analysis with over 221 effect sizes and 61,000 participants from Japan, Europe, and the United States. The average effect size for playing violent video games on aggression were the largest in cross-sectional studies ( $r = .26$ ), followed by experimental ( $r = .21$ ), and longitudinal studies ( $r = .20$ ). Some researchers have found evidence that effect sizes are increasing, possibly due to video games becoming more violent (Gentile & Anderson, 2003).

Despite research suggesting that the effect sizes for the relation between violent video gaming and aggression are increasing, there are some researchers that suggest the effect sizes reported by Anderson and colleagues are inflated. For example, Ferguson (2015) conducted a meta-analysis of 101 studies of the effects of playing video games (both violent and nonviolent games) on children and adolescents' aggression, and reported substantially smaller effect sizes for increased aggression ( $r = .06$ ), compared to previous studies by Anderson and colleagues (Anderson & Bushman, 2001, 2002; Anderson et al., 2007; Anderson et al., 2010). Ferguson and colleagues (Ferguson, 2007; Ferguson & Kilburn, 2009; Ferguson & Olson, 2014; Ferguson & Rueda, 2010; Lobel, Engels, Stone, Burk, & Granic, 2017) propose that the discrepancy in effect sizes for the relation between exposure to violent video games and aggression may be due to the measures of aggression used in laboratory studies and the lack of consideration of possible third variables in correlational studies. In laboratory studies, Ferguson and colleagues suggest that poor measures of aggression (e.g., measuring aggression with a noise blast measure in Anderson & Dill, 2000) may measure competitiveness, rather than aggression, are not standardized, and may not represent real-world violence (Ferguson, 2007; Ferguson & Olson, 2014; Ferguson & Rueda, 2010). Additionally, Ferguson (2007) and Lobel et al., (2017) cautions that in correlational studies, the influence of possible third variables (e.g., family background variables, gender, or personality characteristics that may predispose aggression) is not always considered. As such, Ferguson and colleagues suggest that meta-analyses reporting higher effect sizes may be exaggerated based on the varied, unstandardized measures of aggression and the lack of

control for possible confounding variables, especially in samples of children (as the majority of the research is based on young adults).

That being said, researchers suggest that even small effect sizes for aggressive behaviour can result in substantial practical consequences because of the high number of children who are spending a great deal of time playing violent video games. Further, the effects may be cumulative, eventually resulting in significant impacts on the individual and society (Prot, McDonald, Anderson, & Gentile, 2012). This debate surrounding the extent to which playing violent video games influences children's aggression calls for research to examine children's differential susceptibility to the negative effects of violent video gaming and identify children who are at-risk for aggression.

**General Aggression Model and violent video games.** The GAM (Anderson & Bushman, 2002) can inform our understanding of the effects of playing violent video games and predicting children who are at-risk for experiencing negative effects of playing violent video games, including aggression. Personological risk factors and situational risk factors, such as playing violent video games, can cumulatively influence individuals' aggressive behaviour. Personological risk factors that can combine with exposure to violent video games and increase risk of aggressive behaviour, can include the player's gender, age, temperament, history of aggression, lack of adaptive social skills, and poor emotion regulation (Anderson & Bushman, 2002). The violent content in video games and the amount of exposure to violent video games are situational risk factors that in combination with various personological risk factors may increase the likelihood of aggression (Anderson & Bushman, 2002). Playing violent video games can affect individuals' internal states by priming aggressive cognitions (e.g., increasing

aggressive scripts or hostile bias), increasing physiological arousal, and creating aggressive affect (e.g., anger) resulting in both short and long-term effects on aggression (Anderson & Bushman, 2002; Anderson & Carnagey, 2014; Anderson & Dill, 2000; Anderson et al., 2010; Bushman & Anderson, 2002; Greitemeyer & Mügge, 2014; Grizzard et al., 2016).

When violent games are repeatedly played, hostile knowledge structures can become more complex, differentiated, and chronic, which increases the accessibility of aggressive knowledge structures, and can result in the development of an aggressive personality (Buckley & Anderson, 2006; Bushman & Anderson, 2001). As such, future mild or ambiguous situations may be interpreted in a hostile manner and lead to aggressive behaviour. For example, in a longitudinal study of 295 German adolescents (mean age: 13 years) playing a violent video game significantly predicted beliefs that aggression was normative, which in turn, predicted higher levels of aggressive behaviour (Möller & Krahé, 2008). Funk et al. (2004) found that in children aged 9 to 10 years old in the United States, exposure to violent video games predicted more accepting attitudes towards violence, with higher levels of exposure to violent games predicting higher levels of proviolence attitudes. Although few researchers have considered the effects of violent video games on children, there is some evidence to suggest that children who are exposed to video game violence may be at risk for developing aggressive cognitions and, in turn, aggressive behaviour.

When individuals play violent video games their arousal increases (e.g., heart rate), and if these individuals are predisposed to aggression (e.g., high trait hostility, previous aggression history), this surge in arousal can increase their aggressive behaviour

tendencies and likelihood of imitating recently observed behaviours (Anderson, 2003). Ballard and Weist (1996) found that 33 male undergraduate students who played a violent video game demonstrated higher levels of heart rate reactivity and hostility; the more violence in the video game was associated with higher blood pressure reactivity. Therefore, greater exposure to video game violence may increase arousal, which, according to the GAM, can increase the individual's risk for engaging in aggressive behaviour.

Playing violent games can increase aggressive affect (e.g., anger) which can activate individuals' aggressive memories, thoughts, or scripts, and increase the likelihood of selecting an aggressive script or set of behaviours (Buckley & Anderson, 2006; Anderson & Bushman, 2002). In a sample of 148 Portuguese college students, playing a violent video game was associated with higher levels of state hostility and aggressive behaviour, compared to those who played a nonviolent video game (Arriaga et al., 2008). Further, an indirect effect of playing violent video games and aggression through state hostility was found, suggesting that the effects of playing violent video games on aggression may be due, in part, to feelings of hostility. Moreover, studies have found that trait anger moderates the relation between violent video game exposure and aggression, such that the effects are stronger for young adults who have higher levels of trait anger (Engelhardt, Bartholow, & Sauls, 2011; Giumetti & Markey, 2007). Therefore, playing violent video games has been found to increase aggressive affect, and in turn, result in aggressive behaviour.

Research has shown that playing violent video games can result in immediate, short-term increases in aggressive cognitions, aggressive affect, and physiological arousal

in young adults. For example, in a sample of 224 undergraduate students, after playing a violent video game for approximately 20 minutes participants completed ambiguous story stems. Participants expected more aggressive thoughts, feelings, and behaviours from the main characters in the stories, even when they were not provoked (Bushman & Anderson, 2002), demonstrating short-term effects on aggressive cognitions after playing a violent video game. Moreover, chronic violent video game play has been shown to result in long-term effects on aggression.

Playing violent video games requires repeatedly activating aggressive scripts, which can create more positive attitudes and beliefs about the use and effectiveness of aggression to solve conflicts, increase the accessibility to aggressive behavioural scripts and hostile attribution bias, decrease the accessibility of nonviolent behavioural scripts, and decrease the typical negative human emotional reactions towards violence and aggression (Anderson, 2003; 2004). Through the repetition of activating aggressive scripts, experiencing aggressive affect, and feeling aroused, long-term changes in the individual's personality (i.e., their perceptions and interpretations of the world) can occur. Aggression-related knowledge structures become more automatic and chronic, affecting an individual's decision-making processes and resulting in increased risk of aggression (Anderson, 2004; Buckley & Anderson, 2006). Furthermore, when individuals experience positive reinforcement for their aggressive and violent behaviour in a video game (e.g., by winning rewards or points), this can increase their likelihood of selecting aggressive scripts in the future. In violent video games, violence is rewarded in a number of ways, including killing innocent people using a broad range of weapons (e.g., guns, knives, swords, cars; Anderson, 2003). In fact, when adults played a violent video game

and were rewarded for game violence, they showed higher levels of aggressive cognitions and behaviour compared to players who played a game in which violence was punished or who played a nonviolent video game (Carnagey & Anderson, 2005). Overall, the GAM suggests that short and long-term effects of playing violent video games on aggressive behaviour occur through aggressive thoughts, aggressive feelings, and physiological arousal (Anderson et al., 2007; Anderson & Bushman, 2002; Anderson & Carnagey, 2014).

***Findings linking violent video gaming and aggression.*** In a comprehensive review of studies examining the effects of violent video gaming, Dill and Dill (1998) found that the negative effects of violent video game play were at least comparable to that of other forms of media violence (e.g., television and film violence). The majority of the experimental studies revealed that higher levels of short-term violent video game play are associated with higher levels of aggressive cognitions, aggressive affect, aggressive behaviour, and lower levels of prosocial behaviour. These findings were consistent with a widely cited meta-analysis by Anderson and Bushman (2001). Exposure to violent video games was associated with increases in aggressive behaviour ( $r = .27$ ), aggressive cognitions ( $r = .27$ ), aggressive affect ( $r = .19$ ), and physiological arousal ( $r = .22$ ), and decreases in prosocial behaviour ( $r = -.27$ ). The experimental studies demonstrated that playing violent video games can result in short-term effects on aggression and prosocial behaviour in the laboratory, while cross-sectional studies showed that repeated exposure to violent video games is associated with real world aggression, and longitudinal studies suggest long-term effects of repeated exposure to violent video games on aggression (Anderson & Bushman, 2001).

Although the majority of early studies examined predominantly young adults, Anderson (2004) found somewhat similar findings among children and adolescents, such that playing violent video games was associated with increases in children and adolescents' aggressive behaviour and aggressive cognitions, and decreases in helping behaviour. More recently, Anderson et al. (2010) and Greitemeyer & Mügge (2014) replicated these early findings in meta-analyses involving more than 35,000 participants. Anderson et al. (2010) reported that the effects were consistent for both men and women, and for participants from collectivistic Eastern countries (e.g., Japan) and from individualistic, high violence Western countries (e.g., United States and Europe). Again, both short-term and long-term effects of exposure to violent video gaming on aggression were shown, and interestingly, Anderson et al. (2010) reported a marginally significant effect of age, with slightly higher effect sizes for younger participants, suggesting that children might be more susceptible to the effects of playing violent video games than adolescents and adults. The links between exposure to violent video games and aggression are well established in young adults, with research suggesting that similar effects may be found in children and adolescents; however, at the present time, there is a dearth of studies examining effects of playing violent video games on children younger than 10 years old (APA, 2015).

*Children and adolescents.* Although there are fewer studies examining the effects of violent video gaming on children and adolescents, the existing findings appear similar to those reported in young adults. Anderson et al. (2008b) examined the effects of habitual violent video game play on physical aggression in children and adolescents in three independent studies, at two time points (the lag between assessments ranged

between 3 and 6 months). The participants' ages ranged between 9 and 18; one sample was obtained in the United States (aged 9 to 12,  $N = 364$ ) and two samples were collected in Japan (aged 12 to 15,  $N = 181$ ; aged 13 to 18,  $N = 1,050$ ). Habitual game play was measured by having each of the participants list their favourite three video games, and then rate the amount of violent content in each game and how frequently they played each game. In the American sample, physical aggression was measured using combined teacher, peer, and self-reports of physical aggression within the past year. In the two Japanese samples, physical aggression was measured via self-reported frequency of physical aggression. The results revealed that habitual violent video game play predicted physical aggression three to six months later, after controlling for previous aggressiveness and gender. These findings were consistent across both countries and, interestingly, the positive link between playing violent video games and physical aggression was stronger for younger American children (aged 9 to 12,  $r = .40$ ), than both of the Japanese samples of adolescents (i.e., aged 12 to 15;  $r = .34$ ; aged 13 to 18;  $r = .23$ ; Anderson et al., 2008b).

Möller and Krahe (2008) revealed similar findings in a sample of 295 German adolescents (mean age of 13 years), such that video game violence significantly predicted physical aggression 30 months later. In another experimental study, Dutch boys (mean age of 14 years) were found to behave more aggressively in a reaction time task after playing a violent video game, compared to boys who played a nonviolent game (Konijn, Bijvank, & Bushman, 2007). Olson et al. (2009) proposed that the link between exposure to video game violence and physical aggression may be dose-related. In a sample of 1,254 children and adolescents (aged 11 to 16), exposure to M-rated video games

significantly predicted aggression, such that each additional day of exposure to M-rated video games increased the probability of the children and adolescents engaging in physical aggression (Olson et al., 2009). In sum, the findings suggest that playing violent video games may be a risk factor for physical aggression in both children and adolescents, across cultures, and may, in fact, be more detrimental during the school-age to preadolescence phase.

In addition to links with aggressive behaviour, research has suggested that exposure to video game violence is associated with increased aggressive cognitions in adolescents. Anderson et al. (2007) had 189 participants aged 14 to 19 complete questionnaires related to personality, attitudes towards violence, aggressive norms, aggressiveness, violence, exposure to violent video games, and aggressive cognitions. Findings indicated that higher levels of video game violence were significantly related to higher levels of both violent behaviour and aggression. Moreover, adolescents who had greater exposure to violent video games held more pro-violent attitudes, showed greater hostility, thought that violence was typical behaviour, and behaved more aggressively (Anderson et al., 2007). Consistent with these findings, Gentile et al. (2004) reported that in a sample of 607 American early adolescents (aged 13 to 14), higher exposure to video game violence was associated with higher levels of trait hostility, arguments with teachers, and physical fighting. In a stratified nationally representative sample of 1,000 Canadian children and adolescents, aged 10 to 17 and their parents, Dittrick et al. (2013) examined links between playing mature and violent video games with general bullying and cyberbullying. Both parents and children completed measures assessing children's involvement in bullying and video gaming. Results revealed that more general bullying

and cyberbullying behaviours were related to playing more mature and violent video games across parent and child reports (Dittrick et al., 2013). In a sample comparing the effects of violent video game exposure and aggression in children and adolescents (aged 9 to 13) from Singapore, the link between violent video gaming and aggressive cognitions was stronger for the younger children than the adolescents (Gentile et al., 2014). Together, the research supports that playing violent video games may be associated with increases in aggressive cognitions and aggressive behaviour in children and adolescents, which is consistent with the research findings in samples of adults.

*School-age children.* As Anderson and colleagues (Anderson et al., 2008b; Anderson et al., 2010) revealed, school-age children (e.g., 9 to 12) may be the most at-risk group of individuals for experiencing negative effects (e.g., aggression) of playing violent video games; however, this population is vastly understudied. In one study assessing the effects of violent video games on children's aggressive behaviour (Irwin & Gross, 1995), 7- and 8-year-old boys ( $N = 60$ ) were randomly assigned to play either a violent or nonviolent video game. Following this, participants were asked to participate in free play, and then a competitive task, which both took place with another 8-year-old boy (who was a confederate) in a separate room. Playing a violent video game was related to greater physical and verbal aggressive behaviour toward objects in the room, greater verbal aggression towards the confederate during free play, and greater physical aggression towards the confederate during the competitive task. Participants in the violent video game condition engaged in more than twice as many physically aggressive behaviours as participants in the nonviolent video game condition, demonstrating that playing violent video games is associated with aggression in children.

Similar findings were reported in Anderson et al. (2007), where 9- to 12-year-old children ( $N = 161$ ) were randomly assigned to play either a violent or nonviolent video game, and then children set noise blasts to be delivered to another participant. The results indicated that children who played the violent video game set higher levels of noise blasts than those children who played the nonviolent video game. In addition, Coker et al. (2015) found that children's (10 to 11 years) report of playing violent video games predicted their aggressive behaviour, above and beyond the influence of other risk factors, including children's mental health symptoms, nonmedia exposure to violence, and sociodemographic factors. Although few researchers have examined the effects of violent video game exposure in school-age children, the few existing experimental studies have demonstrated short-term effects of playing violent video games on aggressive behaviours in school-aged children.

Longitudinal findings have corroborated these results and further suggested causal implications of playing violent video games on children's aggression. Slater et al. (2003) examined the effects of exposure to various types of media violence, including watching action films, playing violent video games, and visiting Internet websites that included violent content, across two years in 2,550 American children beginning in either grade six or seven. The children completed surveys assessing their frequency of watching action movies, playing computer or video games that included weapons, visiting Internet sites related to violence, and aggressive behaviour. The results revealed that exposure to violent media (combined for movies, video games, and Internet) was positively related to aggression two years later, after controlling for prior aggression and other aggression-related variables (e.g., sensation-seeking, general Internet use). These findings were

consistent with another study (Anderson et al., 2007), in which children ( $N = 430$ ; aged 8 to 10 years) and their teachers completed surveys on two occasions, five months apart, but within the same school year. Teachers and peers rated children's social adjustment, and children rated their involvement in physical fights, exposure to violent media, amount of time spent watching television and playing video games, and their hostile attribution bias. Children who played more violent video games and had higher levels of overall screen time showed higher levels of hostile attribution bias, which in turn, were related to increases in verbal, physical, and relational aggressive behaviour, and a decrease in prosocial behaviour (Anderson et al., 2007). In addition, in a longitudinal study of 3032 children and adolescents (aged 9 to 13), violent video game play predicted youth's aggressive behaviour, suggesting that repeated violent video game exposure may increase children's aggressive behaviour in the long-term (Gentile et al., 2014). Overall, these studies suggest that the effects of repeated exposure to violent video games can have long lasting effects on school-age children, including possible changes to children's cognitions (i.e., developing hostile biases), and resulting in increases in aggressive behaviour and decreases in prosocial behaviour.

*Gender differences.* The research examining gender differences in both the frequency and duration of playing violent video games and overall aggressive behaviour is mixed. Anderson et al. (2008b) found that in a sample of 1,595 Japanese and American children, school-age boys played more violent video games than school-age girls did; additionally, the boys behaved more aggressively than the girls did. Numerous other studies of young adults, adolescents, and children have not found any differences in the effects of playing violent video games on aggression based on gender (e.g., Anderson &

Dill, 2000; Anderson et al., 2010; Anderson et al., 2007). For example, in a sample of 430 school-age children (aged 8 to 10), playing violent video games was associated with increases in hostile attribution biases, verbal aggression, and physical aggression, with no differences between girls and boys (Anderson et al., 2007). Gentile et al. (2014) did not find any gender differences in the link between violent video game exposure and aggressive behaviour and cognitions. Therefore, in order to identify children at-risk for experiencing the negative effects of playing violent video games, more research is needed to better understand any differences between boys and girls.

**Factors related to the link between violent video gaming and aggression.** Few studies have examined known risk factors for aggression (e.g., hostile attribution bias, poor parental monitoring) in the relation between exposure to video game violence and aggression. Some studies have considered additional risk factors as third variables and have co-varied them in the analyses of the effects of exposure to video game violence on aggression. However, this method does not allow researchers to examine the effects of various risk factors in contributing to aggressive outcomes. The research suggests that the effects of violent video game play can be strengthened with the addition of other risk factors, such as the player's gender, age, temperament, having a history of bullying or being bullied, lacking effective problem solving skills, having poor emotion regulation, experiencing hostile biases, and lacking parental monitoring of video game play (Funk & Buchman, 1996; Funk, Buchman & Germann, 2000; Gentile & Anderson, 2003). Recently, the American Psychological Association task force on violent media (2015) reported that there is little evidence that known risk factors for aggression influence the effects of violent video game exposure on aggressive outcomes and that more research is

needed to determine risk factors that might influence the effects of violent video game play.

**Temperament.** Very few studies have examined the influence of children's temperament, including negative affect, in the relation between exposure to violent video gaming and aggression in youth. In one study with 600 adolescents aged 12 to 14, participants completed questionnaires assessing frequency and duration of exposure to violent media, trait hostility, and physical aggression (Gentile et al., 2004). The results revealed the trait hostility mediated the relation between violent video game exposure and aggression, such that higher levels of violent video game exposure were indirectly related to higher levels of physical aggression, through higher levels of trait hostility. Consistent with the GAM, these findings suggest that long-term effects of playing violent video games can include increases in aggressive knowledge structures, which are related to increases in aggression (Gentile et al., 2004). Therefore, children's temperament, including negative affect and hostility, may influence the relation between violent video games and aggression in individuals; however, empirical research is needed with school-age children.

**Parental monitoring.** In the media violence literature, parental monitoring has been shown to mitigate the effects of media violence on children's aggression (Anderson et al., 2003; Gentile et al., 2004; Gentile & Bushman, 2012; Nathanson, 1999; Nathanson & Cantor, 2000; Strasburger & Donnerstein, 1999). The research indicates that parents play an influential role in the impact of exposure to media violence on aggression in children. Parents who set appropriate limits on exposure to violent media (i.e., set rules regarding the amount of time allowed to play video games or the content of the video

games; Gentile et al., 2004; Nathanson, 1999; Strasburger & Donnerstein, 1999), are actively involved in children's violent media habits, and engage in discussions regarding children's understanding and perceptions of the violent content have children who seem to show fewer negative effects of watching violent media, including aggressive behaviour. Despite the evidence that the manner in which parents interact with their children and become involved in their children's media habits has implications for children's aggression, few researchers have examined the role of parental monitoring in the effects of video game violence on children's aggressive behaviour.

Although very few studies have examined the role of parental monitoring in understanding the effects of violent video gaming in children, the existing literature suggests that parental monitoring, including involvement, limit setting, and communication about children's media use may influence the effects of exposure to video game violence on aggression. Gentile et al. (2004) examined the influence of parental limit setting on adolescents' violent video gaming and aggressive behaviour in a sample of 607 adolescents aged 13 to 14. The findings revealed that adolescents who received limits on the amount of time they were allowed to play video games and the types of video games they were allowed to play, showed lower levels of hostility and physical fighting (Gentile et al., 2004). These findings demonstrate that parental limit setting of children's video game use may serve a protective function in reducing children's risk for aggression.

With respect to parental involvement, in a study of children aged 9 to 12 ( $N = 161$ ), children who were exposed to higher levels of video game violence were more likely to engage in aggression later on; however, if children's parents were involved in

their video game play habits, children's risk for engaging in physical aggression was decreased (Anderson et al., 2007). The children most likely to show aggression later on were those who experienced a combination of high levels of video game violence exposure and low levels of parental involvement in their media use. In contrast, the children least at risk for aggression were exposed to low levels of video game violence and had parents who were highly involved in their media use (Anderson et al., 2007). In a sample of 1323 students from grades 3 to 5 parental involvement in children's media use was found to reduce children's total screen time and media violence exposure, which in turn, reduced children's aggression (Gentile et al., 2007). Similarly, in a study of 391 school-age children (aged 6 to 8), parents completed surveys assessing their parenting style, their children's total number of hours spent playing video games in the previous 24 hours, and their children's hyperactive behaviour and attention problems. The results revealed that responsive parenting practices reduced the effects of exposure to video games and children's hyperactive behaviour, such that when parents demonstrated more consistency, warmth, and predictability with their children, children showed lower levels of problem behaviour (Linebarger, 2015).

In terms of parental communication, studies of school-age children ( $N = 478$ ; 10 to 13; Wallenius et al., 2007) and adolescents ( $N = 316$ ; aged 12 to 15; Wallenius & Punamäki, 2008) in Finland examined the link between violent video gaming and aggression, and the influence of parent-child communication. In both studies, youth completed questionnaires assessing their frequency of video gaming, the violence involved in the video games they played, the characteristics of their communication patterns with their parents, and their physically aggressive behaviour. The results

indicated that parent-child communication moderated the relation between exposure to video game violence and physical aggression, with higher levels of exposure to video game violence associated with stronger effects on aggression in parent-child dyads who exhibited poor parent-child communication (i.e., not open, positive, or encouraging parent-child communication; Wallenius & Punamäki, 2008; Wallenius et al., 2007). Furthermore, the effects of poor parent-child communication had the strongest effects for school-age boys. The researchers suggested that younger children may be more influenced by parental communication, especially related to media use, and may benefit from more explanations and interpretations of the violent content in the video games (Wallenius et al., 2007).

Parental monitoring related to children's violent video gaming habits, including involvement, limit setting, and communication about violent video game use, may be influential in reducing children's risk of experiencing negative effects of playing violent video games, including aggression. Furthermore, in the general aggression literature, parental limit setting, involvement, and communication with children, have been shown to influence children's hostile attribution bias (Healy et al., 2015; Nelson & Coyne, 2009; Weiss et al., 1992). Further research is needed to better understand the influence of and importance of children's hostile attribution bias and parental monitoring in the effects of children's violent video gaming and aggression.

### **Study Purpose**

The overall purpose of the present study was to examine the effects of violent video gaming on aggression in children aged 7 to 10 years old, and the role of specific parent and child risk factors in the extent to which playing violent video games was

associated with aggression. This review of the literature highlights the importance of studying the effects of violent video gaming in school-age children, as the limited research available suggests that playing violent video games is associated with higher levels of aggression in children (Anderson et al., 2007; Anderson et al., 2010; Coker et al., 2015; Gentile et al., 2014; Greitemeyer & Mügge, 2014). School-age children are considered to be highly susceptible to the negative effects of playing violent video games, including aggression (Anderson et al., 2008b; Anderson et al., 2010; Eisenberg & Fabes, 1998; Funk et al., 2004; Gentile et al., 2014). When aggression remains stable or increases during childhood, instead of following the typical declining trend, children are considered 'high risk' for continuing aggressive behaviour into adolescence and adulthood (Nagin & Tremblay, 1999). Consistent with the majority of the empirical research on the effects of violent video gaming to date, the present study considers aggression within the context of the GAM (Anderson & Bushman, 2002). Through interactions between personological factors, such as gender and negative affect, and situational factors, including playing violent video games, children's risk of aggressive behaviour increases via increases in aggressive cognitions, aggressive affect, and physiological arousal (Anderson & Bushman, 2002). As such, the extent to which children's hostile attribution bias and temperament helped to explain the links between children's violent video game exposure and physical aggression was explored.

Furthermore, additional factors in children's aggression, such as parental monitoring (i.e., involvement, limit setting, and communication) related to media use may influence the effects of violent video gaming, by potentially mitigating or exacerbating children's aggressive behaviour (Funk & Buchman, 1996; Funk et al., 2000;

Gentile & Anderson, 2003; Gentile et al., 2014b; Zillmann & Weaver III, 1997). Based on the limited research on the effects of violent video gaming in school-age children (i.e., aged 7 to 10), it is necessary for researchers to obtain a better understanding of the links between children's exposure to violent video games, parent and child risk factors, and children's aggressive behaviour.

### **Research Objectives and Hypotheses**

The present study had several research objectives related to the effects of playing violent video games and aggression in children. First, this study sought to confirm the existence of the link between playing violent video games and aggressive behaviour in children. The research examining effects of violent video gaming on aggression is limited in school-age children, and although the majority of the empirical findings with young adults suggest that playing violent video games is associated with increases in aggressive behaviour, some researchers continue to challenge the findings (e.g., Ferguson, 2007, 2015; Lobel et al., 2017). Therefore, examining the link between violent video game play and aggression in 7 to 10 year old children, an understudied population, contributes to addressing this gap in the literature.

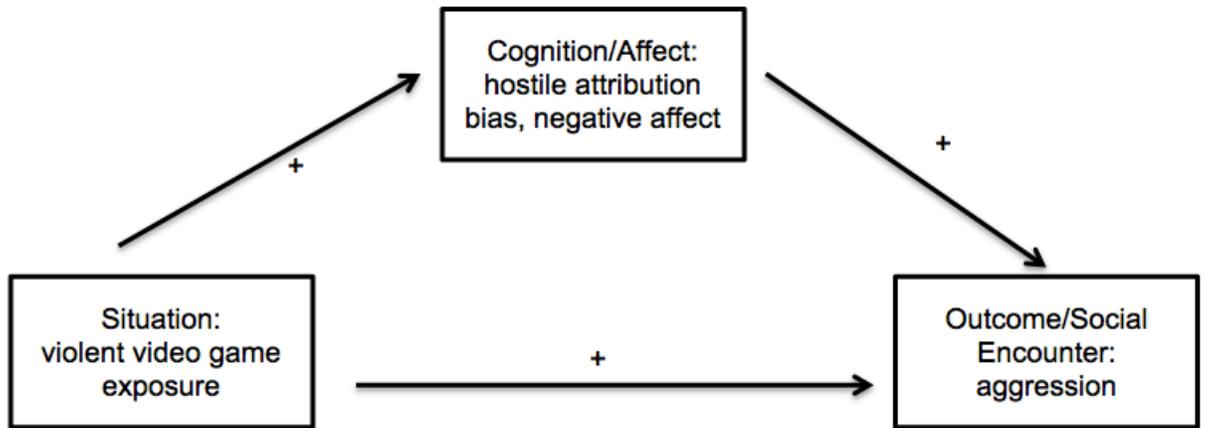
Second, this study sought to identify the influence of known parent and child risk factors for children's aggression, including negative affect, gender, hostile attribution bias, and parental monitoring related to media use (i.e., involvement, limit setting, and communication), in the relation between children's violent video game play and aggression. Few studies have examined the roles of child and parent risk factors in the effects of playing violent video games, specifically in children. Of the studies that have examined risk factors in the effects of violent video gaming in youth, individuals who

played more violent video games more often tended to have higher levels of hostility and aggression, and parental monitoring tended to mitigate children's risk of behavioural problems (e.g., Anderson et al., 2007; Gentile et al., 2014; Gentile et al., 2014b; Linebarger, 2015; Wallenius & Punamäki, 2008). Therefore, consistent with the GAM (Anderson & Bushman, 2002), this study sought to examine whether children's violent video game exposure was related to higher levels of aggression through higher levels of hostile attribution bias and negative affect (Gentile et al., 2004; see Figure 2). A further objective of the study was to investigate whether children who play violent video games, but experience higher levels of parental monitoring (i.e., parental involvement, limit setting, and communication), have lower levels of hostile attribution bias, negative affect, and aggression (see Figures 3a and 3b).

With respect to children's gender, according to the GAM, it is predicted that children's gender may moderate the relation between violent video game play and aggression (see Figure 4).

Examining the influence of risk factors (i.e., hostile attribution bias, negative affect, gender, and parental monitoring related to media use) helps us to better understand the link between violent video gaming and aggression, and to identify children who are likely to experience negative effects of playing violent video games.

Third, the present study sought to obtain an in-depth understanding of parents' perceptions of children's violent video gaming habits through collecting qualitative accounts of parents' perceptions and experiences with children's gaming habits. This information was used in conjunction with the findings from the quantitative results to



*Figure 2.* Hypothesized mediation model of children’s violent video game exposure and aggression, through each of hostile attribution bias and negative affect.

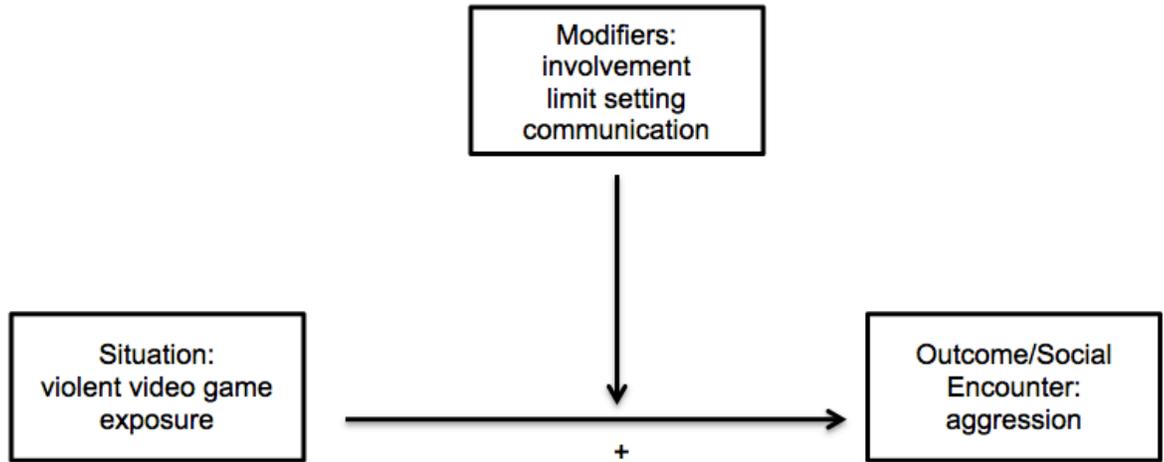
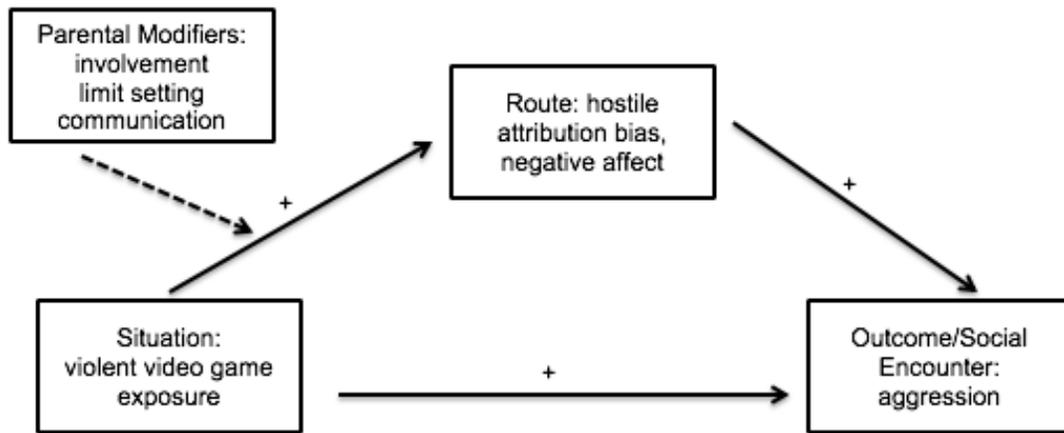
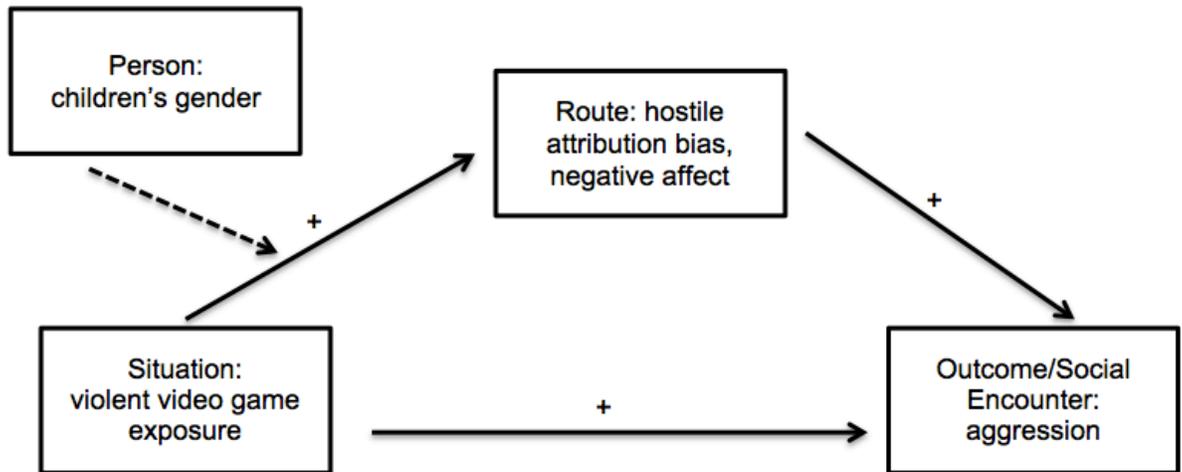


Figure 3a. Hypothesized moderation model of the direct effect of children’s violent video game exposure on children’s aggression, at levels of each of the parental monitoring variables (i.e., parental involvement, communication, and limit setting).



*Figure 3b.* Hypothesized moderated mediation model of the parental monitoring variables (i.e., parental involvement, limit setting, and communication) each moderating the relation between children’s violent video game exposure and aggression, through hostile attribution bias and negative affect.



*Figure 4.* Hypothesized moderated mediation model of children’s gender moderating the relation between violent video game exposure and aggression, through hostile attribution bias and negative affect.

obtain a detailed understanding of the influence of parent and child risk factors in the relation between violent video game play and aggression in children.

The following hypotheses and research questions were proposed:

1. Higher levels of children's violent video game exposure would be related to higher levels of aggression.
2. Higher levels of children's negative affect and hostile attribution bias would each be related to higher levels of children's aggression.
3. Children's hostile attribution bias and negative affect would each mediate the relation between children's violent video game exposure and aggression, such that higher levels of violent video game exposure will be indirectly related to higher levels of children's aggression through higher levels of each of children's hostile attribution bias and negative affect.
4. The relation between children's violent video game exposure and children's aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender, such that the relation between violent video game exposure and aggression would be stronger at lower levels of each of the parental monitoring variables and higher for boys.
5. The relation between children's violent video game exposure, hostile attribution bias, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender, such that the relation between violent video game exposure, hostile attribution bias, and aggression would be stronger for

children with lower levels of each of the parental monitoring variables and for boys.

6. The relation between children's violent video game exposure, children's negative affect, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender, such that the relation between violent video game exposure, children's negative affect, and aggression would be stronger for children with lower levels of each of the parental monitoring variables and for boys.

#### Qualitative research questions

1. Do parents have perceptions about video gaming and children's behaviour? Do they have specific perceptions about the effects of playing violent video games?
2. To what extent do parents monitor their children's video gaming?
3. Do parents intervene or set limits regarding children's video gaming habits?

## CHAPTER II

### Method

#### Participants

For the survey portion of the study, participants were 124 parent-child dyads. Two dyads were excluded from the analyses due to incomplete data on at least one full questionnaire (i.e., CBCL). The final sample consisted of 122 parent-child dyads. According to an a priori power analysis using G\*Power 3.1, this sample was determined to be large enough to detect a small to moderate effect size ( $d = .20$ ; Anderson & Bushman, 2001) based on the statistical power level of .80 ( $\alpha = 0.05$ ) for linear regression analyses using up to eight predictor variables. The sample obtained in the present study appeared sufficient for detecting significant findings.

Children's ages ranged between 7 to 10 years old ( $M = 8.49$  years,  $SD = 1.16$ ), with two-thirds of the sample including boys (41 girls,  $M = 8.59$  years,  $SD = 1.16$ , range = 7 – 10 years; 81 boys,  $M = 8.44$  years,  $SD = 1.16$ , range = 7 – 10 years). Few children ( $n = 18$ ) were diagnosed with a medical condition or a psychological disorder. The majority of the children (92%;  $n = 112$ ) had siblings ( $M = 1.65$ ;  $SD = 0.89$ ; range = 0 – 4). Twenty-three of these siblings participated in the study; 21 parents had two children in the study and one parent had three children in the study. Parents reported the age at which their children began playing video games. The majority of children began playing video games between ages 4 to 6 (60%,  $n = 73$ ), with a few children starting as early as age 1 (2.5%,  $n = 3$ ). Inclusion criteria were that children were required to speak fluent English and not have any diagnosed severe developmental delays or severe physical disabilities. The children's demographic characteristics are summarized in Table 1.

Table 1

*Demographic Characteristics of the Children in the Sample for the Survey Data (N=122)*

Characteristic	N	%
Child gender		
Male/Boy	81	66.4
Female/Girl	41	33.6
Child Psychological or Medical Diagnosis		
Learning disability (LD)	7	5.7
Attention-Deficit/Hyperactivity Disorder (ADHD)	5	4.1
Mood and/or anxiety disorder	2	1.6
Mild visual impairment	2	1.6
Genetic and congenital conditions (e.g., Ehlers-Danlos Syndrome)	3	2.5
Diabetes	1	0.8
Comorbid diagnoses (ADHD, LD, anxiety)	1	0.8

Ninety-nine parents participated in the present study. The majority of the parents were mothers (73% mothers,  $n = 72$ ,  $M_{age} = 38.25$ ,  $SD_{age} = 5.83$ ; 26% fathers,  $n = 26$ ,  $M_{age} = 40.64$ ,  $SD_{age} = 7.09$ ; one legal guardian reported 'other' relationship) and married, with all parents ranging in age from 27 to 54 years (total sample:  $M_{age} = 38.97$ ;  $SD_{age} = 6.27$ ). In terms of ethnicity, the majority of the mothers were Caucasian, followed by Biracial, Multi-racial, South Asian, East Asian, and Middle Eastern ethnicities. Similarly, the majority of fathers were Caucasian, with some fathers of South Asian, Caribbean, East Asian, Native Canadian, and Middle Eastern ethnicities. The majority of mothers and fathers graduated from college or university (63.6%, and 47.5%, respectively). The median annual income of parents who lived with the child was \$90,000 representing a predominantly upper-middle class sample. Significantly more fathers ( $M = .85$ ,  $SD = .46$ ) reported playing video games compared to mothers ( $M = .53$ ,  $SD = .53$ ;  $t(96) = 2.709$ ,  $p = .008$ ). Approximately half of the mothers in the sample (49%,  $n = 36$ ) reported that they play video games themselves, while three-quarters of the fathers (77%,  $n = 20$ ) played video games. The parents' characteristics are summarized in Table 2.

Fifteen parents completed the interview portion of the study. This sample size was determined based on saturation of categories (i.e., the number of participants at which the analysis of additional participants would not reveal any new categories or relationships among the categories; Rennie, Phillips, & Quartaro, 1988). Saturation is often found after analyzing approximately 12 to 15 participants (Francis et al., 2010; Guest, Bunce, & Johnson, 2006). In the present study, saturation was found after analyzing 13 participants. The inclusion criteria for participation in the interviews were as follows: a) completion of the questionnaires in the present quantitative study and parent indicated interest in being

Table 2

*Demographic Characteristics of the Parents in the Sample for the Survey Data (N = 99)*

Characteristic	N	%
<b>Parent gender</b>		
Male	26	26.3
Female	72	72.7
Not identified	1	1.0
<b>Marital Status</b>		
Married	71	71.7
Divorced	4	4.0
Separated	9	9.1
Living Together	7	7.1
Remarried	3	3.0
Other	5	5.1
<b>Mother's Education</b>		
Less than 7 years	0	0.0
Junior high school	0	0.0
Some high school	4	4.0
Graduated high school	13	13.1
Some college or university	8	8.1
Graduated college or university	62	63.6
Graduate/Professional school	11	11.1
Other	0	0.0
<b>Father's Education</b>		
Less than 7 years	0	0.0
Junior high school	0	0.0
Some high school	7	7.1
Graduated high school	18	18.2
Some college or university	18	18.2
Graduated college or university	47	47.5

Graduate/Professional school	8	8.1
Other	1	1.0
Mother's Ethnicity		
South Asian	2	2.0
East Asian	2	2.0
Caucasian	78	78.8
African Canadian	1	1.0
Caribbean	0	0.0
Hispanic	1	1.0
Native Canadian	2	2.0
Biracial	5	5.1
Multi-racial	3	3.0
Other	5	5.1
Father's Ethnicity		
South Asian	4	4.0
East Asian	3	3.0
Caucasian	73	73.7
African Canadian	1	1.0
Caribbean	4	4.0
Hispanic	0	0.0
Native Canadian	2	2.0
Biracial	1	1.0
Multi-racial	2	2.0
Other	8	8.1
Total Income <sup>a</sup>		
Under 30,000	7	7.1
30,000 – 60,000	20	20.2
61,000 – 100,000	32	32.3
101,000 – 150,000	18	18.2
151,000 – 250,000	14	14.1
Above 250,000	4	4.0

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Mothers Play Video Games

Yes	36	48.6
No	35	50.1
Sometimes	1	1.4

Fathers Play Video Games

Yes	20	76.9
No	5	19.2
Sometimes	1	3.8

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*Note.* <sup>a</sup>Four parents did not report income. Data for mother/father ethnicity and mother/father education reflects all 99 families, as each parent provided this data for the mother and father of the child in the study.

contacted for the interview portion of the study; b) spoke fluent English; and, c) cared for a child between the ages 7 and 10 who played video games. Purposeful sampling was used to recruit the participants for the interviews, as parents of children who demonstrated higher levels of aggression and lower levels of aggression were identified. The primary researcher contacted parents beginning with the parents of children with higher levels of aggression and lower levels of aggression, until 15 parents agreed to participate.

Participants for the interviews included 15 parents of 19 children who participated in the survey portion of the study. Of the 15 parents, 67% were mothers ( $n = 10$ ), with one mother who had three children participate in the surveys and two mothers who had two children in the survey portion of the study. Previous qualitative studies in which parents were interviewed about their perceptions of children's media behaviours have included parents of multiple children (e.g., He, Irwin, Bouck, Tucker, & Pollett, 2005; Zaman et al., 2016); therefore, parents with more than one child in the present study were not excluded from participating in the interviews. Frequencies reported in the qualitative analyses were based on the number of parents, as the purpose of the interview data was to obtain parents' perceptions of children's video gaming habits. The parents' ages ranged between 28 and 51 years ( $M = 41.74$ ,  $SD = 6.71$ ) and the parents represented a sample of 19 children (14 boys and 5 girls) with mean age of 8.79 ( $SD = 1.08$ ). The majority of the parents were married (73%) and of Caucasian ethnicity (67%). See Table 3 for demographic characteristics of the sample included in the interviews.

## Measures

Parents were administered a series of questionnaires, including a demographics

Table 3

*Demographic Characteristics of the Sample Included in the Interview Data*

Characteristic	N	%
Child gender		
Male/Boy	14	73.7
Female/Girl	5	26.3
Parent gender		
Male	5	33.3
Female	10	66.7
Marital Status		
Married	11	73.3
Separated	1	6.7
Living Together	1	6.7
Other	2	13.3
Mother's Education		
Graduated high school	2	20.0
Some college or university	1	10.0
Graduated college or university	7	70.0
Father's Education		
Graduated high school	0	0.0
Some college or university	2	40.0
Graduated college or university	3	60.0
Mother's Ethnicity		
East Asian	0	0.0
Caucasian	7	70.0
Biracial	2	20.0
Multi-racial	1	10.0
Father's Ethnicity		
East Asian	1	20.0
Caucasian	3	60.0

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Biracial	0	0.0
Multi-racial	1	20.0
Total Income		
Under 70,000	2	13.3
70,000 – 100,000	4	26.7
101,000 – 150,000	4	26.7
Above 150,000	3	20.0

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questionnaire, a violent video game exposure questionnaire (Anderson & Dill, 2000), the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001), the Temperament in Middle Childhood Questionnaire (TMCQ; Simonds & Rothbart, 2004), and an adapted version of the Adult Involvement in Media Scale (Gentile et al., 2004; Gentile, Nathanson, Rasmussen, Reimer, & Walsh, 2012). A semi-structured interview was conducted with a subset of parents who were interested in participating in interviews with the researcher regarding their role in children's video gaming habits.

Children were administered a violent video game exposure questionnaire (Anderson & Dill, 2000) and a hostile attribution story completion task (Anderson et al., 2007).

## **Parent Measures**

**Background information.** Parents completed a demographics questionnaire (see Appendix A) that included questions regarding their age, marital status, education, ethnicity, occupation, family income, and own interest in playing video games. They also reported on their children's age, grade, number and age of siblings, and if they had any diagnosed medical or psychological conditions.

**Children's aggressive behaviour.** The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) was used to assess children's aggressive behaviour. The CBCL is a parent report of children's behaviour and includes 113 items, and three additional open-ended questions that allow respondents to write in any problems not already included in the questionnaire. Parents were asked to rate the degree to which they thought each item on the CBCL was true of their children's behaviour within the past two months on a scale from 0 (*not true*) to 2 (*very true or often true*). There are eight

syndrome scales, including anxious/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behaviour. In the present study, the aggressive behavior scale was used as a measure of children's aggression. There were 18 items on the aggressive behavior scale, including items such as, "argues a lot", "cruelty, bullying, or meanness to others", "gets in many fights", and "physically attacks people". Raw scores were converted to *T*-scores with higher scores indicating higher levels of aggressive behaviour.

The CBCL has shown to be a reliable and valid measure. Test-retest reliability is reported at .95 ( $p < .001$ ), internal consistency ranges between Cronbach's alpha of .78 - .97, and test-retest reliability ranges from mean  $r_s = .82 - .92$ . Specifically, the internal consistency of the aggressive behavior scale is reported at Cronbach's alpha of .94 and the test-retest reliability is reported at mean  $r = .90$  ( $p < .05$ ; Achenbach & Rescorla, 2001). The CBCL has been shown to be stable over time (i.e.,  $r_s = .64 - .82$  over 12 months;  $r_s = .56 - .81$  over 24 months), including the aggressive behavior scale (i.e.,  $r = .82$  across 12 months;  $r = .81$  across 24 months; Achenbach & Rescorla, 2001). The CBCL also correlates highly with related BASC scales ( $r_s = .38 - .89$ ,  $p < .001$ ) and the aggressive behavior subscale of the CBCL correlates highly with the aggression scale on the BASC for mother and father ratings ( $r_s = .61 - .72$ ,  $p < .001$ ; Achenbach & Rescorla, 2001). In the present study, the internal consistency of the CBCL Aggressive Behavior scale was excellent (Cronbach's alpha = .90).

**Video game violence exposure.** Anderson and Dill (2000) originally measured video game violence exposure in undergraduate students using a questionnaire that is composed of the following composite scores: video game violence exposure score for

each video game reported, and an overall index of exposure to video game violence. This approach has become a standard method for assessing exposure to video game violence in both adult and youth samples (ages 10 to 17; Anderson et al., 2007; Ditttrick et al., 2013; Gentile et al., 2009). Parents were asked to list their children's five most recently played video games. Parents then rated how often their children played each game on a 7-point Likert scale ranging from 1 (*rarely*) to 7 (*often*). Parents rated how violent the content and graphics are of each game on a 7-point Likert scale from 1 (*little or no violent content/little or no blood or gore*) to 7 (*extremely violent content/extremely and bloody and gory*). The version used in the present study was slightly modified from Anderson and Dill's (2000) original version, as parents in the present study only rated their children's frequency of play during recent months, instead of in various grade levels (e.g., during 9<sup>th</sup> and 10<sup>th</sup> grades) as children in the present study were younger than in Anderson and Dill's (2000) study. The video game violence exposure scores were calculated for each favourite video game by summing the violent content and graphics ratings, and then, multiplying that score by the frequency rating. The five video game violence exposure scores were averaged to provide the overall index of exposure to video game violence (Anderson & Dill, 2000). Half of parents listed five video games (52%), with the majority of parents listing at least 3 games (89%). The parent-reported ratings for level of violence in each of the games ranged from 1 to 7 ( $M = 2.47$ ,  $SD = 1.74$ ). Examples of games listed include Grand Theft Auto, Mario Kart, Minecraft, and car racing games. See Table 4 for the frequencies of games reported by parents.

Anderson and Dill (2000) reported the internal consistency of the overall video game violence exposure scale at Cronbach's alpha of .86 for a sample of 227

Table 4

*Frequencies of Video Games Reported by Parents*

<b>Category of Video Game</b>	<b>Frequency reported</b>	<b>Range of Violence Ratings</b>	<b>Typical ESRB ratings</b>
Adventure games (e.g., Mario Kart, Roblox, Pokemon)	123	1-6	E for Everyone; some fantasy violence
Building games (e.g., Minecraft, Lego)	113	1-5	E for Everyone 10+; some fantasy violence
Shooting games (e.g., Call of Duty, Grand Theft Auto)	51	3-7	Teen or Mature (17+); blood and gore, violence
Arcade games (e.g., Pacman, slitherio)	40	1-2	E for Everyone
Sports games (e.g., NHL)	39	1-2	E for Everyone; E for Everyone 10+; some mild violence
Farm/Animal games (e.g., virtual pet)	33	1-2	E for Everyone
Zombie/war games (e.g., Plants vs. Zombies)	30	1-7	E for Everyone 10+; blood, fantasy violence
Car racing games (e.g., Need for Speed)	17	1-4	E for Everyone 10+; Teen; some violence
Educational games (e.g., math practice)	10	1	E for Everyone
Creative games (e.g., fashion, art)	10	1	E for Everyone
Music games	9	1	E for Everyone
Fighting games (e.g., Clash of Clans)	7	1-2	Teen; violence
Cooking games	6	1	E for Everyone

undergraduate students. Anderson and Dill's (2000) method for measuring video game violence exposure has been frequently used with samples of adults and children (ages ranging between 7 and 17 years), and adequate internal consistency of the overall score for this scale has been supported ( $\alpha = .68 - .83$ ; Anderson et al., 2007; Ditttrick et al., 2013; Ferguson, Garza, Jerabeck, Ramos, & Galindo, 2013; Gentile et al., 2009). For the present study, the internal consistency was found to be adequate (Cronbach's alpha = .74).

**Children's negative affect.** The Temperament in Middle Childhood Questionnaire (TMCQ; Simonds & Rothbart, 2004) is 157-item questionnaire that measures various dimensions of temperament in children aged 7 to 10. This measure was developed based on adaptations of the Children's Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001) and any items not adapted from the CBQ were developed specifically for the TMCQ or were adapted from the Childhood Temperament and Personality Questionnaire (CTPQ; Victor, Rothbart, & Baker, 2003) and the Berkeley Puppet Interview (BPI; Ablow & Measelle, 1993; Simonds, 2006). Parents were asked to report what their child's reaction was likely to be in each situation and decide whether each statement was true or untrue of their child's reaction within the past six months on a 5-point Likert scale, ranging from 1 (*almost always untrue of your child*) to 5 (*almost always true of your child*). Higher scores indicated the child showed high levels of the attribute. There are four composite subscales on the TMCQ, including negative affect, effortful control, surgency, and sociability. In the present study, the negative affect scale was used to measure children's negative affect. The negative affect scale is comprised of the anger/frustration, fear, sadness, discomfort, and soothability/falling

reactivity subscales. Sample items from the negative affect scale include, “has temper tantrums when s/he doesn’t get what s/he wants”, “gets mad when provoked by other children”, “is very frightened by nightmares”, “her/his feelings are easily hurt”, and “when angry about something, s/he tends to stay upset for five minutes or longer”.

The revised edition of the TMCQ was first standardized on a sample of 193 children aged 7 to 10 and the internal consistency of the majority of the TMCQ subscales on the parent report ranged from Cronbach’s alpha of .69 - .90, with the activity level subscale at .63 (Simonds & Rothbart, 2004). In a sample of 59 children aged 8 to 10, Cronbach’s alpha for the parent scales ranged between .71 - .92 (Simonds, 2006). There is significant agreement between parent and child reports on the majority of the subscales, with agreement ranging between  $r = .27$  ( $p < .05$ ) to  $r = .50$  ( $p < .01$ ; Simonds, 2006). Within the present study, the internal consistency for the negative affect scale was good (Cronbach’s alpha = .82). The subscales (i.e., anger/frustration, discomfort, fear, soothability) that comprised the Negative Affect scale demonstrated adequate to good reliability (Cronbach’s alphas = .71 - .86).

**Parental involvement, limit setting, and communication in children’s media habits.** The Adult Involvement in Media scale (AIM; Anderson et al., 2007; Gentile et al., 2004; Gentile et al., 2012) is a 42-item questionnaire used to assess the extent to which parents monitor the media habits of their children, in either parent-report or self-report. The parent-report was used in the present study. Some items were rated by parents on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*always*), and some in which parents selected one answer from the following four choices: “yes”, “no”, “sometimes” and “don’t know”. The AIM consists of four main subscales, including coviewing (2

items), limit setting on amount (2 items), limit setting on content (4 items), and active discussion (12 items) about media use. In the present study, the coviewing subscale was used to measure parental involvement in children's media habits. The limit setting on amount and limit setting on content subscales were combined to measure parental limit setting of children's media use. The active discussion subscale was used as a measure of parental communication about media use. Higher scores indicated higher levels of parental involvement, limit setting, and communication related to children's media use.

The coviewing (i.e., involvement) subscale consists of two items (e.g., "How often do you play computer video games with your child?"), the limits on amount subscale consists of two items (e.g., "How often do you put limits on how much time your child may play video games?"), the limits on content subscale consists of four items (e.g., "How often does your child have to ask permission before playing video games?"), and the active discussion subscale (i.e., communication) is comprised of 12 items (e.g., "How often do you talk to your child about the video games he/she plays?"). Two additional items were created for the limit setting on content subscale in the present study based on the aims of the study to assess the manner in which parents set limits on video gaming (i.e., "How often do you check the video game ratings before you allow your child to play a video game?" and "How often do you restrict your child from playing certain video games because of the content?"). Therefore, the limits on content subscale included six items. Analyses were conducted with the two limit setting subscales (i.e., amount and content) separately and combined, and there were no differences in the results. Therefore, the combined limit setting scale, including both limit setting on amount and content of media was used in the analyses to maximize power in the scale.

The total score has shown sufficient reliability (Cronbach's alpha = .85 for parent-report), though reliabilities for individual subscales were not reported (Gentile et al., 2012). Anderson et al., (2007) used an abbreviated version of this measure, including only four items and reported good reliability (Cronbach's alpha = .71). Similarly, Gentile et al. (2004) used an adapted version in which a parental involvement scale was created by combining the frequency with which parents checked video game ratings before letting children purchase games and the frequency with which parents put limits on the amount of time children were allowed to play. These two items significantly correlated with each other ( $r = 0.36, p < .001$ ). In the present study, the internal consistency of the coviewing (i.e., involvement) subscale was low ( $\alpha = .34$ ), which was likely due to this scale only including two items. It is noteworthy that the analyses were conducted with each of the two items separately and there were no significant changes in the results; therefore, the analyses are reported with both items included, but the subscale is interpreted with caution. The limits on content and amount subscales combined was good ( $\alpha = .86$ ), and the active mediation (i.e., parental communication) subscale was good ( $\alpha = .88$ ). The internal consistency for the total score was adequate (Cronbach's alpha = .78). In the present study, the subscales were analyzed combined and separated; no significant differences were found in the results, so the subscales were analyzed separately to assess specific aspects of parental monitoring (i.e., communication, limit setting, and involvement).

### **Child Measures**

**Video game violence exposure.** Anderson and Dill's (2000) measure of violent video game exposure was used to assess children's violent video gaming habits. This

measure of video game violence exposure is a standard method for assessing children's exposure to video game violence (Anderson & Dill, 2000; Anderson et al., 2007). Children were asked to list their five most recently played video games. Then, children rated how often they played each game in recent months on a 7-point Likert scale ranging from 1 (*rarely*) to 7 (*often*). Children then rated how violent the content and graphics of each game were on a 7-point Likert scale from 1 (*little or no violent content/little or no blood or gore*) to 7 (*extremely violent content/extremely and bloody and gory*). The version used in the present study was slightly modified from Anderson and Dill's (2000) original version, as participants in the present study only rated their frequency of play during recent months, instead of in various grade levels (e.g., during 9<sup>th</sup> and 10<sup>th</sup> grades) as children in the present study were younger than in Anderson and Dill's (2000) study. The video game violence exposure scores were calculated for each favourite video game by summing the violent content and graphics ratings, and then, multiplying that score by the frequency rating. The five video game violence exposure scores were averaged to provide the overall index of exposure to video game violence. Just under half of the children listed five video games (43%), with the majority of children listing at least three games (82%). The ratings for the level of violence in each video game ranged from 1 to 7 ( $M = 2.45$ ,  $SD = 1.83$ ). Examples of games included Minecraft, Mario Kart, Grand Theft Auto, and Candy Crush. See Table 5 for frequencies of video games reported by children.

In a sample of 433 children aged 7 to 11, Anderson et al. (2007) used a modified version of Anderson and Dill's (2000) method, in which children were asked to name their three favourite television shows, video games, and movies, and then, rate the frequency of play and amount of violence in each. Adequate internal consistency for

Table 5

*Frequencies of Video Games Reported by Children*

<b>Category of Video Game</b>	<b>Frequency reported</b>	<b>Range of Violent Ratings</b>	<b>Typical ESRB rating</b>
Adventure games (e.g., Mario Kart, Roblox, Pokemon)	120	1-7	E for Everyone; some fantasy violence
Building games (e.g., Minecraft, Lego)	101	1-7	E for Everyone 10+; some fantasy violence
Shooting games (e.g., Call of Duty, Grand Theft Auto)	51	3-7	Teen or Mature (17+); blood and gore, violence
Arcade games (e.g., Pacman, slitherio)	40	1-4	E for Everyone
Zombie/war games (e.g., Plants vs. Zombies)	34	1-7	E for Everyone 10+; blood, fantasy violence
Sports games (e.g., NHL)	24	1-4	E for Everyone; E for Everyone 10+; some mild violence
Fighting games (e.g., Clash of Clans)	21	1-6	Teen; violence
Farm/Animal games (e.g., virtual pet)	20	1	E for Everyone
Car racing games (e.g., Need for Speed)	16	1-2	E for Everyone 10+; Teen; some violence
Educational games (e.g., math practice)	13	1	E for Everyone
Music games	8	1	E for Everyone
Creative games (e.g., fashion, art)	3	1	E for Everyone
Cooking games	2	1	E for Everyone

overall media violence exposure, including exposure to violent television, video games, and movies was reported (Cronbach's alpha = .68). In a sample of 333 youth aged 10 to 17, (Ferguson et al., 2013) youth were asked to report their three favourite video games and rate the frequency with which they played each game. ESRB ratings were used to determine the amount of violence in each game and calculate an overall score for video game violence (Coefficient  $\alpha = .83$ ). In a sample of 1,323 children aged 6 to 12 from the United States, the intraclass correlation for interrater agreement between children's ratings of the level of violence in video games (i.e., user ratings) was reported at .61 (Busching et al., 2015). Within the present study, the internal consistency of children's violent video game play was found to be adequate (Cronbach's alpha = .79).

**Children's hostile attribution bias.** The hostile attribution bias survey was used to assess children's intent attributions (Anderson et al., 2007). The measure includes ten stories that each describes a situation of provocation, in which the provocateur's intent is ambiguous. Anderson et al.'s (2007) measure of hostile attribution is an adaption of an earlier version (Crick, 1995; Nelson & Crick, 1999) which consisted of five stories depicting instrumental provocations (i.e., physical aggression; e.g., "a peer's basketball rolls under the subject's feet and causes him to fall during a race") and five stories with a focus on relational provocations (e.g., "the subject finds a friend playing with someone the subject dislikes").

The hostile attribution bias survey adapted by Anderson et al. (2007) consists of ten stories (i.e., four stories related to physical provocations and six stories reflecting relational provocations) that were composed to be relevant for children in elementary school. In the present study, the child participants answered two questions following each

story regarding the intent of the peer's behaviour. For the first item, they were asked to select one of four possible reasons for the peer's behaviour (e.g., the student just slipped on something, the student does stupid things like that sometimes, the student wanted to make me mad, the student wasn't looking whether they were going). Two responses indicated hostile intent and two responses expressed benign intent, and the response received a score of 0 (*benign intent*) or 1 (*hostile intent*). The second item asked participants whether or not the provocateur(s) intended to be mean (i.e., hostile intent) or not (i.e., benign intent), and responses were rated from 0 (*not intended to be mean*) to 1 (*intended to be mean*). A sample story includes "...the student spills the milk all over your back" and the participants are asked a) "why did the student spill the milk all over your back?", with responses ranging from "the student just slipped on something" (benign intent) to "the student wanted to make me mad" (hostile intent); and, b) "in this situation, do you think that the student was deliberately trying to be mean" (hostile intent) or "just being thoughtless, but not deliberately trying to be mean?" (benign intent). Anderson et al. (2007) computed three scales, including intent attributions for relational provocation, intent attributions for physical provocations scales, and overall hostile attribution score (i.e., intent attributions across both provocation types). Children's responses to the items assessing attribution intent were summed within and across the stories for each provocation type (Crick, 1995; Nelson & Crick, 1999). The scores can range between 0 to 8 for the intent attributions for physical aggression scale, 0 to 12 for the intent attributions for relational aggression scale, and 0 to 20 for the overall hostile attribution scale. Higher scores indicated higher levels of hostile attribution bias. In a sample of children aged 7 to 11, Anderson et al. (2007) reported satisfactory to good coefficient

alphas for each of the three scales (i.e., intent attributions for relational provocations,  $\alpha = .83$ ; intent attributions for physical provocations,  $\alpha = .75$ ; overall hostile attribution,  $\alpha = .85$ ). In the present study, the internal consistencies were adequate to good for each of the three scales (i.e., intent attributions for relational provocations, Cronbach's alpha = .76; intent attributions for physical provocations, Cronbach's alpha = .75; overall hostile attribution bias, Cronbach's alpha = .83). All three scales were strongly correlated with each other ( $r_s = .55 - .91$ ) and the patterns of correlations with other study variables were the same; therefore, the overall hostile attribution scale (i.e., combined physical and relational intent scales) was used in the present analyses to maximize power.

**Semi-structured interview with parents.** The Parent and Child Perceptions of Video Games Interview (Kutner, Olson, Warner, & Hertzog, 2008) parent questions were used to develop a semi-structured interview protocol for the present study (see Appendix B), to address the proposed research questions (i.e., understanding parents' perceptions about children's violent video gaming and parents' monitoring of children's video gaming habits). The Parent and Child Perceptions of Video Games Interview (Kutner et al., 2008) includes questions about parents' concerns about their children's violent video gaming and their involvement and limit setting in children's violent gaming habits (e.g., "Do you have any concerns about your son's video game play?", "What kind of information would you like to have about what's in your son's games?"). The semi-structured interview protocol for the present study consists of open-ended questions about their children's violent video game play, monitoring of children's video gaming, approach to limit setting, communication with their children about video gaming, and any changes observed in their children's behaviours after playing violent video games.

Sample items include, “Do you have any concerns about your child(ren) playing violent video games?”, “What do you use to determine if you will let your child(ren) play a specific video game?”, “Do you discuss playing video games with your child(ren)?”, and “Do you notice any changes in your child(ren)’s behaviour after playing video games?”. As the purpose of the interviews was to obtain parents’ perceptions, parents of multiple children in the study were not excluded; questions were adapted (i.e., child to children) for parents with multiple children in the study.

Although the interview protocol was followed for each interview, the order and specific wording in which the questions were asked slightly varied throughout the interviews to allow for natural flow between the interviewer and the participant. The purpose of allowing this flexibility was to increase the likelihood of participants feeling that the interview was natural and comfortable, encouraging them to express their experiences openly.

## **Procedure**

Prior to any recruitment, clearance from the Research Ethics Board at the University of Windsor was obtained to complete the study. Participants were recruited through children and family community events (e.g., children’s festivals, local fundraisers, mom-to-mom events), a local shopping mall, elementary schools across the city of Windsor-Essex county, sports and recreation centers (i.e., YMCA, University of Windsor gym, Windsor Squash and Fitness), daycares, parenting websites, community centers, online social media sites (e.g., Facebook), parenting groups on social media, psychology courses at the University of Windsor, and through word of mouth. Parents who expressed interest were provided with additional information related to the study,

including a brief description of the purpose of the study, the expectations of participating in the study (for both parent and child), the amount of time required to participate (for both parent and child), and compensation for participation. Parents who were interested in participating in the study scheduled a date and time to complete the study.

The sessions took place in a laboratory at the University of Windsor with the primary researcher or a trained research assistant. Three research assistants assisted with data collection, two of which were fourth year undergraduate psychology students and one who was in her third year of the psychology undergraduate program. Informed consent was obtained from the parent and assent was obtained from the child in order to complete the study. Participants were informed of the general purpose of the study, confidentiality and limits to confidentiality, and any possible risks and benefits (to both parent and child) of participating in the study. Parents were provided with a hard copy of this information. After obtaining informed consent, parents completed a battery of questionnaires, and children were administered a survey and a story completion task. The order in which the questionnaires were presented to the parents was randomized to prevent any order effects. The children were administered the survey assessing their video game play first to engage the children in the study. As compensation for participating in the present study, child participants were provided a small toy (e.g., colouring book, playdough, toy car) after completing the study. Parents received compensation for their participation in the form of a \$5.00 gift card to a local coffee shop and were entered into a draw to win one of four \$75.00 gift cards to the local shopping center. Parents who were enrolled in a psychology course at the University of Windsor received 2 bonus points toward one psychology course of their choice. Participants were

allowed to withdraw at any point and would still have been provided compensation for their time spent on the study; no participants withdrew from the study. After parents completed the survey, they were given a debriefing form including more information about the present study and invited to participate in an optional session, in which they were asked to participate in an interview with the primary researcher.

A subset of 15 parents was selected based on purposeful sampling to ensure the sample consisted of parents with varying experiences (i.e., parents were selected based on their children's aggression scores, with approximately half of the parents' children scoring within the upper range of aggression and half from the lower range of aggression scores). These parents were scheduled to come to the laboratory at the University of Windsor for one hour. The general purpose of the interview was discussed and participants consented to participate in interviews and consented to have the interviews audio recorded (except one participant, who did not consent to having the interview audio recorded). Participants were reminded of their right to refuse to answer any questions prior to beginning the interview. Participants were provided an opportunity to ask questions regarding the study or the interview. Then, participants participated in a semi-structured interview (see Appendix B) with the primary researcher. The interviews varied in length of time, from approximately 20 to 45 minutes.

At the beginning of each interview, rapport-building questions were asked to help parents feel comfortable. All interviews were audio recorded using a recording device in order to transcribe the interviews once completed, with the exception of one interview as the participant did not consent to audio recording. For this participant, the researcher took detailed notes with the participant's responses written verbatim. At the end of the

interview each participant was invited to ask questions regarding the research. They were provided with a copy of the signed consent form and a debriefing form including more information about the present study. Participants were compensated with a \$15.00 gift certificate to a local coffee shop or, if participants were undergraduate students at the University of Windsor, they received two bonus points to a psychology course as part of the psychology research participant pool. Participants were advised that they were free to withdraw at any time during the session and would still receive compensation for their contribution to the study; no participants withdrew from the study.

### **Interview data: Analytical Approach**

A thematic analysis was conducted to analyze the interview data using guidelines provided by Braun and Clarke (2006). Thematic analysis is an effective approach for analyzing interview data as multiple codes are extracted from the data that represent important concepts, and are then combined into broader themes allowing for useful interpretation of the main interview findings (Braun & Clarke, 2006). Codes are basic data excerpts that include interesting or important information from the participants, while themes are broader conceptual categories that represent repeated patterns within the data (Braun & Clarke, 2006). Thematic analysis provides a detailed description of the complete dataset, while identifying important themes that accurately reflect the content provided by the participants. As there is a dearth of literature examining parents' perceptions of children's video gaming and aggression, thematic analysis provided detailed accounts of parents' perceptions and experiences with children's video gaming habits within the context of broad themes evident across multiple participants.

A theoretical thematic analysis was determined to be the most effective approach for analyzing the data, as it allowed the analysis to be guided by the primary researcher's theoretical interests for the present study (Braun & Clarke, 2006). Themes were identified using a semantic approach that used the explicit data to determine themes and then the themes were interpreted within the previous literature. Finally, the thematic analysis was conducted within an essentialist approach, such that the underlying meanings of the themes were interpreted in a straightforward manner (Braun & Clarke, 2006). These decisions were made in an effort to best address the research questions for the present study, which were to understand parents' perceptions about children's video gaming, parental monitoring of their children's video gaming, and if and how parents set limits on children's gaming behaviour.

The analysis first began with transcribing the interviews verbatim using a software program called InqScribe. This program allows for ease in stopping and starting the audio clips, slowing the pace of the speech, and rewinding by seconds to help transcribe the interviews verbatim. All of the interviews were then analyzed using the software program Dedoose, which is an effective program for reviewing and coding interview data. This program allows researchers to identify important excerpts from interviews, code them using descriptive labels, and identify conceptual themes within the data. Codes were defined so that the researcher could easily identify excerpts that fit within specific codes, as well as identify when additional codes were needed. Codes could easily be redefined, minimized, or combined based on the evolving nature of the analytic process. Codes were created in a hierarchical system, allowing for ease in the process of identifying conceptual themes and subthemes. In addition, memos were

attached to excerpts and codes, so that the researcher could document decisions made during the analysis or identify codes that may need to be redefined based on emerging data. Data analysis in the present study followed the steps described below, as outlined by Braun and Clarke (2006), and was completed by the primary researcher.

**Step 1. Became familiar with the data.** While transcribing, the researcher began to recognize possible patterns across the interviews. Interviews were reviewed at least once prior to beginning the coding procedure to ensure accuracy in transcription and allow the researcher to develop an overall idea of possible patterns that might arise during coding. During this step, the researcher began taking notes to highlight interesting or important quotes in the interviews that were considered during coding.

**Step 2. Generated initial codes.** The researcher began identifying an initial list of codes from the data and entering them into Dedoose. The researcher used a theory-driven approach to identifying codes, which involved approaching the data with the specific research questions for the present study (i.e., Do parents hold perceptions about video gaming and children's behaviour? Do they have any specific perceptions about the effects of playing violent video games? To what extent do parents monitor their children's video gaming? Do parents intervene or set limits regarding children's video gaming habits? Codes included quotes from the participants that related to the broad research questions, as well as the specific questions asked during the semi-structured interview. During this step, the researcher highlighted as many potential important excerpts in each transcript and attached a descriptive code to each excerpt in Dedoose. Context of specific excerpts was also included if the researcher felt it was relevant to understanding the true meaning of the excerpt. Codes that were derived from previous interviews were applied to relevant

excerpts in later interviews. Individual excerpts were coded into as many different codes as they fit, and some were initially coded using vague descriptions, until additional coding revealed a specific pattern. Memos were attached to some of the excerpts and codes if the researcher was unclear as to what code the excerpt may belong to or to document any decisions about why excerpts were included or not in specific codes. This initial round of coding revealed a large number of codes (i.e., 53).

**Step 3. Searched for themes.** Consistent with thematic analysis, once all of the data was initially coded and the researcher had a large list of codes, the analysis was re-focused at the broader, thematic level. This step involved determining how codes could be combined to create a theme and identifying the codes that belong to potential themes. It was during this step that the researcher began to think about the relationships between each of the codes, as well as at a more conceptual level, the associations between different levels of themes (Braun & Clarke, 2006). For example, within the context of the research question examining parental intervention in children's video gaming, a group of codes that described different types of limits parents set on their children's gaming and children's reactions to these limits was identified.

During this step, the researcher began identifying themes from the list of codes. A brief description of each code was identified and then the researcher organized the codes based on relationships to other codes. Assimilating relevant concepts into broader categories created theme-related groupings (e.g., parental monitoring, limit setting, parents' perceptions about video games). Dedoose was useful in organizing codes into themes as the codes could be hierarchically organized within the program. Any codes that did not initially fit within a specific theme were put in their own category for the

researcher to later review. Once all of the codes were allocated to a specific theme, the “miscellaneous” group of codes was reviewed and each code was determined to fit within a theme, combined with another code, or removed from the analysis if there was insufficient data to support them (i.e., the code was not evident in more than one interview; Braun & Clarke, 2006).

**Step 4. Reviewed themes.** During this next step, themes were reviewed and refined based on the relationships between themes. If multiple themes appeared to represent the same concept, then themes were combined into one (e.g., setting limits on both the time and content of video games were combined within the overall limit setting theme). Similarly, if one theme appeared to describe diverse codes, then the theme was broken down into multiple themes. In addition, during this step, the researcher reviewed the themes based on internal homogeneity (i.e., the data within each theme is coherent and fit together meaningfully) and external homogeneity (i.e., each theme is distinct and can be clearly differentiated from another theme; Braun & Clarke, 2006).

At this step in the analysis, the researcher reviewed the themes at two levels: a) coded data extracts; and b) validity of individual themes within context of the dataset (Braun & Clarke, 2006). First, the researcher re-read all of the coded extracts for each theme to ensure that the theme accurately captured the data at a microanalytic level. If any of the extracts did not appear coherent, themes were split into multiple themes or the extract was moved to another theme. Any redundant themes were merged together. After reviewing the coded extracts, the researcher re-read the dataset to ensure that the extracted themes accurately represented the meanings portrayed in the dataset. Any extracts that were missed during the earlier stage of coding were coded in Dedoose and

adjustments were made to themes, if needed. Table 6 contains the final list of codes, themes, and brief descriptions of the codes.

**Step 5. Defined and named themes.** Once the researcher was satisfied with the themes, the researcher reviewed each theme to create a definition that accurately reflected the essence of the data included within each theme. At this step, it was important for the researcher to be able to clearly define each theme and the scope of the content in each theme. Additionally, the researcher conceptualized relationships between themes by reviewing how each of the themes fit together within the context of the research questions and the specific interview questions. This was done by sorting each theme under one of the research questions based on which question the researcher felt the category best represented. This process allowed the researcher to further understand the relationships between and within each of the themes within the context of the existing literature.

### **Trustworthiness of Data**

In qualitative data analysis, the trustworthiness of the data can be a concern because the researcher is highly involved in the data collection, analysis, and interpretation. Thus, there is potential for the researcher's perspective to influence the data (Corbin & Strauss, 2008; Strauss & Corbin, 1990; Rennie et al., 1988). It is noteworthy that the researcher in the present study has a well-developed research background in clinical psychology, developmental psychopathology, and the development of aggressive behaviour. It is possible that these biases may have impacted the manner in which the researcher interacted with the participants and obtained the data. In an attempt to prevent these potential biases from interfering with the participants' experiences and the quality of the interviews, the researcher spent the

Table 6

*List of Themes, Codes, and Brief Description Identified in Thematic Analysis*

Theme	Code	Brief Description	Example
<b>General perceptions about video gaming</b>			
	Waste time	Children wasting time playing video games when they could be engaging in other activities.	“I just feel like it’s just such a colossal waste of time. Like there’s so many other things that you could be doing in real life.” (Mother of 8-year-old boy)
	Social skills	Children may not develop effective social skills.	“You see all these young kids coming in that are in school and they don’t know how to talk. Literally, like...they’re on their phones texting each other and there’s no actual communication.” (Father of 10-year-old boy)
	Technology dependence	Children may become dependent on technology as a form of communication.	“I just think...I don’t want them...becoming dependent on technology.” (Mother of 7-year old girl)
	Internet safety	Children may be exposed to dangerous online situations (e.g., communicating with strangers).	“[...] especially because it’s an online game too. So, I know that there’s some predators out there, you know [...]” (Mother of 9-year-old boy)
	Reality vs. Fantasy	Children may have difficulty differentiating reality and fantasy (in the video games) with respect to appropriate behaviours.	“they would be concerned about their children’s video gaming if they started acting like the character [more] than they were acting like themselves. [...] So, I look at if he gets lost in the game.” (Father of 10-year-old boy)

## Perceptions about violent video gaming

Real world violence	Playing violent video games may be related to the increase in real world violent acts.	“[...] you watch the news and, not that it’s going to happen, but a lot of time you wonder if it [violent video gaming] has any correlation to what’s happening in the world [...] the violence that’s going on in the world right now.” (Father of 8-year-old boy)
Imitate aggression	Children may imitate aggressive or violent behaviours observed or practiced in violent video games.	“[...] especially for boys, if they’re playing violent [video] games, I could see how they would act out on those behaviours. [...] I could see how for sure kids would copy that type of stuff.” (Mother of 7-year-old girl)
Desensitization	Children may feel desensitized to violence.	“[violent video games] kind of desensitizes them to violence, like if they see it too much [...] it doesn’t seem real. [...] the graphics are so realistic, it seems a lot more real than when I was a kid. [...] even the sound effects and the guns are so realistic, so I don’t like how real they are.” (Father of 10-year-old boy)
Too young	Children are too young to be exposed to violent video games.	“He’s just not ready for it yet. He says, “I’m just not ready for it yet.”” (Father of 10-year-old boy)
Thoughts and feelings	Children may experience unpleasant thoughts and feelings (e.g., nightmares).	“[...] it’s just more the exposure, you know he’s pretty sensitive to things that are overly violent or gory. [...] it gives him bad

## Exposure to playing violent video games

Acceptable violence	Parents identify video games with violent content that they deemed appropriate (e.g., cartoon violence).	dreams.” (Father of 10-year-old boy) “I guess Super Mario Brothers, that one’s a little bit, not really, it’s kind of cartoon violence.” (Father of 10-year-old boy)
Restrictions in games	Parents set restrictions within violent video games (e.g., turning the volume off, not allowing children to participate in the online chat in the game).	“His interest is the one-one or him and his buddy versus whoever’s out on the internet and they fight. Now they...they’re not allowed to have the little headsets and talk to the people they...they play.” (Father of 10-year-old boy)
With other children	Children playing violent video games only when they play video games at other children’s homes.	“[...] That’s where my concern was with the neighbour [...] They have Grand Theft Auto and those games, so that’s the only time they would be able to play those games.” (Father of 10-year-old boy)
Restricted games	Certain violent video games were restricted (e.g., Grand Theft Auto).	“Those are the games I don’t want him to be playing. Specifically, first-person shooter games.” (Father of 8-year-old boy)

## Reactions to playing video games

### Negative reactions

Lose in game	Children’s negative reactions in response to losing in a game.	“Now there is one, you know, my son in particular....um does not like to lose. And like if he has a friend over, we’ve seen instances where you know the friend is better at the game than him...all of a sudden he’s like, “aww I don’t want to play
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		anymore.”” (Father of 10-year-old boy)
Stop playing	Children’s negative reactions in response to being told to stop playing a game.	“[...] when we ask him to get off the video games, he’s extremely aggressive; hitting, kicking, punching, throwing things, breaking things, that kind of stuff. [...] Regardless of if he’s playing a mild video game or something that might be a little more violent, but still age appropriate, he still has the same reaction [...] when he’s asked to get off, which is immediate aggression.” (Mother of 7-year-old boy)
Violent content	Children’s negative reactions to playing video games with violent content.	“I don’t think that the games he plays are overly aggressive enough to really be a trigger. [...] But, he has mentioned it before, himself, that the violence in the video games might make him do stuff like that [hitting and kicking people].” (Mother of 7-year-old boy)
<b>Positive reactions</b>		
Stress relief	Playing video games as a method of relieving stress.	“[...]it’s kind of like it’s a type of relaxation...it’s a type of stress relief...it’s like ‘me time’.” (Mother of 9-year-old boy)
Improved focus	Experiencing improved focus and attention to detail.	“[...] and he doesn’t have that kind of focus on a lot of things. So, not that it’s a good way, a good thing to encourage it, but it’s...it’s kind of encouraging to me to see that he can focus.”

(Mother of 10-year-old boy)

Skill practice Practicing skills through video games (e.g., hockey drills).

“[...] I really like that he’s doing that [playing hockey video game] cause I think it even helps him kind of understand his positioning.” (Father of 10-year-old boy)

Accepting loss Learning to accept losing in a game.

“I guess video games, in a sense, the positive thing I would say out of it is she learned that it’s okay not to be a winner for things.” (Mother of 7-year-old girl)

### Children’s individual characteristics

Differential impact Impact of playing violent video games may vary based on children’s individual characteristics.

“I would say, between myself growing up and my son, I can see the difference. Some kids do and some kids don’t [react differently based on the content in the video games]. I don’t know that it’s the actual content, rather than the actual person.” (Father of 8-year-old boy)

Specific traits Certain traits (e.g., overly emotional, angry) may increase children’s negative reactions to playing violent video games.

“It [video game with realistic violence] would be very overwhelming, like it would affect him. [...] He seems to really be sensitive to that sort of thing, whereas my daughter could do it all day.” (Father of 10-year-old boy)

### Parental monitoring

#### Involvement and communication

Aware of games Factors that increased awareness of children’s game playing (e.g., playing

“In particular, just the person-on-person violence is something I continually

video games in open area of house, playing games with violent content, parents' own interest in video games)

monitor, especially if I notice him being kind of aggressive at times and then mixing that up with the two. It was to ensure that, you know, it's more responsibility. If I'm going to let him be exposed to that, ensuring that he doesn't connect the two, with his anger and fantasy of it all." (Father of 8-year-old boy)

Attention to games Not paying direct attention to or noticing children's video game play; parents not being fully aware of the exact game children are playing

"Sometimes they're sneaky and you think they're playing that, and you kind of take a look and like, "what happened to the game you were on?" (Mother of two 8-year-old girls and one 10-year-old boy)

Inconsistent awareness Factors related to parents inconsistently monitoring children's video game play (e.g., children playing in their bedrooms or on a small electronic device)

"[...] but I don't really watch that one, like when he plays it on his tablet, it's sort of a small screen, so I don't monitor it as much." (Mother of 9-year-old boy)

Outside of home Parents not usually aware of video games children play at other children's homes

"When they're at other people's houses, if they play during the day, I know the two kids [homes] that they go to and I know both the moms, and I can't see either one of them allowing for violent video games. [But] I've never actually asked them." (Mother of two 8-year-old girls and one 10-year-old boy)

Communicate with parents Parents not speaking with other children's parents to

"Whenever we [other parents] interact, it very

	learn about the video games their children play outside of their home	rarely is [about the video games their children play together]. As you know, they'll just be like, "oh you know them and their video games." [...] Like you don't really discuss any of the particular games." (Father of 10-year-old boy)
Sharing opinions	Parents sharing only opinions or comments with other parents about their children playing video games together	"Just things like, "they'll play video games a lot." That's it. More comments about playing a lot or nothing at all." (Mother of 8-year-old and 10-year-old boys)
Discuss games	Parents talking with their own children about the types of video games they are playing	"Like with Minecraft, it's a very creative game, so we talk about that one a little bit. [...] He was trying to build the living room [...] and so we were talking about it and I sat with him. There are times when I sit with him and [...] we'll talk about it a little bit. So, like "what are you building?" and like, "oh, that's really cool." And, I interact with him as much as I can, you know." (Mother of 10-year-old boys)
Discuss content	Parents talking with their own children about the content of the video games and how this relates to expectations for their children's behaviour in real life (e.g., not imitating actors' behaviours)	"In my own opinion, it was better for me to ensure that he understood that it was a video game, that this wasn't realistic, that this isn't something you can do whether you're a soldier (in this case) or just a regular person. That what happened in the game was

		unacceptable for real life.” (Father of 8-year-old boy)
Discuss strategies	Parents talking with their own children about their strategies for advancing in the video game (e.g., how to beat a level or earn a specific reward in a game)	“He’ll tell me kind of the stuff in Minecraft, what he’s playing or sometimes um like on Plants vs. Zombies, we have different profiles, so if I’m playing on it, then he’ll come and sit and watch me and we’ll discuss what’s going on and what the best strategies are.” (Mother of 7-year-old boy)
Play together	Parents playing video games with their children (e.g., two-player games)	“[...] Just um the Mario Kart one and occasionally I play the Streetfighter. So, like only like 2 or 3 games, really, but, once every two weeks at the most kind of thing.” (Father of 10-year-old boy)
Watch only	Children wanting their parents to only watch them play video games, but not play with them	“What we found was he never wanted to play with [me]. Like he didn’t want to play the game together. But he would ask me, ‘Hey could you play?’” Could you sit down and play Pokemon with me, while I sit down and play Pokemon, and we won’t do anything together.” [...] And what he means is, you sit down and I could really be playing anything.” (Father of 10-year-old boy)
Parents’ interest	Parents who played video games with children related to parents’ own interest in playing video games, themselves.	“[...] I do play Call of Duty, we did the other day actually. [...] but other games like Minecraft, even though it’s a very good

game for him, I don't like playing it because I find it to be very boring for me because it's a younger type game and it doesn't catch my attention as much."  
(Mother of 9-year-old boy)

### Playing video games with others

Children	Children playing video games at other children's homes or when other children coming over to their own home.	"[...] there's a couple of kids that I know they go to their houses and they're really, like Pokemon. The one group, it's [...] two brothers that he goes for sleepovers at their place and [...] everybody sits there and plays their own Pokemon." (Father of 10-year-old boy)
Online	Children interacting with others online during video games (e.g., playing against other individuals, engaging in online chat rooms within the games).	"He absolutely plays online. He's got a friend that I know he goes to school with that he plays Roblox with." (Mother of 10-year-old boy)
Chat rooms	Children engaging in online chat rooms as part of online video games.	"[...] like if you're online, playing in that type of forum, they're kind of nasty to the other people. Like when you hear some of the things that they say, they're not nice." (Mother of 10-year-old boy)

### Setting limits on video gaming

Time	Parents set limits on the amount of time their children are allowed to play video games (e.g., during weekdays, before school, before homework and chores completed).	"I'll set the timer on the microwave and I'll say, "So you've got 25 minutes to play, maybe you want to set the time on your tablet [...], so 20 minutes out, you know the games gonna finish." Because not only are you setting limits for them now that they
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		understand, but you're also setting them up for when they have a deadline.” (Mother of two 8-year-old girls and one 10-year-old boy)
Violent content	Parents limited video games with violent content and games rated M (for Mature).	“Their friends play Call of Duty and Grand Theft Auto. So, the Call of Duty, I don't let them play it anymore because even with the settings changes to like not bloody or anything like that, it's still too gory for age 10 and especially too gory for age 7.” (Father of 10-year-old boy)
Soft limits	Parents' inconsistent limit setting with video gaming (e.g., allowing more time to play on rainy days and varying based on the parent).	“We've tried in the past to put limits on it, like you can only play for like, you know a half hour in the morning and an hour at night. And we kind of stick to it for a little bit and then something will come up and you know, it just gets all of a sudden you realize we're not sticking to it anymore.” (Father of 10-year-old boy)
Following limits	Children had difficulty following limits set by parents (e.g., requesting for additional time, experiencing unpleasant emotions).	“It's very difficult for him to follow those [limits]. He [...] becomes very frustrated with the time. [...] I think it's just basically how he's so pulled into them. It's very interesting. It's very easy to get lost in them and to lose track of time. Often I'll find that I'll tell him he has 30 minutes and I'll set the timer and I'll give him

a 5 minute warning before it's done. And...he'll still feel like he only got to be on there for less than 5 minutes. And he gets upset because he feels like he didn't get the full amount of time allotted." (Mother of 7-year-old boy)

Reward Using video games as a reward for positive behaviour (e.g., hard work in school, completing chores).

"They do have a reward system set up. So, if they come home, like if they come home today and they've got a 4 in something, um 4 minus is accepted, then they will get 20 minutes of tablet time. [...] We also have if they do chores, again [child] was being a pain in the butt, didn't want to make his bed, didn't want to practice piano, so for every checkmark, which we have a little thing in our house in the kitchen, for every checkmark they get 15 minutes. [...] We kind of play it off them, if they're not fighting and they're getting along and they're making good choices, then maybe they'll get a little more time." (Mother of two 8-year-old girls and one 10-year-old boy)

beginning of each of the interviews developing rapport with the interviewees to help increase their comfort and willingness to be open and honest. In addition, the researcher adhered closely to the interview protocol and following each interview, the researcher reflected on any influence of biases in the form of a memo (Glaser & Strauss, 1967). Furthermore, during the data analysis process, the researcher read over each interview multiple times to ensure that the codes were grounded in the interview data and that that interpretation of the codes reflected the information collected from the participants.

## CHAPTER III

### Results

#### Planned Analyses

The statistical analyses were conducted using IBM SPSS Statistics Version 24. Prior to testing study hypotheses, the data were screened in order to identify any missing data and to detect any outliers on each of the study variables. The data were evaluated for the assumptions of univariate and regression analyses and appropriate steps were taken to address violations. Bivariate correlations were conducted between relevant demographic variables and all of the study variables to identify any potential covariates with the independent and dependent variables. *T*-tests were conducted between study variables based on children's and parents' gender.

Correlational analyses were conducted to assess the relations between each of the predictor variables (i.e., children's violent video gaming, parental involvement, limit setting, and communication about media use, children's hostile attribution bias, and negative affect) with the outcome variable (i.e., children's aggressive behaviour).

After identifying significant bivariate correlations among children's violent video game exposure, hostile attribution bias, aggression, and negative affect, multiple regression analyses were performed to determine the extent to which children's violent video game exposure, hostile attribution bias, and negative affect predicted children's aggression. Mediation and moderation analyses were conducted to assess the pathways between children's violent video game exposure and children's aggression, through children's hostile attribution bias, children's negative affect, children's gender, and each of the parental monitoring variables (i.e., parental involvement, communication, and limit setting).

Mediation, moderation, and moderated mediation analyses were conducted using ordinary least squares (OLS) regression-based path analysis. Hayes' (2013) PROCESS macro was used, which simultaneously examines each of the steps recommended by Baron and Kenny (1986), including the following: a) the predictor variable is significantly associated with the outcome variable; b) the predictor variable is significantly related to the mediator variable; c) the mediator variable is significantly associated with the outcome variable; d) the mediator variable mediates the relation between the predictor and outcome variables, such that when the mediator is accounted for, the direct link between the predictor and the outcome variables is no longer significant. By examining these steps altogether, error is reduced. In addition, Hayes' (2013) PROCESS macro formally tests the null hypothesis that the indirect effect of X on Y through M is equal to zero. In moderation, the PROCESS macro assesses the effect of a moderator variable (W) on the direct effect of X and Y. For mediated moderation analysis, PROCESS macro examines the effect of a moderator variable (W) on the indirect effect between X, M, and Y. Based on Hayes (2013), significant interaction effects can be probed by examining the conditional indirect effects at low (i.e., one standard deviation below the mean), average (i.e., mean), and high (i.e., one standard deviation above the mean) values of the moderator. The PROCESS macro provided a bootstrapping estimate of the indirect effect, which involved using 5,000 samples of the data without replacement to provide an estimate of the indirect effect both in the current sample and in the representative larger population (Preacher & Hayes, 2004; Hayes, 2013). Previous researchers have recommended mean-centering independent variables, as the product between the two independent variables within an interaction term can be

highly correlated with the product term, increasing the risk of multicollinearity (Tabachnick & Fidell, 2007). Despite the possible influence on multicollinearity, Hayes (2013) argues that multicollinearity should not affect the accuracy of regression estimates, hypothesis tests, or standard errors. However, Hayes (2013) recommends mean-centering predictor variables in moderation analyses to increase the meaningfulness and interpretability of the moderation effects. It is noteworthy that in the present study, the statistical significance of the moderation effects did not change whether or not the variables were mean-centered. Therefore, in the moderation analyses in the present study, the predictor and moderating variables were mean-centered (except for children's gender), to allow for more meaningful interpretation of the data.

### **Data Screening and Preparation**

**Missing data.** Overall, there was a small amount of missing data in the total sample, as there was only 2% of the total possible data missing across all of the participants, variables, and items. Of the 124 parent-child dyads, one dyad was missing complete data on 38% of the questionnaires; this participant was not able to complete all measures due to time constraints. In addition, one dyad was missing complete data on the CBCL. Therefore, both of the above dyads were removed from the data. No other participants were missing all data on any measure.

Little's MCAR test revealed that the data were missing completely at random,  $\chi^2(205, N = 122) = 191.15, p = .715$ . At the individual participant level, all participants ( $N = 122$ ) were missing less than 17% of their data (i.e., 0.3% to 16.4%; 94% of participants were missing less than 10%). At the variable level, the Missing Value Analysis indicated some level of missingness on the majority of the variables. Parental communication was

missing 9.7% of the data; however, most variables were missing less than 5% of the values (i.e., 4% missing from parental limit setting, 3.2% missing from children's hostile attribution bias, 2.4% missing from children's aggression, 0.4% missing from children's negative affect) and no data were missing on the parental involvement variable. For children's negative affect, calculation of the scaled score takes into account missing data, as it is computed by taking the average of each participant's valid scores (i.e., items with numerical scores, items rated as Does Not Apply are not included in this calculation) on each of the subscales that comprise the negative affect scale (Simonds & Rothbart, 2004). As such, missing data on the TMCQ was not imputed. For the remaining missing data values, Expectation Maximization was used to impute individual item scores, as this method of data imputation is considered appropriate when the data are missing completely at random (El-Masri & Fox-Wasylyshyn, 2005). Expectation Maximization imputation method provides data for missing values with accurate probability (Schafer & Graham, 2002) and realistic estimates of variance (Tabachnick & Fidell, 2007).

**Assumption analyses.** The data were analyzed to evaluate the assumptions of univariate and regression analyses, including adequate sample size, normality, absence of outliers, absence of influential observations, independence of errors, absence of multicollinearity and singularity, homoscedasticity, linearity, and independence of observations.

The sample size was 122 parent-child dyads. Based on Field's (2009) recommendation of an adequate sample size consisting of 10 to 15 participants per predictor variable, the analyses could include up to twelve predictor variables. The number of predictors used in the analyses included up to four variables.

To assess the assumption of normality, the distributions of the independent and dependent variables were analyzed by examining the skewness and kurtosis values for each variable, and additionally, through visual inspection of the histograms for each variable. Skewness values within +/- 2 and kurtosis values within +/- 3 were considered within normal distribution (Field, 2009). After reviewing skewness values for all variables, no violations were found. However, kurtosis was violated for children's violent video game exposure (parent report). Visual inspection of the histograms indicated that children's violent video game exposure was also positively skewed. This variable was transformed using the logarithmic transformation, as this transformation is effective in correcting for positive kurtosis and skewness (Field, 2009). Following transformation, children's violent video game exposure (parent report) fell within normal distribution. Data analysis was performed with and without the transformed variable; no differences in the pattern of findings were found. Therefore, transformed values for children's violent video game exposure (parent report) were included in the analyses.

The assumption of absence of outliers was assessed by examining both univariate and multivariate outliers. Standardized values for each variable that were greater than 3.29 ( $p < .001$ ) were considered univariate outliers (Tabachnick & Fidell, 2007). One outlier was identified on children's violent video game exposure (children's report) and one outlier was found on children's aggressive behaviour (two different participants). To assess multivariate outliers, Leverage values were analyzed based on Stevens (2002) recommended cutoff value of  $(3(k + 1) / n)$ , with  $k$  representing the number of predictor variables. In addition, Mahalanobis distance values were analyzed using the cut off value from the critical values of the chi-square distribution table at  $p < .001$ . One additional

outlier was identified. Based on Tabachnick and Fidell's (2007) recommendation for correcting outliers, the scores for the three outliers were reduced by one standard deviation from the original value.

Absence of influential observations was examined with Cook's distance values. A cut off value of 1.00 (Field, 2009) revealed no influential observations. The Durbin-Watson statistic was analyzed to assess independence of errors; the value of 2.083 fell within the recommended range of 1.5 to 2.5 (Field, 2009). Therefore, no violations were found with respect to absence of influential observations and independence of errors.

To assess for the absence of multicollinearity and singularity, Tolerance and VIF values were analyzed. According to Field's (2009) recommended cut off values of 0.1 for Tolerance values and 10 for VIF scores, no violations were found.

Homoscedasticity and linearity were assessed through visual inspection of scatterplots of the predicted outcome values against the residual values for each variable. In terms of homoscedasticity, the band of residuals within the scatterplots appeared approximately equal in width for all variables. With respect to linearity, the plots appeared to generally follow a straight line, with no curved shape in the data.

Finally, independence of observations was assessed based on the methodology used in the present study. Most of the dyads completed the present study at separate times or in separate rooms. On a few occasions, due to time constraints, some participants completed the study in the same room; these participants were instructed to complete all measures independently. Twenty-two parents participated in the survey with more than one child (23 siblings among 22 parents; one parent with three children and 21 parents with two children). Parents completed separate questionnaires for each child. The

analyses were conducted with data relating to 23 randomly selected siblings excluded; however, the pattern of findings was generally consistent with when these children were included in the data (the few changes were consistent with findings when 23 random cases were removed, suggesting that insufficient power may account for the few changes). *T*-tests were also conducted between the sample with siblings included and the sample without the siblings for all study variables; there were no significant differences between the two groups (see table in Appendix C). Therefore, all children were included to maximize power in the analyses. The means, standard deviations, and ranges for the study variables without the siblings included are presented in Appendix C.

### **Preliminary Analyses**

The means, standard deviations, and ranges for each of the study variables are presented in Table 7. There were no significant differences in any of the parent-report study variables based on the gender of the parent (see Table 8), so mothers' and fathers' scores were combined in the analyses. There were no significant differences between mothers' and fathers' reports with respect to children's violent video game play, parental monitoring (i.e., communication, involvement, and limit setting), children's aggression, negative affect, and hostile attribution. There was a significant difference between parents' report of their own video game play, with significantly more fathers playing video games than mothers (see Table 8).

Compared to previous studies, the level of aggression (using the CBCL) reported in children in the present study is similar to other samples of school-age children (ages 8

Table 7

*Means, Standard Deviations, and Ranges for all Study Variables (N=122)*

Measure	<i>M</i>	<i>SD</i>	Min – Max	Range
CBCL				
Aggressive Behaviour <sup>a</sup>	55.17	6.99	50.00 – 78.00	28.00
Hostile Attribution Bias				
Overall Intent	5.55	4.16	0.00 – 15.00	15.00
Parental Monitoring				
Involvement	2.92	0.63	1.50 – 5.00	3.50
Limit Setting	3.69	0.88	1.38 – 5.00	3.62
Communication	3.47	0.63	2.08 – 4.92	2.83
Violent Video Gaming				
Parent Report	15.65	9.69	1.60 – 60.40	58.80
Parent Report <sup>b</sup>	1.11	0.28	0.20 – 1.78	1.58
Child Report	13.74	10.18	0.40 – 46.80	46.40
TMCQ – Child Temperament				
Negative Affect	2.85	0.36	1.99 – 3.75	1.76

*Note.* <sup>a</sup> *T* scores; <sup>b</sup> Log transformed variables.

Table 8

*T-Tests Assessing Parental Gender Differences on Study Variables*

Variable	Mother ( <i>n</i> = 72)		Father ( <i>n</i> = 26)		<i>T</i> value	<i>p</i> value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Violent video game exposure (child report)	13.45	10.00	15.93	11.29	-1.046	.298
Violent video game exposure (parent report) <sup>a</sup>	1.13	0.26	1.19	0.25	-1.144	.256
Violent video game exposure (parent report)	15.77	9.13	18.34	11.68	1.139	.258
Communication	3.46	0.65	3.57	0.52	-.786	.434
Involvement	2.94	0.68	3.04	0.55	-.680	.498
Limit Setting	3.69	0.91	3.53	0.81	.805	.423
Aggression <sup>b</sup>	54.56	6.72	56.31	7.52	-1.101	.274
Hostile Attribution Bias	5.13	3.97	6.21	4.32	-1.161	.248
Negative Affect	2.84	0.36	2.87	0.32	-.322	.748
Parent plays video games	0.53	0.52	0.85	0.46	-2.709*	.008

Note. <sup>a</sup> Log transformed variable; <sup>b</sup> T Scores.

\**p* < .01.

to 12) from the community (e.g., shopping centres, day cares) who do not have a diagnosed psychiatric disorder (e.g., disruptive behaviour disorder) or any specific history of behaviour problems ( $M = 51.36$ ,  $SD = 3.97$ ; MacBrayer et al. 2003). Similarly, the level of aggression reported in the present study is lower than what was found in clinical samples of children with disruptive behaviour disorders ( $M = 71.24$ ,  $SD = 10.29$ ; MacBrayer et al., 2003). In terms of violent video game exposure, the children in the present study generally appeared to have low levels of exposure; however, means and standard deviations were not available for comparison from previous studies using this measure. Compared to a study that used an adapted version, in which parents of children ages 10 – 17 reported three video games that their children played on a scale from 1 to 4, parents' ratings of the level of violence in their children's video gaming appeared similar in the present study (present study:  $M = 2.47$ ,  $SD = 1.74$ ; Dittrick et al., 2013:  $M = 1.75$ ,  $SD = 1.31$ ). Children's hostile attribution bias scores in the present study ( $M_{relational} = 3.44$ ,  $SD = 2.65$ ;  $M_{physical} = 2.11$ ,  $SD = 2.06$ ) revealed lower levels of hostile attributions, compared to scores reported by a general sample of children aged 10 to 12 ( $M_{relational} = 5.7$ ,  $SD = 2.2$ ;  $M_{physical} = 3.1$ ,  $SD = 2.4$ ; Nelson & Crick, 1999). Additional means and standard deviations from other studies using this measure (e.g., Anderson et al., 2007) were not available. With respect to parental monitoring variables, compared to the parental monitoring total score ( $M = 3.15$ ,  $SD = 0.54$ ; individual subscales not available) reported in Gentile et al. (2012), slightly higher levels of parental monitoring were reported by parents in the present study ( $M_{parental\ monitoring\ total} = 3.50$ ,  $SD = 0.57$ ).

Bivariate correlations were conducted between the study variables and relevant demographic variables to identify any possible confounding variables (see Table 9 for

Table 9

*Bivariate Correlations Between Study Variables and Demographic Variables*

Variable	Child Age	Child Gender	Parent Age	Family Structure	Maternal Education	Paternal Education	Family Income	Parent Plays VGs
Violent Video Game Exposure								
Child Report	-0.09	0.29**	-0.11	0.12	-0.04	-0.28**	-0.15	-0.11
Parent Report	-0.02	0.36**	-0.11	0.04	-0.10	0.00	0.07	0.01
Parenting Practices								
Involvement	-0.02	0.01	-0.10	-0.06	-0.23*	-0.13	-0.09	0.28**
Limit Setting	-0.26**	0.12	-0.04	-0.17	0.14	0.15	0.08	-0.08
Communication	-0.07	0.24**	0.01	-0.13	0.01	-0.01	-0.00	0.06
Hostile Attribution Bias								
Total Bias	0.06	0.12	0.08	0.07	-0.05	-0.22*	-0.14	0.07
Child Temperament								
Negative Affect	-0.16	0.04	-0.09	0.01	-0.14	-0.18	-0.18	-0.11
Child Aggression								
Total Aggression	0.02	0.20*	-0.07	0.06	-0.16	-0.03	-0.16	0.06

\*  $p < .05$ . \*\*  $p < .01$ .

correlation matrix). *T*-tests were conducted to examine children's gender differences in the main study variables (Table 10).

Children's gender was significantly, positively associated with both child and parent report of children's violent video game exposure, parental communication about media, and aggression (see Table 9). Compared to girls, boys had significantly higher levels of violent video game exposure, experienced significantly more aggressive behaviour, and parents reported engaging in significantly more communication about media (see Table 10). In addition, parents' report of their own video game play was significantly, positively related to children's gender, with girls having parents who played higher levels of video games compared to boys (Table 10).

When mother-son ( $n = 57$ ), mother-daughter ( $n = 34$ ), father-son ( $n = 23$ ), and father-daughter ( $n = 7$ ) dyads were examined in relation to children's aggression and violent video game exposure, there were few significant findings. Mothers reported significantly more aggression in boys ( $M = 55.95$ ,  $SD = 7.74$ ) compared to girls ( $M = 52.41$ ,  $SD = 3.53$ ),  $t(89) = 2.510$ ,  $p = .014$ . Similarly, mothers reported significantly more violent video game exposure in boys ( $M = 1.16$ ,  $SD = 0.25$ ) than in girls ( $M = 0.96$ ,  $SD = 0.29$ ),  $t(89) = 3.506$ ,  $p = .001$ . Fathers reported significantly more aggression in girls ( $M = 57.00$ ,  $SD = 9.87$ ) than mothers reported in girls ( $M = 52.41$ ,  $SD = 3.53$ ),  $t(39) = -2.190$ ,  $p = .035$ .

Children's age was significantly, negatively related to parental limit setting around media habits, such that parents tended to set more limits regarding content and frequency of media use with younger children, compared to older children. Higher levels of maternal education were related to lower levels of parental involvement in children's

Table 10

*T-Tests Assessing Children's Gender Differences on Study Variables*

Variable	Boy ( <i>n</i> = 81)		Girl ( <i>n</i> = 41)		<i>T</i> value	<i>p</i> value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Violent video game exposure (child report)	15.79	10.36	9.70	8.59	-3.242**	.002
Violent video game exposure (parent report)	17.77	10.05	11.46	7.43	3.553**	.001
Violent video game exposure (parent report) <sup>a</sup>	1.19	0.24	0.97	0.28	-4.282**	.000
Communication	3.58	0.60	3.26	0.65	-2.668**	.009
Involvement	2.93	0.69	2.92	0.52	-.093	.926
Limit Setting	3.76	0.91	3.54	0.80	-1.288	.200
Aggression <sup>b</sup>	56.17	7.54	53.19	5.29	-2.264*	.025
Hostile Attribution Bias	5.90	4.19	4.86	4.05	-1.317	.190
Negative Affect	2.86	0.36	2.83	0.37	-.406	.685
Parent Plays Video Games <sup>c</sup>	0.50	0.50	0.87	0.50	3.407**	.001

*Note.* <sup>a</sup> Log transformed variable; <sup>b</sup> *T* scores; <sup>c</sup> *N* = 99 parents of 31 girls and 68 boys.  
\**p* < .05. \*\**p* < .01.

media. Higher levels of fathers' education were related to lower levels of children's violent video game exposure. In addition, higher levels of paternal education were associated with lower levels of children's hostile attribution bias.

It is noteworthy that parent report of children's medical or psychological diagnoses was not significantly correlated with children's aggression ( $r = .12, p = .173$ ). In addition, the number of parent and child reported video games did not correlate significantly with children's aggression ( $r = -.08, p = .370$ ;  $r = -.08, p = .358$ , respectively).

Children's gender was used as a control variable in all analyses in the present study given the significant association with multiple predictor variables (i.e., child and parent report of violent video game exposure and parental communication) as well as the outcome variable (i.e., children's aggression). No other demographic variables were used as control variables in the following analyses, as there were no clear patterns of significant correlations between the other demographic variables with the predictor and outcome variables.

### **Primary Analyses**

Bivariate correlations were conducted between each of the independent and dependent variables in order to examine the relations between the study variables. The correlations are presented in Table 11. It is noteworthy that parent and child report of children's violent video game exposure were significantly related ( $r = .36, p < .001$ ), but not to a high degree, so parent and child reports were analyzed separately (as done in a previous study using this measure for both parents and children; Dittrick et al., 2013).

Table 11

*Bivariate Correlations Among Study Variables (N = 122)*

	1	2	3	4	5	6	7	8
1. VVG (parent report)								
2. VVG (child report)	.36**							
3. Children's Negative Affect	.16	-.06						
4. HAB	.13	.22*	.25**					
5. Aggression	.25**	.00	.39**	.09				
6. Involvement	.22*	.08	-.01	.06	-.02			
7. Limit Setting	-.17	-.03	-.05	-.06	-.02	-.05		
8. Communication	.30**	.25**	.02	.12	.13	.38**	.39**	

*Note.* VVG = Violent video game exposure; HAB = Hostile attribution bias.

\* $p < .05$ . \*\* $p < .01$ .

**Hypothesis 1.** It was hypothesized that higher levels of children's violent video game exposure would be related to higher levels of children's aggressive behaviour. This hypothesis was partially supported. Higher levels of parents' report of children's violent video game exposure were related to higher levels of children's aggressive behaviour. Children's report of their violent video game exposure was not significantly related to aggression (see Table 11). These results did not vary based on children's gender, as the interaction between children's gender and violent video game exposure (both parent and child report) was not significant in predicting children's aggression ( $t(118) = .609, p = .544$ ;  $t(118) = .676, p = .501$ , respectively). Similarly, the results did not vary based on the gender of the parent-child dyad, as the interaction between children's gender and children's violent video game exposure in the sample of only mothers and only fathers was not significant in predicting children's aggression ( $t(87) = 1.377, p = .172$ ;  $t(26) = -.688, p = .497$ , respectively).

A multiple regression analysis was performed to determine the extent to which parent report of children's violent video game exposure predicted children's aggressive behaviour, controlling for children's gender. The first step, with children's gender as the predictor variable and children's aggressive behaviour as the outcome variable, was significant,  $F(1, 121) = 5.124, R = .202, R^2 = .041, SE = 6.872, p = .025$ . Children's gender accounted for approximately 4% of the variance in children's aggressive behaviour. Boys were reported to experience higher levels of aggression than girls (see Table 10 for gender differences). The second step, including parent report of children's violent video game exposure, was also significant,  $F(2, 121) = 4.911, R = 0.276, R^2 = .076, SE = 6.772, p = .009$ . Overall, child gender and parent report of children's violent

video game exposure accounted for approximately 8% of the variance in children's aggressive behaviour. The results indicated a significant change in predicting children's aggressive behaviour with the addition of parents' report of children's violent video game exposure. Higher levels of parents' report of children's violent video game exposure were associated with higher likelihood of children demonstrating aggressive behaviour. The results of the regression analysis are presented in Table 12. These findings indicate that higher levels of children's exposure to violent video games predict more aggressive behaviour in children, above and beyond the influence of children's gender.

**Hypothesis 2.** It was hypothesized that higher levels of children's negative affect and hostile attribution bias would each be related to higher levels of children's aggressive behaviour. This hypothesis was partially supported, as higher levels of children's negative affect predicted more child aggression. In contrast, children's hostile attribution bias was not significantly associated with children's aggression.

A multiple regression analysis was conducted to examine the extent to which children's negative affect predicted children's aggression, above and beyond the influence of children's gender. Within the first step, children's gender significantly predicted children's aggression,  $F(1, 121) = 5.124$ ,  $R = .202$ ,  $R^2 = .041$ ,  $SE = 6.872$ ,  $p = .025$ . Children's gender accounted for approximately 4% of the variance in children's aggression. Boys experienced higher levels of aggression in comparison to girls (see Table 10). In the second step, children's negative affect was a significant predictor of children's aggression,  $F(2, 121) = 13.751$ ,  $R = .433$ ,  $R^2 = .188$ ,  $SE = 6.350$ ,  $p < .001$ . Taken together, children's gender and parents' report of children's negative affect accounted for approximately 19% of the variance in children's aggression. The results

Table 12

*Summary of the Multiple Regression Analysis Predicting Children's Aggression from Children's Violent Video Game Exposure (Parent Report)*

	<i>B</i>	<i>SE B</i>	$\beta$	<i>p</i>	<i>R</i>	<i>R</i> <sup>2</sup>	<i>p</i>
Step 1					0.20*	0.04	0.025
Child gender	2.98*	1.32	0.20	0.025			
Step 2					0.28**	0.08	0.009
Child gender	1.90	1.39	0.13	0.175			
Violent video game exposure	5.12*	2.40	0.20	0.035			

*Note.* Step 1: *R*<sup>2</sup> Change = 0.041, *F* Change (1, 120) = 5.124, *p* = .025. Step 2: *R*<sup>2</sup> Change = .035, *F* Change (1, 119) = 4.574, *p* = .035.

\**p* < .05. \*\**p* < .01.

also revealed a significant change in predicting children's aggression when children's negative affect was taken into account. The results indicate that with higher levels of children's negative affect, the likelihood of children engaging in aggression was higher, above and beyond the impact of children's gender. See Table 13 for the results of this regression analysis.

**Hypothesis 3.** Children's hostile attribution bias and negative affect were hypothesized to each mediate the relation between children's violent video game exposure and aggressive behaviour. This hypothesis was partially supported, as children's negative affect significantly mediated the link between children's violent video game exposure (parent report only) and aggression, while controlling for children's gender. Using the PROCESS Macro (Hayes, 2013), the indirect effect of children's violent video game exposure (parent report) on children's aggression, through children's negative affect was significant, as zero was not included in the 95% bootstrapped confidence interval (1.594, 95% CI [.1607, 4.1138]). Therefore, children's negative affect completely mediated the relation between children's violent video game exposure (parent report) and children's aggression, such that children who played more violent video games were more aggressive, because children experienced higher levels of negative affect. The indirect effect between children's violent video game exposure (child report) and aggression, through children's negative affect was not significant, as zero was included in the confidence interval (-.020, 95% CI [-.0801, .0196]). See Figures 5 and 6 for the mediation results. Children's hostile attribution bias was not a significant mediator between children's violent video game exposure (both parent and child report) and aggression, while controlling for children's gender (Parent report; .123, 95% CI [-.2757,

Table 13

*Summary of a Multiple Regression Analysis Predicting Children's Aggression from Children's Negative Affect*

	<i>B</i>	<i>SE B</i>	$\beta$	<i>P</i>	<i>R</i>	<i>R</i> <sup>2</sup>	<i>P</i>
Step 1					0.20*	0.04	0.025
Child gender	2.98*	1.32	0.20	0.025			
Step 2					0.43**	0.19	<0.001
Child gender	2.77*	1.22	0.19	0.025			
Negative affect	7.37**	1.59	0.38	<0.001			

*Note.* Step 1: *R*<sup>2</sup> Change = 0.041 *F* Change (1, 120) = 5.124, *p* = .025. Step 2: *R*<sup>2</sup> Change = 0.147, *F* Change (1, 119) = 21.502, *p* < .001.

\**p* < .05. \*\**p* < .01.

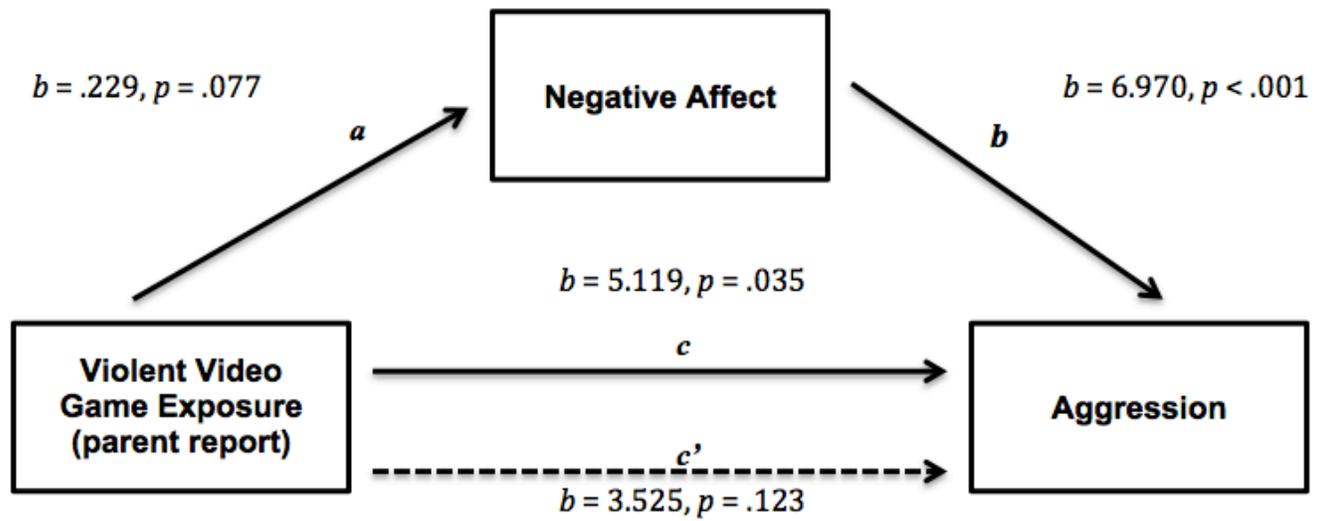


Figure 5. Children’s negative affect as a significant mediator in the relation between children’s violent video game exposure (parent report) and aggression, such that higher levels of children’s violent video game exposure were related to higher levels of aggression, through higher levels of negative affect.

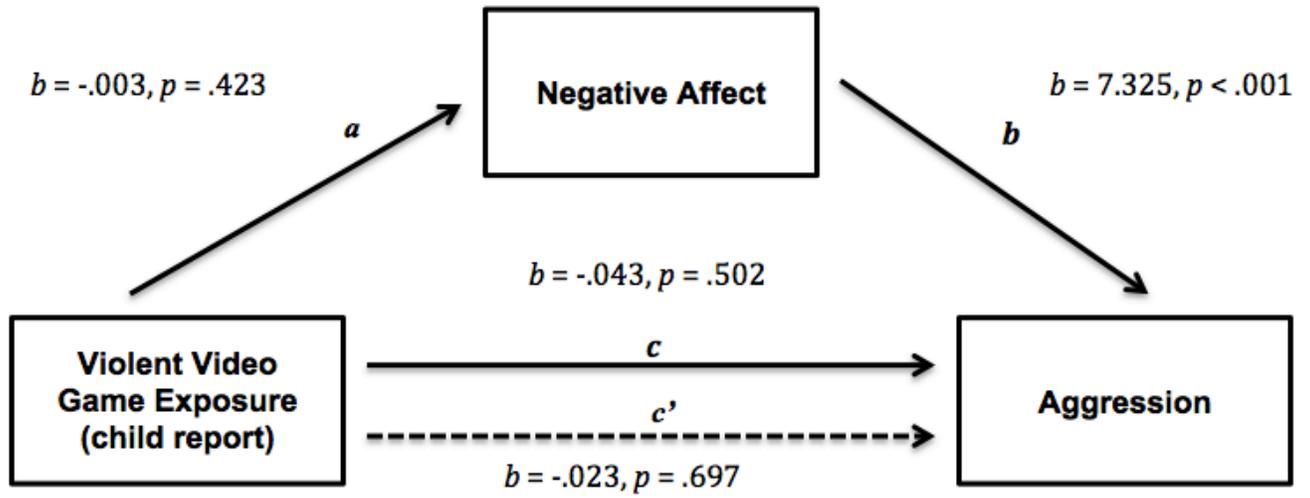


Figure 6. The relation between children’s violent video game exposure (child report) and aggression was not significantly mediated by children’s negative affect.

1.3756], Child report; .011, 95% CI [-.0109, .0454]). See Figures 7 and 8 for the mediation results.

To determine the extent to which children's negative affect and children's violent video game exposure predicted children's aggressive behaviour, a multiple regression analysis was conducted, controlling for children's gender. Children's gender significantly predicted children's aggressive behaviour in the first step,  $F(1, 121) = 5.124$ ,  $R = .202$ ,  $R^2 = .041$ ,  $SE = 6.871$ ,  $p = .025$ , and accounted for approximately 4% of the variance in children's aggressive behaviour. Children's negative affect also significantly predicted children's aggression,  $F(2, 121) = 13.751$ ,  $R = 0.433$ ,  $R^2 = .188$ ,  $SE = 6.350$ ,  $p < .001$ . Overall, child gender and children's negative affect accounted for approximately 19% of the variance in children's aggressive behaviour. The results indicated a significant change in predicting children's aggressive behaviour with the addition of children's negative affect. In the third step, children's violent video game exposure (parent report) was included in the model. Although the model in step three was significant ( $F(3, 121) = 10.082$ ,  $R = 0.452$ ,  $R^2 = .204$ ,  $SE = 6.313$ ,  $p < .001$ ) and the variance accounted for in children's aggression increased to 20%, there was no significant change in predicting children's aggression with the addition of children's violent video game exposure. Overall, these findings reveal that with higher levels of children's negative affect, the likelihood of children demonstrating aggressive behaviour was higher. The results of the regression analysis are presented in Table 14. These findings indicate that higher levels of children's negative affect predict more aggressive behaviour in children, above and beyond the influence of children's gender.

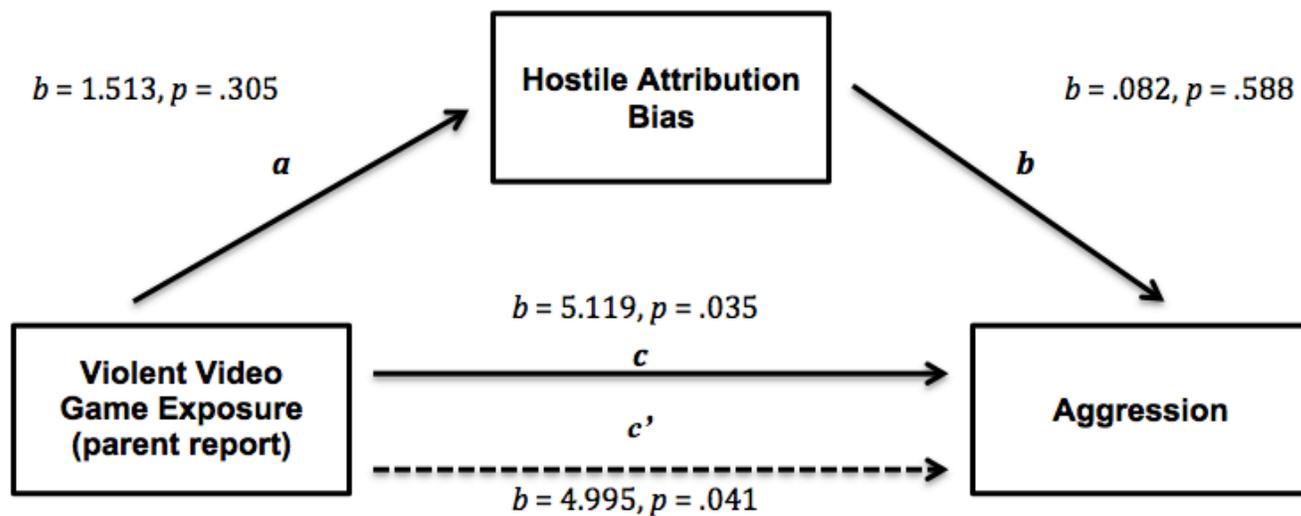


Figure 7. The relation between children’s violent video game exposure (parent report) and aggression was not significantly mediated by children’s hostile attribution bias.

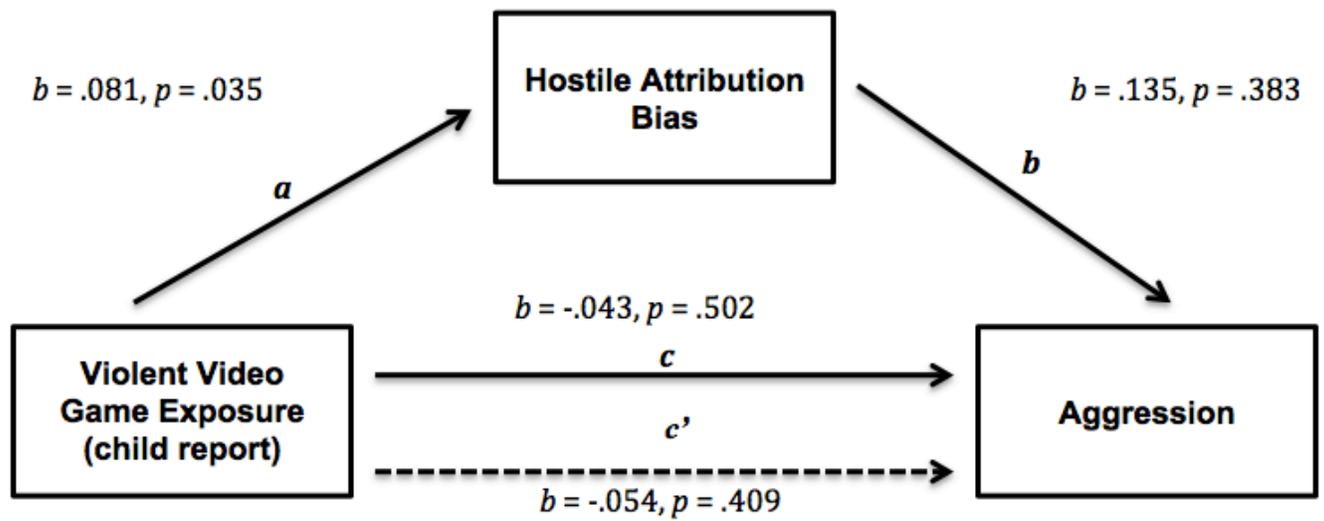


Figure 8. The relation between children's violent video game exposure (child report) and aggression was not significantly mediated by children's hostile attribution bias.

Table 14

*A Summary of a Multiple Regression Predicting Children's Aggression from Children's Violent Video Game Exposure (Parent Report) and Negative Affect*

	<i>B</i>	<i>SE B</i>	$\beta$	<i>p</i>	<i>R</i>	<i>R</i> <sup>2</sup>	<i>p</i>
Step 1					0.20*	0.04	0.025
Child gender	2.98	1.32	0.20	0.025			
Step 2					0.43**	0.19	<0.001
Child gender	2.77*	1.22	0.19	0.025			
Negative affect	7.37**	1.59	0.38	<0.001			
Step 3					0.45**	0.20	<0.001
Child gender	2.04	1.30	0.14	0.119			
Negative affect	6.97**	1.60	0.36	<0.001			
Violent video game exposure	3.53	2.27	0.14	0.123			

*Note.* Step 1: *R*<sup>2</sup> Change = 0.041, *F* Change (1, 120) = 5.124, *p* = .025. Step 2: *R*<sup>2</sup> Change = 0.147, *F* Change (1, 119) = 21.502, *p* < .001. Step 3: *R*<sup>2</sup> Change = 0.016, *F* Change (1, 118) = 2.416, *p* = .123.

\**p* < .05. \*\**p* < .01.

The above regression analysis was conducted for children's report of violent video game exposure. The findings revealed that children's violent video game exposure did not significantly predict children's aggression above and beyond the influence of children's gender and negative affect (see Table 15).

To further understand the link between children's violent video gaming, hostile attribution bias, and aggression, a multiple regression analysis was performed. The extent to which violent video gaming (parent report) predicted children's aggression above the influence of children's hostile attribution bias was examined. In step one, children's gender significantly predicted aggression,  $F(1, 121) = 5.124$ ,  $R = .202$ ,  $R^2 = .041$ ,  $SE = 6.872$ ,  $p = .025$ . Children's gender accounted for approximately 4% of the variance in aggression. Step two, including children's hostile attribution bias, was not significant,  $F(2, 121) = 2.819$ ,  $R = .213$ ,  $R^2 = .045$ ,  $SE = 6.885$ ,  $p = .064$ . Step three, in which violent video game exposure (parent report only) was added into the model, was significant,  $F(3, 121) = 3.353$ ,  $R = .280$ ,  $R^2 = .079$ ,  $SE = 6.792$ ,  $p = .021$  and accounted for approximately 5% of the variance in children's aggression. The results indicated a significant change in predicting children's aggression when children's violent video game exposure was added into the model,  $R^2 \text{ Change} = 0.033$ ,  $F \text{ Change}(1, 118) = 4.266$ ,  $p = .041$ . The results revealed that with higher levels of children's violent video game exposure (parent report), the likelihood of children engaging in aggressive behaviour was higher, above and beyond the impact of children's gender and hostile attribution bias. See Table 16 for the results of this regression analysis.

The above regression analysis was conducted with children's report of violent video game exposure to examine the effect on children's aggression, above and beyond

Table 15

*A Summary of a Multiple Regression Predicting Children's Aggression from Children's Violent Video Game Exposure (Child Report) and Negative Affect*

	<i>B</i>	<i>SE B</i>	$\beta$	<i>p</i>	<i>R</i>	<i>R</i> <sup>2</sup>	<i>P</i>
Step 1					0.20*	0.04	0.025
Child gender	2.98*	1.32	0.20	0.025			
Step 2					0.43**	0.19	<0.001
Child gender	2.77*	1.22	0.19	0.025			
Negative affect	7.37**	1.59	0.38	<0.001			
Step 3					0.43**	0.19	<0.001
Child gender	2.92*	1.28	0.20	0.024			
Negative affect	7.33**	1.60	0.38	<0.001			
Violent video game exposure	-0.02	0.06	-0.03	0.697			

*Note.* Step 1:  $R^2$  Change = .041,  $F$  Change (1, 120) = 5.124,  $p$  = .025. Step 2:  $R^2$  Change = .147,  $F$  Change (1, 119) = 21.502,  $p$  < .001. Step 3:  $R^2$  Change = .001,  $F$  Change (1, 118) = .152,  $p$  = .697.

\* $p$  < .05. \*\* $p$  < .01.

Table 16

*Summary of a Multiple Regression Analysis Predicting Children's Aggression from Hostile Attribution Bias and Violent Video Game Exposure (parent report)*

	<i>B</i>	<i>SE B</i>	$\beta$	<i>p</i>	<i>R</i>	<i>R</i> <sup>2</sup>	<i>P</i>
Step 1					0.20*	0.04	0.025
Child gender	2.98*	1.32	0.20	0.025			
Step 2					0.21	0.05	0.064
Child gender	2.87*	1.33	0.20	0.033			
Hostile attribution bias	0.11	0.15	0.07	0.467			
Step 3					0.28*	0.08	0.021
Child gender	1.84	1.40	0.13	0.192			
Hostile attribution bias	0.08	0.15	0.05	0.588			
Violent video game exposure	5.00*	2.42	0.20	0.041			

*Note.* Step 1: *R*<sup>2</sup> Change = 0.041, *F* Change (1, 120) = 5.124, *p* = .025. Step 2: *R*<sup>2</sup> Change = 0.004, *F* Change (1, 119) = .533, *p* = .041. Step 3: *R*<sup>2</sup> Change = 0.033, *F* Change (1, 118) = 4.266, *p* = .041

\**p* < .05. \*\**p* < .01.

the influence of children's hostile attribution bias and gender. No significant results were found for children's violent video game exposure (see Table 17).

**Hypothesis 4.** It was hypothesized that each of the parental monitoring variables (i.e., involvement, communication, limit setting) and children's gender would each moderate the link between children's violent video game exposure and aggression. Prior to assessing this hypothesis, correlations between all of the parental monitoring variables (i.e., involvement, communication, and limit setting) with children's violent video game exposure and aggression were analyzed. Higher levels of children's violent video game exposure (parent report) were significantly related to higher levels of parental involvement ( $r = .22, p < .05$ ) and to parental communication ( $r = .30, p < .01$ ). Higher levels of children's violent video game exposure (child report) were significantly related to higher levels of parental communication ( $r = .25, p < .01$ ). None of the parental monitoring variables (i.e., involvement, communication, and limit setting) were significantly related to children's aggression. In addition, children's gender was significantly related to children's violent video game exposure (parent report:  $r = .36, p < .01$ ; child report:  $r = .29, p < .01$ ) and aggression ( $r = .20, p < .05$ ). Despite these correlations, the moderation analyses were conducted to determine if the link between children's violent video game exposure and aggression might have varied in strength based on parental monitoring or children's gender. This hypothesis was not supported.

The interaction effects between each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication) and children's violent video game exposure (parent report), controlling for children's gender, were not significant in predicting children's aggression ( $\beta = -.341, t [117] = -.105, p = .917$ ;  $\beta = -2.839, t [117] =$

Table 17

*Summary of a Multiple Regression Analysis Predicting Children's Aggression from Hostile Attribution Bias and Violent Video Game Exposure (child report)*

	<i>B</i>	<i>SE B</i>	$\beta$	<i>p</i>	<i>R</i>	<i>R</i> <sup>2</sup>	<i>P</i>
Step 1					0.20*	0.04	0.025
Child gender	2.98*	1.32	0.20	0.025			
Step 2					0.21	0.05	0.064
Child gender	2.87*	1.33	0.20	0.033			
Hostile attribution bias	0.11	0.15	0.07	0.467			
Step 3					0.23	0.05	0.104
Child gender	3.17*	1.38	0.22	0.023			
Hostile attribution bias	0.14	0.16	0.08	0.383			
Violent video game exposure	-0.05	0.07	-0.08	0.409			

*Note.* Step 1: *R*<sup>2</sup> Change = .041, *F* Change (1, 120) = 5.124, *p* = .025. Step 2: *R*<sup>2</sup> Change = .004, *F* Change (1, 119) = .533, *p* = .467. Step 3: *R*<sup>2</sup> Change = .006, *F* Change (1, 118) = .687, *p* = .409.

\**p* < .05. \*\**p* < .01.

-1.268,  $p = .207$ ;  $\beta = -.614$ ,  $t [117] = -.205$ ,  $p = .838$ , respectively). Similarly, the interaction effects between each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication) and children's violent video game exposure (child report), controlling for children's gender, were not significant in predicting children's aggression ( $\beta = -.115$ ,  $t [117] = -1.272$ ,  $p = .206$ ;  $\beta = .009$ ,  $t [117] = .143$ ,  $p = .887$ ;  $\beta = -.079$ ,  $t [117] = -.750$ ,  $p = .455$ , respectively).

Children's gender did not significantly moderate the link between children's violent video game exposure and aggression. The interaction effects between gender and children's violent video game exposure (parent and child report) were not significant in predicting children's aggression, ( $\beta = 2.988$ ,  $t [118] = .609$ ,  $p = .544$ ;  $\beta = .100$ ,  $t [118] = .676$ ,  $p = .501$ , respectively).

**Hypothesis 5.** It was hypothesized that the indirect relation between children's violent video game exposure and aggression, through hostile attribution bias would be moderated by parental involvement, limit setting, and communication, while controlling for children's gender. Additionally, it was predicted that the indirect relation between children's violent video game exposure, hostile attribution bias, and aggression would be moderated by children's gender. Despite the indirect effect between children's violent video game exposure, hostile attribution bias, and aggression not revealing any significant findings, the moderation effects were examined based on Hayes' (2013) suggestion that significant moderated mediation may not require the initial mediation pathway to be significant. For both parent and child report of children's violent video game exposure, the moderated mediation analyses did not reveal any significant results.

As such, this hypothesis was not supported for either parent or child report of children's violent video game exposure.

**Parent report.** The moderated mediation index for the effect of children's violent video game exposure (parent report) on aggression through hostile attribution bias, by parental involvement, was not significant (-.159, 95% CI [-.1.8029, .3415]). Children's violent video game exposure did not significantly predict children's hostile attribution bias,  $\beta = 1.117$ ,  $t(117) = .727$ ,  $p = .469$ . Similarly, parental involvement did not significantly predict children's hostile attribution bias,  $\beta = .300$ ,  $t(117) = .488$ ,  $p = .627$ . The interaction between children's violent video game exposure and parental involvement was not a significant predictor of children's hostile attribution bias,  $\beta = -1.949$ ,  $t(117) = -.980$ ,  $p = .329$ .

The moderated mediation index was not significant for parental communication as a moderator of the indirect effect of children's violent video game exposure on children's aggression, through hostile attribution bias (-.142, 95% CI [-1.3648, .3126]). Children's violent video game exposure did not significantly predict children's hostile attribution bias,  $\beta = 1.274$ ,  $t(117) = .841$ ,  $p = .402$ . Similarly, parental communication did not significantly predict children's hostile attribution bias,  $\beta = .478$ ,  $t(117) = .754$ ,  $p = .452$ . The interaction between children's violent video game exposure and parental communication was not a significant predictor of children's hostile attribution bias,  $\beta = -1.739$ ,  $t(117) = -.953$ ,  $p = .343$ .

The moderated mediation index was not significant for parental limit setting as a moderator of the indirect effect of children's violent video game exposure on children's aggression, through hostile attribution bias (.099, 95% CI [-.2243, 1.0759]). Children's

violent video game exposure did not significantly predict children's hostile attribution bias,  $\beta = 1.348$ ,  $t(117) = .889$ ,  $p = .376$ . Similarly, parental limit setting did not significantly predict children's hostile attribution bias,  $\beta = -.349$ ,  $t(117) = -.769$ ,  $p = .443$ . The interaction between children's violent video game exposure with parental limit setting was not a significant predictor of children's hostile attribution bias,  $\beta = 1.213$ ,  $t(117) = .884$ ,  $p = .379$ .

For children's gender as a moderator of the link between children's violent video game exposure on children's aggression, through hostile attribution bias, the moderated mediation index was not significant ( $-.279$ , 95% CI  $[-1.7493, 1.0519]$ ). Children's violent video game exposure did not significantly predict children's hostile attribution bias,  $\beta = 3.223$ ,  $t(118) = 1.396$ ,  $p = .165$ . Similarly, children's gender did not significantly predict children's hostile attribution bias,  $\beta = 3.772$ ,  $t(118) = 1.149$ ,  $p = .253$ . The interaction between children's violent video game exposure with children's gender was not a significant predictor of children's hostile attribution bias,  $\beta = -2.874$ ,  $t(118) = -.960$ ,  $p = .339$ .

**Child report.** For the effect of children's report of their violent video game exposure on aggression, through hostile attribution bias, by parental involvement, the moderated mediation index was not significant ( $-.007$ , 95% CI  $[-.0540, .0074]$ ). Children's violent video game exposure significantly predicted children's hostile attribution bias,  $\beta = .082$ ,  $t(117) = 2.143$ ,  $p = .034$ . However, parental involvement did not significantly predict children's hostile attribution bias,  $\beta = .461$ ,  $t(117) = .749$ ,  $p = .456$ . The interaction between children's violent video game exposure with parental

involvement was not a significant predictor of children's hostile attribution bias,  $\beta = -.050$ ,  $t(117) = -.919$ ,  $p = .360$ .

The moderated mediation index for parental communication as a moderator of the effect of children's violent video game exposure on children's aggression, through hostile attribution bias was not significant (.000, 95% CI [-.0168, .0254]). Children's violent video game exposure was not a significant predictor of children's hostile attribution bias,  $\beta = .076$ ,  $t(117) = 1.897$ ,  $p = .060$ . Similarly, parental communication did not significantly predict children's hostile attribution bias,  $\beta = .364$ ,  $t(117) = .583$ ,  $p = .561$ . The interaction between children's violent video game exposure with parental communication was not a significant predictor of children's hostile attribution bias,  $\beta = .003$ ,  $t(117) = .040$ ,  $p = .968$ .

The moderated mediation index for parental limit setting as a moderator of the effect of children's violent video game exposure, on children's aggression, through hostile attribution bias was not significant (.006, 95% CI [-.0050, .0359]). Children's violent video game exposure significantly predicted children's hostile attribution bias,  $\beta = .098$ ,  $t(117) = 2.276$ ,  $p = .025$ . However, parental limit setting did not significantly predict children's hostile attribution bias,  $\beta = -.374$ ,  $t(117) = -.868$ ,  $p = .387$ . The interaction between parental limit setting with children's violent video game exposure was not a significant predictor of children's hostile attribution bias,  $\beta = .045$ ,  $t(117) = 1.208$ ,  $p = .229$ .

For children's gender as a moderator of the link between children's violent video game exposure on children's aggression, through hostile attribution bias, the moderated mediation index was not significant (-.002, 95% CI [-.0537, 0.0298]). Children's violent

video game exposure did not significantly predicted children's hostile attribution bias,  $\beta = .089$ ,  $t(118) = 1.183$ ,  $p = .239$ . Similarly, children's gender did not significantly predict children's hostile attribution bias,  $\beta = .671$ ,  $t(118) = .524$ ,  $p = .601$ . The interaction between children's violent video game exposure with children's gender was not a significant predictor of children's hostile attribution bias,  $\beta = -.011$ ,  $t(118) = -.122$ ,  $p = .903$ .

**Hypothesis 6.** It was hypothesized that the indirect relation between children's violent video game exposure and aggression, through negative affect would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication and children's gender. For both parent and child report of children's violent video game exposure, the moderated mediation analyses did not reveal any significant results (controlling for children's gender). As such, this hypothesis was not supported for either parent or child report of children's violent video game exposure.

**Parent report.** The moderated mediation index for the effect of children's violent video game exposure (parent report) on aggression through negative affect, by parental involvement, was not significant ( $-.093$ , 95% CI  $[-2.1165, 2.1169]$ ). Children's violent video game exposure did not significantly predict children's negative affect,  $\beta = .244$ ,  $t(117) = 1.810$ ,  $p = .073$ . Similarly, parental involvement did not significantly predict children's negative affect,  $\beta = -.028$ ,  $t(117) = -.518$ ,  $p = .606$ . The interaction between children's violent video game exposure and parental involvement was not a significant predictor of children's negative affect,  $\beta = -.013$ ,  $t(117) = -.077$ ,  $p = .939$ .

The moderated mediation index was not significant for parental communication as a moderator of the indirect effect of children's violent video game exposure on children's

aggression, through negative affect (-.096, 95% CI [-1.9203, 1.9094]). Children's violent video game exposure did not significantly predict children's negative affect,  $\beta = .238$ ,  $t(117) = 1.790$ ,  $p = .076$ . Similarly, parental communication did not significantly predict children's negative affect,  $\beta = -.016$ ,  $t(117) = -.285$ ,  $p = .777$ . The interaction between children's violent video game exposure and parental communication was not a significant predictor of children's negative affect,  $\beta = -.014$ ,  $t(117) = -.086$ ,  $p = .931$ .

The moderated mediation index was not significant for parental limit setting as a moderator of the indirect effect of children's violent video game exposure on children's aggression, through negative affect (.206, 95% CI [-1.9194, 1.7215]). Children's violent video game exposure did not significantly predict children's negative affect,  $\beta = .225$ ,  $t(117) = 1.691$ ,  $p = .093$ . Similarly, parental limit setting did not significantly predict children's negative affect,  $\beta = -.009$ ,  $t(117) = -.213$ ,  $p = .832$ . The interaction between children's violent video game exposure with parental limit setting was not a significant predictor of children's negative affect,  $\beta = .030$ ,  $t(117) = .246$ ,  $p = .806$ .

For children's gender as a moderator of the link between children's violent video game exposure on children's aggression, through negative affect, the moderated mediation index was not significant (-.894, 95% CI [-4.4091, 2.8615]). Children's violent video game exposure did not significantly predict children's negative affect,  $\beta = .306$ ,  $t(118) = 1.514$ ,  $p = .133$ . Similarly, children's gender did not significantly predict children's negative affect,  $\beta = .117$ ,  $t(118) = .408$ ,  $p = .684$ . The interaction between children's violent video game exposure with children's gender was not a significant predictor of children's negative affect,  $\beta = -.129$ ,  $t(118) = -.494$ ,  $p = .622$ .

**Child report.** For the effect of children's report of their violent video game exposure on aggression, through negative affect, by parental involvement, the moderated mediation index was significant (-.061, 95% CI [-.1509, -.0061]). However, children's violent video game exposure did not significantly predict children's negative affect,  $\beta = -.002$ ,  $t(117) = -.679$ ,  $p = .498$ . Similarly, parental involvement did not significantly predict children's negative affect,  $\beta = .025$ ,  $t(117) = .465$ ,  $p = .643$ . The interaction between children's violent video game exposure with parental involvement was not a significant predictor of children's negative affect,  $\beta = -.008$ ,  $t(117) = -1.746$ ,  $p = .083$ .

The moderated mediation index for parental communication as a moderator of the effect of children's violent video game exposure on children's aggression, through negative affect was not significant (.016, 95% CI [-.0520, .0933]). Children's violent video game exposure did not significantly predict children's negative affect,  $\beta = -.003$ ,  $t(117) = -.910$ ,  $p = .365$ . Similarly, parental communication did not significantly predict children's negative affect,  $\beta = .015$ ,  $t(117) = .270$ ,  $p = .788$ . The interaction between children's violent video game exposure with parental communication was not a significant predictor of children's negative affect,  $\beta = .002$ ,  $t(117) = .389$ ,  $p = .698$ .

The moderated mediation index for parental limit setting as a moderator of the effect of children's violent video game exposure on children's aggression through negative affect was not significant (.025, 95% CI [-.0236, .0741]). Children's violent video game exposure did not significantly predict children's negative affect,  $\beta = -.002$ ,  $t(117) = -.673$ ,  $p = .502$ . Similarly, parental limit setting did not significantly predict children's negative affect,  $\beta = -.028$ ,  $t(117) = -.729$ ,  $p = .467$ . The interaction between

parental limit setting with children's violent video game exposure was not a significant predictor of children's negative affect,  $\beta = .003$ ,  $t(117) = .794$ ,  $p = .429$ .

For children's gender as a moderator of the link between children's violent video game exposure on children's aggression, through negative affect, the moderated mediation index was not significant (.060, 95% CI [-.1179, .1289]). Children's violent video game exposure did not significantly predict children's negative affect,  $\beta = -.005$ ,  $t(118) = -.697$ ,  $p = .487$ . Similarly, children's gender did not significantly predict children's negative affect,  $\beta = .015$ ,  $t(118) = .133$ ,  $p = .894$ . The interaction between children's violent video game exposure with children's gender was not a significant predictor of children's negative affect,  $\beta = .003$ ,  $t(118) = .338$ ,  $p = .736$ .

### **Additional Analyses**

**Indirect effects of violent video game exposure on hostile attribution bias, through negative affect.** Correlational analyses revealed that higher levels of children's violent video game exposure (child report) were significantly related to higher levels of children's hostile attribution bias (Table 11). In addition, higher levels of children's hostile attribution bias were significantly correlated with higher levels of children's negative affect. To further explore the link between children's violent video game exposure (parent and child report), negative affect, and hostile attribution bias, mediation analyses were performed. While controlling for children's gender, children's negative affect was found to significantly mediate the link between children's violent video game exposure (parent report) and hostile attribution bias, (.609, 95% CI [.0327, 1.8112]); however, the indirect link between children's report of violent video game exposure,

negative affect, and hostile attribution bias was not significant (-.008, 95% CI [-0.0367, 0.0077]). See Figures 9 and 10 for the mediation results.

A summary of the quantitative findings from the present study can be found in Table 18.

### **Interview data**

The results of the thematic analysis are presented within the context of the research questions and the specific questions asked of the participants during the interviews. The research questions included the following: a) Do parents hold perceptions about video gaming and children's behaviour? Do they have any specific perceptions about the effects of playing violent video games? b) To what extent do parents monitor their children's video gaming (e.g., their involvement and communication with their children about video gaming)? c) Do parents intervene or set limits regarding children's video gaming habits?

In describing the results of the thematic analysis, the following descriptors will be used to indicate the frequency of each theme/code in the dataset (i.e., the number of parents that endorsed the individual theme/code): "all" refers to all fifteen parents; "most" indicates thirteen to fourteen parents; "many" is ten to twelve parents; "some" represented seven to nine parents; "several" refers to four to six parents; and "few" is one to three parents. No new codes were discovered within the last two interviews, indicating that theoretical saturation was likely achieved.

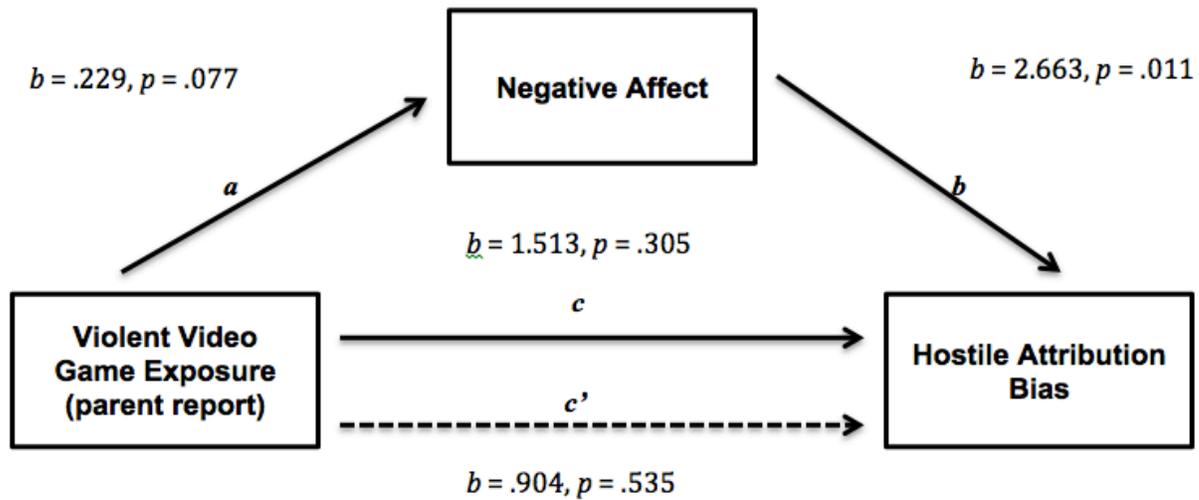


Figure 9. Children's negative affect as a significant mediator in the relation between children's violent video game exposure (parent report) and hostile attribution bias, such that higher levels of children's violent video game exposure were related to higher levels of hostile attribution bias, through higher levels of negative affect.

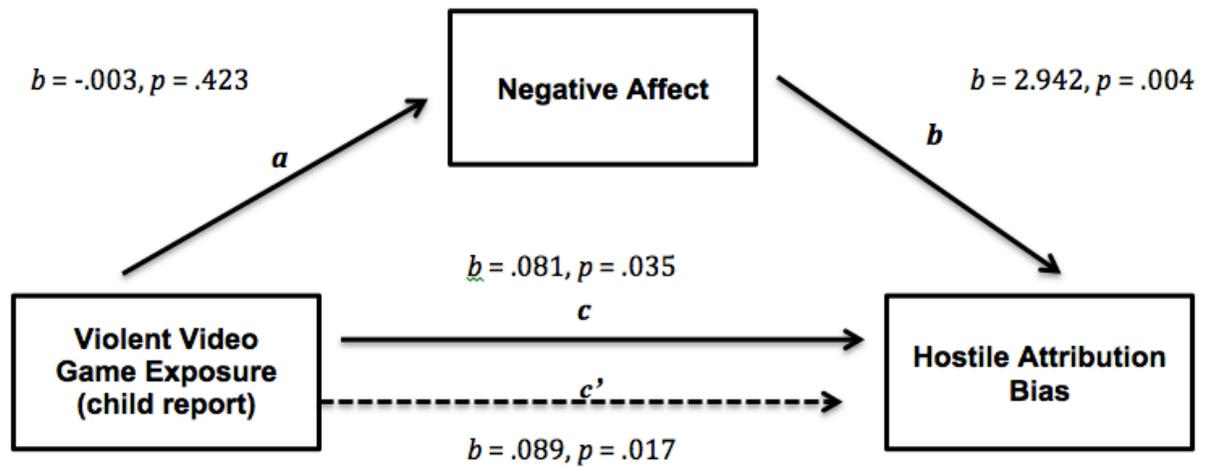


Figure 10. The relation between children’s violent video game exposure (child report) and hostile attribution bias was not significantly mediated by children’s negative affect.

Table 18

*Summary of Quantitative Findings*

Study Hypotheses	Result
<p><b>Hypothesis 1:</b> Higher levels of children's violent video game exposure would be related to higher levels of aggression.</p> <ul style="list-style-type: none"> <li>• Higher levels of parent report of children's violent video game exposure were related to higher levels of aggression.</li> <li>• Children's report of violent video game exposure was not related to aggression.</li> </ul>	Partially Supported
<p><b>Hypothesis 2:</b> Higher levels of children's negative affect and hostile attribution bias would each be related to higher levels of children's aggression.</p> <ul style="list-style-type: none"> <li>• Higher levels of children's negative affect were related to higher levels of children's aggression.</li> <li>• Hostile attribution bias was not related to aggression.</li> </ul>	Partially Supported
<p><b>Hypothesis 3:</b> Children's hostile attribution bias and negative affect would each mediate the relation between children's violent video game exposure and aggression.</p> <ul style="list-style-type: none"> <li>• Children's negative affect mediated the link between children's violent video game exposure and aggression, with higher levels of children's violent video game exposure indirectly related to higher levels of children's aggression, through higher levels of negative affect.</li> <li>• Children's hostile attribution bias was not found to be a mediator.</li> </ul>	Partially Supported
<p><b>Hypothesis 4:</b> The relation between children's violent video game exposure and children's aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.</p> <ul style="list-style-type: none"> <li>• None of the parental monitoring variables or children's gender were found to be moderators.</li> </ul>	Not Supported
<p><b>Hypothesis 5:</b> The relation between children's violent video game exposure, hostile attribution bias, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.</p>	Not Supported

- None of the parental monitoring variables or children's gender were found to be moderators.

**Hypothesis 6:** The relation between children's violent video game exposure, children's negative affect, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender. Not Supported

- None of the parental monitoring variables or children's gender were found to be moderators.

**Additional finding:**

- Children's negative affect mediated the link between children's violent video game exposure (parent report) and hostile attribution bias, with higher levels of children's violent video game exposure indirectly related to higher levels of hostile attribution bias through higher levels of negative affect.
-

## Research Question 1: Parents Perceptions about Video Gaming

**Parents' perceptions about video gaming in general.** Very few researchers have interviewed parents to learn about their perceptions of children's media habits, especially in school-aged children and with respect to video gaming. Given the purpose of the present study, it was important to understand the perceptions parents held about children's video gaming, and in particular, violent video gaming. Parents were asked if they had any concerns about their children's video game play and what those concerns included, as well as any concerns about their children playing violent video games. Many parents ( $n = 12$ ) discussed having some concerns about children playing video games. Perceptions about video gaming included that children could become dependent on technology ( $n = 7$ ), parents were concerned about internet safety when playing online video games ( $n = 7$ ), parents believed it would lead to difficulties learning effective social skills (e.g., learning to communicate in person instead of through a video game;  $n = 3$ ), and that it is a waste of time ( $n = 2$ ). In addition, parents ( $n = 6$ ) believed that children might become confused with the distinction between reality and fantasy, and assume that the way that a character acts in a video game is appropriate for them to act out in real life (i.e., not understanding that playing a video game is often different than behaving in real life). For example, one parent said:

*[they would be concerned about their children's video gaming if] they started acting like the character [more] than they were acting like themselves. [...] So, I look at if he gets lost in the game. (Father of 10-year-old boy)*

With respect to parents' specific perceptions about children playing violent video games, many parents ( $n = 11$ ) expressed some concerns. One parent believed that children's violent video game play is linked to real world violence and aggression. For example, one parent said:

*[...] you watch the news and, not that it's going to happen, but a lot of time you wonder if it [violent video gaming] has any correlation to what's happening in the world [...] the violence that's going on in the world right now. (Father of 8-year-old boy)*

Similarly, several parents ( $n = 4$ ) believed that children might imitate violent or aggressive behaviour from the violent video games. One parent said:

*[...] especially for boys, if they're playing violent [video] games, I could see how they would act out on those behaviours. [...] I could see how for sure kids would copy that type of stuff. (Mother of 7-year-old girl)*

Similarly, another parent provided an example of their child imitating a video game and said:

*He'll grab the nerf blaster and just [...] pretend like [he's playing] Splatoon, like after he's done playing. (Father of 8-year-old boy)*

Several parents ( $n = 4$ ) also believed that playing violent video games could desensitize children to aggression and violence. For example, one parent explained that:

*[violent video games] kind of desensitizes them to violence, like if they see it too much [...] it doesn't seem real. [...] the graphics are so realistic, it seems a lot more real than when I was a kid. [...] even the sound effects and the guns are so realistic, so I don't like how real they are. (Father of 10-year-old boy)*

Children being too young or immature and losing their childhood innocence by playing violent video games also emerged as a belief about playing violent video games, reported by several parents ( $n = 5$ ). In addition, a few parents believed that children who played violent video games would experience an increase in negative feelings and thoughts (e.g., become upset or have nightmares;  $n = 2$ ).

**Playing violent video games.** Parents were asked if their children played any video games with violent content, as past research has shown that more than half of the media children under the age of 13 are exposed to includes some violence (Anderson et al., 2003; Wilson et al., 2002). Many of the parents ( $n = 14$ ) reported that their children play some violent video games (e.g., Call of Duty, Halo), though interestingly, all of these parents deemed the violent games their children played as containing acceptable violence, including video games that had cartoonish violence and did not include any blood or gore. Several of the parents ( $n = 5$ ) set limits on how their children played violent video games, such as not allowing children to use headsets that connected with players online or requiring the volume in the game be turned down.

Another subtheme that emerged was that a few of the parents ( $n = 3$ ) whose children played violent video games, usually played them when they were with other children or at other children's homes. For example, one parent said:

*[...] That's where my concern was with the neighbour {...} They have Grand Theft Auto and those games, so that's the only time they would be able to play those games. (Father of 10-year-old boy)*

Another parent said:

*I've said no to that [Grand Theft Auto], but [...] it's influenced by other parents too, because they'll say it's not that big of a deal [...] I'll allow him to play it [Grand Theft Auto] at their house I guess. (Mother of 9-year-old boy)*

Another interesting subtheme that emerged related to the specific games that children were not allowed to play. Most of the parents ( $n = 14$ ), who allowed their children to play some violent video games, did not permit their children to play Grand Theft Auto or first person shooter video games (e.g., Call of Duty). However, even though some parents did not want their children playing these violent video games, a few of them ( $n = 3$ ) reported knowing that their children played them while at other children's homes. Despite parents' numerous concerns about children playing violent video games, most parents ( $n = 14$ ) reported that their children played violent video games and a few ( $n = 3$ ) reported that they played them while at other children's homes.

**Reactions to playing video games.** Although there is limited research examining the effects of playing violent video games on school age children's behaviour, the current literature suggests that some children experience higher levels of aggression after playing violent video games (Anderson et al., 2007), and playing violent video games may also increase children's anger and hostility (Gentile et al., 2004). In the present study, parents were asked if they noticed any changes in their children's behaviour after playing video games and if they felt that these changes depended on the content in the video games. These findings revealed the following two subthemes related to children's reactions: a) negative reactions; and, b) positive reactions. Another theme that emerged from the interviews was that several parents thought that children's individual characteristics influenced the manner in which children react to playing video games.

**Negative reactions.** Of the negative reactions that were described by the parents ( $n = 11$ ), parents reported that children tended to experience negative feelings (e.g., anger, frustration, fear, annoyance) and negative behaviours (e.g., aggression, physical tension, whiny attitude) when they were told to stop playing a game ( $n = 8$ ), when they played video games with content that included shooting, war, contact sports, or high intensity action ( $n = 7$ ), or if they lost a game ( $n = 2$ ). For example, one parent said:

*If you took it [video game] away, he would throw outrageous fits. [...] I'll have to tell him to get off and then he becomes frustrated. [...] That can make him pissy or punch the walls as he's walking up the stairs.* (Mother of 8-year-old boy)

Another parent reported:

*[...] when we ask him to get off the video games, he's extremely aggressive; hitting, kicking, punching, throwing things, breaking things, that kind of stuff. [...] Regardless of if he's playing a mild video game or something that might be a little more violent, but still age appropriate, he still has the same reaction [...] when he's asked to get off, which is immediate aggression.* (Mother of 7-year-old boy)

A parent provided an interesting comment about what her own child had observed in himself after playing violent video games. The participant said:

*I don't think that the games he plays are overly aggressive enough to really be a trigger. [...] But, he has mentioned it before, himself, that the violence in the video games might make him do stuff like that [hitting and kicking people].* (Mother of 7-year-old boy)

One parent shared another example of a negative reaction experienced by her child:

*I don't know if other kids are experiencing the same sort of thing, but when he plays like an angry game he [...] he gets angry after, sometimes, but not always.*

(Mother of 9-year-old boy)

The findings revealed that many of parents noticed some negative reactions in their children after playing video games, and specifically related to being told to stop playing or if they lost in the game. In some situations, parents ( $n = 7$ ) reported that they thought children were more aggressive after playing video games with violent content.

**Positive reactions.** Several parents ( $n = 5$ ) reported that they noticed some positive reactions that children have to playing video games. Subthemes that emerged from the parents included experiencing stress-relief ( $n = 3$ ), improved focus and skills (e.g., sports plays;  $n = 2$ ), and learning to lose in games ( $n = 2$ ). For example, one parent said:

*I guess video games, in a sense, the positive thing I would say out of it is she learned that it's okay not to be a winner for things.* (Mother of 7-year-old girl)

In addition to learning how to lose, another parent found that playing video games provided her child with an outlet to release his excess energy, which allowed him to feel calmer after playing the video game:

*If he's got a lot of energy and he plays the game, I think it [his energy] might absorb into the game [...] and then he feels kind of done with all of his energy.*

*[...] After video games, I feel like maybe he's a little calmer because he's gotten it [his energy] out.* (Mother of 9-year-old boy)

**Children's individual characteristics.** The role of individual characteristics, such as children's temperament, is not well understood in the links between children's violent

video game play and aggression. Therefore, an interesting finding that arose from the interviews was that some parents ( $n = 7$ ) thought that children's individual characteristics influenced the manner in which they reacted to playing video games. As one parent explained, children's unique characteristics may be an important factor in understanding differences between children's outcomes from playing video games:

*I would say, between myself growing up and my son, I can see the difference.*

*Some kids do and some kids don't [react differently based on the content in the video games]. I don't know that it's the actual content, rather than the actual person. (Father of 8-year-old boy)*

Specifically, temperament arose as an individual characteristic that may have an important role in understanding differences in children's reactions to playing video games, and their reactions to playing violent video games. Some of the parents ( $n = 7$ ) suggested certain characteristics that may make a child more likely to be negatively affected by playing a violent video game, such as being more dominant, "high strung", sensitive, overly emotional, angry, and easily suggestible. One parent explained that in addition to children's temperament (as reported by a parent), the manner in which children regulate their behaviour and emotions may be an important factor in why some children are more negatively affect by playing violent video games:

*I don't think it [playing violent video game, Call of Duty or another shooting game] affects him particularly as a person, whereas, it might have an effect on other children. [...] Like if your child has behavioural issues or something, maybe it will affect them if they're playing violent video games. [...] He's a pretty easy guy. Like my other guy would just have a meltdown. So, I think their*

*temp[erament], the way he deals with limit setting [influences his reaction to playing video games]. (Mother of 9-year-old boy)*

Another parent explained that her child might be more likely to have a negative reaction to playing violent video games based on his temperament:

*It [video game with realistic violence] would be very overwhelming, like it would affect him. [...] He seems to really be sensitive to that sort of thing, whereas my daughter could do it all day. (Father of 10-year-old boy)*

It appears that some of the parents thought that children's individual characteristics, such as temperament and their ability to regulate behaviour and emotions, contribute to children's reactions to playing video games and may have more of an impact than the actual content of the video games being played.

## **Research Question 2: Parental Monitoring of Children's Video Gaming**

**Parental involvement and communication.** In order to better understand the extent to which parents are aware of their children's video gaming and the manner in which they are involved in their children's gaming, parents were asked about their children's favourite video games, if they play video games with other children, if they discuss video games with their children (and the content of these discussions), and finally, if they play video games together.

Many parents ( $n = 10$ ) were aware of the video games their children were playing. Several of the parents ( $n = 5$ ) shared that they were not always sure what games their children played. A few parents ( $n = 2$ ) explained that following completion of the survey portion of the present study, they learned that the video games they thought their children were playing were not accurate. For example, one parent said:

*Well I learned after we left here the [...] last time, that he plays games that I do not approve of and those are like [...] the shoot 'em up games, where they're working online with other people for a common goal. (Mother of 8-year-old boy)*

A few parents ( $n = 3$ ) said that they were not always able to monitor the video games that their children played. For example, parents explained that their children play video games in their bedroom, or on a small electronic tablet, where it was difficult to watch what was being played. One parent found that even when they tried to monitor their children's video gaming, it was difficult to consistently know what they were playing:

*Sometimes they're sneaky and you think they're playing that, and you kind of take a look and like, "what happened to the game you were on?" (Mother of two 8-year-old girls and one 10-year-old boy; quote represented all children)*

Similarly, another parent shared that even when they think they know what their children are playing, they aren't always fully aware:

*Like, "Oh, they're good downstairs playing Minecraft." When in reality, they're playing GTA violent. (Father of 8-year-old boy)*

Another parent discussed the balance between monitoring every aspect of their children's video gaming and monitoring what is necessary to ensure safety:

*Are we over their shoulder all the time, looking to see...um, no. Do they know that we go through their history even if they try to delete it and figure out...they do know. (Mother of two 8-year-old girls and one 10-year-old boy; quote represented all children)*

Parents who reported that they monitored their children's video gaming ( $n = 6$ ) tended to require their children to play video games in open areas of their house (e.g., in the

kitchen), compared to in their bedrooms or on another level of the house. In addition, a few parents were more likely to watch their children's video gaming when they knew the game included some violence, or when the parents were interested and played video games, themselves. For example, parents shared that they specifically monitored video games that contained some violence to ensure their children knew the difference between the video game and reality:

*In particular, just the person-on-person violence is something I continually monitor, especially if I notice him being kind of aggressive at times and then mixing that up with the two. It was to ensure that, you know, it's more responsibility. If I'm going to let him be exposed to that, ensuring that he doesn't connect the two, with his anger and fantasy of it all. (Father of 8-year-old boy)*

For parents who were less aware of their children's video gaming, they explained that they were not always paying attention to what their children were playing ( $n = 5$ ). An especially interesting finding was that many of the parents ( $n = 10$ ) were not aware of what their children played while at other children's homes. For example, one parent explained:

*When they're at other people's houses, if they play during the day, I know the two kids [homes] that they go to and I know both the moms, and I can't see either one of them allowing for violent video games. [But] I've never actually asked them.*

(Mother of two 8-year-old girls and one 10-year-old boy; quote represented all children)

Most of the parents ( $n = 14$ ) further explained that they do not usually talk with the parents of the children's homes where their children play video games. One parent said:

*I don't know that I'm always like, "oh what video games does your child play?" because I just don't think about that.* (Mother of 9-year-old boy)

Another parent shared a similar experience of not getting into detail about their children's video game play:

*Whenever we [other parents] interact, it very rarely is [about the video games their children play together]. As you know, they'll just be like, "oh you know them and their video games." [...] Like you don't really discuss any of the particular games.* (Father of 10-year-old boy)

A parent shared that if she does speak with other children's parents about their children playing video games, it is not usually about the specific games or content they are playing:

*Just things like, "they'll play video games a lot." That's it. More comments about playing a lot or nothing at all.* (Mother of 8-year-old boy and 10-year-old boy; quote represented both children)

Despite that most of parents ( $n = 14$ ) did not discuss video games with other parents, several parents ( $n = 5$ ) reported having some discussion about video gaming generally with others. These conversations tended to be about parents' general opinions of their children playing video games. For example:

*I would say we do discuss them, but not trying to specifically discuss the games. Like we might be mutually discussing how frustrated they are because they won't get off Minecraft or that kind of stuff. So we're already familiar, just in passing discussions with what types of games our kids are playing.* (Mother of 7-year-old boy)

Another parent provided a specific example of a situation in which they actually spoke with one of the other children's parents about their children playing video games together:

*So the friend's mom called and talked to my wife and I, and said, "hey listen, they play this game, but I don't allow the headsets because I guess there was a headset at his dad's place and so he played and he started talking to some guy, and it was pretty inappropriate the way they kind of spoke to each other. (Father of 10-year-old boy)*

Therefore, it appears that only several of the parents ( $n = 5$ ) discuss their children's video gaming with other children's parents, and often these discussions are about how often their children play, but not about the specific nature of the video games. Fewer parents ( $n = 3$ ) actually discuss the types of video games that their children play together and any rules they have for the children.

A few of the parents ( $n = 3$ ) explained that they did not discuss the content of video games their children played at other children's homes with the other parents because they did not have any control over the rules at other children's homes and they wanted to be respectful of the other parents. In addition, one parent shared that if other parents are busy with personal issues (e.g., finance stress or marriage difficulties) they didn't want to burden them more, so they didn't discuss what their children played while at their home. For example, one parent explained:

*It's hard because they're going to the neighbour's house and there's different rules there, right. [...] It's difficult because I'm like, [...] you want them to respect*

*your parenting, but you still don't want to have a confrontation with a dad that you barely even know. (Father of 10-year-old boy)*

Although several ( $n = 5$ ) of the parents discussed video games with other parents, most of the parents ( $n = 14$ ) discussed playing video games with their own children. Parents shared that they discussed the content of the video games ( $n = 13$ ) and game strategies ( $n = 4$ ). This was an interesting finding, because despite several of the parents not always being aware of the games their children played, most parents were interested or curious about the video games their children were playing. For example:

*Like with Minecraft, it's a very creative game, so we talk about that one a little bit. [...] He was trying to build the living room [...] and so we were talking about it and I sat with him. There are times when I sit with him and [...] we'll talk about it a little bit. So, like "what are you building?" and like, "oh, that's really cool." And, I interact with him as much as I can, you know. (Mother of 9-year-old boy)*

In addition to showing interest or curiosity in their children's video games, most parents ( $n = 13$ ) discussed the specific content in the video games (e.g., what they were actually doing in the game) with their children. For example, some of the parents ( $n = 9$ ) shared that they engaged in discussion with their children about the differences between how they were behaving in the video games and how they were expected to behave in real life. Interestingly, 60% of fathers tended to have these conversations with their children about the differences in children's behaviour in the video games and in real life, compared to 40% mothers. Often these discussions were about children not imitating the behaviours they played in the games or why the actions in the video games were not appropriate behaviours for real life. For example, one parent said:

*I tend to do it, just explain that it's not real. [...] I try to clarify the difference between the fantasy and the real life, because there are a lot of similar, realistic type things. Like Call of Duty, when you're talking about urban warfare where you're fighting basically criminals and terrorists, to understand that you know [that it is different than real life]. Again, if a police officer's going to shoot a criminal, it's not just because they want to. It's the last thing they want to do. You know it would weigh on them in real life. And they'd have a hard time dealing with it, but it's something they'd have to do as part of their job. (Father of 8-year-old boy)*

In another interview, a parent discussed with her children that they should not imitate the actions from the video games in real life:

*[...] I mean, we have conversations, like this isn't allowed obviously. You can't kill people. It's not [...] real. (Mother of 9-year-old boy)*

Finally, several parents ( $n = 4$ ) also stated that they discussed video game strategies and tips for advancing through the game with their children. Occasionally children would ask their parents how to beat a certain level or how to earn a specific reward in a game. These discussions tended to happen more often when participants were also familiar with video gaming or played video games themselves.

Overall, it appears that most parents tended to engage in some conversations with their children about their video gaming. Most of the discussions were related to the content in the video games (e.g., what their children are doing in the game). What is especially interesting, however, is that these discussions appeared more frequent when children played violent video games because parents felt that they needed to discuss the

differences in children's behaviour during a video game (e.g., killing people/things, causing destruction) and how they would be expected to behave in real life. That is, children's violent video gaming may make it more likely for parents to engage in discussions regarding the specific content of the video game, whereas these discussions may be less frequent if the video game is less violent.

When parents were asked about if and how they played video games with their children, all of the parents reported that they played video games with their children. Parents and children tended to play together in two-player games where each parent and child took turns playing the game. A few of the parents ( $n = 2$ ) explained that they thought their children preferred to have them in the same room while they played video games, but only wanted their parents to watch them play, not to actually play the game with them. For example, one parent said:

*What we found was he never wanted to play with [me]. Like he didn't want to play the game together. But he would ask me, 'Hey could you play?' 'Could you sit down and play Pokemon with me, while I sit down and play Pokemon, and we won't do anything together.' [...] And what he means is, you sit down and I could really be playing anything. (Father of 10-year-old boy)*

It was also found that many of the parents ( $n = 10$ ; fathers:  $n = 4$ ) enjoyed playing video games themselves. In fact, several of the parents ( $n = 5$ ; fathers:  $n = 4$ ) who played video games with their children, were mostly fathers who tended to enjoy playing video games themselves. These parents were very familiar with the video games that their children were playing and were excited to play with them.

Taken together, the main findings with regard to parental monitoring included that most parents try to be involved in their children's video gaming by observing what they are playing, engaging in conversations about the games, and for some parents, having discussions about the differences between real life and the video games. Despite these findings, several parents struggled to be consistent with their monitoring, especially when they became busy. For example, parents were not always aware of what video games their children were playing. Additionally, the type of video game children were playing sometimes appeared important in whether or not parents engaged with their children's gaming. For example, when children were playing video games with violent content, parents were more likely to engage their children in discussion about the content of the game, however, these conversations seemed less likely when the parents were unfamiliar with the video games, themselves.

**Playing video games with other children.** Parents were asked whether or not their children played video games with other children and at other children's homes and if they had any concerns about their children playing video games at other children's homes. Many of the parents ( $n = 11$ ) reported that their children played video games with other children either at other children's homes or other children came over to their own home. In addition to playing video games with other children in person, several parents ( $n = 4$ ) reported that their children played online video games that involved their children playing against other individuals. Some of the parents ( $n = 7$ ) shared concerns about their children interacting with strangers in online video games. A concern that a parent raised was the possibility for predators in online chats that could potentially put children's

safety at risk. One parent also noted that the content in the chat rooms can be inappropriate or mean, and could upset their children. For example, a parent shared:

*[...] It's the people in the games. Like if you're online playing in that type of forum, they're kind of nasty to the other people. Like when you hear some of the things that they say, ya, they're not nice. [...] Because it's interactive, right, so you're playing as a team. If they're playing like a war game or an army game and you have to work together with this team to get to this end goal. But, they can tell the kids that are younger because obviously their voices are different. And they like really pick on these kids. They're really nasty to them. (Mother of 10-year-old boy)*

When children played video games at other children's homes, many of the parents ( $n = 10$ ) noted that they were not always aware of the video games their children were playing. Several parents ( $n = 5$ ) noted that they asked their children after playing at a friend's house the video games that they played. A few of these parents ( $n = 2$ ) learned that their children were playing more violent video games or video games that they were not allowed to play when they were at other children's homes. For example, one parent said:

*I try to really stress to her not to be playing anything [that she is not allowed to play] because she knows what she should and shouldn't be playing. [...] Even when she told me she played it [Grand Theft Auto] there and I said right away to them, I said, "that's supposed to be for kids who are 18 and up." (Mother of 7-year-old girl)*

Therefore, even though most of the parents ( $n = 14$ ) tried to restrict some violent video games in their own home, some reported ( $n = 8$ ) that their children had access to violent video games at other children's homes:

*I've said no to that [Grand Theft Auto], but other parents like...it's influences by other parents too. Cause they'll say, it's not a big deal, it's whatever, my son has it. [...] But, I'll...I'll allow him to play it at their house, I guess. But, I won't buy it for my house. (Mother of 9-year-old boy)*

In addition, most of the parents ( $n = 14$ ) did not discuss the video games that their children are allowed to play with the other parents. A few parents ( $n = 3$ ) explained their reasons for not having these discussions with other parents as recognizing that they did not have control over what happened at other children's homes, not wanting to be intrusive and tell other parents how to parent their children, and not wanting to increase other parents' stress if they had other stressors in their lives (e.g., financial or marital stress).

### **Research Question 3: Parents' Limit Setting of Children's Video Gaming**

**Setting limits on video gaming.** Previous research has found that when parents set limits on the amount and duration of children's media use, as well as the content they are exposed to in various media outlets, children may experience fewer behavioural problems (Nathanson, 2007). In the present study, parents were asked if they set limits on the amount of time and/or on the content of the video games that they allowed their children to play in order to understand if and how parents intervene or mediate their children's video gaming behaviour. In addition, participants were asked to describe how their children reacted to limits. The subthemes that emerged included the following:

parents set limits on the amount of time their children were allowed to play video games ( $n = 10$ ); violent video games and games rated M (for Mature) tended to not be allowed ( $n = 14$ ); and limits were often “soft limits” ( $n = 9$ ).

**Limits on time.** In terms of setting limits on the amount of time children were allowed to play video games, several parents ( $n = 6$ ) tended to set specific limits during the weekdays. Parents reported various limits for their children’s video gaming during weekdays, including that they were not allowed to play at all during the week, before school, before their homework and chores were completed, or before bedtime. In addition, a few parents ( $n = 3$ ) implemented strategies to help their children follow these time limits, including using timers, providing children with warnings, and shutting off the wireless Internet access. One parent explained:

*[...] We have a way of doing it [limiting video game play] through our Wifi. [...] We can set a time limit for each computer, each device. (Mother of 9-year-old boy and 10-year-old girl; quote represented both children)*

Another parent found it important to give her child reminders for the amount of time remaining to play the video game:

*I’ll set the timer on the microwave and I’ll say, “So you’ve got 25 minutes to play, maybe you want to set the time on your tablet [...], so 20 minutes out, you know the games gonna finish.” Because not only are you setting limits for them now that they understand, but you’re also setting them up for when they have a deadline. (Mother of two 8-year-old girls and one 10-year-old boy; quote represented all children)*

Some parents ( $n = 7$ ) found it effective to use video games as a reward for children's positive behaviour or as a consequence for aggressive behaviour:

*Usually I like set the half an hour [limit] a day. Sometimes, if he's behaving really well or doing extra chores, something like that, then he might be able to earn extra time. Consequently, it's his favourite thing, especially the tablet [...]. So, if there's extreme behaviour, like aggression or things like that, that will be one of the first consequences to be or privileges to be taken away as well. (Mother of 7-year-old boy)*

Another explained how video games are used as a reward for positive behaviour:

*They do have a reward system set up. So, if they come home, like if they come home today and they've got a 4 in something, um 4 minus is accepted, then they will get 20 minutes of tablet time. [...] We also have if they do chores, again [10-year-old boy] was being a pain in the butt, didn't want to make his bed, didn't want to practice piano, so for every checkmark, which we have a little thing in our house in the kitchen, for every checkmark they [all three children] get 15 minutes. [...] We kind of play it off them, if they're not fighting and they're getting along and they're making good choices, then maybe they'll get a little more time.*

(Mother of two 8-year-old girls and one 10-year-old boy)

**Limits on content.** With regards to limits set on the content of video games, most of the parents ( $n = 14$ ) tried to limit or not allow children to play violent video games or video games rated M (for Mature). For example, one parent said:

*Their friends play Call of Duty and Grand Theft Auto. So, the Call of Duty, I don't let them play it anymore because even with the settings changes to like not*

*bloody or anything like that, it's still too gory for age 10 and especially too gory for age 7. (Father of 10-year-old boy)*

Some of the reasons for these limitations were due to parents' concerns about the negative effects of playing violent video games on children's behaviour. For example, as noted above, several parents felt that playing violent video games would desensitize children to violence ( $n = 4$ ), lead children to imitate aggressive or violent behaviours ( $n = 4$ ), and increase children's negative feelings (e.g., more likely to become upset;  $n = 2$ ). The manner in which parents reported that they determined if they felt the content of the video game was acceptable for their children to play included reviewing ratings by the ESRB ( $n = 9$ ), reading reviews from other players online ( $n = 5$ ), playing the video games themselves ( $n = 3$ ; all fathers), or asking other parents about the games ( $n = 5$ ). One parent, who played video games, commented that they would review the content in the game by playing it and determine if it is acceptable for their child to play or not. This approach was reported in parents ( $n = 3$ ) who were already familiar with video games and played them themselves:

*I keep track of what he plays. Before he can play anything, I let it be known that because I'm a gamer myself, I want to make sure that it's appropriate for him to play. (Father of 8-year-old boy)*

Overall, it appeared that many of parents set "soft limits". That is, parents' limits on video gaming in terms of frequency, duration, and content were not always consistent. It depended on the specific day of the week, how busy parents were, the weather (i.e., participants found their children played more video games when the weather was cold or rainy and they were forced to stay indoors), which parent was home and supervising the

children, and if the children played video games at other children's homes. For example, one parent said:

*We've tried in the past to put limits on it, like you can only play for like, you know a half hour in the morning and an hour at night. And we kind of stick to it for a little bit and then something will come up and you know, it just gets all of a sudden you realize we're not sticking to it anymore.* (Father of 10-year-old boy)

Another parent explained:

*[It's] definitely weather related and you know, season related. He would play more in the bath weather, bad season. [...] So in the winter, [...] he'll play them more. [...] In the summer, not so much, only because he's more active outside.* (Mother of 10-year-old boy)

Despite most parents setting limits on the content of video games, some parents ( $n = 8$ ) reported that children played video games that they were not allowed to play when they were at other children's homes or even in their own home. For example, one participant said:

*[...] I know that there are ratings on games and that some of them are above his age level, so I try to not let him play those ones, but there are a couple that are Mature and 17 and up that he does play that I allow.* (Mother of 9-year-old boy)

**Following limits.** Many of the parents ( $n = 9$ ) reported that their children have difficulty following limits. In terms of children following the limits the parents set around their video game play, some of the parents ( $n = 8$ ) reported that children requested for more time to play. For example:

*We'll hear, "2 more minutes", "Wait til I die", "Wait til so and so, the time runs out". (Mother of two 8-year-old girls and one 10-year-old boy; quote represented both children)*

Many of the parents ( $n = 9$ ) reported that children became upset and experienced negative reactions to limits being set, as described above. For example, one parent said:

*It's very difficult for him to follow those [limits]. He [...] becomes very frustrated with the time. [...] I think it's just basically how he's so pulled into them. It's very interesting. It's very easy to get lost in them and to lose track of time. Often I'll find that I'll tell him he has 30 minutes and I'll set the timer and I'll give him a 5 minute warning before it's done. And...he'll still feel like he only got to be on there for less than 5 minutes. And he gets upset because he feels like he didn't get the full amount of time allotted. (Mother of 7-year-old boy)*

Overall, many parents described their children as having difficulty following limits on video gaming, especially with respect to limits on the duration of video gaming. It was common for children to request extra time to play or become frustrated that they did not finish the game yet. For all of these children, the participants reported that these feelings of injustice and/or frustration did not last long and their children were able to move on to another task after a couple of minutes.

## CHAPTER IV

### Discussion

The purpose of the present study was to further our understanding of the links between playing violent video games and aggression in children, and to consider parent and child risk factors that may influence aggression in children who play violent video games. As the previous research examining effects of violent video game exposure on children's behaviour was limited in school-age children, the present study extended the literature by assessing the links between playing violent video games and aggressive behaviour in children aged 7 to 10 years old. Furthermore, by obtaining parents' perceptions and experiences related to children's video gaming, the present study provided a detailed understanding of parents' perceptions of video gaming habits in families with children aged 7 to 10 years old, including parental monitoring and parents' impressions of the effects of video gaming in children. The present study extends previous research findings by deepening our understanding of the factors that influence children's aggression in an era heavily influenced by media.

#### **Link Between Violent Video Gaming and Aggression**

The first objective of the present study, and an important theme of the overall study, was to confirm the existence of the link between playing violent video games and aggression in children aged 7 to 10 years old. As the majority of the previous research has focused on adolescents and young adults, the present study provided further information about the link between violent video game exposure and aggression, in school-age children. In young adults, the literature is generally consistent in that more exposure to violent video games is associated with increased aggressive behaviour (e.g.,

Anderson & Bushman, 2001; Dill & Dill, 1998). The few studies that previously examined violent video game exposure and children's behaviour revealed mixed findings in terms of children's outcomes (Ferguson, 2015; Ferguson & Kilburn, 2009; Lobel et al., 2017); however, there appeared to be a general consensus that children's exposure to violent video games was associated with greater levels aggressive behaviour (e.g., Anderson et al., 2007; Coker et al., 2015; Gentile et al., 2014; Gentile et al., 2014b; Irwin & Gross, 1995; Slater et al., 2003) and that school-age children may, in fact, be the most at-risk group to experience negative behavioural outcomes of playing violent video games (Anderson et al., 2008b; Anderson et al., 2010; Gentile et al., 2014). Therefore, it was hypothesized that higher levels of children's violent video game exposure would be related to higher levels of aggression.

The findings from the present study revealed that higher levels of children's violent video game exposure (parent report) were significantly associated with higher levels of children's aggression ( $r = .25, p < .01$ ), with an effect comparable to previous studies with children (Anderson, 2004; Paik & Comstock, 1994). Furthermore, parent report of children's violent video game exposure significantly predicted children's aggression, above and beyond the effect of children's gender. Interestingly, children's and parents' reports of children's violent video game exposure were positively correlated, suggesting that children and parents generally agree with respect to the types of video games children play and the level of violence in the games. However, despite this significant association, children's reports of their violent video game exposure were not significantly related to aggressive behaviour. There are a number of possible explanations for this difference in findings. It is noteworthy that parents' reported slightly higher levels

of violent video game exposure compared to children. Children may have had difficulty understanding the 7-point rating scale and might have benefitted from having examples of types of violence in video games associated with each level of violence rating scale. It is also possible that due to method variance, within-reporter variables (i.e., parent report of children's violent video game exposure and children's aggression) tend to predict each other better than using a variable reported by one respondent (i.e., child report) to predict a variable reported by a different respondent (i.e., parent report; Gentile et al., 2012). As such, these differences in findings highlights the importance of having multiple raters and not solely relying on children's ratings of their exposure to violent video games.

In addition, across both parent and child ratings, boys were significantly more likely to play violent video games compared to girls, which was consistent with previous findings (Anderson et al., 2008b); however, the link between playing violent video games and aggressive behaviour did not significantly differ based on children's gender. Overall, these results support the link between children's violent video game exposure and aggressive behaviour for both boys and girls, which is generally consistent with past research (e.g., Anderson & Dill, 2000; Anderson et al., 2010; Anderson et al., 2007; Gentile et al., 2014).

These findings are an important contribution to the current literature as the American Psychological Association task force on violent media (2015) identified understanding the effects of violent video game exposure on aggression in children under the age of 10 years old as a gap in the literature. Therefore, the present study extends the literature by finding that higher levels of violent video game exposure predict higher levels of aggression in children between ages 7 to 10 years old.

## **Parent and Child Risk Factors in the Link Between Violent Video Gaming and Aggression**

A further objective of the study was to identify parent and child risk factors (i.e., children's negative affect, hostile attribution bias, gender, and parental monitoring) for children's aggression in relation to their violent video gaming. Based on a review of the literature, a number of hypotheses were proposed.

**Children's negative affect, hostile attribution bias, and gender.** First, it was hypothesized that higher levels of children's negative affect and hostile attribution bias would each be related to higher levels of children's aggression. This hypothesis was partially supported, as higher levels of children's negative affect were significantly related to higher levels of their aggressive behaviour; however, children's hostile attribution bias was not significantly related to aggression. Furthermore, although children's gender was significantly associated with aggression, children's negative affect was a stronger predictor of children's aggression.

These results are consistent with the rich literature of risk factors for aggression in children, such that children who experience more negative affect (e.g., sadness, anger, discomfort) are at greater risk for aggression (e.g., Anderson et al., 2007; Anderson et al., 2012; Gentile & Bushman, 2012; Kingston & Prior, 2005; Kirsh, 2006; Olweus, 1980; Tremblay et al., 2004). With regard to children's hostile attribution bias, the present findings were inconsistent with previous research, in which individuals' hostile cognitions were significantly related to aggressive behaviour (Dodge & Tomlin, 1987; Gentile et al., 2004; Gentile et al., 2014). Compared to previous studies using the same measure of children's hostile attribution bias, the children in the present study reported

less hostile cognitions (Nelson & Crick, 1999). Therefore, it is possible that the present findings are indicative of the community sample of children obtained in this study, who tended to report low levels of hostile attribution bias, and as a result reduced the power required to detect significant effects.

Second, mediational pathways among children's violent video game exposure, hostile attribution bias, negative affect, and aggression were explored. In the present study, it was hypothesized that children's hostile attribution bias and negative affect would each mediate the link between children's violent video game exposure and aggressive behaviour. Partial support was found for these hypotheses, such that the relations between parent report of children's violent video game exposure and aggressive behaviour were significantly mediated by children's negative affect; the results were not significant for children's report of violent video game exposure. These results highlight the role of children's negative affect in the effects of playing violent video games on aggression, such that children who play more violent video games tend to experience more aggression, due to feeling higher levels of negative affect (e.g., anger, sadness, fear). This is consistent with findings in young adults that suggest personality factors, including temperament, may influence the effects of exposure to media violence on aggressive behaviour (Aluja-Fabregat & Torrubia-Beltri, 1998; Lynn et al., 1989; Zillmann & Weaver III, 1997). In addition, these findings are consistent with the GAM, such that personological factors (e.g., children's temperament) and situational factors (e.g., playing violent video games) can cumulatively contribute to aggressive behaviour (Anderson & Bushman, 2002; Anderson et al., 2012). Given that there is a dearth of research examining links among children's temperament, violent video game exposure,

and aggression, these results are especially important and suggest that children's temperament, specifically high levels of negative affect, may be a key risk factor for children to experience negative effects of playing violent video games (i.e., aggression).

Children's hostile attribution bias was not found to significantly mediate the link between children's violent video game exposure (for both parent and child report) and aggression. These results were generally not consistent with previous findings in samples of adolescents and young adults, in which the links between violent video game exposure and aggression were influenced by hostile cognitions. Research has shown that adolescents and young adults who are exposed to violent video games over the long-term develop chronic, aggressive cognitions (Arriaga et al., 2008; Buckley & Anderson, 2006; Bushman & Anderson, 2001; Gentile et al., 2004). When individuals play violent video games, they repeatedly activate aggressive scripts, increasing the likelihood for hostile cognitions to be more automatic and easily activated, even in neutral situations (Anderson, 2003; 2004; Bushman & Anderson, 2002; Buckley & Anderson, 2006). Despite these findings linking violent video game exposure and hostile cognitions, Krahe and Möller (2003) did not find a direct link between exposure to violent video games and hostile attribution bias in adolescents. Instead, exposure to violent video games increased adolescents' normative beliefs about aggression, which then increased their hostile attribution tendencies. Thus, it may be that young children who play violent video games are at risk for developing aggressive cognitions when they already have pro-aggressive beliefs and through repeated exposure to violent video games. In the present study, since the children were 7 to 10 years old, it is possible that these cognitions had not yet become automatic or chronic.

Children's violent video game play, gender, negative affect, and hostile attribution bias as predictors of children's aggression were further explored, and although children's violent video game play (parent report) was a significant predictor of aggression, the strongest predictor of aggression was children's negative affect. This finding indicates that although children's exposure to violent video games was associated with higher risk of aggression, negative affect further increases this risk, and is possibly one of the most important factors in children behaving aggressively. It has been well documented in the aggression literature that children with high levels of negative affect are at much greater risk for aggression, compared to children who experience more positive affect (e.g., Kingston & Prior, 1995; Kirsh, 2006; Gentile et al., 2004; Olweus, 1980; Tremblay et al., 2004). Therefore, it is not surprising that children's negative affect was found to be a strong predictor of aggression.

It is interesting, however, that even when children's negative affect is taken into account, children's violent video game exposure contributes some additional risk of aggression. Although children's violent video game exposure was not a significant predictor of children's aggression in the presence of children's negative affect, children's violent video game exposure increased the amount of variance accounted for in predicting children's aggression. This finding reinforces the importance of children's exposure to violent video gaming as a risk factor for aggression, especially for children who may already be predisposed to aggressive behaviour as a result of experiencing more negative affect than other children (Gentile et al., 2004). This is consistent with the risk and resiliency model, such that the combination of multiple risk factors of aggression, including children's exposure to violent video games and a predisposition to negative

affect, increases children's risk for developing behavioural problems (Gentile & Bushman, 2012; Kirsh, 2006; Masten, 2001). If children are predisposed to respond in an aggressive manner (e.g., typically experience high levels of negative affect) when they are exposed to a situation that has the potential to increase their arousal (e.g., playing violent video games), their risk for aggression is heightened (Anderson & Carnagey, 2014). As few studies have examined links between multiple risk factors for negative effects of violent video game exposure, this finding is significant in highlighting the importance of children's temperament (i.e., high levels of negative affect) in predicting their risk for experiencing negative effects related to playing violent video games, such as aggression.

Third, in the present study, the pathways between children's violent video game exposure, hostile attribution bias, and negative affect were further explored and revealed notable findings. Children's negative affect was found to mediate the link between parent report of children's violent video game exposure and hostile attribution bias, such that higher levels of children's violent video game exposure were related to higher levels of hostile attribution bias, partly as a result of experiencing higher levels of negative affect. This finding can be explained by the main principles of the GAM (Anderson & Bushman, 2002; Anderson et al., 2003), such that exposure to violent video gaming is a situational factor that, in combination with personological factors (i.e., negative affect), activates children's aggressive cognitions. Previous findings from experimental studies suggest that following exposure to violent media, youth show increases in aggressive affect and cognitions (e.g., Anderson et al., 2003; Anderson, Bushman, Donnerstein, Hummer, & Warburton, 2015). The present study extends these findings suggesting that children's

temperament (i.e., negative affect) can increase children's likelihood of experiencing harmful effects of playing violent video games, such as hostile cognitions. In the literature, there is some support for hostile cognitions as a risk factor for aggression in children (Anderson et al., 2007; Gentile & Bushman, 2012; Hopf, Huber, & Weiß, 2008). Therefore, these findings provide additional support for children's negative affect as a predisposing factor to experiencing negative effects of playing violent video games, including aggressive cognitions and aggressive behaviour.

**Parental monitoring.** It was hypothesized that the relation between children's violent video game exposure and children's aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use), such that the relation between violent video game exposure and aggression would be stronger at lower levels of each of the parental monitoring variables. This hypothesis was not supported. The results revealed that higher levels of children's violent video game exposure were significantly related to higher levels of parental involvement and communication about children's video gaming habits. However, children's violent video game exposure was not significantly related to parental limit setting of children's media use. In addition, none of the parental monitoring variables (i.e., parental involvement, limit setting, and communication) were significantly related to children's aggression. Furthermore, none of the parental monitoring variables (i.e., parental involvement, communication, and limit setting) significantly moderated the link between violent video game exposure and aggression. It is noteworthy that parent report of their own video gaming was significantly, positively related to parental involvement in children's media habits ( $r = .31, p < .01$ ); however, parent's own report of

video gaming was not significantly associated with children's violent video gaming (parent or child report) or aggression.

Second, indirect pathways were explored to determine the influence of interactions between parent and child risk factors for aggression on the effects of children playing violent video games. It was hypothesized that the indirect link between children's violent video game exposure and aggression through each of children's hostile attribution bias and negative affect would be moderated by each of the parental monitoring variables (i.e., parents' involvement, limit setting, and communication). The results did not support these hypotheses.

The findings describing the links between children's violent video game exposure, parental monitoring, and aggression are somewhat inconsistent with previous research (e.g., Anderson et al., 2007; Gentile et al., 2014b; Wallenius et al., 2007; Wallenius & Punamäki, 2008). The few studies examining the influence of parental monitoring with children on the effects of children's violent video game exposure have found that higher levels of parental monitoring (i.e., involvement, limit setting, and communication) predicted lower levels of children's violent video game exposure and reduced the likelihood of children engaging in aggression (e.g., Anderson et al., 2007; Gentile et al., 2014b; Wallenius & Punamäki, 2008). For example, previous findings have indicated that when parents set limits on children's media use, children tend to behave less aggressively (e.g., Anderson et al., 2007; Gentile et al., 2004; Gentile & Bushman, 2012; Strasburger & Donnerstein, 1999). Based on these previous findings, it was expected that in the present study, parental monitoring would mitigate the negative effects of playing violent video games; however, the results did not support this.

The results of the present study, however, found that higher levels of parental involvement and communication about media were associated with higher levels of children's violent video game exposure. The more children played violent video games, the more likely parents were to be involved in their children's media use and engage in discussions about media content. Past research has also found that parents were more likely to be involved and discuss the violent content in the media when they thought their children preferred media with more violent content (Rasmussen et al., 2017). Therefore, these findings suggest that when children play more violent video games, parents may feel more concerned about the negative effects of their children being exposed to the violent content, and thus, may be more likely to monitor their children's media habits (Rasmussen et al., 2017).

In the survey used in the present study, parental communication was assessed by asking parents specific questions about the content of their discussions with their children about their media use (e.g., "How often do you discuss with your child how what happens in video games wouldn't happen in real life? How often do you tell your child not to imitate how the characters in games behave?"). It is noteworthy that the questions parents were asked tended to be more applicable to parents of children who played video games with violent content. Thus, it makes sense that parents who scored high on parental communication tended to have children who played more violent video games. For parents of children who played less violent video games, they may not have needed to discuss the difference between video games and real life, or that their children should not imitate the behaviour of the characters in the games. Previous research examining the influence of parental communication with their children about violent media suggests that

the intention of parental communication is to prevent any harmful effects to their children from engaging with violent media (Nathanson, 2007). Parents also tend to engage in discussions with their children about violent content in media when they think their children prefer violent media (Rasmussen et al., 2017). Therefore, the finding in the present study that higher levels of children's violent video game exposure were related to higher levels of parental communication about media, is consistent with previous findings. It appears that parents whose children played more violent video games tended to have more frequent discussions with their children about the violent content in the video games, the difference between playing video games and behaving in real life, and reminding children not to imitate the violent behaviour shown in the video games.

Despite significant links between parental involvement and communication with children's violent video game exposure, none of the parental monitoring variables were associated with children's aggression. It is possible that because the ratings of parental monitoring of children's media habits were more positive in the present study than in previous studies (Gentile et al., 2012), there was insufficient power to detect a significant relation to aggression, or that specific nuances of parental monitoring may not have been assessed in sufficient detail.

Based on previous findings with school age children, it is likely that the manner in which parents engage with their children's media habits influences their experience with violent media. For example, in children aged 9 to 12, Anderson et al. (2007) found that the specific combination of exposure to high levels of violent video games and low levels of parental involvement in media were the strongest predictors of aggression. However, in a study by Gentile et al. (2014), parental involvement did not significantly mediate the

relation between children's violent video game exposure and aggressive behaviour. Therefore, it might be important to understand the specific manner in which parents interact with their children's media use. It is possible that the specific nature of parental monitoring was not captured and assessed in sufficient detail in the present study. In a study by Nathanson (1999), although some parents were involved in their children's exposure to media violence, if they did not engage in discussions about the violent content specifically, children continued to think positively about aggression. Similarly, when parents played video games with their children, but did not discuss the violent content, it was hypothesized that children perceived their parents' involvement as an endorsement of violence (Nathanson, 1999). In contrast, when parents directed children's attention toward the victim of the violence in the media, children tended to think the violence was unjustified, which might have reduced the likelihood that children would develop aggressive attitudes and feelings (Nathanson & Cantor, 2000). Therefore, the manner in which parents engage and interact with their children's media use may influence children's beliefs about aggression. As such, to understand the effects of parental monitoring on children's aggression, it may be important to consider children's beliefs about aggression and violence.

It is noteworthy that in the present study, parental involvement in children's media habits was measured using two items that assessed only the frequency that parents watched television or played video games with their children, not the manner in which parents interacted with their children. Interestingly, in a previous study examining the effects of parents' engaging with their children's media use, simply watching violent media with children (without engaging in any discussion related to the negative

consequences of violence) was related to more aggression in children (Nathanson, 2007). Therefore, it appears that the specific *manner* in which parents interact with their children and violent media influences children's behaviour more than whether or not parents are involved in children's media habits. Thus, it is possible that in the present study, parental involvement represented a less active form of parental monitoring, in which parents simply watched their children play video games or played alongside them.

Previous literature examining the manner in which parents' communicate with their children about violent media suggests that when parents specifically discuss the violent content in media and the negative consequences of exposure to violent media, children tend to have more negative attitudes towards aggression, than when parents simply watch or play violent media with their children and do not discuss the violent content (Nathanson, 1999). Therefore, it is likely that parental communication about violent media content mitigates the impact of violent media on children's aggressive behaviour, through children's aggressive beliefs; however, in the present study, it is possible that a link between parental communication, violent video game exposure, and aggression was not found because the sample of children in the present study were generally low in aggression, diluting the likelihood of a significant effect.

With regard to parental limit setting on children's exposure to media violence and aggressive behaviour, previous findings within the literature are inconsistent. When parents set limits on the violent content that children are exposed to, some children show less aggression, whereas others challenge their parents' rules and instead, seek out more violent media (Gentile et al., 2004; Nathanson, 2007). Therefore, it is important to understand the specific nature of how parents set limits, and the influence on the effects

of children's exposure to media violence, and more specifically violent video games. Moreover, past research suggests that parents are more likely to monitor and mediate children's exposure to media violence when they are concerned about the violent content or that their children are being exposed to media violence (Rasmussen et al., 2017). Therefore, it may be beneficial for future research to consider parental attitudes towards media violence and perceptions of their children's exposure to media violence when assessing parental monitoring.

Despite some of the previous research supporting the influence of parental monitoring in mitigating the negative effects of media violence, there is some inconsistency in the literature with children. For example, in a study of children and adolescents, parental monitoring was not found to mediate the relation between children's violent video game exposure and aggression (Gentile et al., 2014). As research examining the mechanisms and moderators of the effects of playing violent video games is still very limited, it is possible that parental monitoring has less of an influence in younger children, as was found in the present study.

***Children's gender.*** The link between children's violent video game exposure and aggressive behaviour was hypothesized to be moderated by children's gender. In addition, the indirect links between children's violent video game exposure and aggressive behaviour through each of hostile attribution bias and negative affect were predicted to be moderated by children's gender. The results did not support these hypotheses. The indirect link between violent video game exposure, hostile attribution bias, and aggression was not found to be significant, and this finding did not change based on children's gender. Although children's negative affect was a significant

mediator of the relation between children's violent video game exposure and aggression, the strength of this indirect relation did not vary based on children's gender. However, the results revealed that boys were exposed to significantly more violent video games (parent and child report) and engaged in significantly more aggression, compared to girls.

These findings are consistent with previous research that has also found that school-aged boys played more violent video games and behaved more aggressively than school-aged girls (Anderson et al., 2008b). In addition, previous research has found that despite differences in boys and girls' level of violent video game play and aggression, the link between children's violent video game exposure, hostile attribution bias, and aggression did not vary based on children's gender (Anderson et al., 2007; Gentile et al., 2014). Similarly in the present study, the strength of the relation between violent video games and aggression did not vary based on children's gender in either mother or father reports of children's aggression. Therefore, it appears that higher levels of violent video game exposure are associated with higher levels of aggression in both boys and girls, though boys tend to engage in more violent video games and aggressive behaviour.

### **Parents' Perceptions of Children's Video Game Exposure**

To this author's knowledge, the present study was the first to interview Canadian parents to understand their perceptions of children's video game exposure and the manner in which parents may be involved in their children's video gaming habits. Previous studies of Canadian samples that have used qualitative methods have focused on children and adolescents' perspectives (e.g., Canadian Teacher's Federation, 2003; Kline & Botterill, 2001) or parents' perceptions of children's general screen time (e.g., He, Irwin, Bouck, Tucker, & Pollett, 2005). Themes that emerged from the thematic analysis

provide further information to help understand Canadian parents' perceptions of children's video gaming habits and risk factors for children experiencing negative effects of playing violent video games. Themes are presented within the context of the broad research questions in the present study, including the following: a) Do parents hold perceptions about video gaming and children's behaviour? Do they have any specific perceptions about the effects of playing violent video games? b) To what extent do parents monitor their children's video gaming (e.g., their involvement and communication with their children about video gaming)? c) Do parents intervene or set limits regarding children's video gaming habits?

**Parents' perceptions about video gaming.** Many parents tended to express a number of general perceptions about children playing video games, including that children would have difficulty learning effective social skills (e.g., learning to communicate in person) and might become dependent on technology, as well as concerns about internet safety when playing online video games. For example, one father of a 10-year-old boy commented that "you see all these young kids coming in that are in school and they don't know how to talk. Literally, like...they're on their phones texting each other and there's no actual communication." Similarly, in a previous qualitative study in which 24 families living in Belgium with young children (ages 3 to 9) were interviewed, parents shared concerns about their children's gaming, including not wanting their children to become "too absorbed" in the games (Zaman et al., 2016). An especially interesting finding in the present study was that some parents believed that children might feel confused with the distinction between acceptable behaviour in real life and behaviour in video games. Some parents felt that children may have difficulty recognizing the

differences in acceptable behaviour in video games and in real life. For example, one parent said they “would be concerned about their children’s video gaming if they started acting like the character [more] than they were acting like themselves.”

Several parents reported that children might imitate the aggressive or violent behaviour they engaged in while playing violent video games. Several parents worried that playing violent video games would be linked to real world aggression, children’s desensitization to violence and aggression, and cause children to experience negative feelings and thoughts (e.g., feel angry, have nightmares). One father of a 10-year-old boy said, “[violent video games] kind of desensitizes them to violence, like if they see it too much [...] it doesn’t seem real. [...] the graphics are so realistic, it seems a lot more real than when I was a kid. [...] even the sound effects and the guns are so realistic, so I don’t like how real they are.” Some parents believed that their children were too young or immature to understand the violent content in some of the video games, and that playing violent video games could cause their children to lose their childhood innocence. Interestingly, despite parents’ many concerns about children playing violent video games, and although the survey data indicated that the mean levels of video game violence children were exposed to were relatively low, most children in the present study played some violent video games (e.g., Call of Duty, Halo).

Consistent with parents’ concerns about children’s reactions to playing violent video games, many parents tended to notice that their children experienced negative reactions to playing video games, including increased negative feelings (e.g., anger, frustration, fear, and annoyance) and behaviours (e.g., aggression, physical tension, whiny attitude). These behaviours and feelings most often occurred when children played

games with violent content (e.g., first-person shooter games, games about war) or high intensity action (e.g., contact sports), or when children were told to stop playing a video game. These findings are consistent with the results from the survey data in the present study, which revealed that children's violent video game exposure predicted children's aggression. Furthermore, children were more at risk for aggression when they experienced high levels of negative affect. Interestingly, during the interviews, parents reported that children's individual characteristics, such as temperament, affected the manner in which children reacted to playing violent video games. For example, parents reported that children were more likely to experience a negative reaction to playing violent video games if their children were typically more angry, suggestible, emotional, sensitive, dominant, "high strung", or had difficulty regulating their emotions.

Findings from the surveys and interviews are consistent with previous research suggesting that children become more aggressive after playing violent video games (e.g., Anderson, 2004; Anderson et al., 2008b; Dittrick et al., 2013; Olson et al., 2009; Wilson, 2007). In addition to behaving more aggressively, a few previous studies suggested that playing violent video games might increase children's anger and hostility (Gentile et al., 2004). The GAM (Anderson & Bushman, 2002) posits that the combination of situational experiences, cognitions, and emotions influence behaviour. More specifically, the GAM suggests that personological factors, such as children's temperament, may influence the effects of playing violent video games (Anderson & Carnagey, 2014). The interviews in the present study provide additional support for the GAM, with parents reporting that children who play violent video games may experience greater levels of negative affect and aggressive behaviour. The findings from both the survey and interview data

consistently provided support for the GAM, suggesting that the combination of children's exposure to violent video games and having a difficult temperament (i.e., higher levels of negative affect) is associated with higher risk of aggression.

### **Parental Monitoring of Children's Video Gaming**

Most of the parents were aware of the video games their children played, but a few parents noted that it was difficult to constantly monitor their children's video gaming. Parents were more involved in monitoring their children's gaming habits when they were concerned that their children were playing video games with violent content, when parents themselves were interested in video games, and when parents required their children to play video games in open areas of the house. These findings were consistent with the survey data suggesting that when children played violent video games, parents were more involved and more consistently monitored their game play. In addition, during the interviews, these parents shared that they wanted to ensure that their children knew the differences between behaviour that was acceptable in video games and in real life. For example, a father of an 8-year-old boy commented that, "it was better for me to ensure that he understood that it was a video game, that this wasn't realistic, that this isn't something you can do whether you're a soldier (in this case) or just a regular person. That what happened in the game was unacceptable for real life."

The survey results found that when children played more violent video games, parents were more likely to engage in discussions regarding the content of the video games. Thus, it appears that when children play more violent video games, parents are more likely to engage in conversations with their children explaining to them the difference between playing video games and behaving in real life, to try to reduce

children's risk of imitating behaviours they engage in during video game play. These findings are consistent with past research that parents tend to engage in more monitoring of their children's media violence if parents are concerned about their children being exposed to violent content or if they think their children prefer violent media (Rasmussen et al., 2017). These findings are important given the previous literature suggesting the importance of parental monitoring of children's video gaming as a protective factor that may, in fact, mitigate children's risk of aggression (Anderson et al., 2003; Gentile et al., 2014b; Nathanson, 1999; Nathanson & Cantor, 2000).

Previous research suggests that when parents set limits on the amount and duration of children's media use, as well as the specific content with which they are exposed, children might experience fewer behaviour problems (Nathanson, 2007). Most parents who participated in the interviews in the present study shared that they tended to limit video games with violent content. Many parents were concerned about the negative effects of children being exposed to violence in video games, including children imitating the aggressive or violent behaviour, being desensitized to violence, confusing reality and fantasy in video games, and increasing their negative affect (e.g., anger and frustration). This is consistent with previous research findings indicating that parents may set limits on children's violent media use with the intention of reducing the risk of children engaging in aggression (Gentile et al., 2004, Gentile & Bushman, 2012; Strasburger & Donnerstein, 1999). However, the interviews in the present study revealed that despite many parents having concerns about their children being exposed to violent video games, only some parents set limits and these limits tended to be "soft limits", as parents had difficulty consistently setting limits on their children's video gaming. Previous findings

have suggested that only 30% of parents monitor their children's media habits, with even fewer parents enforcing rules regarding children's media use (Rideout et al., 2010), and that parental monitoring may vary based on other demands in parents' lives (Zaman et al., 2016). Therefore, despite research suggesting the importance of parents' setting limits on children's media use, 40% of the parents in the present study reported the importance of being aware of children's video gaming and 93% reported setting limits on children's video gaming, yet 60% of parents had difficulty consistently setting limits on children's video gaming. Furthermore, previous research findings indicate that inconsistency in parenting may be associated with increased behaviour problems in children (Linebarger, 2015), suggesting that the consistency of parental monitoring may be an important factor in mitigating children's risk of aggression.

The interview data also revealed that many parents tended to not know the video games that their children played when they were at other children's homes. Although they tried to limit children's access to violent video games, they assumed that their children sometimes played violent games while at other children's homes. For example, some parents shared that although they did not allow their children to play first-person shooter games at home (e.g., Call of Duty), their children sometimes played them at other children's homes. Furthermore, parents did not openly communicate with other parents about the video games their children played together. Thus, it appears that many of the parents felt strongly about their children having limited exposure to violent video games; however, consistently following through with enforcing these limitations, especially when their children played video games at other children's homes, appeared to be difficult for many parents. This is an interesting finding given the previous literature

suggesting when parents set moderate limits on children's media use, children tended to be less aggressive than when parents were consistently restrictive (Nathanson, 2007). As such, it may be important for parents to engage in consistent, moderate limit setting of children's exposure to violent video games.

Although many parents reported concerns about children playing violent video games, including imitating aggressive behaviour and experiencing negative thoughts and feelings, parents were not consistently aware of children's violent video gaming (especially when children played video games at other children's homes), nor were they consistent in setting limits on children's video gaming. Previous research has suggested that parents' own beliefs about media violence and children's access to violent media may influence the link between parental monitoring and mitigating the negative effects of violent media exposure in children (Rasmussen et al., 2017). As such, to better understand this discrepancy in parents' concerns about exposure to media violence and consistent monitoring, it may be important to consider parents' own perceptions of media violence exposure.

### **Overall Study Findings**

The present study makes several contributions that extend the current state of the aggression and violent media literature in school-aged children. First, the present study revealed that children between ages 7 and 10 years who played violent video games were at higher risk for aggression, negative affect, and hostile attribution biases. During the interviews, parents' perceptions about children playing violent video games supported these findings, with concerns that children may imitate the aggression in the video games, their likelihood of engaging in aggressive behaviour would increase, and they would

experience more negative thoughts and emotions (e.g., anger). Taken together, these findings are consistent with the previous literature suggesting that many children under the age of 10 have access to and play video games with some form of violence (Anderson et al., 2003; Rideout et al., 2010; Saleem & Anderson, 2012) and that children who are exposed to violent video games may be at increased risk for developing aggressive behaviour (Anderson et al., 2007; Buckley & Anderson, 2006; Bushman & Anderson, 2002; Coker et al., 2015; Funk et al., 2004; Gentile et al., 2014; Gentile et al., 2014b; Irwin & Gross, 1995; Möller & Krahe, 2008).

Second, children who were predisposed for aggression (i.e., experiencing higher levels of negative affect) were at greater risk of aggressive cognitions (i.e., hostile attribution bias) and aggressive behaviours when they played violent video games. The effects of playing violent video games and experiencing high levels of negative affect both were associated with higher risk of aggression. Similarly, parents also reported during the interviews that they thought that children's temperament, such as being overly emotional or angry, played an important role in determining which children would be more at risk for experiencing negative effects of playing violent video gaming. These findings are consistent with previous research that has found children's temperament to be an influential factor in the links between children's exposure to media violence and aggression (Aluja-Fabregat & Torrubia-Beltri, 1998; Lynn, Hampson, & Agahi, 1989; Zillmann & Weaver III, 1997). Moreover, the findings shed light on the cumulative nature of risk factors which contribute to greater risk for behavioural problems in children than if they only experience one risk factor in isolation (Anderson et al., 2012; Gentile & Bushman, 2012; Kirsh, 2006; Masten, 2001).

Third, the present study found that parents of children who played more violent video games tended to be more involved and engaged in more discussions related to the content of the video games with their children. Parents who played more video games themselves, were also more involved in children's video game play. Interestingly, during the interviews, parents reported that they believed that playing violent video games might increase children's risk of imitating aggressive behaviour from the video games or confusing reality and fantasy with respect to appropriate behaviour. Parents tended to be involved and engage in discussions with their children specifically about violent content in the video games (i.e., the difference between acceptable behaviours in video games compared to real life); parents who tended to play video games themselves also reported this more often. These results are consistent with previous findings suggesting that parental monitoring may be an important factor in helping to mitigate children's risk of experiencing negative effects of playing violent video games, such as aggression (e.g., Anderson et al., 2007; Gentile et al., 2004; Gentile & Bushman, 2012; Rasmussen et al., 2017; Strasburger & Donnerstein, 1999).

Thus, the overall findings from the present study provide some support for the GAM, specifically that personological factors (e.g., children's negative affect) and situational factors (e.g., playing violent video games) can contribute to children's cognitions (e.g., hostile attribution biases) and behaviour (e.g., aggression). In addition, environmental modifiers, including parental monitoring, may be important in mitigating children's risk of experiencing negative effects of playing violent video games. The present study highlights the importance of considering multiple risk factors that are

associated with higher risk of aggression in children when they play violent video games, including children's temperament, hostile attribution bias, and parental monitoring.

### **Limitations and Future Directions**

The findings from the present study are limited in a number of ways. The sample obtained in the present study consisted of mostly boys who were from two-parent homes, with parents who completed post-secondary education and were mostly within the upper-middle class. The majority of the parents in the sample (both the survey and interview data) consisted of mothers of Caucasian background. Given the homogeneity of the sample, the generalizability of the findings is limited, especially with children from families with lower socio-economic status and/or greater ethnic diversity. Some research considering the influence of socioeconomic status and cumulative risk within the family (i.e., racial/ethnic background, maternal education, and income-to-needs ratio) has suggested possible differences in the effects of playing violent video games on children's behaviour depending on the family's overall risk (e.g., Linebarger, 2015). In particular, socioeconomic status and ethnic minority status has been shown to have an effect on children's behaviour through parenting styles (Burchinal, Roberts, Zeisel, Hennon, & Hooper, 2006). Therefore, the primarily Caucasian, upper-middle class sample in the present study may have biased the results in terms of children's access to violent video games, parental availability and monitoring of children's media use, and children's behaviour problems. It is also possible that the design of the study was biased towards families who could afford time to participate in research, physically come into to the university and pay for travel or parking, and have the financial means to access to video games. As such, it would be important for future research to recruit more culturally and

socioeconomically diverse samples in order to determine if these contextual factors contribute to any differences in the effects of playing violent video games and children's aggression, as well as any variations in the influence of child and parent risk factors.

The majority of the parents who completed the surveys and interviews were mothers (75% and 67%, respectively). This may limit the findings from the present study because an interesting finding that was obtained from the interview data was that fathers tended to have greater interest in playing video games (themselves and with their children) and were more likely to engage in conversations with their children about the difference between children's behaviour in video games and in real life, compared to mothers. In addition, the survey findings from the present study revealed that parents' report of their own video game play was significantly, positively related to parental involvement, such that higher levels of parents' report of their own video game play was related to higher levels of parental involvement in children's media habits. As such, the influence of parental monitoring may vary depending on parents' own interest with video games, experience playing violent video games in particular, and concerns about children's exposure to media violence (Rasmussen et al., 2017). It may be that parents, who have first-hand experience playing violent video games and are more familiar with the content in violent video games, tend to recognize the importance of being involved in their children's gaming to reduce the chance that children may imitate aggressive behaviours in video games. Similarly, a study by Van der Voort, Nikken, and van Lil (1992) found that parents tended to be more involved and monitor their children's media use when parents, themselves, were more interested in media. Interestingly, mothers were more likely to restrict children's video game use and discuss the content in the video

games with their children than fathers (Nikken & Jancz, 2006; van der Voort et al., 1992). It may be that parental monitoring of media use is more likely to occur by the specific parent who is most concerned about the negative effects of media use (Nikken & Jansz, 2006; Rasmussen et al., 2017; Shin & Huh, 2011; Valkenburg, Krmar, Peeters, & Marseille, 1999; Van der Voort et al., 1992) or by parents with higher levels of education (Valkenburg et al., 1999).

In the present study, parental monitoring (i.e., involvement, limit setting, and communication) was measured in terms of frequency of parents' involvement with their children's media use, discussions about the content of the video games, and limits set on the frequency and content of media use. Given the previous research findings that suggest that the manner in which parents engage with their children can influence children's interest in playing violent video games and aggressive behaviour (Gentile et al., 2014b; Nathanson, 1999, 2007), it would be important for future research to provide a more comprehensive assessment of parental monitoring in children's violent video game use. For example, it would be important to assess the consistency of parents' monitoring of children's video gaming, the manner in which parents set specific limits around children's gaming habits, and the nature of the conversations parents have with their children about the content of the video games. These may be important to understanding the nature of parental monitoring as protective factors that could potentially mitigate children's risk of aggression (Anderson et al., 2003; Anderson et al., 2007; Gentile et al., 2004; Gentile et al., 2014b; Gentile & Bushman, 2012; Nathanson, 1999, 2007; Nathanson & Cantor, 2000; Strasburger & Donnerstein, 1999). Furthermore, as more children are playing violent video games, it will be important for future research

examining the influence of parent and child interactions in the effects of children's violent video game exposure to consider that as these children become older and become parents, there will be more parents who have experience with violent video games. In the present study, the findings indicated that parents' own video gaming was associated with their involvement in children's media use. Therefore, it may be important for future research to take into consideration the role of personal experience with video gaming, as it may have an impact on parents' monitoring of children's video gaming or their beliefs about children's exposure to violent video games.

Causality of aggression from playing violent video games cannot be inferred in the present study due to the nature of the cross-sectional research design. The data were obtained via questionnaires and interviews assessed at one time point, thereby limiting the extent to which the effects of playing violent video games on children's behaviour can be determined. Correlational and regression analyses suggest possible associations and predict the directionality of these relations. The present study was able to identify violent video game exposure as a risk factor for aggression; however, without the use of a longitudinal research design, it is not possible to identify a direct, causal relationship between playing violent video games and aggression in children. Although the present study was not able to identify causal pathways between children's violent video game exposure and aggression, previous longitudinal studies provide more support for a causal relation between children's violent video gaming and aggressive behaviour (i.e., the socialization hypothesis), compared to aggressive children engaging in more violent video gaming (i.e., the selection hypothesis; e.g., Anderson et al., 2007). In the present study, mediation and moderation analyses were conducted to deepen our understanding

of the mechanisms between playing violent video game exposure and aggression, however, future longitudinal research would benefit from employing path analysis. A longitudinal design would provide greater confidence in the validity of the causal relationships among the factors that contribute to children experiencing negative effects of playing violent video games, compared to cross-sectional data (Mertler & Reinhart, 2016). Path analysis may be an important analysis to shed light on the developmental cascades of various risk factors (e.g., temperament, gender, hostile cognitions, and parental monitoring) that ultimately lead to children's aggression.

Despite the limitations of the study design and statistical analyses, correlational studies provide a picture of children's experience with violent video games in an uncontrolled setting, highly representative of children's day-to-day life (Bushman & Anderson, 2015; Kronenberger et al., 2005). Thus, the correlational analyses in the present study may represent children's typical experiences with violent video games and behaviour. Moreover, the use of interviews in the present study extended the correlational findings by providing a more comprehensive exploration of parents' perceptions of children's violent video gaming habits. Therefore, although the findings are limited in terms of determining causality and considering the links between all of the identified risk factors for aggression, the combination of cross-sectional and interview methods provided a thorough approach to furthering our understanding of the effects of children's violent video game exposure.

Finally, the qualitative findings are limited as three parents with multiple children in the study were included in the sample of interviewees. This may have had an influence on the information that parents shared, as they had more than one child to base their

responses on and the information shared may not have been unique to each individual parent-child dyad. For example, parents may set limits differently for each child, so this information may have been unclear in these three parents. As such, it is possible that the internal validity of the data may have been reduced resulting in a more general depiction of parenting related to children's video gaming habits rather than specific experiences related to a single parent-child dyad. Despite this methodological limitation, previous qualitative studies, in which parents were interviewed about their perceptions of children's media use, have included parents of multiple children (e.g., He et al., 2005; Zaman et al., 2016). To more accurately capture unique parent-child dyad experiences, it may be important for future research to instruct parents to consider only one child when participating in interviews about their children's experiences.

### **Applied Implications**

Violent video gaming is on the rise in children, and parents remain concerned about the negative consequences children may experience as a result of playing violent video games. Furthermore, as there is a dearth of research examining the effects of playing violent video games in children under the age of 10 (APA, 2015), the findings from the present study have important applied implications for clinicians and parents. The present study provides support for a number of important risk factors, and possible protective factors, in children's aggression, specifically within the context of being exposed to violent video games.

As the link between violent video game exposure and aggression in children aged 7 to 10 years old was confirmed in the present study, this provides more support for researchers who have identified children's exposure to violence in video games as an

important risk factor for children's aggression. Moreover, this link was consistent for both boys and girls, suggesting that any child who plays violent video games may be at risk for aggression. Considering that more children, especially those under the age of 10, are being exposed to violent content in video games, this is a serious and important finding for parents and clinicians. Understanding the risk factors for aggression, parents can be more informed about aspects of children's media use that may be associated with higher risk of behaving aggressively (e.g., playing violent video games). Clinicians may use this information to better understand the developmental trajectories of children who experience aggression and identify potential factors that may be contributing to children's aggression that may serve as effective targets for intervention.

In addition to simply playing violent video games, the present study identified a number of potential risk factors for children's aggression. Especially of interest was the finding that the cumulative effects of children's violent video game exposure and high levels of negative affect posed the greatest risk for children's aggression. This information is useful for parents to know, so that if they recognize high levels of negative affect in their children, it may be especially important to reduce their children's access to violent video games. In addition to children's temperament, parental monitoring (i.e., involvement, limit setting, and communication) was explored as a possible modifier in the link between children's violent video game play and aggression. Although the statistical findings from the present study were not supportive of a link between parental monitoring with children's aggression, the results indicated that parental involvement and communication about media habits were related to children's violent video game exposure, such that parents were more inclined to monitor and engage in discussions with

their children with children who played more violent video games. This suggests that parents are paying special attention to children's video gaming when it includes violent content. In the interviews, most parents articulated that they are concerned that children may imitate aggressive or violent behaviours from the video games in real life; however, they had difficulty consistently setting limits on children's video gaming.

These findings are useful in providing recommendations for parents and clinicians. As children's exposure to violent video games was predictive of children's aggression, parents are encouraged to reduce children's exposure to violent video gaming. It may be beneficial for parents to more effectively monitor children's violent video game use, such as by being more consistent in setting moderate limits on videogaming, increasing their awareness of children's violent video game exposure (both in their own home and when their children play video games at other children's homes), directing children's attention to the impact of the violence on the victims in the video games, and discussing the difference in children's behaviour in violent video games and real life. Consistent with findings from the present study, the Academy of Pediatrics (2016) suggests that parents should monitor children's media use by playing alongside their children to learn more about the games and engage in discussions with their children about the difference between fantasy and reality.

Clinicians may incorporate these findings into prevention and intervention efforts with families, helping parents to reduce children's exposure to violent video games, engage in more effective parental monitoring, and increase children's ability to regulate negative affect. In addition, as many parents were not aware of children's video gaming when they played with children outside of their home, it will be important for clinicians

to help parents effectively communicate with other parents about their children's video gaming and limitations to help them maintain consistency in monitoring their children's exposure to violent video games. As few interventions have proven successful with children's violent video gaming, these results are especially important for increasing protective factors that might help mitigate children's risk of aggression (Saleem & Anderson, 2012). Moreover, research has demonstrated that intervention aimed to reduce children's aggression is most effective when delivered during the preadolescent years (Huesmann, 1986). Therefore, these findings, which are specific to children aged 7 to 10 years old, are especially critical in developing successful early prevention and treatment programs.

## **Conclusion**

The findings from the present study within the context of previous research reinforce the link between children's exposure to media violence, specifically violent video games, and children's risk of aggression. It is important, however, to note that many parents experience a 'third-person effect', in which they believe that although other children may have increased risk for aggression by being exposed to media violence, their own children will not be affected in the same way. As such, even though only a small percentage of parents may be concerned about their children being negatively affected by playing violent video games, in actuality, a high number of children are at heightened risk for aggression (Academy of Pediatrics, 2016). It is also important to be aware of the cumulative nature of risk factors, and that exposure to violent video games may not be necessary or sufficient to cause aggression, but it is one risk factor that has been well supported by research to increase the likelihood of children's aggression

(Bushman & Anderson, 2015). In addition, it is important to consider children's behaviour in the context of their environment, such that parental monitoring may be an important factor in mitigating children's risk of aggression (e.g., Gentile et al., 2014b). It will be important for future research to continue to examine the effects of children's exposure to video game violence by using varying research methods, diverse populations, and different settings. Replication of findings indicating that exposure to video game violence is a risk factor for aggression will be important, as well as continuing to understand the influence of additional risk factors for aggression, including children's aggressive cognitions and parents' perceptions about violent media.

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## APPENDICES

### APPENDIX A

#### Demographics Questionnaire

Child's Name: \_\_\_\_\_

Today's Date: \_\_\_\_\_

Child's birth date: (day, month, and year) \_\_\_\_\_

Child's current grade in school: \_\_\_\_\_

Child's gender: \_\_\_\_\_

Your relationship to child (e.g., mother, father): \_\_\_\_\_

Your birth date: (day, month, and year) \_\_\_\_\_

Parents' Marital Status:

- Married
- Divorced
- Separated
- Living Together
- Remarried
- None of the above (Please specify: \_\_\_\_\_)

Mother's education

- Less than 7 years
- Junior high school (Grade 9)
- Some high school (Grade 9)
- Graduated from high school or equivalent high school diploma
- Some college or university (at least one year)
- Graduated from college or university
- Graduate/professional school (e.g., Master's Ph.D.)
- Other \_\_\_\_\_

Father's education

- Less than 7 years

- Junior high school (Grade 9)
- Some high school (Grade 9)
- Graduated from high school or equivalent high school diploma
- Some college or university (at least one year)
- Graduated from college or university
- Graduate/professional school (e.g., Master's Ph.D.)
- Other \_\_\_\_\_

Mother's occupation: \_\_\_\_\_

Father's occupation: \_\_\_\_\_

Mother's ethnicity: (please choose the one that fits the best)

- South Asian
- East Asian
- Caucasian
- African Canadian
- Caribbean
- Hispanic
- Native Canadian
- Biracial – Please specify: \_\_\_\_\_
- Multi-racial – Please specify: \_\_\_\_\_
- Other – Please specify: \_\_\_\_\_

Father's ethnicity: (please choose the one that fits the best)

- South Asian
- East Asian
- Caucasian
- African Canadian
- Caribbean
- Hispanic
- Native Canadian
- Biracial – Please specify: \_\_\_\_\_
- Multi-racial – Please specify: \_\_\_\_\_
- Other – Please specify: \_\_\_\_\_

Has your child been diagnosed with a disability or a psychological disorder?

\_\_\_\_\_

If so, please specify:

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Is your child receiving any psychological services? \_\_\_\_\_

If so, please describe:

---

Does your child have a serious illness? \_\_\_\_\_

If so, please specify:

---

Is your child currently taking any medications? \_\_\_\_\_

If so, please specify:

---

What is the approximate total annual income of the parent(s) who live with the child

---

Does your child have any siblings? \_\_\_\_\_

If so, please describe the age and gender of each sibling:

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Do you enjoy playing video games? \_\_\_\_\_

If yes, please list your favourite video games and the total average number of hours per week you spend playing video games.

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At what age did your child begin playing video games? \_\_\_\_\_

## APPENDIX B

### Interview Protocol

*Today, I am going to ask you some questions about your child's video gaming and your experiences with your child's gaming habits. I'll ask you about the types of games your child plays and how you interact with your child while he or she plays video games. I'll also ask you about what you perceive your role is in your child's video gaming habits. The purpose of this interview is to try to get a better understanding of what these experiences are like for you and how you interact with your child about their video gaming habits.*

*Keep in mind that you do not have to tell me anything that you are not comfortable with and we can stop this interview at any time. Everything that you say to me will be confidential and the only time that I would have to break this confidentiality is if I think that your child or another child's safety is at risk. If you have any questions during the interview, please feel free to ask me and there are no right or wrong answers to anything we discuss today. I am really interested in getting to know about how you think and feel about your child's video gaming, so I will encourage you to share your experiences if you feel comfortable. Do you have any questions for me before we get started with the interview?*

- *Questions to get to know the parents more and build rapport; tell me about you and your family.*
- *What made you interested in participating in the interview portion of this study?*
  - o *I really appreciate you participating in this study and the interview, as it will be very helpful to understand what parents of children who play video games are experiencing. The information we learn from you and other parents participating in this study will help me to better understand how you and other parents interact with their children who play video games and how parents perceive their role in children's video gaming habits.*
- *The number of children playing video games has been increasing over the past few years and it has become very common for children to play video games for numerous hours each day. How often does your child play video games? Do you have any concerns about your child's video game play?*
  - o *If yes, what are your concerns?*
- *Do you enjoy playing video games yourself? How often do you play video games?*
- *What are your child's favourite types of video games? Does your child play any video games with violent content (e.g., blood and gore, shooting, punching, kicking, breaking objects)? Are there any games that you do not want your child to play? Do you have any concerns about your child playing violent video games?*
  - o *If yes, what are your concerns?*
  - o *If yes, what kinds of games would you prefer your child to not play? Why?*

- *Do you set limits on the time or frequency that your child is allowed to play video games? How do you prevent your child from playing certain games? How do you set limits on your child's video games?*
  - o *If yes, Is your child responsive to these limits? Do you have any concerns with setting limits on your child's video gaming?*
- *Are you familiar with the rating system for video games? Do you ever look at or use the ratings or other information on the game package? How do you determine if you will let your child play a specific video game?*
- *Does your child play video games with other children?*
  - o *If yes, Does your child go to other children's homes to play video games? Do you know what video games your child plays when he/she is at other children's homes? Do other children come over to your house to play video games with your child? Do you and the other children's parents discuss your children playing video games? Do you have any concerns about the video games your child plays at other children's homes? Do you ever prevent your child from going to another child's house because of the type of video games they play? Are there times when you are not sure of what video games your child is playing when he/she is at other children's homes?*
- *Do you discuss playing video games with your child?*
  - o *If yes, What do you say to your child about the video game? Do you discuss the content of the video game? Does your child ask you any questions about video games?*
- *Do you ever play video games with your child?*
  - o *If yes, How do you play video games together? How often do you play video games together?*
- *Do you notice any changes in your child's behaviour after playing video games?*
  - o *If yes, What kinds of behaviours does your child show after playing video games? Do you think the content of the video game make a difference on your child's behaviour? Do you think the amount of time your child plays video games make a difference on his/her behaviour?*
  - o *Have you ever considered seeking help from your doctor or another professional regarding your child's video game play?*
- *So, those are all of the questions I have for you. Do you have anything else that you would like to share or anything I did not ask you about today? Do you have any questions for me? Thank you again for coming in today to talk with me about your experiences with your child's video gaming. All of the information you shared with me today is very valuable and will help give me a better understanding of what it is like for parents of children who play video games and*

*any concerns that other parents similar to you may have. Here is some more information about the study, how you can get into contact with me if you have any questions or concerns about the study, and also some links for resources for parents of children who play video games.*

## APPENDIX C

*Comparison of Quantitative Findings with Full Sample (N = 122) and Sample with Randomly Selected Siblings Removed (N = 99)*

Study Hypotheses	Full Sample (N = 122)	Random Siblings removed (N = 99)
<p><b>Hypothesis 1:</b> Higher levels of children's violent video game exposure would be related to higher levels of aggression.</p>	<p><b>Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of parent report of children's violent video game exposure were related to higher levels of aggression.</li> <li>• Children's report of violent video game exposure was not related to aggression.</li> <li>• Regression analysis: children's violent video game exposure (parent report) significantly predicted children's aggression, when gender was included as a covariate.</li> <li>• Regression analysis: Children's negative affect predicted children's aggression, above and beyond the effect of children's violent video game exposure (parent report).</li> </ul>	<p><b>No change in finding; Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of parent report of children's violent video game exposure were related to higher levels of aggression.</li> <li>• Children's report of violent video game exposure was not related to aggression.</li> <li>• <b>Change in regression:</b> children's violent video game exposure (parent report) significantly predicted children's aggression, when gender was not included as a covariate.</li> <li>• Regression analysis: Children's negative affect predicted children's aggression, above and beyond the effect of children's violent video game exposure (parent report).</li> </ul>
<p><b>Hypothesis 2:</b> Higher levels of children's negative affect and hostile attribution</p>	<p><b>Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of children's negative affect were related to</li> </ul>	<p><b>No change in finding; Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of children's negative</li> </ul>

bias would each be related to higher levels of children's aggression.

**Hypothesis 3:** Children's hostile attribution bias and negative affect would each mediate the relation between children's violent video game exposure and aggression.

**Hypothesis 4:** The relation between children's violent video game exposure and children's aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.

**Hypothesis 5:** The relation between children's violent video game exposure,

higher levels of children's aggression.

- Hostile attribution bias was not related to aggression.

**Partially Supported**

- Children's negative affect mediated the link between children's violent video game exposure and aggression, with higher levels of children's violent video game exposure indirectly related to higher levels of children's aggression, through higher levels of negative affect.
- Children's hostile attribution bias was not found to be a mediator.

**Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**Not Supported**

- None of the parental monitoring variables or

affect were related to higher levels of children's aggression.

- Hostile attribution bias was not related to aggression.

**Change in finding; Not Supported**

- Children's negative affect was not found to be a mediator.
- Children's hostile attribution bias was not found to be a mediator.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**No change in finding; Not Supported**

- None of the parental monitoring variables

hostile attribution bias, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.

children's gender were found to be moderators.

or children's gender were found to be moderators.

**Hypothesis 6:** The relation between children's violent video game exposure, children's negative affect, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.

**Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**Additional finding**

- Children's negative affect mediated the link between children's violent video game exposure (parent report) and hostile attribution bias, with higher levels of children's violent video game exposure indirectly related to higher levels of hostile attribution bias through higher levels of negative affect.

**Change in finding; not supported**

- Children's negative affect was not found to be a mediator.

*Comparison of Quantitative Findings with Randomly Selected Siblings Removed (N = 99) and Random 23 Cases Removed (N = 99); Findings Compared to Full Sample (N = 122)*

Study Hypotheses	Random Siblings removed (N = 99)	Random cases removed (N = 99)
<p><b>Hypothesis 1:</b> Higher levels of children's violent video game exposure would be related to higher levels of aggression.</p>	<p><b>No change in main finding; Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of parent report of children's violent video game exposure were related to higher levels of aggression.</li> <li>• Children's report of violent video game exposure was not related to aggression.</li> <li>• <b>Change in regression:</b> children's violent video game exposure (parent report) significantly predicted children's aggression, when gender was not included as a covariate.</li> </ul>	<p><b>No change in main finding; Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of parent report of children's violent video game exposure were related to higher levels of aggression.</li> <li>• Children's report of violent video game exposure was not related to aggression.</li> <li>• <b>Change in regression:</b> children's violent video game exposure (parent report) significantly predicted children's aggression, when gender was not included as a covariate.</li> </ul>
<p><b>Hypothesis 2:</b> Higher levels of children's negative affect and hostile attribution bias would each be related to higher levels of children's aggression.</p>	<p><b>No change in finding; Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of children's negative affect were related to higher levels of children's aggression.</li> <li>• Hostile attribution bias was not related to aggression.</li> <li>• Regression analysis: Children's negative affect predicted children's aggression, above and beyond the effect of children's violent video game</li> </ul>	<p><b>No change in finding; Partially Supported</b></p> <ul style="list-style-type: none"> <li>• Higher levels of children's negative affect were related to higher levels of children's aggression.</li> <li>• Hostile attribution bias was not related to aggression.</li> <li>• Regression analysis: Children's negative affect predicted children's aggression, above and beyond the effect of children's violent video game</li> </ul>

exposure (parent report).

exposure (parent report).

**Hypothesis 3:** Children's hostile attribution bias and negative affect would each mediate the relation between children's violent video game exposure and aggression.

**Change in finding; Not Supported**

- Children's negative affect was not found to be a mediator.
- Children's hostile attribution bias was not found to be a mediator.

**Change in finding; Not Supported**

- Children's negative affect was not found to be a mediator.
- Children's hostile attribution bias was not found to be a mediator.

**Hypothesis 4:** The relation between children's violent video game exposure and children's aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**Hypothesis 5:** The relation between children's violent video game exposure, hostile attribution bias, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**Hypothesis 6:** The relation between children's violent video game exposure, children's negative affect, and aggression would be moderated by each of the parental monitoring variables (i.e., parental involvement, limit setting, and communication about media use) and children's gender.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**No change in finding; Not Supported**

- None of the parental monitoring variables or children's gender were found to be moderators.

**Additional finding**

**Change in finding; not supported**

- Children's negative affect was not found to be a mediator between children's violent video game exposure (parent report) and children's hostile attribution bias.

**Change in finding; not supported**

- Children's negative affect was not found to be a mediator between children's violent video game exposure (parent report) and children's hostile attribution bias.
-

*Means and Standard Deviations for all Study Variables (N=122), Sample with Randomly Selected Sibling Removed (N = 99), and Random Sample of 99 Cases (N = 99)*

Measure	N = 122		N = 99; Siblings removed		N = 99; Random cases	
	M	SD	M	SD	M	SD
<b>CBCL</b>						
Aggressive Behaviour <sup>a</sup>	55.17	6.99	55.05	6.68	54.76	6.94
<b>Hostile Attribution Bias</b>						
Overall Intent	5.55	4.16	5.64	4.14	5.42	4.19
<b>Parental Monitoring</b>						
Involvement	2.92	0.63	2.96	0.65	2.93	0.63
Limit Setting	3.69	0.88	3.64	0.91	3.65	0.86
Communication	3.47	0.63	3.48	0.62	3.46	0.64
<b>Violent Video Gaming</b>						
Parent Report	15.65	9.69	16.30	10.19	15.37	9.79
Parent Report <sup>b</sup>	1.11	0.28	1.13	0.28	1.10	0.28
Child Report	13.74	10.18	14.73	10.71	13.85	10.59
<b>TMCQ – Child Temperament</b>						
Negative Affect	2.85	0.36	2.85	0.36	2.82	0.33

*Note.* <sup>a</sup> T scores; <sup>b</sup> Log transformed variables.

*T-Tests Assessing Differences in Study Variables Between the Full Sample (N = 122) and Sample with Randomly Selected Siblings Removed (N = 99)*

Variable	Full Sample		Siblings Removed		T value	p value
	M	SD	M	SD		
Violent video game exposure (child report)	13.74	10.18	14.73	10.71	.702	.483
Violent video game exposure (parent report)	15.65	9.69	16.30	10.19	.485	.629
Violent video game exposure (parent report) <sup>b</sup>	1.11	0.28	1.13	0.28	.528	.598
Communication	3.47	0.63	3.48	0.62	.010	.118
Involvement	2.92	0.63	2.96	0.65	.473	.637
Limit Setting	3.69	0.88	3.64	0.91	-.414	.680
Aggression <sup>a</sup>	55.17	6.99	55.05	6.68	-.129	.897
Hostile Attribution Bias	5.55	4.16	5.64	4.14	.160	.873
Negative Affect	2.85	0.36	2.85	0.36	.000	1.000

Note. <sup>a</sup> T scores; <sup>b</sup> Log transformed variable.

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