Who Bullies and When? Concurrent, Longitudinal, and Experimental Associations between Personality and Social Environments for Adolescent Bullying Perpetration

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ABSTRACT

Increasing evidence suggests that bullying may be used by adolescents as a strategic, adaptive tool against weaker peers to obtain valued resources like social status and romantic partners. However, bullying perpetration may only be adaptive within particular environmental contexts that provide opportunities to obtain these resources at minimal costs. These environmental opportunities may be relevant for adolescents who possess particular personality traits and are motivated to exploit these contexts and power imbalances. Using an adaptive social ecological framework, the primary goal of my dissertation was to examine concurrent, longitudinal, and experimental associations between exploitative personality traits and broader social ecologies to facilitate adolescent bullying perpetration. In Study 1, I examined whether risky social environments filtered through antisocial personality traits to facilitate direct and indirect forms of bullying perpetration in a cross-sectional sample of 396 adolescents. In Study 2, I extended Study 1 by investigating the longitudinal associations among bullying, empathic and exploitative personality traits, and social environmental variables, in a sample of 560 adolescents across the first three years of high school. Given that Studies 1 and 2 were correlational, in Study 3, I explored whether bullying perpetration could be experimentally simulated in a laboratory setting through point allocations in the Dictator and Ultimatum economic games by manipulating power imbalances in a sample of 167 first-year undergraduate students. Results from all three studies largely supported the prediction that broader social ecologies filter through exploitative personality styles to associate with bullying perpetration. Exploitative adolescents are primarily likely to take advantage of particular contexts including power advantages, higher social status, and
poorer school and neighborhood climates. The results of my dissertation demonstrate the complex reality of the social ecology of bullying, and the need for anti-bullying initiatives to target multiple contexts including individual differences.

*Keywords:* bullying; adolescence; personality; social ecology; evolution
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CHAPTER 1: GENERAL INTRODUCTION

Bullying behavior is linked to multiple health risks for millions of individuals across the world (Volk, Craig, Boyce, & King, 2006; Wolke, Copeland, Angold, & Costello, 2013). For victims of bullying, numerous studies document short- and long-term associations with mental and physical health problems including depression, anxiety, headaches, and stomach aches (e.g., Gini & Pozzoli, 2009; Volk, Camilleri, Dane, & Marini, 2012). The health risks for perpetrators of bullying, however, have been somewhat mixed. In the long-term, bullying perpetration has been clearly associated with socially undesirable behavior like delinquency and substance use (e.g., Kretschmer et al., 2017a; Ttofi, Farrington, & Lösel, 2012; Wolke et al., 2013). In contrast, in the short-term, bullying perpetration has been associated with positive mental health and social relationships, including higher self-efficacy and social competence (Caravita, Di Blasio, & Salmivali, 2009; Vaillancourt, Hymel, & McDougall, 2003), more material resources like electronics and money (Volk, Dane, & Marini, 2014), higher social status and popularity (Dijkstra, Lindenberg, & Veenstra, 2008; Kretschmer, Veenstra, Dekovic, & Oldehinkel, 2017; Reijntjes et al., 2013; Sijtsema, Veenstra, Lindenberg & Salmivalli, 2009), and more dating and sexual partners (Connolly, Pepler, Craig, & Taradash, 2000; Volk, Dane, Marini, & Vaillancourt, 2015).

One of the key reasons for the contrast in negative risks for victims but positive short-term correlates for bullies may be a result of the power imbalance that fundamentally characterizes bullying. Evident throughout animal observations (e.g., lions, Scheel & Packer, 1991; hyenas, Stewart, 1987), social psychology experiments (e.g., the Stanford Prison Experiment; Haney, Banks, & Zimbardo, 1973), and more
recently in adolescent developmental literature (e.g., Sijtsema, et al., 2009), power coincides with being at the top of a social hierarchy, which in turn, results in reaping the majority of the zero-sum resources in a society. Bullying may be one form of behavior used by adolescents to achieve and/or maintain power, and in turn, valued resources. Bullying is a harmful, proactive form of aggression used against someone weaker for material, social, and romantic resources (Volk et al., 2014). As a result, the more powerful perpetrator may obtain multiple benefits when bullying, but the weaker victim may experience serious costs. If bullying is so beneficial, then why does not everyone with more power use this behavior?

Increasing evidence suggests that bullying may be most often perpetrated under the right combination of circumstances that maximizes the benefits of bullying, while also minimizes the costs (Volk et al., 2012). Adolescence appears to be a developmental period when ratio of costs to benefits of bullying may be highly salient. In fact, bullying behavior peaks during adolescence, with anywhere from 30% to 40% of adolescents involved (Craig & Pepler, 1998; Vaillancourt et al., 2010). Depending on how it is measured and defined, up to 15% of adolescents are involved as perpetrators, 14% as victims, and 4.4% as bully-victims (those who engage in bullying, but also are recipients of bullying behavior; Espelage & Holt, 2007). Further, bullying intervention efforts have largely been ineffective, if not iatrogenic, for adolescents, despite being modestly effective for younger children (Yeager, Fong, Lee, & Espelage, 2015). Given that this is the developmental period when bullying peaks, the lack of effective interventions for adolescents is alarming. An important reason for ineffective interventions may be that
developmentally relevant contexts, motivations, and benefits behind adolescent bullying have largely been neglected.

Adolescence is marked not only by biological changes-particularly puberty- but also social transitions (Caspi & Roberts, 2001; Totura et al., 2009). For example, the start of high school is associated with more independence from teachers (i.e., separate teachers and classrooms for each subject), which reduces the amount of adult supervision (Juvonen & Graham, 2014; Volk, Farrell, Franklin, Mularczyk, & Provenzano, 2016). There is also increasing independence from the family as adolescents explore their autonomy and expand their social networks in a larger, newer group of peers (Bellmore, Huang, Bowman, White, & Cornell, 2017; Totura et al., 2009). As a result, the reconstruction of peer networks combined with increased independence and decreased supervision may create ample opportunities for adolescents to use bullying without any adult-initiated repercussions. These environmental contexts may result in adolescents obtaining valued resources when bullying, including social status, power, and romantic opportunities. However, these opportunities may only be relevant specifically for individuals who possess particular personality traits that motivate them to exploit these contexts. Taken together, these findings suggest that under the right environment and individual contexts, bullying can be adaptive for some adolescents. Therefore, the purpose of my dissertation was to examine multiple individual and environmental factors that independently and jointly facilitate adaptive and strategic bullying perpetration. This research objective would help determine not only what types of adolescents bully, but also the types of contexts in which they bully. My research objective was addressed through a series of three studies. In the first study, I examined whether risky
environments concurrently filtered through antisocial personality traits to facilitate direct and indirect forms of adolescent bullying perpetration. In the second study, I expanded upon these cross-sectional results by examining longitudinal associations between antisocial personality and environments that may facilitate bullying across high school. In the third study, I examined whether manipulating dyadic power contexts in economic games could experimentally simulate bullying in a laboratory setting.

**Bullying and the Links to Evolution and Ecology**

In order to investigate why particular contexts facilitate adaptive bullying for particular individuals, the evolutionary roots of bullying behavior should first be understood. Bullying can only be an evolutionary adaptation if it meets two criteria (Williams, 1966). First, bullying should be related to genes that relate to the probabilistic expression of bullying behavior. Second, bullying was likely used to solve problems in the ancestral environment, otherwise known as the Environment of Evolutionary Adaptation (EEA; Irons, 1998). That is, bullying behavior should have been, and should continue to be, associated with survival in ways that help increase reproductive fitness, which is why this behavior was selected for in our ancestral past and continues to be used in modern societies (Volk et al., 2012). It appears that evidence for both criteria exist in the context of bullying.

Regarding the genetic criteria for adaptations, a behavioral genetic study by Ball and colleagues (2008) found that bullying had a heritability coefficient of 0.61 among twins, providing indirect evidence for a genetic component of bullying. Moreover, there is evidence for bullying in industrialized (Elgar et al., 2013) and non-industrialized cultures (Turnbull, 1972), and historical cultures (e.g., Golden, 1990; Rawson, 2003;
Volk et al., 2012). This indicates that there is likely to be something independent from cultural and cohort effects that may be contributing to bullying behavior. Instead, it appears that there are likely enough genetic underpinnings for evolution to have selected for bullying behavior across cultures and throughout history (Volk et al., 2012).

Regarding the second criterion, evolution may have selected for a tendency to bully others as a means to increase reproductive fitness. Bullying can be a behavior used (either consciously or unconsciously) to increase material resources, social status, and mating opportunities to achieve the ultimate goal of evolution- to pass on one’s own genes via reproduction (Dawkins, 1989). Therefore, bullying is likely one adaptive response to multiple selection pressures as a means to obtain resources. Evidence supports the notion that bullying may be associated with both social and reproductive resources. For instance, higher bullying perpetration has been associated with higher social dominance (e.g., Reijntjes et al., 2013; 2016), higher perceived popularity (e.g., Sijtsema et al., 2009; Vaillancourt et al., 2003; Vaillancourt & Hymel, 2006), a higher number of dating partners (e.g., Connolly et al., 2000), and a higher number of sexual partners (Volk et al., 2015a). In sum, it appears that bullying has been a stable behavioral strategy in the past and in the present.

It is important to note that throughout this dissertation, I am referring to “pure bullies” who engage in bullying behavior, as opposed to “bully-victims,” who engage in bullying, but also are recipients of bullying behavior. This is because the evidence for the motivations for bullying behind pure bullies and bully-victims appear to be different. Pure bullies appear to use bullying for adaptive purposes, and therefore fit with the two evolutionary criteria. In contrast, evidence exists that bully-victims may use bullying for
reactive purposes, which does not necessarily fit the two necessary criteria for adaptive behavior (Marini, Dane, Bosacki, & YLC-CURA, 2006; Volk et al., 2012; 2014). Given the support for “pure bullying” and the two necessary assumptions, it is now important to understand the various contexts that facilitate bullying as an adaptive behavior.

Humans are naturally social and are molded through socio-ecological processes that help individuals adapt and survive in their environment throughout the lifespan (Bjorklund & Ellis, 2014). Under particular social environments, individuals may decide whether it is more adaptive to compete or cooperate with others (Dawkins, 1989). Bullying may be one method of competing and can be considered a facultative or conditional adaptation, or a behavior that is adaptive under particular ecological contexts (Underwood, 1964). There are two primary explanations that may provide support for bullying as a facultative adaptation (Dane, Marini, Volk, & Vaillancourt, 2017). First, adolescents may use self-assessments of their own traits (e.g., personality, physical size, strength; Buss, 2011) and their environment (e.g., attachment in social relationships, resource availability, predictability; Del Giudice & Belsky, 2011) to determine whether bullying may adaptively result in more benefits than costs. The ability to assess one’s own heritable traits and broader social-ecological variables may be evolved psychological mechanisms that can facilitate decisions to engage in bullying perpetration. Second, some individuals may possess personality traits that may have genetic bases that allow them to exploit vulnerable or less powerful peers for self-gain (Del Giudice & Belsky, 2011). For the few individuals possessing these traits, bullying may be a preferred method of obtaining resources as opposed to prosocial, cooperative methods (Dane et al., 2017). As a result, for some adolescents, bullying may be a subconscious and/or conscious
conditional adaptation during exposure to particular environments, while for other adolescents, these traits may be fixed and heritable.

In line with these two broader evolutionary explanations, the Ecological Systems Theory naturally fits to help explain when bullying may be adaptive (EST; Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). The EST explains human development through the intricate reciprocal interactions, otherwise known as proximal processes, between an individual and several environmental systems across the lifespan. Two of the goals of the EST include: 1) explaining the change and continuity of a developing individual including their biological and psychological characteristics, as well as their surrounding environment, and 2) developing theoretical models that can help to evaluate and explain these developing mechanisms (Bronfenbrenner & Morris, 2006). Ultimately, this theory helps explain not only what contexts matter, but why they matter across the lifespan.

Given that adolescence is a developmental period with multiple biological, social, and psychological changes, and is also a time when bullying peaks in prevalence (Volk et al., 2012), the EST is a helpful framework for determining the onset of multiple factors that contribute to bullying during this unique life period. This theory can help identify the factors from childhood that may have contributed to bullying and also how these factors can contribute to bullying in adulthood. Recently, several researchers have examined ecological systems that facilitate bullying perpetration, starting with the most proximate factors including individual characteristics and personality, and ending with the more distal factors including school and neighborhood climates (Hong & Espelage, 2012). While some of these factors may directly influence bullying, they may also influence one
another to indirectly influence bullying. These direct and indirect associations highlight the heterogeneity and complexity of bullying perpetration, and the need for researchers to not only investigate what environmental contexts facilitate bullying, but for whom those environmental contexts matter. A basic rule in psychology is that different environments can differentially affect behavior for different people (Bronfenbrenner, 1979). Individual differences in personality may be one linking mechanism underlying the associations between broader environmental systems and adaptive bullying perpetration.

**The Role of Personality in Bullying Perpetration**

Personality traits can influence how individuals both experience and respond to the environment (Caspi et al., 2002; Marceau et al., 2013; Moffitt, 2005; Scarr & McCartney, 1983). As a result, personality traits appear to be a natural filter of the environment, and can be a significant tool that may link the broader ecology to bullying behavior. Like bullying, personality traits are rooted in genetic variations (Lewis & Bates, 2014). These foundations may provide further insight into the genetic bases that may allow bullying to be more adaptive for particular adolescents. Individual differences in personality trait levels tend to be highly stable across time, with evidence for correlation coefficients of over .70 for most personality traits across a three-year time span in samples of children and adolescents (e.g., De Fruyt et al., 2006). However, a meta-analysis found that personality was least stable during adolescence with a correlation of about .43 between the ages of 12 to 17 (Roberts & DelVecchio, 2000). One reason for reduced stability may be that personality can be shaped by the broader environment (McCrae et al., 2000). New social transactions may foster development by both evoking and provoking responses from the environment, which may modify cognitions, emotions,
and behavior to adapt to new social roles (Caspi & Roberts, 2001; Denissen, van Aken, Penke, & Wood, 2013). For example, personality development can be affected by social experiences that are normative throughout the lifespan. These normative social experiences may intersect with personality development during adolescence, and jointly influence bullying behavior. Individuals with particular genetically based personality traits may be more or less responsive to social ecological contexts (Del Giudice & Belsky, 2011; Hawley, 2011). Adolescence in particular may be an important developmental period when the predictability and stability of attachment to social relationships, resources, and broader environments may trigger developmental switches and/or the expression of particular genotypes. For these individuals, exposure to harsh environments may trigger faster-life history strategies, otherwise characterized by aggressive and risky behavior to obtain social and sexual resources (Dane et al., 2017). Thus, after self-assessments of traits and environments, bullying may be one form of subconscious and/or conscious adaptive behavior to obtain resources. In contrast, for individuals who possess personality traits that are less responsive to environments and are more inclined to exploit others, they may be more willing to use bullying as a fixed, aggressive strategy (Dane et al., 2017; Del Giudice & Belsky, 2011). Taken together, exploring the associations between proximate personality traits in combination with distal environments may be one method to investigate extrinsic social factors along with intrinsic personality traits that may influence adolescent bullying.

Most studies on bullying and personality have found that antisocial or negative personality traits were correlated with bullying perpetration. For instance, several studies have found that perpetrators are generally less agreeable and more difficult to get along
with, but also less conscientious (Bollmer, Harris, & Milich, 2006; Tani, Greeman, Schneider, & Fregoso, 2003). Other studies have found perpetrators are higher in neuroticism (Connolly & O’Moore, 2003). Finally, one of the most frequent personality correlates of bullying has been a lack of empathy (Caravita et al., 2009; Jolliffe & Farrington, 2006). Taken together, these personality studies reveal a profile of bully perpetrators that are generally difficult to get along with, antisocial, impulsive, and uncaring. However, there are two important issues that this profile does not address. First, this profile highlights perpetrators as being disagreeable, which is in a sense quite obvious given the disagreeable nature of bullying behavior (Book, Volk, & Hosker, 2012; Volk, Della Cioppa, Earle, & Farrell, 2015). Second, this personality profile does not adequately address the adaptive motivations to acquire resources that may increasingly characterize bullying as an adolescent ages. Instead, the existing literature characterizes a reckless, hostile perpetrator that uses bullying reactively as a result of poor social and emotional competence. Essentially, these traits may be more characteristic of bully-victims and/or bullying among younger children (Yeager et al., 2015). As a result, these studies demonstrate additional personality traits should be investigated for strategic adolescent bullying.

Recently, researchers have been investigating predatory, exploitative personality traits as a correlate of adaptive bullying. For instance, several studies have opted to use the recently proposed HEXACO model of personality (Lee & Ashton, 2004) to investigate bullying. This model is rooted in evolutionary theory, with adaptive trade-offs for being high and low in each of the six cross-culturally replicated personality traits (Ashton & Lee, 2007). This model also includes a trait called Honesty-Humility, which at
the lower end, captures an intentional exploitation and manipulation of others for self-
gain. Moreover, this model captures additional traits (i.e., Emotionality, Agreeableness,
and Conscientiousness), which are associated with a tendency to engage in antisocial
behavior (Book, Visser, & Volk, 2015; Book et al., 2016). As a result, the HEXACO is a
parsimonious personality model that includes personality traits covered in some previous
personality models, but also includes traits related to antisocial versus prosocial behavior,
and finally includes an additional unique sixth trait capturing exploitation.

Researchers using the HEXACO personality model have found that instead of the
traits that assess general disagreeableness, a lack of conscientiousness, or a lack of
empathy, lower Honesty-Humility was the sole multivariate predictor of a general
measure of bullying (Book et al., 2012) as well as for verbal and social forms of bullying
(Farrell, Della Cioppa, Volk, & Book, 2014). However, there were some mixed findings
for other forms of bullying. For example, while lower Honesty-Humility was correlated
with physical bullying, lower Conscientiousness was the only significant predictor above
and beyond all of the other traits (Farrell et al., 2014). Taken together, these findings
provide evidence for adolescent bullying being at least partially, motivated by a
predatory, exploitative personality style that seeks to take advantage of weaker peers for
self-gain. However, different forms of behavior may be facilitated by additional traits
(e.g., inhibiting impulses to engage in risky physical bullying). Nevertheless, the overall
predatory adaptive personality profile of bullying perpetrators contrasts with previous
profiles of maladaptive, impulsively aggressive perpetrators who are low in empathy. As
a result, this highlights the need for research to simultaneously investigate exploitative
personality traits along with disagreeable, reckless, and low empathic traits in concurrent,
longitudinal, and experimental studies. Few studies have yet investigated how exploitative personality associates with the broader social ecology to facilitate bullying perpetration, further demonstrating the need for integrative studies.

**Personality and the Broader Social Ecology**

Several ecological studies that have examined personality and social environments provide some hypotheses for the association between exploitative personality traits and bullying. Although the majority of these studies have not specifically examined exploitative traits and have instead opted for other types of individual differences, these studies still demonstrate the possible indirect associations between personality, the environment, and bullying (Barboza et al., 2009). For example, a study by Lee (2011) found that negative family factors had indirect associations through individual traits like fun-seeking to predict bullying. In fact, these indirect effects were stronger than the direct effects between family and bullying. Other studies have found evidence for interactions between personality and environment to facilitate bullying.

To our knowledge, only one study has examined how the HEXACO’s Honesty-Humility interacts with social variables to predict bullying. In this study, adolescents who were more exploitative (i.e., lower in Honesty-Humility) engaged in higher levels of bullying perpetration, but only when their mothers had low knowledge of their behaviors, peers, and whereabouts (Farrell, Provenzano, Dane, Marini, & Volk, 2017). Accordingly, exploitative adolescents only used bullying under environments when they knew they would have fewer repercussions. In contrast, exploitative adolescents did not engage in higher levels of bullying if their mothers had high knowledge. Other studies have also found interactions between personality and environments for bullying perpetration. For
example, one study by Low and Espelage (2014) found that impulsivity interacted with community violence to predict delinquency one year later, which then predicted bullying another year later. Although this study did not examine exploitative personality styles, it nevertheless demonstrated the possibility for personality traits to interact with the broader social environment to predict bullying over time. Likewise, several longitudinal studies have examined traits similar to exploitation that may also demonstrate additional directional evidence for personality, environment, and bullying over time.

The studies that have longitudinally investigated personality traits that are similar to exploitation have used composite measures of narcissism, which is a trait that includes both exploitative and superior (e.g., entitled, boastful) tendencies (Ang, Ong, Lim, & Lim, 2010). For example, in a sample of early adolescents, initial levels of narcissism positively predicted longitudinal bullying perpetration (Fanti & Henrich, 2015; Fanti & Kimonis, 2012). Only one other study has examined narcissism with an additional ecological variable. Reijntjes and colleagues (2016) examined trajectories of narcissism, social dominance, and bullying perpetration. Across three years of adolescence, boys who were higher in trajectories of bullying and narcissism were also higher in trajectories of social dominance. These studies demonstrate that predatory, exploitative personality traits predict bullying across adolescence, and these associations may also be related to other ecological factors like social dominance and popularity.

In summary, the existing studies on exploitative personality and bullying are largely concurrent. This limitation prevents drawing conclusions on the direct of effects. In contrast, while the few existing longitudinal studies have provided some directional evidence, these studies have not examined the specific role of exploitative personality
traits with the broader social ecology. Therefore, these limitations highlight the need for concurrent, longitudinal, and experimental studies with exploitative personality traits along with the broader social environment for facilitating adolescent bullying perpetration.

Overview of Current Studies

The primary goal of this dissertation was to examine concurrent, longitudinal, and laboratory-based associations between exploitative personality traits and broader social ecologies to facilitate bullying perpetration. More specifically, I predicted that broader environments would filter through exploitative personality to predict adolescent bullying perpetration (i.e., environmental variables would have indirect associations through exploitative personality to bullying perpetration).

In Study 1, I examined whether risky social environments filtered through antisocial personality traits to facilitate direct and indirect forms of bullying perpetration in a concurrent sample of 396 adolescents. I examined risky environments from three different levels of ecological systems varying in proximity to adolescents. This way, I could examine each of the ecological systems separately in individual system-level models, but also simultaneously in a single comprehensive, global model using path analyses. I also used the HEXACO personality model so that exploitation (i.e., lower Honesty-Humility) could be differentiated from impulsivity (i.e., Conscientiousness), general anger (i.e., lower Agreeableness), and lower empathy (i.e., lower Emotionality). I predicted that all ecological variables including parent, peer, school, and neighborhood variables would have indirect associations with both direct (physical and verbal) and indirect (social and relational) forms of bullying primarily through lower Honesty-
Humility. This would demonstrate how risky social ecologies can be exploited by adolescents to strategically use bullying. However, given that bullying is an antisocial behavior, I still predicted there would be univariate correlations with bullying and the other antisocial personality traits.

To extend on Study 1, for Study 2, I examined whether similar direct and indirect associations between personality, environment, and bullying would be found in a longitudinal sample of 560 adolescents from the McMaster Teen Study. To address the developmental changes in the adaptive role of bullying during adolescence, I investigated whether empathy or exploitation had longitudinal associations with bullying perpetration across the first three years of high school to develop a Personality Model of bullying perpetration. The second goal of Study 2 was to explore the reciprocal associations between personality, bullying and broader social ecologies to develop an Ecological Model. All models were developed using developmental cascades in order to account for stability and within time association of variables. I predicted that exploitation, but not empathy, would have longitudinal associations with bullying perpetration, and that broader social environments including family functioning, school bonding, and popularity, would have indirect associations with bullying perpetration over the high school years through exploitative personality.

Finally, given that both Studies 1 and 2 were correlational, for Study 3, I investigated whether bullying perpetration could be experimentally simulated in a laboratory setting through the use of economic games in a sample of 167 first-year undergraduate students. Both economic games and bullying perpetration may share adaptive evaluations of the costs of competing compared to the benefits of cooperating,
and these evaluations may be influenced by power imbalances and personality. I explored whether self-report bullying was associated with point allocation behavior in the Dictator Game (powerful condition), but not with point allocation behavior in two types of Ultimatum Games (equivalent power and powerless conditions). I also explored whether self-report bullying and Dictator Game allocations shared similar environment-personality mechanisms. I expected that self-report bullying would be associated with point allocations in the Dictator Game, but not allocations in the Ultimatum Games. I also predicted that both self-report bullying and Dictator Game allocations would be associated with exploitative personality (i.e., the HEXACO’s Honesty-Humility). Finally, I predicted both bullying and Dictator Game allocations would share similar indirect associations with broader social ecological variables filtering through the exploitative trait to predict both forms of behavior.

In summary, these three studies were conducted to demonstrate the reality of the complex associations among personality, social environments, and bullying perpetration. Ultimately, the goal of my three dissertation studies was to demonstrate that bullying development varies for different adolescents under different environments. Therefore, I hoped to demonstrate not only what contexts should be targeted for anti-bullying initiatives, but in particular for which adolescents.
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CHAPTER 2: STUDY 1

Social Ecology and Adolescent Bullying: Filtering Risky Environments through 
Antisocial Personality¹

Bullying is intentionally harmful behavior used against weaker victims to obtain immediate material (i.e., money), social (i.e., popularity), and/or reproductive (i.e., dating and sexual partners) benefits (Volk, Dane, & Marini, 2014). Bullying peaks during adolescence, during which time many other risky individual and environmental factors emerge (Volk, Craig, King, & Boyce, 2006). According to the Ecological Systems Theory (EST; Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006), risks to development and behavior do not occur in isolation. Instead, multiple nested ecological systems influence one another, and ultimately influence the presence or absence of risky individual behavior (e.g., bullying) that lies at the center of these systems. As a result, proximate systems may directly influence an individual’s bullying behavior, while distal systems may influence an individual’s bullying directly or indirectly by first influencing more proximate systems related to bullying (e.g., Barboza et al., 2009; Lee, 2011; Low & Espelage, 2014).

The ecological systems may not influence all adolescents to bully in the same way. Instead, under various environments, adolescents with different personality traits

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may respond/and or evoke responses in different ways (Moffitt, 2005; Scarr & McCartney, 1983). Thus, distal risky environments may differentially filter through multiple proximate personality traits. Accordingly, just as risky environments may be differentially associated with personality traits, personality traits may be differentially associated with bullying. Of particular interest may be the antisocial personality traits that are related to bullying. Recent evidence suggests that direct, overt forms of bullying (e.g., physical hitting or pushing, verbal threatening and teasing) may be related to impulsive, poorer behavioral control, while indirect, covert forms of bullying (e.g., social exclusion, rumor spreading) may be related to predatory, exploitative tendencies (Book, Volk, & Hosker, 2012; Farrell, Della Cioppa, Volk, & Book, 2014). Taken together, the relationships between the risks and outcomes of bullying appear to be complex and should be considered from multiple ecological systems. I therefore suggest that the effects of adverse ecological factors from the EST including poorer social relationships, environmental settings, and community norms (Hong & Espelage, 2012) may filter through antisocial personality traits to encourage adolescent bullying perpetration.

**Bullying and The Microsystem**

The microsystem includes demographic characteristics, personality traits, and immediate social relationships (Bronfenbrenner, 1979). Age and gender are two important demographic risk factors of bullying. Being younger is often a risk factor for direct bullying, but direct forms of bullying and aggression often decline with developmental changes in social cognition, which may be implemented through indirect strategies (Volk et al., 2016). In addition, being a boy is often a risk for using direct bullying (Card, Stucky, Sawalani, & Little, 2008). Although boys use more direct forms
of aggression than girls, there are often no significant gender differences for indirect aggression (Card et al., 2008). However, it appears girls prefer to use indirect forms of aggression more so than direct forms of aggression (Card et al., Volk et al., 2014; 2016). These differential gender risks likely reflect developmental changes in the onset of sexual selection pressures (Pellegrini & Long, 2002). Males often prefer demonstrating directly aggressive behavior that can demonstrate strength, toughness, and an ability to fight and secure resources that can attract prospective mating partners (Buss, 2015). In contrast, due to greater obligatory investment in offspring, females often prefer indirectly aggressive behavior that can maximize harm on the reputation of intrasexual rivals (thereby indirectly enhancing one’s own status to prospective mates), while minimizing risks of perpetration and retaliation (Campbell, 2013; Vaillancourt, 2013). Alongside demographics, personality is another important individual characteristic that may facilitate bullying.

Several studies on personality and bullying used the well-known Five Factor Model (FFM; Costa & McCrae, 1992) of personality. These studies found lower Agreeableness, lower Conscientiousness, and higher Neuroticism were risks for bullying, as children with these traits had higher levels of perpetration (e.g., Bollmer, Harris, & Milich, 2006; Tani, Greenman, Schneider, & Fregoso, 2003). Increasingly, researchers in personality are moving from the FFM to the more recently proposed six-factor HEXACO model of personality. The HEXACO has strong evolutionary foundations, and has been consistently replicated across cultures (Ashton & Lee, 2009). Each personality factor varies on a continuum, with different risks and benefits associated with each pole. In particular, three traits represent a tendency to be antisocial versus prosocial. At the lower
end, Honesty-Humility (H) captures exploitation and manipulation (Ashton & Lee, 2009). Lower Agreeableness (A) captures general anger and an intolerance of others. Lower Emotionality (E) captures lower kin altruism, higher emotional detachment, and lower anxiety and fear. A fourth factor, Conscientiousness (C), tends to capture the tendency to act upon these antisocial outcomes. Extraversion (X), and particularly Openness to Experience (O), are less predictive of antisocial behaviors (Book, Visser, & Volk, 2015). Studies using the HEXACO to explore bullying have shown that these four antisocial traits may be risk factors for perpetration.

At the multivariate level, adolescents lower in Honesty-Humility significantly engaged in more global bullying (Book et al., 2012), and more direct verbal and indirect social bullying (Farrell et al., 2014). Lower Conscientiousness was a multivariate predictor of direct physical bullying, but a univariate correlate of global bullying. Lower Agreeableness and lower Emotionality only had univariate correlations with global bullying. Thus, the four antisocial traits were all risk factors for bullying. Given that lower Honesty-Humility was the strongest multivariate predictor, the findings suggest that predatory, exploitative personality traits may be the biggest personality risk factor for bullying, rather than anger (lower Agreeableness) or empathy (lower Empathy). Also, reckless impulsivity (lower Conscientiousness) may be a secondary risk factor for direct bullying. It appears that there are different personality profiles that put adolescents at risk for engaging in bullying, depending on the form of behavior used. These personality profiles may have a heritable basis that allow these traits to be natural filters of the environment.
Individual differences in personality may be a result, at least in part, of genotypic variations (Lewis & Bates, 2014). These variations can facilitate differences in how environments are experienced, and ultimately the response of an adolescent to the environment (Moffitt, 2005; Scarr & McCartney, 1983). Bullying has been argued to be an evolutionary adaptation that is the result of the interaction between one’s environment and heritable factors (Ball et al., 2008; Volk et al., 2012). Consequently, the antisocial HEXACO traits are ideal filters for the more distal risky environments. Under adverse environments that may have minimal risk of identification, repercussions, and sanctions, adolescents with lower Honesty-Humility may take advantage by adaptively bullying for self-gain.

For example, in a recent study, lower maternal knowledge and lower Honesty-Humility combined together were risks for engaging in more bullying (Farrell, Provenzano, Dane, Marini, & Volk, 2017). Although gene-environment interactions can be bi-directional (Moffitt, 2005; Scarr & McCartney, 1983), and this study lacked the longitudinal data to determine causal directions, the results nonetheless highlight the potential for adverse environments to filter through antisocial personality to indirectly influence bullying. However, this study investigated only one form of risky parenting (i.e., knowledge), and a global composite of bullying, even though it is evident that there are multiple social environments that influence bullying and there are different personality profiles for direct versus indirect bullying. As a result, it may be important to investigate whether similar or different antisocial traits can filter other social relationships and environments to predict both direct and indirect bullying.
For instance, friends play increasingly important roles in decision-making as adolescents become more independent from parents (Volk et al., 2016). Poorer quality friendships characterized by lower conflict resolution and reciprocity have been risk factors for bullying perpetration (Bollmer, Milich, Harris, & Maras, 2005). Negative social relationships, including those with friends, may foster poorer mutuality and concern for others, which may be a risk for both antisocial personality (Ashton & Lee, 2001), and bullying perpetration. Like adverse or risky parenting, poorer friendships may filter indirectly through antisocial personality to facilitate direct and indirect forms of bullying perpetration. Taken together, these microsystem risk factors may filter through antisocial personality to promote both forms of bullying. Similar mechanisms with personality traits may apply to risky mesosystem factors.

**Bullying and the Mesosystem**

The mesosystem incorporates interactions between microsystem variables and may be risks for facilitating competitive environments that encourage bullying. Immediate friendships in the microsystem are embedded in the wider peer networks and school classroom atmospheres that comprise the mesosystem. Within this network, adolescents obtain a certain level of status and social influence relative to their peers in the classroom, and bullying may be one way to obtain status. Consequently, popularity may be a risk factor for bullying. Adolescents who held characteristics valued by their peers at school including popularity, were more likely to use bullying to achieve and maintain social status amongst their peers (Dijkstra, Lindenberg, & Veenstra, 2008; Reijntjes et al., 2013; 2016) and within their classroom (Huitsing & Veenstra, 2012; Sentse, Veenstra, Kiuru, & Salmivalli, 2015). Such influence can further be encouraged
by adverse competitive school atmospheres. For instance, higher social cohesion and lower competition were linked to lower behavior problems (Loukas, Suzuki, & Horton, 2006) and bullying (Freeman et al., 2009). Also, competitive classroom environments can be linked to status, privileges, and favoritism based on achievement (Butler & Kedar, 1990), leading to social comparisons that reinforce dominance hierarchies (Roseth, Johnson, & Johnson, 2008). As a result, the benefits of bullying via antisocial personality may outweigh the costs under these risky peer and competitive climates.

Adolescent perceptions of unfair or inconsistent discipline under competitive school classroom atmospheres may also be a risk for bullying. For example, schools characterized by fairness, assertive and consistent rule enforcement, and higher support had lower rates of bullying (Gregory et al., 2010; Salmivalli & Voeten, 2004). Schools with fairer discipline may discourage students from focusing on competition and bullying while schools with poorer discipline may fail to stigmatize students’ use of aggression within their social competitions. Accordingly, risky mesosystem factors may also filter through antisocial personality traits to facilitate both direct and indirect forms of bullying. Competitive encouragement may further be promoted in the wider macrosystem.

**Bullying and the Macrosystem**

The macrosystem includes broader cultural norms of acceptable values and behavior (Bronfenbrenner, 1979; Hong & Espelage, 2012). Norms on bullying and violence may be risks for bullying since they may reflect the moral legitimacy of bullying and violent behavior in these environments. For example, higher perceived bullying norms were associated with higher bullying behavior in older grades with preadolescent students, but had weaker associations with bullying in younger grades (Salmivalli &
Voeten, 2004). Therefore, bullying norms appeared to be a risk for bullying particularly during adolescence. Likewise, a higher perception of neighborhood violence was associated with higher school bullying (Chaux, Molano, & Podlesky, 2009). Higher perceived norms and violence in the wider neighborhood may be a risk because it reinforces a broader culture of accepting violence, inequality, and competition (Daly & Wilson, 2010; Elsaesser, Hong, & Voisin, 2016; Low & Espelage, 2014; Volk, Della Cioppa, Earle, & Farrell, 2015). Inequality may further be accentuated in socio-economic status (SES).

The cultural norms regarding competition within dominance hierarchies underlying perceived socio-economic status (SES) relative to peers may reflect the broader adverse macrosystem (Volk et al., 2015b). Some studies found that direct bullying was more prevalent in lower SES neighborhoods, while indirect bullying was more prevalent in higher SES neighborhoods (Tippett & Wolke, 2014). In contrast, other studies found that income inequality may be a better correlate of bullying rather than absolute SES (Chaux et al., 2009; Elgar et al., 2013). Consistent with theories on income inequality and violent behavior (e.g., Daly, 2016; Daly & Wilson, 2010), greater inequality may reinforce dominance hierarchies based on demographics beyond SES to compete for limited resources (Hong & Espelage, 2012). Within these environments, a faster life history strategy characterized by risky, aggressive forms of behavior like bullying may result in higher immediate resources (Del Giudice & Belsky, 2011). As a result, individuals lower in SES may place a lower value on the potential costs of violence, in comparison to individuals higher in SES in the same environment, who may have more resources to lose. In particular, according to the young male syndrome, males
may have less to lose from violence than females as a result of females’ greater obligatory parental investment, and alternatively males may have more to gain through violence (Daly, 2016). In sum, bullying norms, violence, and SES factors may be a direct risk for bullying, but also an indirect risk for adolescents with antisocial tendencies, who may take advantage of these environments and values.

Current Study

Adolescents with particular personality traits, primarily those who are exploitative (lower Honesty-Humility), but also less empathic (lower Emotionality), more disagreeable (lower Agreeableness), and more impulsive (lower Conscientiousness), appear to engage in higher bullying perpetration. However, these traits themselves are likely to be influenced by broader social ecological factors. Presently, I am not aware of any studies that investigated whether risky, negative environmental factors filter specifically through these antisocial personality traits to encourage direct and indirect forms of adolescent bullying, even though these two forms may have different personality and/or ecological predictors (Farrell et al., 2014; Volk et al., 2006).

The purpose of conducting Study 1 was to determine whether environmental factors were associated with direct and indirect forms of bullying indirectly through these four antisocial HEXACO personality traits. I recognize that gene-environment associations can be bi-directional (Marceau et al., 2013; Moffitt, 2005). However, I chose to largely focus on the direction of leading towards bullying perpetration, using Bronfenbrenner’s ecological systems to model direct and indirect effects (via personality) of adolescents’ social ecology. That is, I expected more distal systems to have more indirect effects on bullying than more proximate systems. Furthermore, while I expected
the four antisocial traits to predict bullying perpetration, I predicted that predatory, exploitative lower Honesty-Humility would be the most prominent personality risk factor for both forms of bullying, but that reckless, impulsive lower Conscientiousness would be a secondary personality risk factor for direct bullying. I tested these predictions with two sets of analyses to demonstrate the complexity of the adolescent social ecology in a comprehensive way. First, for a holistic view, I conducted an overall global analysis of all environmental systems simultaneously. Second, to demonstrate the subtle mechanisms that may be diluted in the global analyses, we examined the environment broken down into the separate systems (i.e., micro-, meso-, and macro-).

Method

Participants

Adolescents ($N = 396; M_{age} = 14.64, SD_{age} = 1.52$; age ranged from 12 to 18 years; 58% girls) were recruited from extracurricular activities, such as sports teams and youth groups in Southern Ontario, Canada. The self-reported ethnicity was primarily White (73.7%; 6.1% Asian; 1.0% Black; 0.5% Native Canadian; 4.3%, Mixed; 4.8% Other). Some participants did not report an ethnicity (9.6%). Self-perceived socio-economic status (SES) was also primarily middle class (64.6%; 12.1% lower class, 22.8% upper class). Some participants did not report SES (0.5%).

Procedure

Adult leaders of extracurricular clubs were contacted via email and phone to participate. After consent, researchers attended a club meeting to invite adolescents to participate in a study was about social relationships. Interested adolescents were provided an envelope with a parental consent form, an adolescent assent form, an identification
(ID) number, and a website link to the online questionnaires. Participants were told both forms were needed for researchers to use their data, and to complete the questionnaires in private at home. At a prearranged time, researchers returned to collect completed forms and verified participation via ID numbers. Participants received $15 in compensation, were thanked for their participation, and were debriefed that the study was on bullying. Methods were cleared by a university research ethics board.

**Measures**

**Bullying.** Participants completed a self-report bullying scale (Volk & Lagzdins, 2009) consisting of seven items to measure perpetration, but only three items were used for this study. The questions included, “In school, how often have you ______ someone much weaker or less popular last term?” The behavior included, “hit, slapped, or pushed” for physical bullying, “threatened, yelled at, or verbally insulted,” for verbal bullying, “spread rumors, mean lies, or actively excluded,” for social bullying. The physical and verbal items were averaged ($r = .41, p < .001$) to measure direct bullying, and the social item was used to measure indirect bullying. Questions were rated on a five-point scale (1 = *that hasn’t happened* and 5 = *several times a week*), with higher values indicating higher perpetration.

**Personality.** Participants completed a self-report of the 60-item HEXACO Personality Inventory-Revised (HEXACO PI-R; Ashton & Lee, 2009). Only the traits that reflect “anti-social tendencies” were used (i.e., Honesty-Humility, Emotionality, Agreeableness, Conscientiousness; Book et al., 2016). Items asked how much participants agree with each statement. Items with coefficient alpha values for the current sample include: “I wouldn’t pretend to like someone just to get that person to do favors
for me,” for Honesty-Humility ($\alpha = .67$), “I feel like crying when I see other people crying,” for Emotionality ($\alpha = .75$), “I rarely hold a grudge, even against people who have badly wronged me,” for Agreeableness ($\alpha = .68$), and “I plan ahead and organize things, to avoid scrambling at the last minute,” for Conscientiousness ($\alpha = .75$). Items were rated on a five-point scale (1 = strongly disagree to 5 = strongly agree) and averaged with higher scores indicating higher levels of a trait.

**Microsystem.** The microsystem variables selected for this study reflect direct, dyadic social relationships with parents and friends (Bronfenbrenner, 1979).

**Parental knowledge.** Participants completed a questionnaire on parental knowledge (Stattin & Kerr, 2000). Each item ($\alpha = .83$) asked, “How often do your parents know...” A sample item includes, “What you do with your free time?” Items were rated on a five-point scale (1 = almost never to 5 = very often) and averaged, with higher values indicating higher parental knowledge.

**Friendship problems.** Participants completed a nine-item Relationship Structures (ECR-RS) Questionnaire (Fraley, Heffernan, Vicary, & Brumbaugh, 2011) assessing friendship avoidance and anxiety for their best friend. A sample item for friendship avoidance ($\alpha = .88$) includes, “It helps to turn to this person in times of need,” and a sample (reversed) item for friendship anxiety ($\alpha = .94$) includes, “I often worry that this person doesn’t really care for me.” Items were rated on a seven-point scale (1 = strongly disagree to 7 = strongly agree), and the two composites were averaged ($r = .48$, $p < .001$) with higher values indicating more problems.

**Mesosystem.** The mesosystem variables selected for this study reflect interactions between microsystem variables, in particular at the school classroom setting. This
includes direct interactions an adolescent can have with peer groups (i.e., not just dyadic friendships), but also teachers, administrators, and school officials (Bronfenbrenner, 1979; Hong & Espelage, 2012).

**Interpersonal influence.** Participants completed six items assessing social dominance and interpersonal influence (adapted from Hawley, Little, & Card, 2007; 2008; Vaillancourt, Hymel, & McDougall, 2003). Participants were asked how true the statements were. A sample item includes, “In groups I am usually in charge or in control.” Items were rated on a five-point scale (1 = *never true* to 5 = *almost always true*) and averaged to create a composite (α = .84) with higher scores indicating higher interpersonal influence.

**School social competition.** Social competition at school was assessed through agreement with six items on the Desire for Social Success subscale of the Social and Academic Competition Scale (SACS; Sutton & Keogh, 2000). A sample item includes, “I try hard in class so that I can make fun of people who aren’t as good as me.” Items were rated on a four-point scale (1 = *strongly disagree* and 4 = *strongly agree*) and averaged to create a composite (α = .63) with higher scores indicating higher perceived school social competition.

**School discipline.** School discipline was assessed through the 14-item Student Discipline subscale of the Vessels School Climate Survey (Vessels, 1998). An item for discipline includes, “Rules and consequences for breaking rules are made with student input and are viewed as fair,” and was rated on a four-point scale (1 = *strongly disagree* and 4 = *strongly agree*). Items were average to create a composite score (α = .78), with higher scores indicating fairer discipline.
**Macrosystem.** The macrosystem variables selected for this study reflect the abstract macrosystem of wider acceptable norms, values, and behavior (Bronfenbrenner, 1979; Hong & Espelage, 2012).

**School bully norms.** School bully norms were assessed with five-items adapted from by Salmivalli and Voeten (2004). Participants rated what would happen in their class if someone behaved in the ways outlined in the items. A sample item includes, “A classmate making friends with the bullied victim,” and rated on a seven-point scale (1 = *nothing special would happen* and 7 = *the others would show disapproval to him/her*). Items were average to create a composite score ($\alpha = .52$), with higher scores indicating higher frequency, approval and/or support for school bullying perpetration.

**Socio-economic status.** An average of two items on SES inequality was first computed: “In your high school, how much income inequality was there amongst the students’ families?” and “In your neighborhood, how much income inequality is there amongst the families?” Inequality was rated on a three-point scale (1 = *a low amount* and 3 = *a high amount*; $r = .28$, $p < .001$). A composite between inequality and family SES (reverse coded) as described under demographics ($r = .13$, $p = .013$) was computed, such that higher values indicate higher adverse socio-economic conditions (i.e., lower SES, higher inequality).

**Neighborhood violence.** A five-item version of the Children’s Exposure to Community Violence Scale (Richters & Martines, 1993) by Low and Espelage (2014) was used to ask how often participants experienced each scenario. A sample item includes, “I have seen somebody being beaten up.” Items were rated on a four-point scale
(1 = never and 4 = often) and averaged into a composite (α = .74) with higher ratings indicating higher exposure to violence.

Data Analyses

Two sets of path analyses were conducted using MPlus version 7.4 (Muthén & Muthén, 1998-2017). The first set consisted of one path analysis, which I called an “overall model.” All ecological variables were included to see whether they simultaneously filtered through the antisocial personality traits to associate with the two forms of bullying. The second set consisted of three separate path analyses that I called “system-level models.” In both sets of analyses, the indirect effects from the ecological variables to the two forms of bullying through the four personality traits were of primary interest. However, all direct paths were estimated given previous research (e.g., Barboza et al., 2009; Lee, 2011). Models were fully saturated and fit indices were not informative (Kline, 2016; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Pearl, 2012).

Parameters for direct effects were estimated using Maximum Likelihood Robust (MLR) to correct for non-normal distributions of variables. To test for indirect effects, 95% bias-corrected confidence intervals with 10,000 bootstrapped samples were estimated using Maximum Likelihood (ML). Confidence Intervals that did not cross zero were determined to be significant indirect effects (Shrout & Bolger, 2002). Estimation of models used Full Information Maximum Likelihood (FIML) to use all available data even for cases that had some missing data (Schafer & Graham, 2002).

Results

Preliminary Assumptions and Correlations
Preliminary analyses were conducted using SPSS 24 software. Consistent with literature (e.g., Pellegrini & Long, 2002; Volk, Veenstra, & Espelage, 2017), both bullying variables were positively skewed and leptokurtic. Univariate outliers were Winsorized to preserve rank-order, but minimize impact (Tabachnick & Fidell, 2013). All independent variables demonstrated acceptable descriptive statistics (see Table 2.1). Each variable had 1.5% or less missing data which did not change the pattern of results. Data also reflected acceptable multivariate assumptions, with the exception of slight heteroscedasticity. However, subsequent analyses circumvented non-normality through the use of appropriate of the MLR estimator.

Significant correlations ranged from small to moderate in size (see Table 2.1). Direct and indirect bullying were significantly positively correlated. Both subtypes were significantly negatively correlated with Honesty-Humility, Agreeableness, and Conscientiousness. For ecological variables, both subtypes were negatively correlated with parental knowledge and positively correlated with friendship problems, school social competition, and neighborhood violence. Direct bullying was also positively correlated with being a boy and interpersonal influence, while indirect bullying was positively correlated with school bullying norms.

For correlations between the ecological variables and personality, Honesty-Humility, Agreeableness, and Conscientiousness were positively correlated with age and parental knowledge, and negatively correlated with friendship problems in the microsystem. Emotionality was positively correlated with being a girl and higher parental knowledge. Being a girl was also positively correlated with Honesty-Humility and Conscientiousness. Honesty-Humility and Agreeableness were positively correlated with
Table 2.1

Means, Standard Deviations, Response Options and Pearson Correlations Between Ecological, Personality, and Bullying Variables.

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Note. N = 396; H = Honesty-Humility; E = Emotionality; A = Agreeableness; C = Conscientiousness; Micro = Microsystem; Gen = Gender; Know = Parental Knowledge; Prob = Friend Problems; Meso = Mesosystem; Disc = School Discipline; Com = School Competition; Int = Interpersonal Influence; Macro = Macrosystem; Norm = Bullying Norms; SES = Socio-economic Status; Viol = Neighborhood Violence; Dir = Direct Bullying; Ind = Indirect Bullying; Significant correlations are bolded for ease of presentation.

*Gender coded with 0 = Boy and 1 = Girl.

*p < .05, **p < .01, ***p < .001.
school discipline and bullying norms, and negatively with school competition and interpersonal influence. Finally, Honesty-Humility, Agreeableness, and Conscientiousness were negatively correlated with neighborhood violence.

**Primary Path Analyses**

**Overall Model.** As predicted, there were several significant direct effects from the ecological and personality variables to bullying (see Table 2.2 and Figure 2.1). Younger age, higher interpersonal influence, higher neighborhood violence, and lower Conscientiousness were positively associated with direct bullying. Higher bullying norms and lower Honesty-Humility were positively associated with indirect bullying. For the individual/microsystem variables with personality, there were direct effects from lower friendship problems, lower interpersonal influence, and lower school competition to higher Honesty-Humility and Agreeableness. However, higher friendship problems was associated with higher Emotionality. Higher Honesty-Humility and Conscientiousness had additional direct effects from higher parental knowledge. Higher school discipline had a direct effect on higher Agreeableness, and finally being a girl had a direct effect on higher Emotionality and higher Conscientiousness. There were no direct effects from the macro- system variables to personality.

As predicted, there were several significant indirect effects on the subtypes through bullying. However, the indirect effects were with only individual/micro- and meso-system variables (see Figure 2.1). For the individual/microsystem variables, being a boy had an indirect effect on higher direct bullying through lower Conscientiousness ($B = -.007, SE = .005, β = -.012, 95% CI [-.020, -.001]$). Lower parental knowledge had indirect effects through lower Conscientiousness on direct bullying ($B = -.016, SE = .008,$
Table 2.2

Overall Model: Direct Effects of Ecological, Personality, and Bullying Variables.

<table>
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<tr>
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<th>Personality</th>
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<th>Conscientiousness</th>
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<td>.02(.07)</td>
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<td>-.21(.03)**</td>
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<td>-.04(.04)</td>
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<tr>
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<td>-.12(.06)**</td>
<td>-.03(.03)</td>
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Note. N = 396; Gen = Gender; ParKno = Parental Knowledge; Friend Prob = Friends Problems; InterInfl = Interpersonal Influence; SchDisc = School Discipline; SchCom = School Competition; BullyNor = School Bullying Norms; SES = Socio-economic Status; Violence = Neighborhood Violence; H = Honesty-Humility; E = Emotionality; A = Agreeableness; C = Conscientiousness; Significant direct effects are bolded for ease of presentation.

*Gender coded with 0 = Boy and 1 = Girl.

*p < .05, **p < .01, ***p < .001.
Figure 2.1: Significant Direct and Indirect Paths for Overall Model.
Note. N = 396; Significant direct effects are on the left and significant indirect effects are on the right. All paths, disturbances, and covariances were estimated; Only significant paths are shown for ease of presentation; No line indicates no significant path; For indirect effects, solid black lines indicate indirect effects through Honesty-Humility, and solid grey lines indicate indirect effects through Conscientiousness. Standardized direct path coefficients are presented; See in text for indirect path coefficients and confidence intervals.

*Gender coded as 0 = Boy, 1 = Girl.
*p < .05, **p < .01, ***p < .001.
\( \beta = -.046, 95\% CI [-.035, -.002] \), but through lower Honesty-Humility on indirect bullying \((B = -.021, SE = .008, \beta = -.042, 95\% CI [-.041, -.007])\). Higher friendship problems also had an indirect effect through lower Honesty-Humility on higher indirect bullying \((B = .007, SE = .003, \beta = .022, 95\% CI [.002, .016])\).

For the mesosystem, there was an indirect effect of higher interpersonal influence \((B = .025, SE = .009, \beta = .050, 95\% CI [.009, .046])\) and higher school social competition \((B = .018, SE = .011, \beta = .021, 95\% CI [.003, .046])\) through lower Honesty-Humility on higher indirect bullying. For the macro-system variables, there were no indirect effects. Therefore, in the overall model analysis, there were significant indirect effects of environmental factors through lower Honesty-Humility for indirect bullying, but through Conscientiousness for direct bullying primarily through the micro- and meso-systems.

**System-Level Models.**

**Microsystem.** As predicted, there were several significant direct effects on bullying (see Table 2.3 and Figure 2.2). Both direct and indirect bullying were significantly associated with lower Honesty-Humility. For the individual/microsystem variables with personality (see Table 2.3 and Figure 2.2), higher parental knowledge had direct effects on all four personality traits. Higher friendship problems had a positive direct effect on Emotionality, but a negative direct effect on Agreeableness. Being a girl was positively associated with Emotionality and Conscientiousness, while being younger was positively associated with Agreeableness. As expected, there were significant indirect effects. Lower parental knowledge had indirect effects through lower Honesty-Humility for both direct bullying \((B = -.015, SE = .007, \beta = -.043, 95\% CI [-.031, -.004])\) and indirect bullying \((B = -.033, SE = .010, \beta = -.067, 95\% CI [-.527, -.016])\).
Mesosystem. As predicted, there were several significant direct effects on bullying (see Table 2.3 and Figure 2.3). Lower Conscientiousness and lower Honesty-Humility had significant direct effects on both direct and indirect bullying, but indirect bullying was also associated with higher interpersonal influence. For the mesosystem with personality (see Table 2.3 and Figure 2.3), lower interpersonal influence, higher school discipline, and lower school competition were associated with higher Honesty-Humility and Agreeableness. Higher school discipline and lower school discipline were also associated with higher Conscientiousness.

As predicted, there were several significant indirect effects of the mesosystem variables on bullying through personality (see Figure 2.3). Higher interpersonal influence had an indirect effect through lower Honesty-Humility on higher indirect bullying ($B = .014, SE = .007, \beta = .032, 95\% CI [.002, .030]$). Higher school competition had an indirect effect through lower Honesty-Humility on both direct ($B = .014, SE = .008, \beta = .022, 95\% CI [.001, .034]$) and indirect ($B = .017, SE = .010, \beta = .023, 95\% CI [.003, .042]$) bullying. Higher school competition also had an indirect effect through lower Conscientiousness on both direct ($B = .013, SE = .007, \beta = .020, 95\% CI [.002, .031]$) and indirect ($B = .023, SE = .010, \beta = .032, 95\% CI [.008, .049]$) bullying. Finally, lower school discipline had an indirect effect through lower Honesty-Humility on both direct ($B = -.014, SE = .009, \beta = -.020, 95\% CI [-.036, -.001]$) and indirect ($B = -.018, SE = .010, \beta = -.021, 95\% CI [-.042, -.003]$) bullying. Lower school competition also had an indirect effect through lower Conscientiousness on both direct ($B = -.011, SE = .007, \beta = -.016,$
Table 2.3

System-Level Models: Direct Effects of Ecological, Personality, and Bullying Variables.

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<td>BullyNor</td>
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<td>0.06(.06)</td>
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<td>-0.13(.03)**</td>
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Note. N = 396; Gen = Gender; ParKno = Parental Knowledge; Friend Prob = Friends Problems; InterInfl = Interpersonal Influence; SchDisc = School Discipline; SchCom = School Competition; BullyNor = School Bullying Norms; SES = Socio-economic Status; Violence = Neighborhood Violence; H = Honesty-Humility; E = Emotionality; A = Agreeableness; C = Conscientiousness; Significant direct effects are bolded for ease of presentation.

*p < .05, **p < .01, ***p < .001.
Figure 2.2. Significant Direct and Indirect Paths for Microsystem-Level Model.

Note. N = 396; Significant direct effects are on the left and significant indirect effects are on the right. All paths, disturbances, and covariances were estimated; Only significant paths are shown for ease of presentation; No line indicates no significant path; For indirect effects, solid black lines indicate indirect effects through Honesty-Humility; Standardized direct path coefficients are presented; See in text for indirect path coefficients and confidence intervals.

Gender coded as 0 = Boy, 1 = Girl.
*p < .05, **p < .01, ***p < .001.
Figure 2.3. Significant Direct and Indirect Paths for Mesosystem-Level Model.
Note. N = 396; Significant direct effects are on the left and significant indirect effects are on the right. All paths, disturbances, and covariances were estimated; Only significant paths are shown for ease of presentation; No line indicates no significant path; For indirect effects, solid black lines indicate indirect effects through Honesty-Humility, solid grey lines indicate indirect effects through Conscientiousness; Standardized direct path coefficients are presented; See in text for indirect path coefficients and confidence intervals.
*p < .05, **p < .01, ***p < .001.
95% CI [-.032, -.002]) and indirect (B = -.021, SE = .011, β = -.025, 95% CI [-.051, -.005]) bullying.

Macrosystem. As predicted, there were several significant direct effects on bullying (see Table 2.3 and Figure 2.4). Lower Honesty-Humility had significant positive direct effects on both types of bullying, while lower Conscientiousness predicted direct bullying, and higher Emotionality predicted indirect bullying. For the macrosystem with personality (see Table 2.3 and Figure 2.4), lower neighborhood violence had direct effects on higher Honesty-Humility and Conscientiousness, while lower bullying norms had direct effects only on higher Honesty-Humility.

As predicted, there were several significant indirect effects of the macrosystem variables on bullying through personality (see Figure 2.4). Higher bullying norms had an indirect effect through lower Honesty-Humility on both direct (B = .003, SE = .002, β = .016, 95% CI [.001, .009]) and indirect (B = .007, SE = .003, β = .022, 95% CI [.001, .015]) bullying. Higher neighborhood violence had an indirect effect through lower Honesty-Humility on both direct (B = .015, SE = .007, β = .026, 95% CI [.005, .034]) and indirect bullying (B = .030, SE = .012, β = .036, 95% CI [.011, .060]). Finally, higher neighborhood violence an indirect effect through lower Conscientiousness on direct bullying (B = .014, SE = .007, β = .024, 95% CI [.004, .031]). In summary for the system-level models, there were significant indirect effects of environmental factors from all three systems primarily through lower Honesty-Humility for both direct and indirect bullying. However, indirect effects were found secondarily through lower Conscientiousness, although these effects were more frequent for direct than indirect bullying.
Figure 2.4. Significant Direct and Indirect Paths for Macrosystem-Level Model.

Note. N = 396; Significant direct effects are on the left and significant indirect effects are on the right. All paths, disturbances, and covariances were estimated; only significant paths are shown for ease of presentation; No line indicates no significant path; For indirect effects, solid black lines indicate indirect effects through Honesty-Humility, solid grey lines indicate indirect effects through Conscientiousness; Standardized direct path coefficients are presented; See in text for indirect path coefficients and confidence intervals.

*p < .05, **p < .01, ***p < .001.
Discussion

The purpose of conducting Study 1 was to investigate how risky social-ecological factors had direct and indirect (via antisocial personality) effects on two forms of adolescent bullying perpetration. Through comprehensive overall model and system-level models, I noted numerous direct and indirect effects of negative social ecology on bullying. However, I focused on the novel contribution of four antisocial traits in the contemporary HEXACO model of personality. As expected, my results highlight a complex pattern of relationships between risky environment, antisocial personality, and bullying behavior.

Direct Effects

As in previous studies (e.g., Book et al., 2012; Farrell et al., 2014), the direct effects demonstrated differential personality profiles that put adolescents at risk for bullying. Being predatory and exploitative (lower Honesty-Humility) appears to be the primary personality risk factor for both direct and indirect forms of bullying, but being reckless and impulsive (lower Conscientiousness) may be a secondary risk factor, in particular for direct bullying. This is in contrast to previous studies that found associations between general disagreeableness (i.e., lower Agreeableness; e.g., Tani et al., 2003) or a lack of empathy (i.e., lower Emotionality; Caravita, Di Blasio, & Salmivalli, 2008). Surprisingly, there was one positive direct effect between being emotional and indirect bullying. It is possible that tendencies to be anxious, fearful, sentimental and/or dependent on others may be risks for encouraging (or allowing) the use of peer-supported indirect social bullying to obtain social power. Overall, these personality-bullying direct effects support bullying as being a primarily proactive antisocial behavior, that is less
affiliated with reactive anger (Book et al., 2012; Volk et al., 2014), or a lack of empathy (Espelage, Hong, Kim, & Nan, 2017; Jordan, Amir, & Bloom, 2016).

Of some surprise were the lack of direct effects between the risky environmental variables and the two forms of bullying (see Figures 2.1-4), despite having significant univariate correlations (see Table 2.1). Researchers should be cautious about over-interpreting the direct effects of these variables as being isolated risk factors for bullying. Instead, it is evident in the pattern of data that these broader risk factors filter through (or lose variance to) more proximate risk factors, such as antisocial personality. This suggests the indirect effects demonstrate important advantages that future studies may want to continue exploring (Volk et al., 2017).

**Indirect Effects**

While the two sets of analyses yielded similar implications, there were some key differences that should be noted. The overall model analysis demonstrated most of the proximate, but no distal, ecological variables were risks for bullying through antisocial personality. However, when analyses were broken down into the three systems, broader variables, such as bullying norms and neighborhood violence, were significant risks for bullying through personality. While consistent with Bronfenbrenner’s (1979) view that proximate factors have the strongest influence on adolescents, the data suggest that for a comprehensive view of the complexity of the social ecology of bullying, both the overall model and the system-level models are needed. Moreover, both sets of analyses show how multiple systems have risks for bullying that filter through personality.

As with the direct effects, the indirect effects also suggest that a predatory, exploitative tendency is the most important and frequent personality risk factor for both
direct and indirect forms of bullying, and that risky environments primarily filter through this trait. Exploitative and manipulative adolescents may be more motivated to take advantage of negative social relationships and environments that facilitate bullying for immediate self-gain. For instance, lower parental knowledge (found in the microsystem model) may be irrelevant for students who are not motivated to exploit others, but highly relevant for adolescents who wish to exploit others and avoid parental sanctions (Farrell et al., 2017). Similarly, these types of adolescents may be willing to exploit friendship problems (found in overall model) by using bullying to solve them. In the mesosystem, only exploitative adolescents were likely to exploit their influence to dominate weaker peers. The results are consistent with previous studies on social power and status with bullying, which found youth with more peer social influence were able to strategically bully (e.g., Sentse et al., 2015), but tended to have higher friendship problems (e.g., Bollmer et al., 2005). These results are also in line with evolutionary frameworks that certain genetically based personality traits may be more likely to be triggered by particular environmental conditions (Del Giudice & Belsky, 2011), with some individuals strategically assessing their own personality traits, social relationships, and broader environments (Buss, 2011). For example, individuals exposed to harsh or adverse environments may be more likely to exploit others for short-term gain, as opposed to building longer-term social relationships due to future discounting (Hawley, 2011).

Likewise, at the level of the macrosystem, risky school and neighborhoods including higher bullying, competition, and violence norms may offer cultural values that encourage exploitation to strategically bully weaker peers for more immediate goals (Freeman et al., 2009; Loukas et al., 2006; Roseth et al., 2008; Volk et al. 2015). Higher
levels of perceived competition may be a risk as it demonstrates the presence of zero-sum resources such as limited economic (Elgar et al., 2013), academic, and/or social (Butler & Kedar, 1990) privileges that could be competed for. Although it is possible for adolescents with antisocial traits to perceive higher violence in their surrounding environments (e.g., Low & Espelage, 2014), my results still suggest that these perceptions are associated with predatory, exploitative traits that indirectly link them to both forms of bullying. These results are consistent with theoretical frameworks that perceiving harsh and unpredictable environments characterized by adverse social relationships and higher violence or inequality may motivate psychological mechanisms that trigger coercive strategies, such as bullying, for immediate rewards (Hawley, 2011).

If these coercive strategies have been associated with successful immediate resource acquisition within these adverse environments in previous experiences (e.g., Dawkins, 1989), then exploitative adolescents may continue to target vulnerable peers using similar bullying strategies instead of alternative prosocial strategies. In sum, my prediction that the exploitative trait (i.e., Honesty-Humility) would be the most prominent personality risk factor was supported by the data. Thus, while risky ecological factors matter, their influence may partly work through an individual’s tendency to exploit others. For those who are more cooperative, a competitive environment, a large amount of interpersonal influence, and/or a lack of parental knowledge may not lead to bullying because they are not personally motivated to exploit others in the first place.

Also as predicted, an impulsive personality style (i.e., lower Conscientiousness) was a secondary risk factor that filtered adverse environments, but more frequently for direct bullying than indirect bullying. The results agree with previous findings on direct
bullying (e.g., Farrell et al., 2014), and in particular for boys (e.g., Volk et al., 2016). Therefore, while bullying may be a proactive goal-oriented behavior, it is still a form of risky antisocial behavior, that may be associated with a general recklessness for consequences (Volk et al., 2014). For example, poorer parental relationships, competitive classroom climates, and violent communities may be risks that fail to provide the necessary social structures that would otherwise allow impulsive individuals to inhibit their direct bullying. These environments may also suggest a harsh and unpredictable environment, that may trigger risky or impulsive forms of behavior like bullying that could reap immediate, short-term benefits (Hawley, 2011). For indirect bullying, it appears that school structures in particular (i.e., discipline and competition) may be risks for impulsive adolescents to bully, knowing that there will be fewer consequences and sanctions from school administrators. Finally, it should be noted that the effect sizes between personality and bullying were relatively small. The effect sizes between Honesty-Humility and bullying, and the effect sizes between Conscientiousness and bullying were also relatively equal in size, which limits drawing conclusions of which trait has a stronger association with bullying. However, Honesty-Humility was the most frequent personality correlate of bullying across all analyses.

Surprisingly, I did not find being lower in empathy (i.e., lower Emotionality) or general anger (i.e., lower Agreeableness) to filter any of the risky environments. As discussed under the direct effects, these findings were in contrast to previous findings (e.g., Tani et al., 2003; Jordan et al., 2016), but support the view that bullying is a proactive rather than reactive or non-empathic behavior (Book et al., 2012). Moreover, it appears that risky environments are filtered primarily through predatory, exploitative
tendencies, while direct bullying is filtered additionally through reckless, impulsive
tendencies. Taken together, risky environments do not affect all adolescents the same
way, and instead antisocial personality traits may differentially filter these environments
to encourage either direct or indirect bullying.

Limitations

Although the results offer important ecological implications to adolescent
bullying, there are some important caveats. First, because the measures were self-report, I
cannot eliminate biases or social desirability due to shared-method variance (Volk, Dane,
Marini, & Vaillancourt, 2015). Future studies using multiple informants including self-
reports, peer-rated nominations, and third-party teacher or parent reports would give
additional validity (Volk et al., 2017). Despite these limitations, previous studies using
self-reports of bullying, personality, and the environmental variables used in the study
showed these measures can be externally valid (e.g., Book et al., 2012). By using scales
that have a high degree of reliability, counterbalancing the order of questionnaires, and
ensuring participant confidentiality, I can reduce the biases of self-report (Volk et al.,
2015a). In fact, all of the measures generally had high reliabilities. Two exceptions were
for the school bullying norms variable which had a low reliability, and the SES variable
where there was a small correlation between inequality and family socio-economic status.
The low reliability for bullying norms may be due to the small number of items capturing
a broad range of norms. For instance, three of the items captured joining the bullying
behavior, one item captured intervening, and another item captured seeking help
elsewhere. Also, the small correlation between inequality and family SES may be
because absolute levels of socio-economic status may not necessarily be related to higher
inequality, even if they both may share variance related to economic adversity. Thus, additional items capturing a broader range of bullying norms and additional items capturing economic adversity may increase the reliability of the measures. Nevertheless, when looking particularly at bullying perpetration, self-reports may provide good validity in an individual’s perceptions of goals and power imbalances (Volk et al., 2015a; 2017), especially under perceptions of particular environmental conditions.

Second, the measures of the mesosystem were proxies of this system in that they did not directly assess interactions among multiple forms of the microsystem. Instead, measures of differential aspects of the school climate that included items assessing interactions between teachers and parents (school discipline measure), among peers (interpersonal influence), and peers and teachers (school competition) were used. Therefore, in future studies, researchers may include measures that more directly assess the definition of the mesosystem (i.e., measures specific to teacher-parent interactions) to see if similar results can be replicated.

Third, the data was cross-sectional and concurrent, preventing me from drawing any causal conclusions. Perceptions of environment may influence personality and vice versa, as evident through previous gene-environment interactions (e.g., Moffitt, 2005). Thus, while I focused on personality as a filter for broader environmental data, it remains to be determined whether this is in fact a causal pathway (I suspect it is bidirectional). And while I chose to reflect the ecological systems model with wider environments encompassing proximate ones, future researchers could explore the direction of indirect effects using longitudinal data and/or experimental interventions.
Finally, some of the personality and environmental characteristics may be sample specific. The sample came from extracurricular activities that emphasize group cohesion and hard work. Youth who are more reckless, angry, lower in empathy, and exploitative may be less likely to join such clubs, preventing us from capturing the full lower range of these traits. For example, the sample’s mean Conscientiousness score was higher than general trends for this age group (Ashton & Lee, 2016). Nevertheless, these traits were normally distributed in the sample. Similarly, the participants were predominately White and middle-class. While there was a modest range of SES and neighborhood violence, it is likely that I did not capture the full range of these variables. Thus, I caution the generalization of my results to extreme samples (e.g., psychopathic personality traits or extremely violent neighborhoods).

**Practice Implications and Conclusions**

Yet, in spite of these limitations, the findings demonstrate the ecological complexity and heterogeneity of adolescent bullying perpetration. Researchers, practitioners, policy makers, teachers, and school administrators should recognize that both proximate and distal ecological factors affect adolescent decision-making, and ultimately their bullying perpetration (Huang, Hong, & Espelage, 2013; Maton, 2000). And while adverse social relationships, school climates, and neighborhood variables may facilitate bullying, they may do so specifically for particular adolescents. That is, my results highlight the risks of exploitative and impulsive personality traits as they differentially filter adverse social environments to facilitate direct and indirect bullying.

Given that the context of each bullying incident is unique, stakeholders should be aware of the environmental conditions within a given institution, and make adjustments
according to the specific individuals involved (Elsaesser et al., 2016; Hong, Cho, Allen-Meares, & Espelage, 2011; Yeager, Fong, Lee & Espelage, 2015). The goodness of fit between the target ecological variables and the adolescents involved will determine what initiatives are effective (Huang et al., 2013). While it may be important for professionals who work with youth to intervene at each risk factor across the ecological levels (e.g., focusing only on either parent-child relationships or school disciplinary practices), it is important to recognize the indirect effects suggest that interventions will be most effective when they also cut across levels and/or include considerations of individual personality traits (Voisin, Patel, Hong, Takahashi, & Gaylord-Harden, 2016).

For instance, schools may want to work with, rather than against, personality predispositions by providing prosocial alternatives for exploitative adolescents to obtain resources, such as gaining status through extracurricular activities and sports (Ellis, Volk, Gonzalez, & Embry, 2015). Likewise, schools and neighborhoods may want to increase positive, organized, and harmonious institutional social structures, in addition to promoting individual prudence and diligence. This way, environmental risk factors (e.g., school competition, neighborhood violence) can be targeted through the traits in which they may be filtered (i.e., exploitation/impulsiveness). Ultimately, intervention practices should be based on an understanding of the numerous mechanisms behind individuals and environments that influence adolescent behavior (Hong et al., 2011). Continued research and practices that expand and reflect our understanding of the interplay between social ecology, personality, and individual bullying are strongly encouraged.
References


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CHAPTER 3: STUDY 2

Is Exploitation or Empathy Important for Adolescent Bullying? A Longitudinal Social-Ecological Investigation

Bullying may be used adaptively to intentionally harm weaker targets to obtain material resources like money or electronics, social dominance and popularity, and/or access to romantic partners (Volk, Dane, & Marini, 2014). There are many individual and environmental contexts that can influence the power imbalance associated with bullying (Hong & Espelage, 2012). According to the ecological systems theory (EST; Bronfenbrenner, 1979), multiple nested ecological systems directly and indirectly influence social development and behavior. In fact, several researchers have found interactions among personality traits and social environments to predict bullying perpetration (e.g., Barboza et al., 2009; Lee, 2009; Low & Espelage, 2014). For example, cognitive empathy (i.e., recognizing emotions in others) interacted with popularity such that adolescent girls higher in cognitive empathy had higher levels of bullying perpetration, but only if they were popular (Caravita, Di Blasio, & Salmivalli, 2009). In

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2 A version of this chapter is under review for publication. Farrell, A. H., Volk, A. A., & Vaillancourt, T. (under review). Is exploitation or empathy important for adolescent bullying? A longitudinal social-ecological investigation.

3 The data used for this study came from the McMaster Teen Study. The McMaster Teen Study is supported by grants awarded to Dr. Tracy Vaillancourt from the Canadian Institutes of Health Research, the Social Sciences and Humanities Research Council of Canada, and the Ontario Mental Health Foundation.
Study 1, I found that exploitation interacted with adverse parenting, school, and neighborhood environments, such that these environments were indirectly associated with higher bullying perpetration through higher levels of an exploitative personality trait. Thus, higher social status and adverse school and family environments may interact with empathic and/or exploitative traits to facilitate bullying perpetration.

Developmental cascade models are an ideal method of capturing multiple domains that impact youth development (Masten & Chicchetti, 2010; Vaillancourt, Brittain, McDougall, & Duku, 2013). These models reveal whether each domain spreads its effects across other domains, and whether these effects occur over time. Accordingly, developmental cascade models naturally fit with the EST framework. Despite these benefits, few researchers have actually used cascade models to investigate bullying perpetration. Therefore, I expanded on Study 1 in Study 2 by examining the simultaneous and longitudinal associations between personality and social environments that are linked with adolescent bullying using cascade models.

**Personality and Bullying: Empathy versus Exploitation**

The innermost system of the EST is the microsystem, which includes the individual’s characteristics and their most proximate social environments (Bronfenbrenner, 1979; Hong & Espelage, 2012). Rooted in genotypic variations, personality is a basic individual characteristic within the microsystem that can influence how adolescents experience and respond to the environment (Moffitt, 2005). Although predominately stable, personality traits can still be shaped by normative life-course related events, such as adapting to new social environments (McCrae et al., 2000). Empathy is one form of individual difference that has been studied often with bullying
among children. Empathy is comprised of two components: cognitive and affective. Cognitive empathy includes the skill to recognize the emotional state of others, and affective empathy includes the ability to feel the emotional state of others (Caravita et al., 2009). Previously, lower levels of both forms of empathy predicted higher bullying perpetration in the majority of these studies (e.g., Jolliffe & Farrington, 2006; Zych, Ttofi, & Farrington, 2016). These findings portray children who bully as having a lack of remorse or understanding of the harm inflicted on targets. Despite these associations, bullying interventions aimed at increasing empathy were largely ineffective among adolescents, despite being somewhat effective for younger children (Yeager, Fong, Lee, & Espelage, 2015). Given that these interventions were effective for children, lower empathy may be an important reason why younger children bully. However, ineffectiveness of empathy related interventions for adolescents suggests that these interventions either do not work, or empathy may not be the primary reason why older adolescents bully. Adolescents who bully may not necessarily have lower emotional sensitivity to others, but instead are unconcerned for others (see Jordan, Amir, & Bloom, 2016, for a discussion of the difference between empathy and concern). These adolescents may be also intentionally using bullying as a strategic tool to obtain adaptive resources (Pronk et al., 2017; Vaillancourt, McDougall, Hymel, & Sunderani, 2010; Volk et al., 2014; Yeager et al., 2015). As a result, personality traits that target strategic exploitation may be more relevant correlates of adolescent bullying.

Cross-sectional studies using the HEXACO personality model (Lee & Ashton, 2004), found that being lower in a trait called Honesty-Humility (i.e., being intentionally exploitative) predicted adolescent bullying perpetration (Book, Volk, & Hosker, 2012;
Farrell, Della Cioppa, Book, & Volk, 2014). This personality trait has also indirectly linked and/or interacted with bullying and various social environments, including parenting (e.g., Farrell, Provenzano, Dane, Marini, & Volk, 2017) and (in Study 1) school climate, interpersonal influence, and exposure to neighborhood violence. Researchers have also used the exploitative subscale of Narcissism measures and found a positive association with both bullying (e.g., Ang, Ong, Lim, & Lim, 2010) and recognition for negative emotions (Konrath, Corneille, Bushman, & Luminet, 2013). Despite these concurrent associations, few researchers have explored these links longitudinally.

The limited existing longitudinal studies have investigated bullying with a composite Narcissism scale, which includes both exploitative tendencies and perceptions of superiority (Ang et al., 2010). Baseline Narcissism predicted higher, more stable long-term bullying perpetration during early adolescence (Fanti & Henrich, 2015; Fanti & Kimonis, 2012). Similarly, across three years from late childhood to early adolescence, boys who were higher on Narcissism only had higher social dominance if they were also higher on bullying perpetration (Reijntjes et al., 2016). Accordingly, exploitative individuals may be cognizant of the weaknesses among their peers, and take advantage of these weaknesses via bullying to secure their own social resources. These studies demonstrate the necessity for longitudinal ecological models that incorporate personality, in particular the role of exploitation in comparison to the role of empathic concern, along with broader social environments.

**Environmental Ecology of Bullying: Family, Peers, and School**

Personality traits do not operate in isolation. Rather, they interact with proximate and distal social environments to influence behavior (Bronfenbrenner, 1979). The family
context is the primary social environment that a child can experience in the microsystem (Hong & Espelage, 2012). In both concurrent (e.g., Merrin, Espelage, & Hong, 2016), and longitudinal studies (e.g. Espelage, Low, Rao, Hong, & Little, 2014; Kretschmer, Veenstra, Dekovic, & Oldehinkel, 2017), researchers have found that adverse family relations were associated with higher bullying perpetration. In two concurrent studies, the association between parenting and bullying was found to be both moderated (Farrell et al., 2017), and indirectly associated with an exploitative personality trait (i.e., in Study 1). For example, being more exploitative was associated with higher bullying at lower, but not higher, levels of parental knowledge (Farrell et al., 2017). Thus, the association between family functioning and exploitative traits should be investigated longitudinally across adolescence. Adverse family relationships may not only model the legitimacy of bullying behavior within social relationships, but also indicate a lack of any parental repercussions after using bullying. Exploitative adolescents may especially be willing to take advantage of this adverse relationship. Although it is most often evident that family functioning can be an antecedent of bullying, it is also possible that family functioning can be an outcome of bullying. In one study, trajectories of moderate levels of bullying across middle to high school predicted long-term negative family interactions (Espelage, Van Ryzin, & Holt, 2017). It is possible that in families where bullying is not tolerated, bullying may create strained relationships with parents. Alternatively, adolescents who bully may in general not get along with their parents, who may also utilize bullying behavior. Similar bi-directional associations are evident for bullying and social status.

As adolescents become increasingly independent from parents, they become more integrated within their peer networks (Harris, 1995), which is another important
component of the microsystem that can influence bullying (Volk et al., 2016). Within these peer networks, there are often hierarchies with adolescents at the top of the hierarchy having the most social dominance, influence, and resources (Garandeau, Lee, & Salmivalli, 2013; Pellegrini & Long, 2002). However, it is important to distinguish social status from social preference. Higher levels of social status often coincide with higher levels of popularity, but these socially powerful adolescents are not necessarily liked or preferred as friends by their peers (Pronk et al., 2017; Reijntjes et al., 2018; Vaillancourt & Hymel, 2006). Several researchers have demonstrated that while individuals who bully are often higher in peer-perceived popularity (i.e., seen as popular and powerful; Cillessen & Mayeux, 2004; Parkhurst & Hopmeyer, 1998; Vaillancourt, Hymel, & McDougall, 2003), these individuals were lower in social preference (i.e., liked by peers; Cillessen & Mayeux, 2004; Coie, Dodge, & Coppotelli, 1982; Vaillancourt & Hymel, 2006; Vaillancourt et al., 2003). For example, researchers have found that perpetrators ranked highest in popularity across both Western and Eastern cultures (Pronk et al., 2017). Likewise, longitudinal increases in bullying have previously been associated with higher teacher-reported social dominance (Reijntjes et al., 2013), and higher perceived popularity, but not social preference (e.g., Sentse et al., 2015a; Sijtsema, Veenstra, Lindenberg, & Salmivalli, 2009). Finally, higher self-reported interpersonal influence also had indirect concurrent associations with bullying through lower Honesty-Humility in Study 1, underlining the need for investigating these bi-directional associations longitudinally. Although bullying may be ineffective for being liked by peers, bullying appears to be effective for obtaining social power (Vaillancourt et al. 2003), in particular
for individuals willing to exploit their high social status. These bi-directional associations are also demonstrated in the broader school environment.

Each component of the school environment can be a part of the microsystem (e.g., peer relationships, teacher-student relationships), and these components can interact to influence bullying perpetration within the broader school climate. Accordingly, the school climate can be classified as part of the mesosystem, which is the next level of the EST and encompasses all previous microsystem variables and the interactions between the microsystem variables (Hong & Espelage, 2012). Previously, higher levels of classroom bullying were concurrently associated with adverse school environments, in particular for adolescents in comparison to younger children (Lee, 2011; Salmivalli & Voeten, 2004). Negative school climates characterized by higher bullying norms and a poorer sense of cohesion, bonding, and community may foster competition that reinforces the legitimacy of bullying as a strategic tool (Sentse, Veenstra, Kiuru, & Salmivalli, 2015). Bullying has been shown to be tolerated by peers with higher social status in classrooms with higher bullying norms (Dijkstra et al., 2008; Sentse et al., 2015b). The reverse association has also been found, with a trajectory of moderate levels of bullying predicting lower long-term school belonging (Espelage, Hong, Kim, & Nan, 2017). However, in this study, a trajectory of high levels of bullying was associated with higher long-term school belonging, suggesting that some adolescents who bully may have closely aligned peers. This may be indicative of exploitative adolescents who are strategically able to form allies or followers, and supports the notion that bullying can be used as a form of power among peers at school (Vaillancourt et al., 2003; 2010).
These studies indicate that distal mesosystem environments may have bi-directional associations with multiple ecological variables to encourage bullying perpetration. In particular, these environments may have associations with more proximate microsystem environments and individual traits. As a result, these broader social environments may work indirectly through proximate personality traits to facilitate adaptive adolescent bullying that can maximize benefits and minimize costs over time.

**Current Study**

Given the lack of studies that simultaneously determine the role of empathy and exploitative personality traits with broader social environments, the purpose of conducting Study 2 was to explore the bi-directional associations of these ecological variables in a multi-informant, longitudinal sample of adolescents. The first goal was to explore the associations between personality and bullying during the first three years of high school (Grades 9, 10, and 11 in Ontario, Canada). These grades coincide with the developmental period when bullying may become more strategic with respect to social status (e.g., Volk et al., 2014; Yeager et al., 2015), providing an optimal period to explore the role of empathic concern in comparison to exploitation. I predicted that exploitation, but not empathy, would be associated with long-term bullying. The second goal was to investigate whether the personality trait that was associated with long-term bullying (i.e., empathic concern and/or exploitation), had associations with broader social-ecological variables (i.e., family functioning, self-perceived social status, school bonding) to indirectly facilitate long-term bullying perpetration. I predicted that the three social variables would be indirectly associated with long-term bullying through exploitation. Finally, I investigated whether gender would moderate these associations. Bullying
perpetration has been shown to be higher among boys than among girls (Kretschmer et al., 2017; Merrin et al., 2016). However, there have been mixed findings for the association between social status and gender depending on the variable measured (e.g., higher popularity, social preference, and power for boys who use physical aggression, but higher perceived popularity only for girls who use relational aggression; Vaillancourt & Hymel, 2006). I examined whether gender would moderate the association between self-perceived social status and a global, overall bullying.

Method

Participants

Participants were from an on-going longitudinal study on bullying, mental health, and academic achievement called the McMaster Teen Study. After receiving school board approval, 51 randomly selected primary schools in a southern Ontario school district were contacted to participate in the study in the spring of 2008. An estimated yearly household income was estimated by parents, with the median of $70,000-$80,000 at Time 1. This median income was similar to that of the city of recruitment ($76,222) and province ($70,910; http://statscan.gc.ca). At Time 1, participants were in Grade 5, and participants have been followed annually until Time 11, with data collection still on-going (see Vaillancourt et al., 2013 for a more detailed description of recruitment). For the longitudinal study, 875 students (78%) agreed to participate (mean age 10.91 years at Time 1 \([SD = .36]\)), and 80.6% \((n = 703)\) participated in at least one of the annual follow-ups from Time 2 to Time 8. To be included in the current study, participants had to have participated in at least one time point in Time 5 (Grade 9), Time 6 (Grade 10), or Time 7 (Grade 11), for a final sample of 560 participants (Boys = 252, Girls = 308; Time 5 \(n =\)
524; Time 6 \( n = 504 \); Time 7 \( n = 470 \). Of this final sample, 76.3% completed all three time points, 15.0% completed two time points, and 8.8% completed one time point. The ethnicity of the final sample was primarily White (Caucasian; 64.3%), with fewer African/West-Indian-Canadian (Black; 3.0%), Asian-Canadian (4.1%), and Other (7.0%). The remaining participants did not report an ethnicity (21.6%).

**Procedure**

Every year, parents were asked to provide written consent and adolescents were asked to provide written assent. Parents completed the measures over phone interview or via paper and pencil and students completed the measures on-line or on paper and pencil via prepaid mail. The study received ethics clearance from the school board and the associated university ethics councils.

**Measures**

**Bullying.** Bullying perpetration was measured using the self-reported five-item Vaillancourt and Hymel Bullying Involvement Questionnaire (VHBIQ; Vaillancourt et al., 2010a; Vaillancourt et al., 2010b). A sample item includes, “Since the start of the school year (September), how often have you physically bullied others by hitting, kicking, shoving, etc.? during the past 3 months?” Each item measured a different form of bullying, such as physical (e.g., hitting, shoving, kicking, spitting or beating up others), verbal (name calling, mocking, hurtful teasing, verbally threatening), social (e.g., excluding others from groups, gossiping or spreading rumors about others), and cyber (using computer or e-mail messages or pictures to hurt someone’s feelings). Items were rated on a five-point Likert scale (0 = *not at all* and 4 = *many times a week*). Items were
averaged to create a composite, with higher scores indicating higher bullying perpetration. The alphas were .77 in Grade 9, .77 in Grade 10, and .81 in Grade 11.

**Empathy.** Empathy was measured with an adapted seven-item version of the empathic concern subscale of the Interpersonal Reactivity Index self-report (Davis, 1980) in Grades 9 and 10. Items were rated on a five-point Likert scale (0 = *not at all like me* and 4 = *always like me*). A sample item includes, “Sometimes I feel very sorry for other people when they are having problems.” There were no reverse-keyed items, and therefore all items were averaged to create a composite, with higher scores indicating higher empathy. The alphas were .87 in Grade 9 and .86 in Grade 10.

**Exploitation.** Exploitation was measured through a six-item self-report from the exploitativeness subscale of the Narcissistic Personality Questionnaire-Revised (Ang & Raine, 2009). Participants were asked to rate on a five-point Likert scale (0 = *not at all like me* and 4 = *completely like me*). A sample item includes, “I am good at getting people to do things my way.” There were no reverse-keyed items, and therefore all items were averaged to create a composite, with higher scores indicating higher exploitativeness. The alphas were .78 in Grade 9, .78 in Grade 10, and .78 in Grade 11.

**Family Functioning.** Overall family functioning was assessed through a six-item Family Functioning subscale of the Brief Child and Family Phone Interview (BCFPI-3; Cunningham, Pettingill, & Boyle, 2000) completed by parents. Parents responded on a four-point Likert scale (1 = *strongly disagree* and 4 = *strongly agree*). A sample item includes, “We express feelings to each other.” Items were averaged to create a composite with higher scores reflecting higher family functioning (i.e., higher communication,
support, attachment, general relationships, and problem solving within the family). The alphas were .83 in Grade 9, .81 in Grade 10, and .86 in Grade 11.

**Self-Perceived Social Status.** Social status was assessed through self-reports with three items including, “I am well liked by other students in my high school,” “I am popular in my high school,” and “I am someone with a lot of friends in my high school.” Items were answered on a five-point Likert scale (0 = *not at all true about me* and 4 = *very true about me*). Items were averaged to create a composite, with higher scores indicating higher self-perceived social status. The alphas were .87 in Grade 9, .84 in Grade 10, and .88 in Grade 11.

**School Bonding.** School bonding was assessed through an eight-item self-report of the School Bonding subscale of the People in My Life Scale Questionnaire (RLPQ; Cook, Greenberg, & Kusche, 1995; Murray & Greenberg, 2006). Items were rated on a four-point Likert scale (0 = *almost never or never true* and 3 = *almost always or always true*). A sample item includes, “Most mornings I look forward to going to school.” Items were averaged to create a composite, with higher scores indicating higher school bonding. The alphas were .84 in Grade 9, .85 in Grade 10, and .84 in Grade 11.

**Data Analyses**

**Preliminary Analyses.** Prior to conducting the primary analyses, data were screened for missing data and assumptions using SPSS 24 software. Three MANOVAs were used to test for significant differences in participants who completed all three waves, two waves, and one wave on all study variables (i.e., one MANOVA per wave). There were no significant differences among the three groups at Time 5, \( \lambda = .958, F (12, 888) = 1.60, p = .085, \eta^2 = .021 \), Time 6, \( \lambda = .974, F (12, 808) = 0.91, p = .538, \eta^2 = .013 \),
and Time 7, $\lambda = .982$, $F (10, 812) = 0.74$, $p = .682$, $\eta^2 = .009$. The average missing data within a wave for the study variables was 7.81%. For univariate assumptions, bullying was positively skewed and leptokurtic. All univariate outliers were Winsorized to preserve rank-order, but reduce impact (Tabachnick & Fidell, 2013). Winsorizing outliers reduced skewness and kurtosis values within acceptable limits for path analyses (Kline, 2016).

**Statistical Modeling.** Primary analyses were conducted using MPlus version 7.4 (Muthén & Muthén, 1998-2017). All analyses were conducted using Maximum Likelihood Robust (MLR) estimation to circumvent non-normality. First in the Personality Models, the associations between exploitation, empathy, and bullying were assessed via path analyses to determine which personality traits in Grade 9 and Grade 10 had long-term direct and indirect effects on Grade 11 bullying perpetration. Second, in the Ecological Models, path analyses were explored with bullying, the environment variables (self-perceived social status, family functioning, school bonding), and the significant personality trait from the Personality Models (i.e., exploitation and/or empathy) across Grades 9, 10, and 11.

Both sets of path analyses were investigated through a series of nested models following the procedures by Vaillancourt et al. (2013). In Model 1, within time covariance terms between study variables were assessed (e.g., Grade 9 exploitation with Grade 9 empathy and Grade 9 bullying). In Model 2, auto-regressive stability paths were added between repeated measures (including both lag-1 and lag-2 paths; e.g., Grade 9 bullying to Grade 10 bullying; Grade 9 bullying to Grade 11 bullying). In Model 3, cross-lagged paths were added between study variables at adjacent time points (e.g., Grade 9
exploitation to grade 10 bullying). The best fitting model was identified as the final model. Model fit was assessed using criteria of the comparative fit index (CFI) ≥ .95, root-mean-square error of approximation (RMSEA) ≤ .06, and standardized root mean square residual (SRMR) ≤ .08, (Browne & Cudeck, 1993; Hu & Bentler, 1999; Kline, 2016). Although the $\chi^2$ test of significance is highly sensitive to large sample sizes (Kline, 2016), it was used to compare nested models. For non-nested models, the AIC was used where lower values with a change > 10 represented a significantly better fitting model (Kline, 2016). Full Information Maximum Likelihood (FIML) estimation was used to handle missing data to allow for using any available data points (Schafer & Graham, 2002).

For the best fitting model, tests of indirect effects were conducted for any pathways that involved three or more significant time periods involving significant cross-lagged paths (Vaillancourt et al., 2013). Significant indirect effects were estimated with 95% bias-corrected confidence intervals with 10,000 bootstrapped samples using Maximum Likelihood (ML) estimation. Confidence Intervals that did not cross over zero were determined to be significant (Shrout & Bolger, 2002). Next, given that bullying perpetration has previously been higher in boys than girls (e.g., Kretschmer et al., 2017; Merrin et al., 2016), and the mixed findings between bullying and social status (e.g., Vaillancourt & Hymel, 2006), gender differences in the cross-lagged paths were tested in a multi-group analysis similar to the procedures by Vaillancourt et al. (2013). Model 4 was an unconstrained model, where all parameters from Model 3 were allowed to vary. In Model 5, cross-lagged paths were constrained to be equal across gender. If there was no significant change after the constraints, it was assumed that the model did not vary across
gender. Finally, in Model 6, the effect of socio-economic status (i.e., household income) was examined as a control variable.

**Results**

**Descriptive Statistics and Bivariate Correlations**

Means, standard deviations, range of values, and gender differences of all study variables are in Table 3.1. A MANOVA testing for sex differences in study variables was significant, $\lambda = .770, F (17, 321) = 5.63, p < .001, \eta^2 = .230$. Girls were higher in empathy in Grade 9 and 10 than boys, and boys were higher in exploitation in both of these grades than girls. Boys also reported higher self-perceived social status at all grades, and higher Grade 10 school bonding in comparison to girls. There were no gender differences for family functioning or bullying.

Bivariate correlations are presented in Table 3.2. Within time, bullying was significantly positively correlated with exploitation and negatively with empathy, school bonding, and family functioning with the exception of Grade 9 bullying and Grade 9 family functioning. In addition, in Grade 9, empathy was significantly negatively correlated with exploitation and positively correlated with school bonding and family functioning, but in Grade 10 was only positively correlated with school bonding. Within all years, exploitation was positively correlated with social status. School bonding was also positively associated with social status in all years. Across time, bullying was significantly positively correlated with exploitation, and negatively correlated with empathy and school bonding, with the exception of Grade 9 empathy and Grade 11 bullying. Across time, social status was also significantly positively associated with exploitation and school bonding. Finally, Grade 9 empathy was significantly positively
correlated with Grade 10 family functioning, and Grade 9 school bonding was significantly positively correlated with Grade 11 family functioning.

**Nested Model Comparisons: Personality Models**

Because empathy was only measured in Grades 9 and 10, only Grade 9 and Grade 10 exploitation were entered in the Personality Models for consistency. However, Grade 11 bullying was still entered in the personality model to see whether early personality predicted later bullying. Fit indices and model comparisons are presented in Table 3.3. For the Personality Models, Model 1 (covariance), which included only the within time covariance terms had poor fit, CFI = 0.102, RMSEA = 0.280, and SRMR = 0.243. Model 2 (autoregressive), which included within time covariance and across time autoregressive paths had significant improvement in fit, $\chi^2_{\text{diff}(7)} = 488.396$, $p < .001$, and had good fit, CFI = 0.986, RMSEA = 0.047, and SRMR = 0.037. Model 3 (cross-lagged, full model), which included within time covariance, autoregressive paths, and cross-lagged paths, had significant improvement in fit, $\chi^2_{\text{diff}(6)} = 14.153$, $p < .05$, and had excellent fit, CFI = 0.999, RMSEA = 0.027, and SRMR = 0.007. Therefore, Model 3 was chosen as the final Personality Model (see Figure 3.1). A multi-group analysis was then conducted on Model 3 to compare gender differences in an unconstrained model (Model 4) when all parameters from Model 3 were allowed to vary to a constrained model (Model 5) when cross-lagged paths were constrained to be equal across the two genders. Model 4 had a good fit, CFI = 0.988, RMSEA = 0.086, and SRMR = 0.016, as did Model 5, CFI = 0.981, RMSEA = 0.063, and SRMR = 0.043. However, there was no significant difference between the two models, indicating that cross-lagged paths did not differ across gender, $\chi^2_{\text{diff}(8)} = 13.2955$, $p > .05$. Finally, to control for the effects of Grade 9
Table 3.1

*Descriptive Statistics for Study Variables in Total and by Gender*

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*Note. N = 560.*

**p < .01. ***p < .001.
Table 3.2

Bivariate Correlations for Study Variables

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Note. N = 560.

**p < .01. ***p < .001.
Table 3.3

Model fit Statistics for Personality Models and Ecological Models

<table>
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<tr>
<th>Fit Indices</th>
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<td>df</td>
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<td>RMSEA</td>
<td>SRMR</td>
<td>AIC</td>
<td>vs.</td>
<td>cd</td>
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<tr>
<td>1. Covariance</td>
<td>15</td>
<td>640.909</td>
<td>1.360</td>
<td>0.102</td>
<td>0.280</td>
<td>0.243</td>
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<td>8</td>
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<td>1.020</td>
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<td>0.047</td>
<td>0.037</td>
<td>3915.856</td>
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<td>2.778</td>
<td>0.807</td>
<td>0.999</td>
<td>0.027</td>
<td>0.007</td>
<td>3912.424</td>
<td>3 vs. 2</td>
<td>1.090</td>
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<td>4. Model 3 Unconstrained across sex</td>
<td>4</td>
<td>11.829</td>
<td>0.852</td>
<td>0.988</td>
<td>0.086</td>
<td>0.016</td>
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<td>vs.</td>
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<td>3829.621</td>
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<td>0.990</td>
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<td>vs.</td>
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<td>0.042</td>
<td>9295.649</td>
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<td>1.000</td>
<td>0.000</td>
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<td>0.019</td>
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<td>vs.</td>
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<td>101.129</td>
<td>1.026</td>
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<td>0.038</td>
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<td>5 vs. 4</td>
<td>1.048</td>
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<tr>
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<td>30</td>
<td>35.133</td>
<td>1.059</td>
<td>0.998</td>
<td>0.017</td>
<td>0.017</td>
<td>11466.993</td>
<td>vs.</td>
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Note. Bolded model is the final model; c weighting constant for computing chi-square under MLR; CFI = Comparative Fit Index; RMSEA = Root Mean Square of Approximation; SRMR = Standardized Root Mean Square Residual; AIC = Akaike Information Criterion; cd weighting constant for comparing difference in chi-square values using MLR.
Figure 3.1. Final Personality Model.

Note. Values represent standardized coefficients which are statistically significant at the $p < .05$ level. Standard errors are presented in parentheses. Solid lines represent significant direct paths; Dashed lines represent significant indirect pathways including at least one cascade effect; Non-significant parameters are not displayed for ease of presentation.
socio-economic status, household income was added to Model 3, and was allowed to correlate with all Grade 9 variables to form Model 6 (control model). Model 6 had good fit, similar to Model 3. However, the AIC in Model 3 (3912.424) was lower than the AIC in Model 6 (6078.44), indicating the Model 3 without the control variable had significantly better fit. Therefore, Model 3 was chosen as the final Personality Model.

**Direct paths in final model.** Across each time point, bullying was concurrently related with exploitation ($r = .19, .12$) and empathy ($r = -.15, -.13$). Exploitation and empathy were correlated in Grade 9 ($r = -.11$). Exploitation, empathy, and bullying were all stable across time, and Grade 10 exploitation significantly predicted Grade 11 bullying.

**Indirect paths in final model.** Indirect pathways including three time points and at least one significant cross-lagged path were tested for significance. As predicted, bootstrapped confidence intervals indicated that higher Grade 9 exploitation significantly predicted higher Grade 10 exploitation, which in turn significantly predicted higher Grade 11 bullying ($B = .032, SE = .009, \beta = .096, 95\% CI [.015, .051])$.

**Nested Model Comparisons: Ecological Models**

Given that exploitation was longitudinally associated with bullying in the final Personality Model, exploitation was used instead of empathy as the personality trait in the Ecological Models. Since exploitation data were available from Grades 9 to 11, three waves were examined for all variables in the Ecological Models. Fit indices and model comparisons are presented in Table 3.3. For the Ecological Models, Model 1 (covariance), which included only the within time covariance terms had poor fit, $CFI = 0.193, RMSEA = 0.209, and SRMR = 0.226$. Model 2 (autoregressive), which included
within time covariance and across time autoregressive paths had significant improvement in fit, \( \chi^2_{\text{diff}(15)} = 7422.134, p < .001 \), and had good fit, CFI = 0.994, RMSEA = 0.020, and SRMR = 0.042. Model 3 (cross-lagged, full model), which included within time covariance, autoregressive paths, and cross-lagged paths, had significant improvement in fit, \( \chi^2_{\text{diff}(40)} = 60.195, p < .05 \), and had good fit, CFI = 1.000, RMSEA = 0.000, and SRMR = 0.008. Therefore, Model 3 was chosen as the final Ecological Model (see Figure 3.2). A multi-group analysis was then conducted on Model 3 to compare gender differences in an unconstrained model (Model 4) when all parameters from Model 3 were allowed to vary to a constrained model (Model 5) when cross-lagged paths were constrained to be equal across the two genders. Model 4 had a good fit, CFI = 0.994, RMSEA = 0.034, and SRMR = 0.019, as did Model 5, CFI = 0.990, RMSEA = 0.031, and SRMR = 0.038. However, there was no significant difference between the two models, indicating cross-lagged paths did not differ across gender, \( \chi^2_{\text{diff}(40)} = 48.609, p > .05 \). Finally, to control for the effects of Grade 9 socio-economic status, household income was added to Model 3, and was allowed to correlate with all Grade 9 variables to form Model 6 (control model). Model 6 had good fit, similar to Model 3. However, the AIC in Model 3 (9309.376) was lower than the AIC in Model 6 (11466.993), indicating the Model 3 without the control variable had significantly better fit. Therefore, Model 3 was chosen as the final Personality and Environment Model.

**Direct paths in final model.** Across each time point, bullying was concurrently related with exploitation \((r = .19, .11, \text{ and } .17)\), but only at Grade 9 and 10 with school bonding \((r = -.21, -.19)\). Exploitation and social status were concurrently related in Grade 9 and 10 \((r = .22, .11)\). Across each time point, social status was concurrently related with
Figure 3.2. Final Ecological Model.

Note. Values represent standardized coefficients which are statistically significant at the $p < .05$ level. Standard errors are presented in parentheses. Solid lines represent significant direct paths; Dashed lines represent significant indirect pathways including at least one cascade effect; Non-significant parameters are not displayed for ease of presentation. Social Status = Self-Perceived Social Status; School = School Bonding; Family = Family Functioning.
school bonding ($r = .43, .43, \text{ and } .34$). Exploitation and family functioning were concurrently related in Grade 11 ($r = .11$). Bullying, exploitation, social status, school bonding, and family functioning were all stable across time. However, there was a significant positive cross-lagged effect from Grade 9 social status to Grade 10 exploitation and a negative cross-lagged effect from Grade 9 school bonding to Grade 10 social status. There was also a positive cross-lagged effect between Grade 10 exploitation and Grade 11 bullying, and between Grade 10 family functioning and Grade 11 exploitation.

**Indirect paths in final model.** Indirect pathways including three time points and at least one cross-lagged path were tested for significance. As predicted, bootstrapped confidence intervals showed two significant indirect effects that were central to the research questions on exploitation, bullying, and the broader social ecology. Higher Grade 9 exploitation predicted significantly higher Grade 10 exploitation, which in turn, predicted significantly higher Grade 11 bullying ($B = .027, SE = .008, \beta = .081, 95\% CI [.011, .044]$). Higher Grade 9 social status significantly predicted higher Grade 10 exploitation, which in turn predicted significantly higher Grade 11 bullying ($B = .001, SE = .001, \beta = .016, 95\% CI [.002, .010]$). There were several additional significant indirect effects not central to the research questions, but still involved exploitation, bullying and/or the broader social ecology. Grade 9 social status significantly predicted higher Grade 10 exploitation, which in turn predicted significantly higher Grade 11 exploitation ($B = .053, SE = .018, \beta = .060, 95\% CI [.020, .091]$). Grade 9 family functioning significantly predicted higher grade 10 family functioning, which in turn predicted significantly higher Grade 11 exploitation ($B = .107, SE = .051, \beta = .052, 95\% CI [.011,
Finally, Grade 9 school bonding significantly predicted higher Grade 10 social status, which in turn predicted significantly higher Grade 11 social status ($B = -0.079$, $SE = 0.038$, $\beta = -0.048$, 95% CI $[-0.156, -0.006]$).

**Discussion**

The purpose of conducting Study 2 was to examine whether exploitation and/or empathy had longitudinal associations with bullying, and whether personality and bullying were reciprocally associated with broader ecological factors such as: family functioning, self-perceived social status, and school bonding. These two research objectives were investigated across the first three years of high school, as this is when bullying peaks in adolescence (Pepler, Jiang, Craig, & Connolly, 2008). As predicted, exploitation, but not empathy, predicted long-term bullying, and this association held within the broader social ecology. Moreover, exploitation and bullying had significant associations with social environmental variables over time.

**Personality Model**

As predicted, lower empathy was only concurrently associated with bullying, but exploitation was both concurrently and longitudinally associated with bullying perpetration. The concurrent associations with lower empathy and higher bullying are supported by previous studies (e.g., Zych et al., 2016). Also, the unidirectional longitudinal association of exploitation predicting bullying is consistent with previous concurrent results (e.g., Ang et al., 2010; Book et al., 2012; Farrell et al., 2014), and longitudinal findings with bullying and Narcissism (e.g., Fanti & Henrich, 2015; Reijntjes et al., 2016). These results support recent proposals that as adolescents get older, bullying is less related to the lack of emotional recognition or response that is often
evident in younger children. Instead, although generally unconcerned with others, adolescents who bully are more likely employing bullying as an adaptive strategy for social status, including social power and dominance (Vaillancourt et al., 2010; Volk et al., 2014; Yeager et al., 2015). As a result, exploitative adolescents may be strategically assessing environmental contexts that they can take advantage of, thereby engaging in later bullying. More broadly, these results support the notion that for some individuals, coercive forms of behavior like bullying may be associated with personality traits that can have genetic bases (Dane, Marini, Volk, & Vaillancourt, 2017; Del Giudice & Belsky, 2011; Hawley, 2011).

The cascade association was found between exploitation and bullying from Grade 10 to Grade 11, but not from Grade 9 to Grade 10. This association contrasts previous findings that bullying perpetration is a result of the transition from middle to high school (e.g., Pellegrini & Bartini, 2000; Pellegrini & Long, 2002; Pepler et al., 2006). However, the results are consistent with recent findings that bullying perpetration was stable over one year of adolescence, regardless of whether or not students transitioned across schools (Wang, Brittain, McDougall, & Vaillancourt, 2015). Also, the stability of exploitation found across the three years of high school are consistent with the relative stability of personality traits over time (e.g., de Fruyt et al., 2006; McCrae et al., 2000). These findings together suggest that bullying perpetration, and the association between bullying and personality, can be understood as both a contextual and a developmental process during early to middle adolescence (Pepler et al., 2008; Wang et al., 2015).

The lack of an association between exploitation and bullying at the start of high school in Grade 9 may be a reflection of an adjustment period, when adolescents are
observing their novel social environment, including their peer networks and school climate, and evaluating the most strategic method to obtain status. This idea is further supported by Grade 9 exploitation having a significant indirect association with grade 11 bullying through Grade 10 exploitation. It appears that baseline exploitation remained stable and predicted long-term bullying. Only after assessing these initial social conditions may adolescents recognize which contexts to exploit for bullying. In fact, Wang et al. (2015) found that students were more likely to fall victim to reputational biases that are established in familiar school contexts. Accordingly, exploitation may be longitudinally predicted by social variables after high school contexts become familiar, as evident in the ecological approach.

**Ecological Model**

Although highly stable, personality traits can still be shaped by normative social events, environments, and relationships (McCrae et al., 2000). In the Ecological Model, evidence was found for both high stability of personality and associations between personality and social environments. The indirect effect of Grade 9 exploitation on Grade 11 bullying through Grade 10 exploitation found in the first Personality Model remained significant in the ecological approach. In fact, this indirect effect had the largest effect size among all of the indirect effects, which may demonstrate the salience and ecological proximity of personality. There was also a significant positive indirect cascade effect from Grade 9 social status to Grade 11 bullying through Grade 10 exploitation. These results are consistent with previous findings that aggressive adolescents can enjoy the benefits of high social status, including popularity, and power (Cillessen & Mayeux, 2004; Reijntjes et al., 2018; Vaillancourt et al., 2003; Vaillancourt & Hymel, 2006). A
recent study found the association between social status and bullying held cross-culturally in both Eastern and Western cultures (Pronk et al., 2017). As well, the findings are in line with previous concurrent indirect effects of interpersonal influence on bullying through an exploitative personality trait (i.e., lower Honesty-Humility in Study 1), and with previous longitudinal direct effects between bullying, social dominance (e.g., Reijntjes et al., 2013), and popularity (Sentse et al., 2015a; Sijtsema et al., 2009). Adolescents appear to strategically exploit their initial social status and target vulnerable peers in order to engage in more bullying over time. As a result, social status emerges to have an especially salient role with both exploitation and bullying across adolescence. These findings also support the broader evolutionary framework. First, it is possible that adolescents who have previously had success in obtaining resources like social status with aggressive strategies such as bullying may continue to use these strategies instead of prosocial or cooperative alternatives (Dawkins, 1989). Second, adolescents may engage in self-assessment of their own personality traits along with their social environments, including self-perceived social status, to determine whether the benefits of engaging in bullying within that context outweigh the costs (Buss, 2011; Dane et al., 2017; Del Giudice & Belsky, 2011; Hawley, 2011). Accordingly, particular environmental factors such as a higher social status may trigger bullying behavior in adolescents who possess exploitative tendencies.

A positive cascade effect was also found from Grade 10 family functioning to Grade 11 exploitation. Although consistent with the notion that social environments can predict personality, the positive association was surprising. Adverse parent relationships have often been associated with bullying (Merrin et al., 2016; Kretschmer et al., 2017),
and exploitation (e.g., Farrell et al., 2017; Study 1). However, the opposite association was found, and this association was concurrent in Grade 11. It is also interesting to note that although non-significant, the association between family functioning and exploitation was in the opposite, negative direction in Grade 9 \((r = -0.04, p = .413)\), but in the positive direction in Grade 10 \((r = 0.04, p = .388)\). These differential associations may suggest a suppression effect. For instance, it is possible that family functioning is generally inversely related to antisocial personality and behavior like exploitation and bullying. However, given the stronger cascade effect between Grade 9 social status and Grade 10 exploitation, it is possible that in the presence of higher social status combined with exploitation, family functioning may be positively related to exploitation. These results may demonstrate the transition from a lack of being taught prosocial strategies by parents, to learning to strategically use antisocial strategies from parents, including exploiting higher social status. Taken together, these results support that at first, there can be direct associations between adverse social environments and bullying. However, as adolescents get older, they may develop more strategic means to obtain resources that are in turn supported by closer parenting. Researchers may want to further investigate these potential suppression effects and developmental changes both before and after high school.

Unlike social status and family functioning, school bonding did not have any associations with exploitation. Despite the negative cross-lagged effect between Grade 9 school bonding and Grade 10 social status, higher school bonding was concurrently associated with higher social status within each of the three years. The data suggest that although adolescents can exploit their social status to engage in bullying, it may be
possible that high status adolescents who are prosocial and not exploitative may contribute to positive school environments. Prosocial behavior such as defending behavior has previously been associated with social preference and popularity (Pronk et al., 2017). Fostering such positive school climates may be one avenue for future interventions.

Finally, although gender was tested as a moderator within the cascade models, there was no evidence for any differences between boys and girls. Previously researchers have found that bullying was higher in boys in comparison to girls, but the association between sex, bullying, and social status can vary depending on the measure used (e.g., social preference versus peer-perceived popularity; Vaillancourt & Hymel, 2006). Although boys reported higher social status across all three years than girls, there were no significant differences in bullying across the years, or in the cascade models. The lack of gender moderation is consistent with some previous studies and may be attributed to similar reasons. Some studies have used reputation-based classroom measures of bullying, which may rely on individuals observing more overt forms of bullying (Dijkstra et al., 2008). As a result, this may over-estimate overt bullying behavior like hitting, which may be more dominant among boys. In contrast, self-report measures of bullying were used, which may help capture covert bullying not as commonly witnessed by peers, thus minimizing observed sex differences. A broader measure of social status that includes items on popularity, likeability, and friendships was also used. Future studies incorporating both types of bullying and multiple status measures may help test this hypothesis.

Limitations
Although the findings contribute important findings on the roles of exploitation and social variables in facilitating adolescent bullying, there are some limitations that should be considered. First, all variables except for family functioning used self-reports. As a result, the associations may have been inflated due to shared-method variance (e.g., Coyne, Smith-Lee Chong, Seigne, & Randall, 2003; Gini & Pozzoli, 2009; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). However, careful selection of reliable and valid measures may have helped overcome these biases. Second, although the study was longitudinal and may demonstrate the direction of effects, it still does not allow for causal conclusions. As a result, additional longitudinal and experimental studies may help continue to inform researchers about the mechanisms and associations among these variables over time.

Third, although the sample size was relatively large, there were still many parameters estimated, which may have underestimated some of the cascade effects (Kline, 2016). With the exception of the stability paths, most of the other paths were small to moderate in size. Also, the effect sizes between empathy and bullying, and the effect sizes between exploitation and bullying were relatively similar in size. However, the high retention of participants across waves and the ability to find some cascade effects despite controlling for stability of each variable is a strength of the study. Also, despite the similar effect sizes between both personality traits with bullying, the fact that the effect size for exploitation and bullying held over time is also a strength to this study.

Fourth, only a total bullying variable was examined, as opposed to different subtypes of bullying. In future studies, researchers should examine whether the associations found are generalizable to all forms of bullying. Fifth, empathy was not
measured in Grade 11, which prevented examining the autoregressive, concurrent, and cascade associations with Grade 11 empathy. Also, only empathic concern was used in this study. Some researchers have found that different aspects of empathy, such as cognitive and affective empathy, have differential associations with bullying. For instance, affective empathy in particular has previously been inversely associated with bullying (van Noorden, Haselager, Cillessen, & Bukowski, 2015). Comparisons of several forms of empathy may help reveal if similar results are replicated. In addition, it may be beneficial to use alternate personality models (e.g., the HEXACO) that include both exploitative (i.e., lower Honesty-Humility) and empathic (i.e., Emotionality) personality traits in a single model.

Sixth, the family functioning variable included items that primarily assessed support and communication concerning the family. It is difficult to determine whether the positive cascade effect between Grade 10 family functioning and Grade 11 exploitation was a result of parents’ personality and interpersonal style. Future studies that include measures of parents’ antisocial personality and behavior may help reveal the underlying mechanisms between family functioning and exploitation across adolescence. Finally, the waves were collected every year, which may be a relatively short time period to expect many developmental changes. High stability of variables may underestimate cascade effects (Masten & Cicchetti, 2010; Vaillancourt et al., 2013). Future studies with longer assessment intervals may allow for finding these associations. However, the ecological associations across each year of high school were the main focus, and significant cross-lagged and indirect effects were found.

Implications and Conclusions
The study demonstrates the complex associations between personality traits, social environments, and bullying during adolescence. In particular, researchers, practitioners, and school administrators should recognize that bullying can be understood as a developmental process that is used within particular environmental contexts as a strategic tool. Moreover, stakeholders should be sensitive to the developmental changes associated with bullying. For instance, simply applying empathy training skills to exploitative high school students may be ineffective if they are actively seeking to take advantage of vulnerable environments and peers (Yeager et al., 2015). Further, if adolescents continue to be rewarded with popularity and status resources directly by peers, but also indirectly by school faculty who do not intervene, bullying may be continued to be used as an adaptive strategy. As a result, a combination of both proximate factors and distal factors should be considered in preventative efforts (Huang, Hong, & Espelage, 2013). In particular, alternative prosocial methods to achieve similar status goals should be available for exploitative adolescents to use (Ellis, Volk, Gonzalez, & Embry, 2016). Therefore, it is important to target each individual ecological factor, (e.g., improving school bonding), but also important to target how each factor is associated with every other factor (e.g., increasing social status for those who help improve school bonding and reduce bullying; Voisin, Patel, Hong, Takahashi & Gaylord-Harden, 2016).

The results highlight the complexity of the EST approach and its application to bullying, but they also offer hope of decoding these complex relationships. The use of additional longitudinal models that further tease apart the intricate ecological mechanisms are encouraged to continue revealing avenues for more successful adolescent bullying prevention.
References


CHAPTER 4: STUDY 3

Exploiting Power Imbalances: Can Economic Games Simulate Bullying?4

Bullying is a behavior that has serious health risks for millions of individuals worldwide (Volk, Craig, King, & Boyce, 2016; Wolke, Copeland, Angold, & Costello, 2013). A fundamental feature of bullying, the presence of a power imbalance, is difficult to experimentally manipulate realistically within a social context (Volk, Dane, & Marini, 2014). Moreover, given that another fundamental feature of bullying is that it causes actual harm, it is very likely to be unethical for researchers to randomly assign individuals to act as perpetrators, and others as victims (e.g., the Stanford Prison Experiment; Haney, Banks, & Zimbardo, 1973). For these reasons, most studies on bullying perpetration use correlational, questionnaire-based procedures, as I did in Study 1 and Study 2. However, experimental designs may help researchers approach causal conclusions regarding factors that influence bullying. I propose that economic games can be a novel, innovative method for experimentally simulating and investigating how changes in power can influence potentially harmful behavior. Economic games that incorporate a power difference appear to share similarities with bullying by virtue of the fact that both involve goal-directed, cost-benefit decision-making behavior within an unequal competitive framework.

Costs versus Benefits of Behavior

Competitive bullying and economic behavior may both represent facultative adaptations—behavior that is adaptive only under specific contexts (Underwood, 1954).

4 A version of this chapter will be submitted for publication.
According to Bronfenbrenner’s Ecological Systems Theory (EST; Bronfenbrenner, 1979), multiple environmental contexts interact with an individual to influence their behavior. Both bullying and economic games appear to be rooted in an adaptive evaluation of the costs of competing in comparison to the benefits of cooperating within a particular context. Given that adolescent bullies have more power over their victims, they may intentionally use this power to harm weaker individuals for their own benefits (Volk et al., 2014). Youths may bully to obtain material resources including electronics, money, or school and/or neighborhood territories (Volk et al., 2014). Bullying perpetration has previously also been associated with higher popularity, social dominance, and social status (Kretschmer, Veenstra, Dekovic, & Oldehinkel, 2017; Reijntjes et al., 2013). Finally, bullying has been related to a higher number of dating and sexual partners (e.g., Connolly, Pepler, Craig, & Taradash, 2000), including younger age of first sexual experience and more sexual partners (Volk, Dane, Marini, & Vaillancourt, 2015). By targeting weaker peers, bullies may experience fewer costs such as victim retaliation (Volk et al., 2014; Wolke et al., 2013), and instead gain more beneficial resources. Similar mechanisms may work during the evaluation of costs and benefits behind economic behavior.

Numerous studies using economic games have manipulated ecological factors such as game structure and peer interaction to determine what contributes to competitive behavior (Boone, Declerck, & Suetens, 2008). According to the evolutionary game theory, when an individual identifies behaviors that will provide the self with an advantage, some individuals may choose to behave competitively instead of cooperatively (e.g., Boone et al., 2008). Often, individuals who choose to behave
competitively are those who have used competitive strategies in the past and have succeeded (Dawkins, 1989). As a result, these individuals may opt to continue using competitive behavior as opposed to cooperative strategies in instance where they anticipate winning against vulnerable peers. Indeed, many studies have found evidence for individuals behaving more selfishly in economic games and social dilemma paradigms to protect and/or acquire one’s own resources, and reduce retaliation from one’s opponents (e.g., Barclay, 2011; Barker & Barclay, 2016). Similar to bullying research, advantages linked to economic games included material resources like money (e.g., Prisoner’s Dilemma Paradigm; Zettler, Hilbig, & Heydasch, 2013; Public Goods Game; Barker, Barclay, & Reeve, 2013), and social reputation (e.g., Dictator Game; Piazza & Bering, 2008; Public Goods Game; Hilbig, Zettler, & Heydasch, 2012).

Therefore, as in deciding to bully, deciding to compete during an economic game may depend on comparisons of power ratios between oneself and one’s opponent(s) (Barclay, 2011; Gavrilets, 2012). Beyond these cognitive and competitive similarities, both bullying and economic behavior may be adaptively facilitated for individuals who possess particular personality traits.

**Personality, Bullying, and Economic Games**

Personality traits have strong genotypic variations (Lewis & Bates, 2014), and may have been acted upon by natural selection to help compete for resources (Jonason, Li, Webster, & Schmitt, 2009). Personality may also interact with environmental contexts such as a power imbalance to facilitate particular facultative adaptations. Recently, a contemporary model of personality called the HEXACO has been used to study both bullying and economic behavior. Inspired by evolutionary theory, this cross-culturally
replicated personality model comprises six personality factors, each varying on a continuum, and each with different benefits and costs at each pole (Ashton & Lee, 2007; 2009). Of particular interest to decision-making in bullying and economic games are the Honesty-Humility (H) and Agreeableness (A) factors. Honesty-Humility is characterized by traits associated with intentional, predatory exploitation at the lower end, and traits such as sincerity and fairness at the higher end. Agreeableness is characterized by anger-proneness and intolerance for being exploited at the lower end, and patience and forgiveness at the higher end. Given that Honesty-Humility is not captured as a separate dimension in any other personality models, the HEXACO model is unique in distinguishing these two traits that capture the two response classes (fairness/exploitation and forgiveness/punishment) associated with reciprocal altruism. In fact, lower Honesty-Humility has previously been associated with higher material resources (Lee et al., 2013; Ashton, Lee, Pozzebon, Visser, & Worth, 2010), higher social dominance orientation (e.g., Lee, Ashton, Ogunfowora, Bourdage, & Shin, 2010), and short-term, unrestricted socio-sexual orientation (Bourdage, Lee, Ashton, & Perry, 2007). Finally, both of these personality factors were strong predictors of antisocial behavior (Book, Visser, & Volk, 2015), including bullying perpetration and competition during economic games (e.g., Book, Volk, & Hosker, 2012; Hilbig, Zettler, Leist, & Heydasch, 2013).

Lower Honesty-Humility has been found to be the strongest personality predictor for an overall composite of adolescent bullying perpetration (Book et al., 2012; Farrell, Provenzano, Dane, Marini, & Volk, 2017), and specific forms of bullying, including verbal and social bullying (Farrell, Della Cioppa, Volk, & Book, 2014; also found in Study 1). However, lower Agreeableness still had univariate correlations with bullying in
these studies. In addition, in both Study 1 and Study 2, multiple environmental contexts including higher social status had indirect associations with bullying perpetration through exploitative personality traits. As a result, particular situational contexts rooted in inequality may facilitate exploitative individuals to use bullying behavior. Individuals who have social influence and are more competitive may benefit from exploiting their power when bullying, while risking fewer costs of weaker victims’ retaliation. Taken together, these findings on personality and bullying suggest that an exploitative personality trait may play a primary role when deciding to bully, although a general tendency for vengefulness and anger may play a secondary role. Similar to bullying, both Honesty-Humility and Agreeableness appear to be important predictors for economic behavior.

Two economic games well-researched using the HEXACO personality model are the Dictator and Ultimatum Games. In both games, there are two participants; an Allocator and Recipient. In the Dictator Game, the Allocator distributes or allocates goods (usually money or points to be exchanged for money), and the Recipient has no choice but to passively accept the allocations (Kahneman, Knetsch, & Thaler, 1986). Thus, the Allocator has all the power as they can distribute selfishly with no retaliation. In contrast, in the Ultimatum Game, the Recipient has the option to accept or reject the allocations (Güth, Schmittberger, & Schwarze, 1982). If the Recipient accepts, both players receive the goods based on the Allocator’s distributions. If the Recipient rejects, neither participant receives the goods. Thus, in the Ultimatum Game, both players are equal in power as the Allocator may distribute selfishly, but the Recipient decides whether both participants get to leave with the distributions.
Studies on these two games and the HEXACO have primarily found that individuals lower in Honesty-Humility appeared to behave more selfishly in response to contextual factors. For example, Allocators who were lower in Honesty-Humility behaved more selfishly (as measured through allocations to the self) during the Dictator Game (Hilbig, Thielmann, Hepp, Klein, & Zettler, 2015; Hilbig & Zettler, 2009; Hilbig, Zettler, Leist, & Heydasch, 2013; Thielmann & Hilbig, 2014; Zhao, Ferguson & Smillie, 2017; Zhao & Smillie, 2015), but not during the Ultimatum Game when Recipients had the potential to reject allocations (Hilbig & Zettler, 2009). However, in the study by Hilbig and Zettler (2009) that compared the Allocator role in both the Dictator and Ultimatum Games, Agreeableness was not examined. Instead, most studies have primarily examined Agreeableness with the Recipient role in the Ultimatum Game. In these studies, lower Agreeableness among Recipients was associated with lower acceptance of allocations (Hilbig et al., 2013; Zhao & Smillie, 2015). Therefore, it appears that Honesty-Humility may be associated with active cooperation and Agreeableness may be associated with reactive cooperation (Zhao & Smillie, 2015).

Consistent with theoretical predictions (Ashton & Lee, 2007), lower Honesty-Humility may be associated with exploiting others when given the opportunity, while lower Agreeableness may be associated with retaliatory anger when anticipating being exploited by others. Therefore, behavioral differences rooted in personality traits for economic games involving power imbalances appear to reflect similar behavioral differences rooted in personality traits for bullying.

**Current Study**
Considering the theoretical similarities in cost versus benefits during decision-making, economic games may therefore be a useful, novel tool to simulate bullying within an experimental study. Using the well-defined Dictator and Ultimatum Games allows for systematically manipulating real world characteristics associated with bullying, in hopes of discovering contexts to manipulate in bullying interventions. However, additional, more explicit evidence that links bullying to economic behavior is needed. Therefore, the purpose of Study 3 was to explore whether economic games can simulate adolescent bullying perpetration.

In particular, I wanted to compare self-report bullying to the role of the Allocator in three games varying in power imbalances. The first was the original Dictator Game (powerful condition) when the Allocator distributes points and the Recipient has to accept the distributions unconditionally. The second was the original Ultimatum Game (equivalent power condition) when the Allocator can distribute points, but a Recipient can either: 1) accept or 2) reject the allocations. If the Recipient chose to accept, both the Allocator and the Recipient would keep their respective distributions. If the Recipient chose to reject, neither the Allocator nor the Recipient would keep the distributions. The third activity represented a variation of the Ultimatum Game (powerless condition), adapted from Güth and Huck (1997). The Allocator again distributes the points. The Recipient either: 1) accepted the allocations, or 2) chose to accept their own novel allocations, while rejecting only the Allocator’s points. Thus, in the Ultimatum Variation, the Allocator could end up with nothing despite allocating selfishly or fairly, even if the Recipient keeps their own points. Using these three games, I investigated three specific research questions:
1. Who takes advantage of a power imbalance in an economic game? Given the similarities in a power advantage, I predicted that individuals with higher middle and high school self-report bullying perpetration would take advantage of power, and behave more selfishly in the Dictator Game (i.e., more selfish point allocation), but not in the original Ultimatum or Ultimatum Variation Games.

2. Do individuals with higher self-report bullying perpetration behave more selfishly in the Dictator Game, and share similar personality traits? Based on previous research on bullying (e.g., Book et al., 2012) and economic games (e.g., Hilbig & Zettler, 2009), I predicted both forms of behavior would be associated primarily with lower Honesty-Humility (i.e., exploitation) as they would involve a power advantage that could be exploited. However, I predicted that lower Agreeableness would be associated with more selfish allocations in the original Ultimatum Game and the Ultimatum Variation Game. The association between Agreeableness and the original Ultimatum Game was expected due to an intolerance for a Recipient’s potential to reject allocations. The association between Agreeableness and the Ultimatum Variation Game was expected due to an intolerance for a Recipient’s potential to reject only the Allocator’s points.

3. What environment-personality contexts are associated with both self-report bullying and selfish behavior in the Dictator Game? Given previous evidence on environment-personality mechanisms behind adolescent bullying (i.e., results from Study 1 and Study 2) and the three adaptive resources associated
with bullying (e.g., Volk et al., 2014), I predicted that material, reputational, and reproductively relevant resources would be associated indirectly through lower Honesty-Humility with both self-reported bullying and selfish behavior in the Dictator Game.

Method

Participants

Based on previous studies finding small to moderate effect size with economic games, a power analysis using G*Power 3.1.9.2 (Faul, Erdfelder, Lang, & Buchner, 2007), revealed that a minimum of 150 participants was needed. First-year undergraduate students from a university in southern Ontario, Canada ($N = 167; M_{\text{age}} = 18.5, SD_{\text{age}} = 1.35; 59.3\%$ women) were recruited from various disciplines through class announcements, word-of-mouth, poster advertisements on campus, and SONA, an online participant pool for psychology students. The self-reported ethnicity was primarily White ($62.3\%; 13.8\%$ Asian; $5.4\%$ Black; $6.6\%$, Mixed; $12\%$ Other). Self-perceived socio-economic status (SES) was also primarily middle class ($51.5\%; 22.2\%$ lower class, $26.3\%$ upper class).

Procedure

Participants were invited to participate in a study of decision-making, social relationships, and personality. Interested participants were directed to a room on campus, where they were greeted by a researcher and a confederate. Once in the room alone, the participant completed a consent form. The participant was then told that they would be completing three decision-making activities with the other participant (i.e., confederate) but in separate rooms. The participant was told they were the “Allocator” and that the
confederate was the “Recipient.” As the Allocator, they would have to distribute 10 points between themselves and the Recipient during each of the three activities. Each allocation was written and placed in an envelope, where one allocation was randomly drawn at the end of the study. The participants were told that at the end of the study, they can be compensated with either 0.5 SONA research credits, or $5 (Canadian). In addition, the number of points they had in the randomly drawn trial would also be converted to a possible $0-$5 dollars. The differential payoff structure was used to maintain internal validity of the study (Barker & Barclay, 2016; Hilbig, 2015a; Zhao et al., 2016).

The three activities (i.e., the Dictator, original Ultimatum, and Ultimatum Variation Games) were presented in random order. Instructions and methods were adapted from Hilbig and colleagues (2013; 2015a). For the Dictator Game (powerful condition), the participant was told to allocate the 10 points in whatever way they pleased but that if this version was drawn, the Recipient would have no choice but to accept both distributions. For the original Ultimatum Game (equivalent power condition), the participant was told if this version was drawn, the Recipient would have the option to accept or reject the allocations. If the Recipient chose to accept, both the Allocator and the Recipient would keep their distributions. If the Recipient chose to reject, neither the Allocator nor the Recipient would keep the distributions. For the Ultimatum Variation Game (powerless condition; Güth & Huck, 1997), the participant was told if this version was drawn, the Recipient would have the option to accept the distributions (i.e., both Allocator and Recipient get to keep their own points), or reject only the Allocator’s points (i.e., Recipient keeps their own distributions only). The participants were told that allocations and Recipient’s decisions for each trial would remain anonymous unless that
particular version was drawn at the end of the study. Instruction check questions were presented after each activity, to check participants’ understanding of the rules.

Following the three activities, participants completed self-report questionnaires online on a laptop in the same room. After completion, the researcher conducted the random draw. If either of the Ultimatum Games were drawn, participants were told the allocations were accepted. For all draws, any point over five was converted into one extra dollar (e.g., self-allocation of six out of ten points was converted into 1 extra dollar, seven out of ten points were converted into $2 extra dollars). Participants were debriefed, thanked for their time, and compensated with either the 0.5 research credit or $5. All methods were cleared by a university research ethics board.

**Measures**

**Bullying.** Participants completed a fourteen item self-report bullying scale (Volk & Lagzdins, 2009) to assess bullying perpetration growing up during middle and high school, as has previously been done with university students (Espelage, Hong, & Mebane, 2016). The questions included, “In middle and high school, how often have you _____ someone much weaker or less popular last term?” The behaviors in the blank assessed different types of behavior including: physical, verbal, social, and cyber bullying. Half of the questions assessed bullying toward peers, and the other half assessed bullying toward a weaker sibling. Items were rated on a five-point scale (1 = *that hasn’t*  5 All analyses were run separately for peer bullying (*N* = 167) and sibling bullying (*N* = 147). Both yielded a similar pattern of results, and therefore both forms of bullying were collapsed into a total bullying score for parsimony. Although not central to the research
happened and 5 = several times a week). An average of all items was used to create a composite average (α = .79). If participants did not have a sibling, an average of just peer bullying was used. Higher scores indicated higher perpetration.

**Personality.** To assess personality, participants completed the 60-item self-report of the HEXACO Personality Inventory-Revised (HEXACO PI-R; Ashton & Lee, 2009). Only Honesty-Humility and Agreeableness factors were used for this study. Participants were asked how much they agreed with each item. A sample item for Honesty-Humility included, “I want people to know that I am an important person of high status.” A sample item for Agreeableness included, “My attitude toward people who have treated me badly is forgive and forget.” Items were rated on a five-point scale (1 = strongly disagree to 5 = strongly agree). An average of the items were used to create an Honesty-Humility scale (α = .70) and Agreeableness scale (α = .76), with higher scores indicating higher levels of a trait.

**Material Resources.** To assess material resources, participants completed a 15-item self-report of the Material Values Scale (Richins, 2004). Participants were asked how much they agreed with each item. A sample item included, “The things I own say a lot about how well I’m doing in life.” Items were rated on a five-point scale (1 = strongly disagree to 5 = strongly agree). An average of the items was used to create a composite, with higher scores indicating higher values for material resources (α = .81).

For exploratory analyses were also run for different forms of bullying (i.e., direct and indirect bullying), but did not yield significant results.
**Reputational Resources.** To assess reputational resources, participants completed six items assessing interpersonal influence (adapted from Hawley, Little, & Card, 2007; 2008; Vaillancourt, Hymel, & McDougall, 2003). Participants were asked how true each statement was. A sample item included, “I usually get my way when I deal with others.” Items were rated on a five-point scale (1 = never true to 5 = almost always true). An average of the items was used to create a composite, with higher scores indicating higher interpersonal influence (α = .81).

**Reproductively Relevant Resources.** To measure reproductively relevant resources, participants completed the nine-item Socio-sexual Orientation Inventory-Revised (Penke & Asendorpf, 2008). Participants were asked to respond honestly to each item. There were three subscales. A sample item for the Behavior subscale included, “With how many different partners have you had sex with in the past 12 months?” which was rated on a 9-point scale (0 = 0 partners to 9 = 20 or more partners). A sample item for the Attitude subscale included, “Sex without love is OK,” which was rated on a 9-point scale (1 = strongly disagree to 9 = strongly agree). A sample item for the Desire subscale included, “How often do you have fantasies about having sex with someone you are not in a committed romantic relationship with?” which was rated on a 9-point scale (1 = never to 9 = at least once a day). Items were averaged for a composite, with higher scores indicating a shorter-term, unrestricted socio-sexual orientation inventory (α = .86).

**Results**

**Preliminary Assumptions and Correlations**

Using SPSS 24 software, univariate and multivariate assumptions were assessed. All variables revealed acceptable univariate and multivariate assumptions. Bullying
perpetration was positively skewed and leptokurtic as expected, but all values were within limits and the mean (1.42) was consistent with previous studies (e.g., Book et al., 2012). The mean of self-allocations in both the Dictator Game (6.30) and Ultimatum Game (5.45) were relatively consistent with previous means of 70% for the Dictator Game (e.g., Engel, 2011) and 50% for the Ultimatum Game (Camerer & Thaler, 1995). Each variable had less than 5% of missing values, with the exception of bullying (12%). However, missing values did not change the pattern of results, \( \chi^2(38) = 37.89, p = .474 \). Listwise deletion was used for regression analyses, and Full Information Maximum Likelihood (FIML) was used for model estimation to use all available data in MPlus (Schafer & Graham, 2002).

As presented in Table 4.1, all significant correlations were small to large in size. Bullying was significantly positively correlated with the Dictator Game allocations (i.e., points allocated to the self). Point allocation was also significantly positively correlated across all three games. For personality, bullying, and the games, Honesty-Humility and Agreeableness were significantly negatively correlated with bullying perpetration and Dictator Game allocations. Agreeableness was also negatively correlated with the Ultimatum Variation Game allocations. For personality and the resources, Honesty-Humility and Agreeableness were significantly negatively correlated with interpersonal influence and material values. Honesty-Humility was additionally negatively correlated with socio-sexual orientation. For resources, bullying, and the games, the Dictator Game allocations and bullying perpetration were significantly positively correlated with all resources, while Ultimatum Game allocations was positively correlated with interpersonal influence.
Primary Analyses

*Who bullies?* The first of the primary analyses was a regression using SPSS to test which of the three games predicted self-report bullying perpetration, controlling for age and gender. As expected, the Dictator Game (i.e., powerful condition) was the only game in which allocations significantly positively predicted bullying perpetration (See Table 4.2). Being a man was also significantly positively associated with bullying perpetration.

*Do they share the same personality traits?* The second of the primary analyses was a path model using MPlus version 7.4 (Muthén & Muthén, 1998-2017) to test whether individuals who “bully” in both the self-report and selfish point allocation in the Dictator Game (i.e., the game associated with self-reported bullying in the first regression analysis) shared the same personality traits, when simultaneously looking at personality and economic behavior. Therefore, Honesty-Humility and Agreeableness were the independent variables, and allocations in the three games and self-report bullying were the dependent variables. The effects of age and gender were also controlled for based on previous findings (e.g., Book et al., 2012), and all direct paths, covariances, and disturbances were estimated. As a result, since the primary goal of the study was to test an empirical summary of the associations between the personality traits and the three economic game allocations controlling for age and gender, the model was fully saturated and fit indices were not informative (Hoyle, 2012; Kline, 2016). All path models used Maximum Likelihood Robust (MLR) estimation to account for the non-normal distribution of bullying. As expected, lower Honesty-Humility significantly predicted higher self-report bullying and selfish point allocation in the Dictator Game, and lower
Agreeableness significantly predicted selfish point allocation in the Ultimatum Variation Game (i.e., powerless condition; see Table 4.2 and Figure 4.1). Unexpectedly, lower Agreeableness significantly predicted higher self-report bullying. Finally, being a man was also significantly positively associated with bullying.

*What environment-personality contexts are associated with behavior?* Given the associations between Honesty-Humility, self-report bullying, and the Dictator game allocations, the third analysis was used to investigate environment-personality associations behind self-report bullying and the Dictator Game allocations using path model on MPlus version 7.4 (Muthén & Muthén, 1998-2017). My goal was to decompose the total effects of the three adaptive resources on bullying and Dictator behavior both directly and indirectly through personality traits, similar to the environment-personality associations examined in Study 1 and Study 2 (Hoyle, 2012; Kline, 2016; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Pearl, 2012). All direct effects, covariances, and disturbances amongst the study variables of interest were estimated. However, given that we controlled for the effects of age and gender in Model 2 on personality, bullying, and Dictator Game allocations, we controlled for age and gender only on the three resources. Model fit was assessed using the following cut-offs: a comparative fit index (CFI) of ≥ .95, a root-mean-square error of approximation (RMSEA) of ≤ .06, and a standardized root mean square residual (SRMR) of ≤ .08, (Browne & Cudeck, 1993; Hu & Bentler, 1999; Kline, 2016). Again, we used MLR estimation to account for the non-
Table 4.1

Means, Standard Deviations, Response Options and Pearson Correlations Between Resources, Personality, Bullying, and Allocations.

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| M            | 18.53| -   | 1.42 | 6.30 | 5.45 | 5.24 | 3.40 | 3.23 | 2.86 | 2.78 | 7.56 |
| SD           | 1.35 | -   | .39  | 2.09 | 1.52 | 1.81 | .61  | .63  | .55  | .68  | 3.30 |
| Response Options | -   | -   | 1-5  | 1-10 | 1-10 | 1-10 | 1-5  | 1-5  | 1-5  | 1-5  | 1-9  |

Note. N = 167; Allocations = Points allocated to self in each game; H = Honesty-Humility; A = Agreeableness; Material = Material Values; Interpersonal = Interpersonal Influence; Socio-sexual = Socio-sexual Orientation. Significant correlations are bolded for ease of presentation.

<sup>a</sup>Gender coded with 1 = Man and 2 = Woman.

*<i>p</i> < .05. **<i>p</i> < .01.
Table 4.2

Direct Effects for Model 1 with Allocations Predicting Self-Report Bullying and Model 2 with Personality Predicting Self-Report Bullying and Allocations.

<table>
<thead>
<tr>
<th>Model 1:</th>
<th>Model 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-Report Bullying</td>
</tr>
<tr>
<td></td>
<td>B(SE)</td>
</tr>
<tr>
<td>Age</td>
<td>.00 (.02)</td>
</tr>
<tr>
<td>Gender a</td>
<td>-.14 (.06)</td>
</tr>
<tr>
<td>Dictator</td>
<td>.04 (.02)</td>
</tr>
<tr>
<td>Ultimatum</td>
<td>-.01 (.02)</td>
</tr>
<tr>
<td>Ultimatum Variation</td>
<td>.01 (.02)</td>
</tr>
<tr>
<td></td>
<td>.09</td>
</tr>
<tr>
<td>R²</td>
<td>.09</td>
</tr>
<tr>
<td>F</td>
<td>2.81</td>
</tr>
</tbody>
</table>

Note. N = 167. Allocations = Points allocated to self in each game. Significant associations are bolded for ease of presentation.

*Gender coded with 1 = Man and 2 = Woman.*
Figure 4.1. Path Analysis for Personality Predicting Self-Report Bullying and Game Allocations.

*Note.* Allocations = Points allocated to self in each game; All direct effects, covariances, and disturbances were estimated but only significant effects are shown for ease of presentation; No line indicates no significant effect; Standardized direct path coefficients are presented.

*a*Gender coded as 1 = Man, 2 = Woman.

*p* < .05. **p* < .01.
normal distribution of bullying. To test for indirect effects, 95% bias-corrected confidence intervals with 10,000 bootstrapped samples were estimated using Maximum Likelihood (ML). Significant indirect effects were determined through confidence intervals that did not cross zero (Shrout & Bolger, 2002).

The total model fit the data well, $\chi^2 (8) = 8.89, p = .351; \text{CFI} = .996; \text{TLI} = .982; \text{RMSEA} = .026; \text{SRMR} = .025$ (See Table 4.3 and Figure 4.2 for significant direct effects). As predicted, there were significant indirect effects through lower Honesty-Humility to higher self-report bullying from higher material values ($B = .15, SE = .05, \beta = .22, 95\% CI [.020, .200]$), higher interpersonal influence ($B = .07, SE = .03, \beta = .17, 95\% CI [.010, .085]$), and higher socio-sexual orientation ($B = .02, SE = .01, \beta = .08, 95\% CI [.004, .038]$). Unexpectedly, there were also significant indirect effects through lower Agreeableness from higher material values ($B = .04, SE = .03, \beta = .05, 95\% CI [.004, .089]$). There were significant indirect effects through lower Honesty-Humility to higher selfish behavior in the Dictator Game from higher material values ($B = .63, SE = .25, \beta = .17, 95\% CI [.008, .907]$), higher interpersonal influence ($B = .02, SE = .01, \beta = .08, 95\% CI [.024, .334]$), and higher socio-sexual orientation ($B = .18, SE = .06, \beta = .12, 95\% CI [.003, .166]$). Finally, being a man was significantly positively correlated with socio-sexual orientation inventory ($r = -.33, p < .001$) and interpersonal influence ($r = -.17, p = .02$). In summary, there were significant indirect effects from all three adaptive resources through lower Honesty-Humility for both bullying and Dictator game allocations, and additionally through Agreeableness for bullying.
Table 4.3

Direct Effects for Model 3 with Resources, Personality, Self-Report Bullying, and Allocations.

<table>
<thead>
<tr>
<th>Personality</th>
<th>Honesty-Humility</th>
<th>Agreeableness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$ ($SE$)</td>
<td>$\beta$ ($SE$)</td>
</tr>
<tr>
<td>Material Values</td>
<td>-.55 (.08)</td>
<td>-.49 (.06)</td>
</tr>
<tr>
<td>Interpersonal Influence</td>
<td>-.21 (.05)</td>
<td>-.23 (.06)</td>
</tr>
<tr>
<td>Socio-sexual Orientation</td>
<td>-.09 (.02)</td>
<td>-.23 (.05)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.49</td>
<td></td>
</tr>
</tbody>
</table>

| Bullying and Dictator Game                 |                  |               |        |                  |               |         |
|                                            | Self-Report Bullying | Dictator Allocations |
|                                            | $B$ ($SE$)       | $\beta$ ($SE$) | $p$     | $B$ ($SE$)       | $\beta$ ($SE$) | $p$     |
| Honesty-Humility                          | -.19 (.07)       | -.29 (.11)    | .01    | -.68 (.35)       | -.20 (.10)     | .05     |
| Agreeableness                             | -.14 (.06)       | -.23 (.09)    | .02    | -.13 (.27)       | -.04 (.08)     | .63     |
| Material Values                           | -.05 (.06)       | -.07 (.08)    | .39    | .62 (.36)        | .16 (.09)      | .09     |
| Interpersonal Influence                    | .02 (.05)        | .04 (.09)     | .63    | .35 (.27)        | .11 (.09)      | .19     |
| Socio-sexual Orientation                   | .04 (.02)        | .16 (.07)     | .02    | .12 (.10)        | .09 (.08)      | .09     |
| $R^2$                                      | .23              |               |        | .19              |               |         |

*Note.* $N = 167$. Allocations = Points allocated to self in each game. Significant associations are bolded for ease of presentation.
Model 3 Path Analysis for Indirect Effects of Resources on Self-Report Bullying and Dictator Allocations Through Personality.

Note. $\chi^2$ (8) = 8.89, $p = .351$; CFI = .996; TLI = .982; RMSEA = .026; SRMR = .025; Allocations = Points allocated to self in each game; All direct effects, covariances, and disturbances amongst study variables were estimated but only significant effects are shown for ease of presentation; Effects of Age and Gender were controlled for in only Resource variables; Lines indicate both a significant direct and indirect effect. No line indicates no significant direct or indirect effect; Standardized direct path coefficients are presented. $^a$Gender coded as 1 = Male, 2 = Female.

$^*p < .05$. $^{**}p < .01$.  

$\chi^2$ (8) = 8.89, $p = .351$; CFI = .996; TLI = .982; RMSEA = .026; SRMR = .025; Allocations = Points allocated to self in each game; All direct effects, covariances, and disturbances amongst study variables were estimated but only significant effects are shown for ease of presentation; Effects of Age and Gender were controlled for in only Resource variables; Lines indicate both a significant direct and indirect effect. No line indicates no significant direct or indirect effect; Standardized direct path coefficients are presented. $^a$Gender coded as 1 = Male, 2 = Female.

$^*p < .05$. $^{**}p < .01$.  

Figure 4.2. Model 3 Path Analysis for Indirect Effects of Resources on Self-Report Bullying and Dictator Allocations Through Personality.
Discussion

Given the similarities in both decision-making and personality, the purpose of conducting Study 3 was to experimentally investigate bullying perpetration through economic games. My predictions were supported as bullying was associated only with Dictator Game allocations, and both forms of behavior were associated with an exploitative personality trait, and similar environment-personality mechanisms.

**Bullying and the Dictator Game**

Self-report bullying perpetration was moderately associated at both the multivariate and univariate levels with selfish point allocation in the Dictator Game, but neither of the two Ultimatum Game allocations. The results were expected as previous studies on both bullying (e.g., Volk et al., 2012; 2014) and economic behavior (e.g., Barclay, 2011; Barker & Barclay, 2016) found these two forms of behavior were associated with comparing the costs of competing in comparison to the benefits of cooperating as operationalized by different power imbalances. As a result, both bullying and Dictator Game allocations may be rooted in being sensitive to potential opportunities taking advantage of one’s own power by intentionally harming weaker peers for self-gain. The willingness of self-reported bullies to exploit their power advantage in the Dictator Game is very similar to their willingness to exploit their power in social contexts via bullying. In contrast, self-report bullying was not associated with selfish behavior during an equivalent power or powerless role, thereby highlighting the contextual nature of these behaviors (Barclay, 2011; Hilbig et al., 2013; Volk et al., 2014). In addition to power, self-report bullying and Dictator Game allocations shared similar personality correlations.
Behavior and Personality

As expected, both self-report early adolescent bullying and selfish allocations in the Dictator Game were associated at the multivariate and univariate levels with lower Honesty-Humility. Consistent with previous studies on bullying (e.g., Book et al., 2012; Farrell et al., 2014; 2017) and the Dictator Game allocations (e.g., Hilbig et al., 2013; 2015b; Hilbig & Zettler, 2009), both forms of behavior were associated with a trait-level intent to exploit others, and this effect was moderate in size. This further supports that bullying and selfish Dictator allocations are fundamentally rooted in exploiting power advantages over weaker peers. As result, this personality trait may be adaptively expressed only under powerful contexts, providing evidence for viewing bullying and selfish Dictator behavior as facultative adaptations. Interestingly, the association between Honesty-Humility and the Dictator Game allocations was stronger than the association between Honesty-Humility and bullying perpetration. Also, the fact that allocations in both Ultimatum Games were not associated with Honesty-Humility suggests that predatory tendencies are not strongly related to selfish behavior when one lacks a power advantage. Instead, such selfish behavior may be associated with lower Agreeableness in powerless conditions.

Previously, studies using the HEXACO model found Agreeableness was associated with only Recipient behavior in the Ultimatum Game (e.g., Hilbig et al., 2013; Zhao & Smillie, 2015). The current study was unique in exploring Agreeableness with the Allocator role in the two Ultimatum Games and found Allocators lower in Agreeableness are generally intolerant of being exploited by others who have more power. Allocators lower in Agreeableness may have behaved selfishly as a pre-emptive
punishment to avoid a Recipient from rejecting the allocations in the Ultimatum Variation Game. Instead of trying to exploit the Recipient (as in the Dictator Game allocations), Allocators lower in Agreeableness may be establishing a credible deterrent, or sending a signal to the Recipient to not antagonize them when they have the option to do so (i.e., by rejecting the allocations) and to also fear retaliation (Pinker, 2011). The fact that this was only found in the Ultimatum Variation allocations (powerless condition) but not the original Ultimatum allocations (equivalent condition) suggests that being intolerant is especially salient under circumstances when individuals can be exploited by virtue of a lack of power. In the same vein, these results may suggest that Allocators higher in Agreeableness may be more likely to cooperate because they have more to lose when they are powerless. Taken together, the association between Honesty-Humility and the Dictator Game allocations, and the association between Agreeableness and the Ultimatum Variation Game allocations support the notion that when individuals with antisocial tendencies have more power and dominance, they have a lower need to cooperate, and have an easier ability to exploit (e.g., Dawkins, 1989; Hawley, 2011). In contrast, when individuals with antisocial tendencies have less power and dominance, they have a higher need to cooperate, and may behave in more prosocial ways.

Interestingly, lower Agreeableness was significantly associated with self-report bullying. While I predicted significant univariate correlations, I expected Honesty-Humility to be the sole multivariate personality trait. However, the data suggest that disagreeable undergraduate students who were unwilling to be taken advantage of reported more bullying. It is possible that bullying is primarily motivated by an intentional exploitation (i.e., lower Honesty-Humility), but also motivated by a general intolerance of
others that could be in the way of accomplishing goals or acquiring resources.

Alternatively, given the modest, but positive, correlation between Honesty-Humility and Agreeableness, it is possible that some of the variance of Honesty-Humility that is associated with bullying was also captured in the Agreeableness items. Nevertheless, the larger effect of Honesty-Humility in comparison to Agreeableness suggests that predatory exploitation is still the strongest personality correlate of bullying. In addition to personality alone, the results showed similar environment-personality mechanisms between bullying and Dictator allocations.

**Environment-Personality Associations**

Consistently across all tests of indirect effects, the three resources were associated with both self-report bullying and selfish Dictator allocations through lower Honesty-Humility, and these effects were small to moderate in size. As expected, for individuals who have higher material values, higher interpersonal influence, and a less restricted, short-term socio-sexual orientation, it may be adaptive to take advantage of power. These results are in line with the environment-personality associations with younger adolescent bullying found in Study 1 and Study 2. In addition, these findings are consistent with studies linking bullying perpetration to higher social status (e.g., Reijntjes et al., 2013) and sexual partners (e.g., Volk et al., 2015). These findings are also consistent with studies linking competitive economic behavior with higher material resources (e.g., Zettler et al., 2013) and reputational resources (e.g., Piazza & Bering, 2008). Finally, the results are consistent with studies linking Honesty-Humility to higher material values (Lee et al., 2013; Ashton, et al., 2010), social dominance orientation (e.g., Lee et al., 2010), and an unrestricted socio-sexual orientation (Bourdage, et al., 2007). Such
environmental contexts may adaptively filter through, or indirect link with, an exploitative personality trait for maintaining or increasing access to these resources as when individuals have more power, they likely have less of a need to cooperate, which may make it easier to exploit weaker peers.

Interestingly, material values had a significant indirect effect through lower Agreeableness for self-report bullying. Although not originally predicted, it is possible that, as compared to young adolescents, older individuals starting university may be more likely to engage in bullying to guard accumulated resources through their vengeful and reactive tendencies. However, interpersonal influence and socio-sexual orientation were unrelated to Agreeableness, suggesting that individuals who are difficult to get along with may have trouble attracting peer relations and dating and/or sexual partners (e.g., Ashton, Lee, & de Vries, 2014; Buss, 1991), even if they are able to secure or guard non-social material resources.

It is important to note that these indirect effects with Agreeableness were not found with selfish Dictator Game allocations. At the core, selfish Dictator Game allocations and bullying perpetration may share an intentional exploitation of power, but there may be secondary differences. Bullying often occurs within a social context that requires both victim and bystander feedback. As a result, it is possible that being reactively aggressive or vengeful could be of some adaptive benefit to bully perpetrators in order to establish credible deterrence, or some signal to rivals not to instigate aggression (Pinker, 2011). However, in the Dictator Game, the Allocator does not require any response from the Recipient. Accordingly, being reactively aggressive may not be as adaptive to Allocators in the Dictator Game. Future studies may want to see whether
manipulating social contexts may test this hypothesis. For instance, some studies that manipulated social distance and familiarity of Recipients found higher levels of selfish allocations were associated with increases in the social distance of Recipients (Bechler, Green, & Myerson, 2015). Bullying would likely be associated with lower social distance (e.g., perpetrators and victims may attend the same school or have the same peer network). It is possible that lower Agreeableness can be adaptive under these contexts for the Dictator Game.

**Limitations**

There were several limitations to this study. First, a cross-sectional sample of older adolescents in university was used. Retrospective measures of bullying perpetration growing up was also used. As a result, I was unable to draw conclusions regarding the direction of effects between resources, personality, and bullying, and future longitudinal studies may want to use both concurrent and longitudinal data for self-report bullying and economic behavior. However, previous studies have used retrospective self-reports of bullying in university samples (e.g., Espelage et al., 2016), providing evidence of validity. Additional studies have used self-reports of personality and the resources, demonstrating acceptable reliability and validity (e.g., Ashton & Lee, 2009; Book et al., 2012; Hilbig & Zettler, 2009; Volk, Veenstra, & Espelage, 2017).

Second, only the Allocator role was examined in all three economic games. Previous studies have examined Honesty-Humility with the Allocator role in the Dictator Game, and Agreeableness with the Recipient role in the Ultimatum Game (e.g., Hilbig et al., 2013; 2015b). Accordingly, it is possible that the power contexts can also be manipulated from the perspective of the Recipient. For example, in the Ultimatum
Variation Game, the Allocator is powerless in comparison to the Recipient, and perhaps similar associations between lower Honesty-Humility and having a powerful role as the Recipient may be found. Also, given that the Recipient would be responding to the role of the Allocator, an additional association between Agreeableness and this version of the game may be found.

Third, the association between self-report bullying and Dictator allocations was only moderate in size, suggesting that these two variables may not be exactly the same construct. For instance, the Dictator allocations may reflect only one context (e.g., overt and direct single trial of competition for economic resources), which may not necessarily translate to social or indirect forms of bullying that may be more covert and associated with reputational resources. However, according to the definition of bullying by Volk and colleagues (2014) that requires intentionality, goal-orientation, and a power imbalance, the Dictator game appears to be a match. Therefore, additional contexts can be manipulated to simulate environmental contexts that are even more ecologically valid for multiple forms of bullying and power imbalances. For example, economic games have extensions such as punishment, when participants can inflict additional harm to others through stealing resources (e.g., Barker & Barclay, 2016). Given that bullying is associated with intentional harm, adding these punishments to the power imbalances in the Dictator and Ultimatum Games may reveal additional methods to simulate bullying. Nevertheless, these two games were used as an exploratory first step in simulating bullying as these two games have been well-established with the HEXACO personality model.

Conclusions
Despite these limitations, this study demonstrated that economic games can correlate with bullying perpetration. Both bullying and selfish behavior in the Dictator Game may involve a strategic, adaptive evaluation of the costs and benefits of competing. An exploitative personality trait associated with taking advantage of power may facilitate this decision-making, and additional environmental context may further filter through this personality trait. The data suggest anti-bullying initiatives may want to foster harmonious climates that also reduce power hierarchies, such as at school or communities (Zwaan, Dijkstra, & Veenstra, 2013). This reduction may prevent individuals with exploitative tendencies from taking advantage of power imbalances. In fact, recent evidence suggests selfish behavior in the Dictator Game is associated with social norms for fairness (Zhao et al., 2017). Therefore, prosocial methods to achieve similar benefits, while increasing the costs of exploiting others, may help reduce bullying (Ellis, Volk, Gonzalez, & Embry, 2015). More evidence linking behavior in economic games to bullying perpetration may provide additional environmental contexts that can be manipulated (e.g., reducing social distance between peers), and in particular for what types of individuals, to help reduce adolescent bullying.
References


Zhao, K., Ferguson, E., & Smillie, L. D. (2017). Politeness and compassion differentially predict adherence to fairness norms and interventions to norm violations in economic games. *Scientific Reports, 7*, doi: 10.1038/s41598-017-02952-1

CHAPTER 5: GENERAL DISCUSSION

Increasing evidence supports the suggestion that adolescence may be a developmental period when bullying can be adaptively used to acquire material, social, and romantic resources (Volk, Dane, & Marini, 2014). Bullying may be adaptive under a specific combination of proximate intrinsic and distal extrinsic social ecological factors. In particular, genetically influenced personality traits may indirectly link broader environments to adolescent bullying. The purpose of this dissertation was to investigate the associations between exploitative personality traits and broader social ecologies (family, peers, school, community, and economic) to see how they independently and indirectly facilitated adolescent bullying perpetration. These associations were examined concurrently, longitudinally, and experimentally in three studies. My prediction that the broader social environments would filter through exploitative personality traits to indirectly associate with bullying perpetration was largely supported throughout these three studies.

In Study 1, I found that environmental variables from three different ecological systems (micro-, meso-, and macro-) were concurrently associated to both direct (i.e., physical, verbal) and indirect (i.e., social) forms of adolescent bullying primarily through a trait capturing exploitation (i.e., lower Honesty-Humility). Direct bullying also had indirect associations from social ecological variables through a trait capturing recklessness (i.e., lower Conscientiousness). To extend on Study 1, I examined personality-environment associations in a sample of adolescents longitudinally. I found that exploitation, but not empathy, was longitudinally associated with bullying perpetration across the first three years of high school. Additionally, social ecological
variables, in particular social status and family functioning, were longitudinally associated with exploitation, and social status was indirectly longitudinally associated with bullying through exploitation. Finally, given that Studies 1 and 2 were correlational, in Study 3, I examined whether bullying perpetration could be simulated through point allocations in economic games in a laboratory setting. I found that economic games can be a novel way to experimentally investigate bullying perpetration. Self-report bullying and selfish Dictator Game point allocations were both related to one another and an exploitative personality trait (i.e., lower Honesty-Humility). Also, the association between the environment and both forms of behavior were indirectly facilitated through this exploitative trait. These three studies together contributed two overall themes in the social ecology of adolescent bullying perpetration. First, these studies demonstrated the significance of the role of exploitative personality traits, as opposed to a lack of empathy, general disagreeableness, or impulsivity, within the context of adaptive adolescent bullying. Second, these three studies demonstrated a complex social ecology of bullying, whereby broader social environments from multiple ecological systems can indirectly facilitate bullying perpetration through exploitative personality traits.

**Antisocial Personality and Bullying Perpetration: The Importance of Exploitation**

Across all three studies, it was evident that traits capturing exploitation were the most prominent personality correlates of adolescent bullying perpetration. In both Studies 1 and 3, lower Honesty-Humility was significantly associated with higher bullying perpetration and selfish Dictator Game point allocations (i.e., an experimental proxy for bullying). In Study 2, higher exploitation was longitudinally associated with bullying perpetration. These results are consistent with previous concurrent associations between
adolescent bullying and Honesty-Humility (e.g., Book, Volk, & Hosker, 2012; Farrell, Della Cioppa, Volk, & Book, 2014), experimental studies on economic game behavior and Honesty-Humility (e.g., Hilbig, Thielmann, Hepp, Klein, & Zettler, 2015; Hilbig, Thielman, Wührl, & Zettler, 2015; Hilbig & Zettler, 2009; Hilbig, Zettler, Leist, & Heydasch, 2013), and finally longitudinal studies on bullying perpetration and narcissism (i.e., comprised of exploitation and self-superiority; Fanti & Henrich, 2015). It was evident that adolescents may be strategically exploiting weaker and vulnerable peers to maximize self-gain, while minimizing costs like victim retaliation. More importantly, my results demonstrate that a predatory, exploitative tendency may be the most relevant personality risk factor for engaging in bullying, over and above other personality traits related to antisocial tendencies.

In contrast to previous studies that found bullying perpetration is often associated with personality traits such as a lack of empathy, a general tendency to be disagreeable or angry, and higher impulsivity (e.g., Bollmer, Harris, & Milich, 2006; Caravita, Di Blasio, & Salmivalli, 2009; Tani, Greeman, Schneider, & Fregoso, 2003), I found lower Honesty-Humility and higher exploitativeness were associated with bullying, despite controlling for these other antisocial personality traits. In both Studies 1 and 3, I found that lower Honesty-Humility was the strongest correlate of bullying perpetration, over and above the other HEXACO personality traits. Although indirect and direct forms of bullying and Dictator Game point allocations were both negatively related with lower Agreeableness (and in Study 1 additionally related to lower Conscientiousness), Honesty-Humility was the strongest correlate. Thus, it appears that predatory exploitation over weaker individuals may be the driving personality factor facilitating bullying, even if the
other antisocial traits are still important and associated with bullying. These results are consistent with recent findings that although Honesty-Humility, Emotionality, Agreeableness, and Conscientiousness from the HEXACO were all associated with antisocial tendencies, Honesty-Humility was the largest and driving contributor of antisociality (Book et al., 2016; Book, Visser & Volk, 2015; Hodson et al., 2018).

However, it is important to note that lower Conscientiousness was additionally a significant multivariate predictor of direct, but not indirect, bullying. This result demonstrates that in addition to reflecting strategical exploitation, direct forms of bullying like hitting, pushing, or kicking, may reflect a risky form of antisocial behavior that is associated with a general recklessness (Volk et al., 2014). These indirect associations are also consistent with theories of a faster life history, which posit that certain individuals who experience competitive or adverse social environments may be more likely to engage in more impulsive and aggressive behavior to obtain immediate, short-term access to resources, and bullying may be one behavior that can reflect this strategy (Dane, Marini, Volk, & Vaillancourt, 2017; Del Giudice & Belsky, 2011; Hawley, 2011). Interestingly, unlike Agreeableness and Conscientiousness, which had at least univariate associations with bullying, lower Emotionality or lower empathy had the fewest univariate and multivariate associations with adolescent bullying.

Although contrasting with the prevalent theories linking lower empathy with bullying, our lack of association agrees with more contemporary theories of adolescent bullying as an adaptive, predatory strategy. In Study 1, lower Emotionality was not significantly related at either the univariate or multivariate levels with bullying, and in Study 2, lower empathy was only concurrently, but not longitudinally, related with higher
bullying. My results are in contrast to those of previous researchers who found significant associations between child bullying and lower empathy (e.g., Caravita et al., 2009; Zych, Ttofi, & Farrington, 2016). Instead, my findings support my prediction that instead of a lack of emotional recognition or response, a predatory exploitation of others’ weaknesses may be an important reason why adolescents bully. This may be one potential reason why empathy related interventions may have been largely ineffective for adolescents (Yeager, Fong, Lee, & Espelage, 2015). Taken together, all three studies not only support existing literature on the concurrent association between exploitative style traits and adolescent bullying (e.g., Book et al., 2012), but extend on these findings by providing both quasi-experimental and longitudinal evidence for this association. These results with personality and bullying also suggest that not every risk factor for bullying affects all adolescents in the same way. Instead, adolescents with specific personality traits may be more likely and willing to use bullying. Further, adolescents with these personality traits can respond to, or are influenced by, particular environments in multiple ways (Caspi et al., 2002; Marceau et al., 2013; Moffitt, 2005; Scarr & McCartney, 1983). In my thesis, these associations between environment and personality were evident through the multiple social environmental variables that were indirectly associated with bullying through exploitative personality styles.

Bullying Perpetration and Indirect Associations with Broader Social Ecology

Across the three studies, it was evident that not all social environments facilitate bullying in the same way for all adolescents. Instead as expected, I found that multiple adverse and risky social environment variables filtered specifically through exploitative personality traits to indirectly facilitate adolescent bullying. These social environmental
variables were from multiple ecological systems ranging from proximate economic power contexts and peer and family relationships, to distal school and community variables. Starting with the more proximate factors, all three studies demonstrated that social relationships in the microsystem (i.e., immediate social context), had indirect associations with bullying most frequently through either lower Honesty-Humility (i.e., Study 1 and 3), or higher exploitation (i.e., Study 2), as opposed to other antisocial personality traits. Occasionally in Study 1, a proximate ecological factor was found to have an indirect effect with bullying primarily through Honesty-Humility and secondarily through lower Conscientiousness. In these instances, the strength of the indirect associations through Honesty-Humility and Conscientiousness were often comparable, as indicated through the standardized beta coefficients. The associations with Honesty-Humility and exploitation may be a result of predatory individuals being able to strategically take advantage of adverse and/or risky social ecological circumstances.

Adverse social relationships including poorer family dynamics and higher peer problems, along with powerful social positions such as higher social status (i.e., Study 2) or higher interpersonal influence (i.e., Study 1 and 3), appeared to be risk factors indirectly associated with bullying through exploitative personality styles. Individuals with higher social status or social influence, and individuals who experience negative social relationships characterized by conflict, lower support and lower warmth, may exploit these social environments. For example, adolescents who know their parents do not have much knowledge or care for their whereabouts may take advantage of this lack of interest by engaging in bullying, knowing that they would have fewer repercussions. Likewise, adolescents who know they have poorer friendships may exploit these friends
and employ these friends in bullying strategies. Finally, exploiting these relationships may be especially advantageous for adolescents who have higher social status, as they would likely have greater influence when navigating their peer networks to effectively assert their power through bullying tactics. These concurrent results held longitudinally across three years of adolescence, and also held when manipulating dyadic economic contexts in a laboratory setting.

These results are consistent with broader evolutionary frameworks that help explain the use of aggressive behavior. Bullying may be a facultative or conditional adaptation that an adolescent may consciously or subconsciously decide to engage in after evaluating his or her own personality traits (i.e., exploitative tendencies; Buss, 2011) in combination with their broader environments (e.g., friendships, family relationships, social status; Dane et al., 2017; Del Giudice & Belsky, 2011; Hawley, 2011; Volk, Camilleri, Dane, & Marini, 2012). Adverse and negative social environments may also facilitate faster life history strategies that encourage aggressive behavior like bullying (as opposed to cooperative, long-term strategies) as an immediate means for resources (Del Giudice & Belsky, 2011; Hawley, 2011). After these assessments of the self and environment, an adolescent may anticipate the immediate benefits of bullying over weaker peers may outweigh the costs. Additionally, if previous uses of bullying have been successful, these dominant and exploitative adolescents may be more inclined to use this behavior again (Dawkins, 1989). Alternatively, adolescents who possess certain genetically based personality traits such as exploitative tendencies, may already be more likely to use coercive or bullying behavior, as opposed to prosocial or cooperative forms of behavior (Del Giudice & Belsky, 2011).
In addition to evolutionary frameworks, my results are consistent with Bronfenbrenner’s Ecological Systems Theory (EST; Bronfenbrenner, 1979), and with recent findings that multiple ecological levels can differentially facilitate bullying perpetration (e.g., Hong & Espelage, 2012). Furthermore, my results demonstrate that multiple ecological contexts can have indirect associations with individual differences in personality, similar to previous ecological studies on bullying (e.g., Barboza et al., 2009; Lee, 2011; Low & Espelage, 2014). However, my results provide some key novel contributions. My findings demonstrate that there are indirect associations from adverse parental and peer relationships and socially powerful positions to bullying, specifically through exploitative traits, as opposed to other antisocial personality traits. These results are likely due to the reason that exploitative adolescents may be more willing and able to take advantage of adverse relationships and powerful positions.

It is likely that within these environmental contexts, exploitative adolescents may experience more social benefits when using bullying (e.g., increased social status), and may simultaneously have fewer costs imposed by parents and/or weaker peers. One of the most noteworthy and prominent social ecological variables that emerged were status related variables that indicate higher power. Across all three studies, it was evident that higher social status (i.e., Study 2) or higher interpersonal influence (i.e., Studies 1 and 3) were commonly associated with bullying through exploitative personality, and this association held concurrently, longitudinally, and in a laboratory based experimental setting. Bullying is fundamentally about a power imbalance (Volk et al., 2014). By definition, bullying requires an individual with more power to inflict harm on a weaker individual. As evident throughout animal studies (e.g., hierarchy in hyenas; Stewart,
1987), and in research in which human participants are assigned a powerful role (e.g., role of prison guards; Haney, Banks, & Zimbardo, 1973), a position of higher status and social power can be translated into gaining resources at the expense of others. It is not surprising then, that this fundamental feature that distinguishes bullying from other forms of aggression is reflected in the broader adolescent social ecology. Those willing to use power to inflict harm on weaker peers may be more effective in doing so if they have exploitative, predatory tendencies (as opposed a general lack of concern or empathy for others). These exploitative tendencies will ultimately assist in taking advantage of higher social status and influence to strategically bully weaker peers, who are less likely to defend themselves and/or retaliate.

My findings are similar to previous associations between strategic adolescent bullying and higher perceived popularity, social status, and influence (Dijkstra, Lindenberg, & Veenstra, 2008; Garandeau, Lee, & Salmivalli, 2013; Pellegrini & Long, 2002; Reijntjes et al., 2013; Sentse, Veenstra, Kiuru, & Salmivalli, 2015; Sijtsema, Veenstra, Lindenberg, & Salmivalli, 2009). Additionally, these results are consistent with those of previous researchers who found that although adolescents who bully can be high in peer-perceived popularity, power, and status, they are not necessarily socially preferred or liked by peers as friends (Vaillancourt & Hymel 2006). Researchers have found that early adolescence is a developmental period when peer-perceived popularity is most valued (LaFontana & Cillessen, 2010). As a result, given that adolescents may be exploiting their social status to engage in bullying, my results support the notion that bullying can be used selectively and adaptively by adolescents for status, a goal that is
highly salient during adolescence. A similar pattern of indirect effects also emerged with more distal ecological variables.

Adverse mesosystem variables (i.e., interactions among immediate social environments), and macrosystem variables (i.e., broader cultural attitudes and values) also indirectly facilitated bullying through either lower Honesty-Humility or higher exploitation. Risky, negative aspects of the social environment such as higher neighborhood violence, higher school competition, and adverse school climates were indirectly associated with bullying. It appears that in addition to immediate social environments, exploitative adolescents may take advantage of wider negative climates to engage in bullying for self-gain. These broader adverse environments may not provide the social structures including discipline that could prevent adolescents from acting on their exploitative motivations. Thus, in addition to assessments of the self and environment, adolescents may have learned the benefits of bullying within these environments outweigh the costs through vicarious reinforcement, consistent with the Social Learning Theory (Bandura, 1978). The fact that risky environments filtered through both lower Honesty-Humility and lower Conscientiousness for direct bullying behavior in Study 1 suggests that while all forms of bullying can be strategically implemented within the right conditions, direct forms of bullying behavior also reflect a recklessness for consequences (Volk et al., 2014), and a tendency to engage in riskier, aggressive behavior for immediate gain (Del Giudice & Belsky, 2011). Accordingly, these findings further provide support that not all environments affect all adolescents the same way. Although predatory, exploitative tendencies appear to filter both proximate and distal adverse social environments for bullying perpetration, there are even subtle
differences in the bullying behavior used. Poorer social relationships, higher social status, and more competitive and violent school and neighborhood variables appear to be risk factors for engaging in bullying as a whole. These variables appear to be risk factors for exploitative adolescents who may strategically take advantage of these contexts to adaptively bully. However, these adverse environments may also be risk factors for generally impulsive or reckless adolescents willing to engage in direct forms of bullying. Accordingly, there appears to be a successful facultative translation of these risky social environments into adaptive bullying behavior by adolescents with a primarily predatory, exploitatively personality style.

Taken together, my results are consistent with previous findings on poorer social relations interacting with Honesty-Humility to predict bullying (e.g., lower parental knowledge; Farrell, Provenzano, Dane, Marini, & Volk, 2017), and with additional ecological findings on personality interacting with or indirectly linking social environments for bullying (Barboza et al., 2009; Lee, 2011; Low & Espelage, 2014). My findings suggest that adolescents who bully may not necessarily be generally disagreeable, antisocial individuals with a lack of empathy. Instead, adolescent perpetrators may be strategic, exploitative individuals who are able to take advantage of their broader social environments and immediate social influence to gain more benefits, while simultaneously reducing costs. Both Studies 1 and 2 demonstrated that the distal and proximate environmental contexts may adaptively filter through an exploitative personality trait to predict bullying, a behavior rooted in taking advantage of power. However, Study 3 extended findings from the previous two studies by demonstrating how proximate contextual factors like power can be manipulated to examine bullying and/or
similarly related competitive behavior, and how these forms of behavior relate with personality. Despite these significant contributions, this dissertation was not without limitations.

**Limitations**

The results of this dissertation provide some important findings and implications on the complex social ecology of bullying. However, there are some limitations to consider. First, the majority of the measures across the studies were self-report measures, with the exception of parent reports in Study 2 and economic behavior in Study 3. As a result, shared method variance may inflate some of the associations that I found (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Future studies may benefit from the inclusion of additional observer reports, including peer-rated nominations of bullying and popularity, and observer ratings by parents and teachers (Volk, Veenstra, & Espelage, 2017). However, all studies used measures that had evidence of high reliability and validity to ensure that any biases could be minimized. Participants were also ensured confidentiality in all three studies to promote honesty in responses and minimize any biases of social desirability. It is also possible that self-reports may assess aspects of motivations behind bullying behavior that may not necessarily be captured in observer or peer-reports, which further validates the importance of self-reports (Volk, Dane, Marini, & Vaillancourt 2015; Volk et al., 2017).

A second limitation was the lack of heterogeneity in samples from Study 1 and Study 3. These two studies used predominantly White samples from Southern Ontario, including adolescent extracurricular activities in Study 1, and an undergraduate sample in Study 3. Accordingly, there was a modest, restricted range of socio-economic status,
neighborhood violence, and other social ecological variables. This may also help explain the low levels of bullying perpetration and the positively skewed distribution of bullying in these studies. Similar to bullying perpetration and these ecological variables, it is likely then, that our samples were restricted in the range of antisocial personality traits, and in turn, limited the effect sizes that could be found in these studies. Thus, I must be cautious of over-generalizing my results both overall, and to more extreme samples of adolescents (e.g., adolescents engaging in juvenile delinquency, incarcerated adolescents, or adolescents from extremely violent and impoverished communities).

Third, I focused primarily on middle adolescent samples for the concurrent and longitudinal studies, and an older adolescent sample for the laboratory-based study. Thus, I am unable to generalize these results to younger, preadolescent samples, especially because the ecological and developmental contexts for adaptive bullying perpetration may be different for younger samples. Additionally, given that the laboratory-based study was conducted on a modest size of an older adolescent university sample, I must replicate this study in a larger sample, and also among different stages of adolescence (i.e., high school students) to determine whether similar patterns of results are generalizable across adolescence. Moreover, randomly assigning participants to participate in the economic games may also strengthen the study. Therefore, future studies may want to incorporate samples with more heterogeneity in socio-economic background, ethnicity, personality, and age, and replicate the laboratory study with random assignment to experimental conditions.

Fourth, there were limitations regarding statistical and conceptual ecological issues. For example, in all three studies, there were many parameters estimated in
comparison to cases (Kline, 2016). This often underestimates the power to detect associations, in particular in longitudinal cascade models that control for both concurrent associations and autoregressive stability paths. This restriction may have contributed to reduced significance levels across all three studies, and as a result, the detection of fewer significance effects. However, this pattern is generally consistent in longitudinal psychological studies (Masten & Cicchetti, 2010; Twisk, 2003; Vaillancourt et al., 2013). This pattern is also consistent with ecological studies in the broader domains of biology and community ecology, and ultimately reflects the complex nature of multiple reciprocal associations that characterize reality (Cressie, Calder, Clark, Ver Hoef, & Wikle, 2009; Krivstov, 2004; Wootton, 2002). The fact that I was still able to find a consistent pattern of environment-personality associations with bullying despite controlling for multiple associations is a strength to this dissertation.

Finally, an important caveat in drawing conclusions regarding the contexts that adaptively facilitate bullying is that I did not actually measure or test whether these contexts are related to adaptive outcomes such as material, social, or romantic resources. Instead, I investigated what individual and environmental contexts could facilitate adaptive for adolescents to use bullying behavior in the first place. Thus, I examined the adaptive motivations for adolescents to engage in bullying behavior. It is only through first identifying these ecological factors that anti-bullying initiatives can be informed about what factors and motivations to intervene. Previous studies have found evidence for bullying being related to material resources (Volk et al., 2014), social status, (Kretschmer, Veenstra, Deković, & Oldehinkel, 2017; Reijntjes et al., 2013), and dating and sexual partners (Volk, et al., 2015; Provenzano, Dane, Farrell, Marini, & Volk,
2017). As a result, the natural next step for future research would be to determine whether certain individual and environmental contexts actually lead to adaptive versus maladaptive outcomes for bullying perpetration.

**Conclusions and Implications**

In summary, findings from this dissertation demonstrated the complex associations between personality and social environments to facilitate adaptive bullying perpetration. Results from the three studies revealed that various social environmental factors including economic conditions, family relations, social status, peer relations, school climate, and neighborhood factors can affect adolescents in different ways. Exploitative adolescents are primarily likely to take advantage of his or her high social status, family environment, and adverse school climate to strategically use bullying behavior, in particular if limited costs, sanctions, and retaliations are also perceived. The three studies highlight the need for anti-bullying initiatives to recognize that bullying perpetration can be understood from both a developmental and contextual perspective. All three studies used different samples that covered a range of adolescent development from early and middle adolescence (Studies 1 and 2), to late adolescence (Study 3). The changes and continuities of the adolescent developmental period must be recognized, and the multiple social-ecological contexts that facilitate bullying during this developmental period should also be understood, and in particular for whom.

If exploitative adolescents are taking advantage of risky environments and social status to reap salient social benefits, then existing strategies to increase empathy, will likely be ineffective in interventions since they do not provide any benefits to adolescent perpetrators if they choose to stop bullying (Yeager et al., 2015). Alternatively, existing
zero-tolerance policies may not be effective unless the costs imposed are pragmatically and reliably implemented, and unless adolescents perceive the costs of these policies to outweigh the social benefits of engaging in bullying. Accordingly, stakeholders can identify the contexts that benefit exploitative adolescents who bully, and modify these factors to further increase the costs of bullying for adolescents such as through reducing perceived popularity (e.g., peer disapproval, bystander intervention). Moreover, by providing prosocial, alternative methods to still obtain valued resources may be an effective way to reduce bullying (Ellis, Volk, Gonzalez, & Embry, 2015). For instance, school activities, roles, and extracurriculars that are prosocial, but still enhance social status, may be one effective intervention. The results of my three dissertation studies also emphasize the need to reduce power hierarchies in social environments, whether within the family, school, or among peers, in particular for individuals willing to exploit these power dynamics in antisocial ways. Accordingly, maximizing the fit between the individuals and environment may be an effective way to reduce bullying perpetration in particular during adolescence (Elsaesser, Hong, & Voisin, 2016; Hong, Cho, Allen-Meares, & Espelage, 2011; Voisin, Patel, Hong, Takahashi, & Gaylord-Harden, 2016).

In future longitudinal and experimental studies, researchers may want to further investigate the development of traits like exploitation and empathy from childhood into adolescence. This may help identify the developmental period when the importance of particular traits begins or ends, when one trait becomes more important than the other, and the periods that particular environment variables are more readily filtered through these traits. For instance, when do environmental variables like parents, social status, or school factors increase or decrease in relation to bullying through exploitation? Also,
when are some variables more important for exploitation particularly during adolescence in comparison to childhood? Continued research on the social-ecological associations across development will help expand the complex web of factors that influence bullying.
References


APPENDIX A: Ethics Clearance (Study 1)

Social Science Research Ethics Board

Certificate of Ethics Clearance for Human Participant Research

DATE: 2/5/2016

PRINCIPAL INVESTIGATOR: VOLL, Anthony - Child and Youth Studies

CO-INVESTIGATOR(S): Angela Book; Andrew Dane; Zopito Marin; Elizabeth Shulman

FILE: 15-173 - VOLL

TYPE: Undergraduate STUDENT: Ann Farrell Masters Thesis/Project SUPERVISOR: Anthony Volk

TITLE: Adolescent Social Relationships

ETHICS CLEARANCE GRANTED

The Brock University Social Science Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 2/5/2016 to 2/28/2017.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 2/28/2017. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics website at http://www.brocku.ca/research/policies-and-forms/research-forms.

In addition, throughout your research, you must report promptly to the REB:

   a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
   b) All adverse and/or unanticipated experiences or events that may have real or potential unwarranted implications for participants;
   c) New information that may adversely affect the safety of the participants or the conduct of the study;
   d) Any changes in your source of funding or new funding to a previously untended project.

We wish you success with your research.

Approved:

[Signature]
Kimberly Match, Chair
Social Science Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.
APPENDIX B: HEXACO Personality Inventory (Study 1 & Study 3)

Please read each statement and decide how much you agree or disagree with that statement. Then write your response in the space next to the statement using the following scale. Please answer every statement, even if you are not completely sure of your response.

1 = strongly disagree  2 = disagree  3 = neutral  4 = agree  5 = strongly agree

1. I would be quite bored by a visit to an art gallery.
2. I plan ahead and organize things, to avoid scrambling at the last minute.
3. I rarely hold a grudge, even against people who have badly wronged me.
4. I feel reasonably satisfied with myself overall.
5. I would feel afraid if I had to travel in bad weather conditions.
6. I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed.
7. I'm interested in learning about the history and politics of other countries.
8. I often push myself very hard when trying to achieve a goal.
9. People sometimes tell me that I am too critical of others.
10. I rarely express my opinions in group meetings.
11. I sometimes can't help worrying about little things.
12. If I knew that I could never get caught, I would be willing to steal a million dollars.
13. I would enjoy creating a work of art, such as a novel, a song, or a painting.
14. When working on something, I don't pay much attention to small details.
15. People sometimes tell me that I'm too stubborn.
16. I prefer jobs that involve active social interaction to those that involve working alone.
17. When I suffer from a painful experience, I need someone to make me feel comfortable.
18. Having a lot of money is not especially important to me.
19. I think that paying attention to radical ideas is a waste of time.
20. I make decisions based on the feeling of the moment rather than on careful thought.
21. People think of me as someone who has a quick temper.
22. On most days, I feel cheerful and optimistic.
23. I feel like crying when I see other people crying.
24. I think that I am entitled to more respect than the average person is.
25. If I had the opportunity, I would like to attend a classical music concert.
26. When working, I sometimes have difficulties due to being disorganized.
27. My attitude toward people who have treated me badly is “forgive and forget”.
28. I feel that I am an unpopular person.
When it comes to physical danger, I am very fearful.

If I want something from someone, I will laugh at that person's worst jokes.

I've never really enjoyed looking through an encyclopedia.

I do only the minimum amount of work needed to get by.

I tend to be lenient in judging other people.

In social situations, I'm usually the one who makes the first move.

I worry a lot less than most people do.

I would never accept a bribe, even if it were very large.

People have often told me that I have a good imagination.

I always try to be accurate in my work, even at the expense of time.

I am usually quite flexible in my opinions when people disagree with me.

The first thing that I always do in a new place is to make friends.

I can handle difficult situations without needing emotional support from anyone else.

I would get a lot of pleasure from owning expensive luxury goods.

I like people who have unconventional views.

I make a lot of mistakes because I don’t think before I act.

Most people tend to get angry more quickly than I do.

Most people are more upbeat and dynamic than I generally am.

I feel strong emotions when someone close to me is going away for a long time.

I want people to know that I am an important person of high status.

I don’t think of myself as the artistic or creative type.

People often call me a perfectionist.

Even when people make a lot of mistakes, I rarely say anything negative.

I sometimes feel that I am a worthless person.

Even in an emergency I wouldn’t feel like panicking.

I wouldn’t pretend to like someone just to get that person to do favors for me.

I find it boring to discuss philosophy.

I prefer to do whatever comes to mind, rather than stick to a plan.

When people tell me that I’m wrong, my first reaction is to argue with them.

When I’m in a group of people, I’m often the one who speaks on behalf of the group.

I remain unemotional even in situations where most people get very sentimental.

I’d be tempted to use counterfeit money, if I were sure I could get away with it.
APPENDIX C: Parental Knowledge (Study 1)

Please rate how often your parents know the following about you.

<table>
<thead>
<tr>
<th>How often do your parents know…</th>
<th>ALMOST NEVER</th>
<th>HARDLY EVER</th>
<th>SOMETIMES</th>
<th>FAIRLY OFTEN</th>
<th>VERY OFTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What you do with your free time?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Which friends you spend free time with?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. What you have to do for homework?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. How you are doing in different subjects at school?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Where you go when you go out with friends at night?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Where you go or what you do after school?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. When you have an exam or paper due at school?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. What you spend your money on?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. In the last month, have your parents had no idea of where you were at night?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
This questionnaire is designed to assess the way in which you mentally represent important people in your life. You'll be asked to answer questions about your parents, your romantic partners, and your friends. Please indicate the extent to which you agree or disagree with each statement by circling a number for each item.

Please answer the following questions about your best friend.

1. It helps to turn to this person in times of need.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

2. I usually discuss my problems and concerns with this person.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

3. I talk things over with this person.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

4. I find it easy to depend on this person.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

5. I don't feel comfortable opening up to this person.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

6. I prefer not to show this person how I feel deep down.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

7. I often worry that this person doesn't really care for me.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

8. I'm afraid that this person may abandon me.
   strongly disagree  1  2  3  4  5  6  7  strongly agree

9. I worry that this person won't care about me as much as I care about him or her.
   strongly disagree  1  2  3  4  5  6  7  strongly agree
APPENDIX E: Interpersonal Influence (Study 1 & Study 3)

Instructions: How true are the following statements?

Response Scale:
1 = never true, 2 = hardly ever true, 3 = sometimes true, 4 = often true, 5 = almost always true

1. I am good at being able to get what I want from others
2. I usually get what I need, even if others don’t
3. I am able to get others to do what I say
4. I have a lot of power over others
5. In groups I am usually in charge or in control
6. I usually get my way when I deal with others
APPENDIX F: School Social Competition (Study 1)

Please rate how much you agree with each of the sentences using the rating scale below:

1 = strongly disagree  2 = disagree  3 = agree  4 = strongly agree

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I don’t try hard because nobody likes a teacher’s pet</td>
</tr>
<tr>
<td>2</td>
<td>I don’t always try hard in class because people won’t like me if I do</td>
</tr>
<tr>
<td>3</td>
<td>I try hard so that I can make fun of people who aren’t as good as me</td>
</tr>
<tr>
<td>4</td>
<td>I enjoy the challenge of hard work</td>
</tr>
<tr>
<td>5</td>
<td>Doing badly in class makes children look good</td>
</tr>
<tr>
<td>6</td>
<td>I wouldn’t like to stand out as better than others in the class</td>
</tr>
</tbody>
</table>


APPENDIX G: School Bully Norms (Study 1)

Imagine that an ordinary student in your class behaved in ways described below. What would be the consequences? What would other students in your class think of that, and how would they respond? Please respond about how you think would actually happen in your class, and not what you think should happen. Additionally, please answer these questions based on what would happen if anyone in your class behaved this way, and not just you. Please rate each item using the rating scale below:

1 = nothing special would happen  
2 = the others would think he/she is a nice fellow  
3 = the others would show approval to him/her  
4 = the others would admire him/her  
5 = the others would start avoiding him/her  
6 = the others would think he/she is stupid  
7 = the others would show disapproval to him/her

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A classmate making friends with the bullied victim</td>
</tr>
<tr>
<td>2</td>
<td>A classmate laughing with others when someone is being bullied</td>
</tr>
<tr>
<td>3</td>
<td>A classmate telling the teacher about the bullying</td>
</tr>
<tr>
<td>4</td>
<td>A classmate joining in the bullying</td>
</tr>
<tr>
<td>5</td>
<td>A classmate amusing others by ridiculing a classmate over and over again</td>
</tr>
</tbody>
</table>
APPENDIX H: Neighborhood Violence (Study 1)

How often do you hear or see the following in your neighbourhood, in your school, or at your home?

1 = never   2 = rarely   3 = sometimes   4 = often

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have heard guns being shot.</td>
</tr>
<tr>
<td>2</td>
<td>I have seen somebody arrested.</td>
</tr>
<tr>
<td>3</td>
<td>I have seen drug deals.</td>
</tr>
<tr>
<td>4</td>
<td>I have seen somebody being beaten up.</td>
</tr>
<tr>
<td>5</td>
<td>I have seen gangs.</td>
</tr>
</tbody>
</table>
APPENDIX I: Ethics Clearance (Study 2)

Université d’Ottawa  
Bureau d’éthique et d’intégrité de la recherche

University of Ottawa  
Office of Research Ethics and Integrity

Ethics Approval Notice  
Social Sciences and Humanities REB

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**Principal Investigator / Supervisor / Co-investigator(s) / Student(s)**

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<th>Last Name</th>
<th>Affiliation</th>
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<td>Tracy</td>
<td>Vaillancourt</td>
<td>Education / Education</td>
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**File Number:** 08-11-03B

**Type of Project:** Professor

**Title:** McMaster longitudinal study for adolescents and young adults

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<th>Expiry Date (mm/dd/yyyy)</th>
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<td>08/10/2018</td>
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</table>

**Special Conditions / Comments:**  
N/A
This is to confirm that the University of Ottawa Research Ethics Board identified above, which operates in accordance with the Tri-Council Policy Statement (2010) and other applicable laws and regulations in Ontario, has examined and approved the ethics application for the above named research project. Ethics approval is valid for the period indicated above and subject to the conditions listed in the section entitled “Special Conditions / Comments”.

During the course of the project, the protocol may not be modified without prior written approval from the REB except when necessary to remove participants from immediate endangerment or when the modification(s) pertain to only administrative or logistical components of the project (e.g., change of telephone number). Investigators must also promptly alert the REB of any changes which increase the risk to participant(s), any changes which considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project and safety of the participant(s). Modifications to the project, including consent and recruitment documentation, should be submitted to the Ethics Office for approval using the “Modification to research project” form available at: https://research.uottawa.ca/ethics/forms.

Please submit an annual report to the Ethics Office four weeks before the above-referenced expiry date to request a renewal of this ethics approval. To close the file, a final report must be submitted. These documents can be found at: https://research.uottawa.ca/ethics/forms.

If you have any questions, please do not hesitate to contact the Ethics Office at extension 5387 or by e-mail at: ethics@uottawa.ca.

Signature:

Mélanie Rioux
Ethics Coordinator
For Catherine Paquet, Director of the Office of Research Ethics and Integrity
APPENDIX J: Ethics Clearance (Study 3)

Brock University
Research Ethics Office
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Certificate of Ethics Clearance for Human Participant Research

DATE: 9/20/2016
PRINCIPAL INVESTIGATOR: VOLK, Tony - Child and Youth Studies
FILE: 16-022 - VOLK
TYPE: Ph. D. STUDENT: Ann Farrell
SUPERVISOR: Tony Volk

Title: Adolescent Social Relationships

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW Expiry Date: 9/29/2017

The Brock University Social Science Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 9/20/2016 to 9/29/2017.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 9/29/2017. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page at http://www.brocku.ca/research/policies-and-forms/research-forms.

In addition, throughout your research, you must report promptly to the REB:
   a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
   b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
   c) New information that may adversely affect the safety of the participants or the conduct of the study;
   d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved:

[Signature]
Jan Pijpers, Chair
Social Science Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.
APPENDIX K: Economic Game Instructions (Study 3)

You will be participating in a couple tasks that look at decision-making, social relationships, and personality.

For the next three tasks, you are randomly selected as the “Allocator,” while another participant completing this task in the lab next door is selected as the “Recipient.” In a moment you will be asked to allocate or divide $10 between yourself and the Recipient in whatever way you please, but the total of allocations must equal $10. You can give as much or as little of this $10 to yourself or to the Recipient. You will be completing 3 versions of this task. Each version will have 3 trials, for a total of 9 trials. At the end of all tasks, 1 of the 9 trials will be randomly chosen. The division of $10 for the randomly chosen trial will be the amount that you and the Recipient will get to keep. If you prefer, you can decide to trade the money allocated for SONA credits. All allocations will remain anonymous to the Recipient until the random trial is chosen. If you have any questions concerning the process, please ask the researcher.

**Dictator Game Instructions (Powerful Condition)**

In this version of the task, you will be asked to divide the $10 between you and the Recipient in whatever way you please, but the total of divisions must equal $10. You can give as much or as little of this $10 to yourself or to the Recipient. The Recipient will have no choice but to ACCEPT BOTH ALLOCATIONS. All allocations will remain anonymous to the Recipient until the random trial is chosen. If you have any questions concerning the process, please ask the researcher.

Check for instructions:
What is the Recipient able to do with the allocations?
Accept __
Reject __

Trial:

How much of the $10 will you allocate to yourself?
1 2 3 4 5 6 7 8 9 10

How much of the $10 will you allocate to the Recipient?
1 2 3 4 5 6 7 8 9 10

Please ensure that the amount allocated to you and the recipient totals $10:

$_____ (amount to self) + $_____ (amount to Recipient) = $_____
Ultimatum Game Instructions (Equal Power Condition)

In this version of the task, you will be asked to divide the $10 between you and the Recipient in whatever way you please, but the total of divisions must equal $10. You can give as much or as little of this $10 to yourself or to the Recipient. The Recipient will have the option to reject both allocations. If the Recipient rejects your allocation, both you and the recipient will receive NO money. If the Recipient accepts your allocation, both you and the recipient will receive the allocated amounts. All allocations and Recipient decisions will remain anonymous until the random trial is chosen. If you have any questions concerning the process, please ask the researcher.

Check for instructions:
If the recipient rejects allocations, who will receive the money?
You __
Recipient __
Neither __
Both __

Trial:

How much of the $10 will you allocate to yourself?
1  2  3  4  5  6  7  8  9  10

How much of the $10 will you allocate to the Recipient?
1  2  3  4  5  6  7  8  9  10

Please ensure that the amount allocated to you and the recipient totals $10:

$____ (amount to self) + $ ____ (amount to Recipient) = $____

Ultimatum Variation Game Instructions (Powerless Condition)

In this version of the task, you will be asked to divide the $10 between you and the Recipient in whatever way you please, but the total of divisions must equal $10. You can give as much of this $10 to yourself or to the Recipient. The Recipient will have the option to reject only your allocation but keep their own allocation. If the Recipient rejects your allocation, ONLY the Recipient will receive their allocation, but you will receive NO money. All divisions and Recipient decisions will remain anonymous until the random trial is chosen. If you have any questions concerning the process, please ask the researcher.

Check for instructions:
If the recipient rejects allocations, who will receive the money?
You __
Recipient __
Neither __
Both __

Trial:

How much of the $10 will you allocate to yourself?
1 2 3 4 5 6 7 8 9 10

How much of the $10 will you allocate to the Recipient?
1 2 3 4 5 6 7 8 9 10

Please ensure that the amount allocated to you and the recipient totals $10:

$_____ (amount to self) + $_____ (amount to Recipient) = $_____
APPENDIX L: Bullying Perpetration (Study 3)

Below are some questions about social relationships at school. Please answer them as honestly as you can. Your answers will be kept completely confidential, and there is no way for anyone to determine your answers about your relationship with them or anyone else.

1. In school, how often have you made fun of someone much weaker or less popular because of their religion or race last year?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

2. In school, how often have you made fun of someone much weaker or less popular because of the way they looked or talked last year?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

3. In school, how often have you hit, slapped, or pushed someone much weaker or less popular last year?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

4. In school, how often have you threatened, yelled at, or verbally insulted someone much weaker or less popular last year?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

5. In school, how often have you spread rumours, mean lies, or actively excluded someone much weaker or less popular last year?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week
6. In school, how often have you made sexual jokes, comments, or gestures aimed at someone much weaker or less popular last year?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

7. In school, how often have you made any of the acts against someone electronically last year?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

Below are some questions about your relationship with your sibling. If you do not have any siblings please select “Not Applicable”:

Not Applicable: ______

Please answer them as honestly as you can. Your answers will be kept completely confidential, and there is no way for anyone to determine your answers about your relationship with them or anyone else.

1. Growing up, how often have you made fun of a weaker or less popular sibling because of their religion or race last term?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

2. Growing up, how often have you made fun of a weaker or less popular sibling because of the way they looked or talked last term?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

3. Growing up, how often have you hit, slapped, or pushed a weaker or less popular
sibling?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

4. Growing up, how often have you threatened, yelled at, or verbally a weaker or less popular sibling?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

5. Growing up, how often have you spread rumours, mean lies, or actively excluded a weaker or less popular sibling?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

6. Growing up, how often have you made sexual jokes, comments, or gestures aimed at a weaker or less popular sibling?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week

7. Growing up, how often have you made any of the acts against a weaker or less popular sibling electronically?
   a) that hasn’t happened
   b) once or twice
   c) once a month
   d) once a week
   e) several times a week
APPENDIX M: Material Resources (Study 3)

Material Values Scale

Indicate your agreement with the following statements. Use the following scale to respond to each statement.

1 = strongly disagree    2 = disagree    3 = neutral    4 = agree    5 = strongly agree

Defining Success

1  I admire people who own expensive homes, cars, and clothes.
2  Some of the most important achievements in life include acquiring material possessions.
3  I don’t place much emphasis on the amount of material objects people own as a sign of success.
4  The things I own say a lot about how well I’m doing in life.
5  I own things that impress people.

Acquisition Centrality

1  I live a simple life, as far as possessions are concerned.
2  The things I own aren’t all that important to me.
3  Buying things gives me a lot of pleasure.
4  I have a lot of luxury things in my life.
5  I own less material things than most people I know.

Pursuit of Happiness

1  I have all the things I really need to enjoy life.
2  My life would be better if I owned certain things I don’t have.
3  I wouldn’t be any happier if I owned nicer things.
4  I’d be happier if I could afford to buy more things.
5  It sometimes bothers me quite a bit that I can’t afford to buy all things I’d like.
APPENDIX N: Reproductively Relevant Resources (Study 3)

Socio-Sexual Orientation Inventory

Please respond honestly to the following questions:

1. With how many different partners have you had sex within the past 12 months?

   0  1  2  3  4  5-6  7-9  10-19  20 or more

2. With how many different partners have you had sexual intercourse on one and only one occasion?

   0  1  2  3  4  5-6  7-9  10-19  20 or more

3. With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?

   0  1  2  3  4  5-6  7-9  10-19  20 or more

4. Sex without love is OK.

   1  2  3  4  5  6  7  8  9
   Strongly disagree  Strongly agree

5. I can imagine myself being comfortable and enjoying "casual" sex with different partners

   1  2  3  4  5  6  7  8  9
   Strongly disagree  Strongly agree

6. I do not want to have sex with a person until I am sure that we will have a long-term, serious relationship.

   1  2  3  4  5  6  7  8  9
   Strongly disagree  Strongly agree
7. How often do you have fantasies about having sex with someone you are not in a committed romantic relationship with?

- 1 – never
- 2 – very seldom
- 3 – about once every two or three months
- 4 – about once a month
- 5 – about once every two weeks
- 6 – about once a week
- 7 – several times per week
- 8 – nearly every day
- 9 – at least once a day

7. How often do you experience sexual arousal when you are in contact with someone you are not in a committed romantic relationship with?

- 1 – never
- 2 – very seldom
- 3 – about once every two or three months
- 4 – about once a month
- 5 – about once every two weeks
- 6 – about once a week
- 7 – several times per week
- 8 – nearly every day
- 9 – at least once a day

9. In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?
☐ 1 – never
☐ 2 – very seldom
☐ 3 – about once every two or three months
☐ 4 – about once a month
☐ 5 – about once every two weeks
☐ 6 – about once a week
☐ 7 – several times per week
☐ 8 – nearly every day
☐ 9 – at least once a day