

THE IMPORTANCE OF EXAMINING POSITIVE RELATIONSHIPS IN RISK
ASSESSMENT FOR CHILDREN WITH ANTISOCIAL BEHAVIOUR

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Abstract

When researchers and clinicians assess a child's risk for future antisocial behaviour, they often take a risk-focussed approach and fail to acknowledge the importance of protective factors, such as positive relationships. In the present study, I examined the moderating role of positive relationships in the association between overall risk and criminal and mental health outcomes. Participants were 256 boys and 176 girls who participated in Stop Now and Plan (SNAP), a gender-specific evidence-based program for children age 6-11 at risk of future antisocial behaviour. The Early Assessment Risk Lists (EARLs) were used to calculate risk scores and positive relationship scores. Criminal outcomes were determined from a criminal records search and mental health outcomes were gathered from parental report on the Child Behavior Checklist (CBCL).

Results for boys indicated that overall risk predicted criminal outcomes, and positive relationships reduced the likelihood of criminal outcomes across all levels of risk with a somewhat greater impact at higher levels of risk. Overall risk did not predict mental health outcomes; however, there was some support for positive relationships as a moderator between overall risk and mental health outcomes. These hypotheses were not confirmed for girls and reasons for these gender differences are discussed. Taken together, these findings suggest that it would be valuable to add positive relationships into risk assessment tools, particularly for boys. Positive relationships should continue to be a focus in intervention programs, particularly for boys at high levels of risk. Finally, girls should continue to be studied separately from boys as their unique trajectories still need to be understood.

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The Importance of Examining Positive Relationships in Risk Assessment for Children with Antisocial Behaviour

Introduction

The emotional and financial costs of crime have been well-established. Measures that accurately assess a child's risk for future antisocial behaviour, based on a child's current and past behaviours and functioning, are important tools in the prevention of crime (Farrington & Welsh, 2007). When assessing a child's risk for future challenges, researchers and clinicians often take a risk-focussed approach without including protective factors, such as positive relationships, in risk assessment. This is surprising, given that positive relationships with parents and peers appear to play an important role in the reduction of antisocial behaviour in children (Lösel & Farrington, 2012). In the present project, I explored the inclusion of positive relationships in the assessment of future risk for children with antisocial behaviour. More specifically, I examined whether positive relationships interact with risk factors and affect the latter's prediction of future criminal outcomes and mental health outcomes.

Risk assessment for antisocial behaviour typically relies on clinical tools that are used to evaluate an individual's likelihood of future antisocial behaviour based on his/her current risk factors. In the past 40 years, the field of psychological assessment has been shifting away from models of adversity and risk factors towards models of resilience and protective factors (Luthar & Zigler, 1991; Rutter, 1979). Measures that assess risk for antisocial behaviour have recently begun to reflect this shift; however, there remain questions about how to integrate an assessment of resilience into risk assessments and what factors should be included.

In the present project, I examined a risk assessment tool for children, the Early Assessment Risk Lists (EARL-20B for boys; Augimeri, Koegl, Webster, & Levene, 2001 and EARL-21G for girls; Levene et al., 2001). This tool, in its current form, does not include explicit information about protective factors. I examined whether low scores on its risk items concerning parent-child and peer relationships have a protective effect and moderate the association between risk factors and future criminal and mental health outcomes. Highlighting these protective factors in a more explicit way on these risk assessment tools could increase their utility in predicting a child's future criminal behaviour and mental health.

I used data from male and female participants previously admitted to Stop Now and Plan (SNAP), a gender-specific evidence-based program for at-risk 6-11 year olds at a children's mental health agency in Toronto, Ontario. I completed two related studies. In the first study, I sought to confirm that overall risk predicted criminal outcomes. Then I hypothesized that positive relationships moderate the association between risk factors and criminal outcomes. Furthermore, I proposed that positive relationships have differential impact in reducing the likelihood of criminal outcomes at varying levels of overall risk, with a greater impact at a higher level of overall risk. Last, I suggested that positive relationships have a stronger impact in reducing the likelihood of criminal outcomes for girls than for boys.

In the second study, I hypothesized that overall risk predicts mental health outcomes. Then I explored whether positive relationships moderated the association between risk factors and mental health outcomes. Mental health outcomes are particularly relevant for girls who exhibit antisocial behaviour. Aggressive girls can face different outcomes than aggressive boys; specifically girls have fewer criminal offences but more mental health difficulties, such as internalizing symptoms (Stack, Serbin, Schwartzman, & Ledingham, 2005). For this study, I

hypothesized that positive relationships moderate the association between risk factors and mental health outcomes, and that the impact of positive relationships differs at varying levels of overall risk, with a greater impact in the reduction of mental health outcomes at a higher level of overall risk. Last, I expected that positive relationships have a stronger impact in reducing mental health outcomes for girls than for boys. The criminal outcomes study is presented first because the primary purpose of the EARLs is to predict criminal outcomes. The mental health outcomes study is presented second, since it is expected to add additional information to the first study's findings, particularly relevant for girls. The two studies are also presented separately because of their different timeframes. While criminal outcomes are measured approximately eight years after intake, mental health outcomes are measured six months after intake.

Tools to Assess Risk for Antisocial Behaviour

The prediction of violent or antisocial behaviour has been a priority in psychology since the 1960s, when a United States Supreme Court decision launched the field of risk assessment for violent behaviour (Dolan & Doyle, 2000). The Court ruled that an individual, Johnnie Baxstrom, who had been detained beyond his sentence in an institution for the criminally insane, was entitled to be released or granted a hearing where the state would have to prove his current dangerousness. This decision led to the releases or transfers of nearly 1,000 offenders from institutions of the criminally insane to the community or lower security civic mental hospitals (Baxstrom v. Herold, 1966; Monahan, 1983). Not only was the idea of "current dangerousness" of criminals introduced, but clinicians and mental health researchers were asked to make predictions about the re-offence rates of these particular individuals. Mental health professionals' predictions of re-offence rates in this population were shown to be incorrect, with major overestimations in the prediction of offences (Steadman & Cocozza, 1974). Other studies over

the next few decades continued to suggest that clinicians and researchers had difficulty predicting criminal outcomes and re-offence rates (Cocozza & Steadman, 1976; Thornberry & Jacoby, 1979). One of the reasons for clinicians' challenges in the prediction of criminal behaviour was likely a lack of structured risk assessment tools.

In the 1990s, structured professional judgment risk assessment tools were developed in North America (Webster, Douglas, Eves, & Hart, 1997). Structured professional judgment tools involve a trained mental health professional assessing an individual's future violence risk through a combination of a checklist of empirically-supported risk factors and their own clinical expertise (de Vogel, de Vries Robbé, de Ruiter, & Bouman, 2011). Structured professional judgment combines research and practice and it is used to both identify and manage risk (Augimeri, Walsh, Woods, & Jiang, 2012). Structured professional judgment is currently well-regarded for use with adults (HCR-20; Webster et al., 1997) and youth (SAVRY; Borum, Bartel, & Forth, 2006). These risk assessment tools were not designed to be used with children.

Tools to Assess Risk for Antisocial Behaviour for Children

Prior to 1998, there were no structured professional judgment tools for antisocial children under the age of 12 (Augimeri, Koegl, Ferrante, & Slater, 2006). This age range is particularly important for risk assessment, because when children under 12 demonstrate antisocial behaviour and are left untreated, they are two to three times more likely to commit criminal offences in their adolescence and adulthood compared to other children (Loeber, Farrington, & Petechuk, 2003). Thus, it is essential to accurately assess antisocial children's risks at this phase in order to direct them into appropriate services and prevent future antisocial behaviour.

The Early Assessment Risk Lists (EARL-20B for boys; Augimeri, Webster, Koegl, & Levene 1998 and EARL-21G for girls; Levene et al., 2001) were created to address the gap in

availability of age-appropriate risk assessment tools. The 1998 version of the boys' EARL was a "Consultation Version" and it was later updated to Version 2 in 2001 (Augimeri et al., 2001).

The EARLs were developed at the Centre for Children Committing Offences (CCCO) housed at the Child Development Institute (CDI) in Toronto, Canada as part of a comprehensive psychosocial risk assessment for children under 12 with antisocial problems who may have already been in trouble with the law (Koegl, Augimeri, Ferrante, Walsh, & Slater, 2008a). The EARLs are used to identify the factors that lead children to develop antisocial problems, predict their risk for future criminal behaviour, and assist in choosing the appropriate treatment (Augimeri, Pepler, Walsh, Jiang, & Dassinger, 2010). The EARLs differ slightly in content for boys and girls, in response to research demonstrating that the presentation of antisocial behaviour and future outcomes can be gender specific (Moffitt et al., 2001).

Protective Factors and their Relationship to Risk Factors

Risk factors are defined as factors that increase the likelihood of a particular negative outcome, such as antisocial behaviour, and protective factors are those that reduce the likelihood of a negative outcome (Farrington, Ttofi, & Loeber, 2014). Risk and protective factors are frequently presented starting at the individual level and moving outwards toward the family, peer, and community levels (Lösel & Farrington, 2012; Pardini, Loeber, Farrington, & Stouthamer-Loeber, 2012). This ordering of risk and protective factors is consistent with a social ecological framework; a framework which consists of different interactive levels of social influence on an individual's development (Bronfenbrenner, 1979). The present project focussed on factors in the individual, family, and peer levels; however, it is acknowledged that all levels interact with each other.

Some researchers argue that protective factors simply refer to the positive end of a risk factor (Webster, Martin, Brink, Nicholls, & Middleton, 2004). For example, if a poor parent-child relationship is a risk factor in the development of antisocial behaviour, a positive parent-child relationship will be a protective factor that reduces the likelihood of a child developing antisocial behaviour. There is a growing recognition that protective factors can exist independently from risk factors and are not simply their opposite ends (Farrington & Loeber, 2000; Loeber, Farrington, Stouthamer-Loeber, & White, 2008). For example, while religiosity has been shown to be protective in reducing antisocial behaviour, non-religiosity has not been demonstrated to be a risk factor (de Vogel et al., 2011). For the present project, protective factors were conceptualized as the positive end of risk factors since relationship-based protective factors are typically framed in this way (Lösel & Farrington, 2012).

In addition to the debate of whether protective factors can exist independently from risk factors, there is also a debate about whether protective factors interact with the level of an individual's overall risk of developing antisocial behaviour. Some researchers suggest that protective factors decrease the likelihood of antisocial behaviour for everyone, regardless of their risk level (White, Moffit, & Silva, 1989). Others suggest that protective factors only decrease the likelihood of antisocial behaviour in a sample that is already at risk (Werner & Smith, 1982). Yet another group suggests that protective factors interact with the level of risk, and have a higher impact at higher levels of risk (Rutter, 1987). Finally, some authors suggest combinations of these assumptions, and that some protective factors help individuals regardless of risk status while others are more relevant in high risk situations or interact with risk level (Farrington et al., 2014; Luthar 1993).

Based on these different assumptions, different terms have been used to denote protective factors in the literature. Indeed, confusing terminology has been a challenge in research pertaining to protective factors. Protective factors that impact children regardless of risk are sometimes called promotive factors or developmental assets (Loeber et al., 2008; Search Institute, 2014). Protective factors that impact all children in an at-risk sample are sometimes called direct protective factors (Lösel & Farrington, 2012), or main effects protective factors (Luthar, 1993). Finally, protective factors that interact with levels of risk are sometimes called interactive protective factors (Farrington & Ttofi, 2011), buffering protective factors (Lösel & Farrington, 2012), or interactive model protective factors (Luthar, 1993). Experts in the development of antisocial behaviour are beginning to systematically identify promotive, direct, or interactive protective factors (Farrington et al., 2014).

For the present project, I focussed on interactive protective factors, since relationship-based protective factors are typically framed in this way (Lösel & Farrington, 2012). These interactive protective factors were interpreted within Michael Rutter (1987)'s framework. Michael Rutter (1987) argued that protective factors are not static factors within an individual; instead, particularly during development, they are dynamic processes of interaction with risk. More specifically, he argued that protective factors interact with and protect against risk factors in four different ways, they: 1) reduce risk impact by altering the experience of the risk and the amount of exposure to the risk; 2) reduce negative chain reactions, such as maladaptive patterns of interaction; 3) establish and maintain self-esteem and self-efficacy; and 4) open up new opportunities for positive experiences.

Protective Factors in Risk Assessment

Most risk assessment tools focus on risk factors and fail to identify protective factors (Farrington et al., 2014), even though the inclusion of protective factors in risk assessment has been shown to have several benefits. For example, integrating protective factors creates a more balanced and less stigmatized view of offenders (Rogers, 2000). It is particularly important to have a less stigmatized view of children and youth with antisocial behaviour, in order to provide them with appropriate treatment and reduce their chances of offending later in life (Loeber et al., 2003). Clinically, the inclusion of protective factors allows clinicians to help their clients find their strengths and motivation, and to develop appropriate strengths-based treatment plans (de Ruiter & Nicholls, 2011).

A few recently developed measures that assess risk for antisocial behaviour do include protective factors. Three of those tools, used specifically with youth, are the *Short-Term Assessment of Risk and Treatability- Adolescent Version* (START-AV; Nicholls, Viljoen, Cruise, Desmarais & Webster, 2010), the *Structured Assessment of Violence Risk in Youth* (SAVRY; Borum et al., 2006) and the *Structured Assessment of Protective Factors for Violence risk Youth Version* (SAPROF-YV; de Vries Robbé, Geers, Stapel, Hiltermann, & de Vogel, 2015). The START-AV consists of 23 items: each is rated for both risk and strength by a clinician. Conversely, the SAVRY consists of 24 risk factor items and six separate protective factor items. The *Structured Assessment of Protective Factors for violence risk Youth Version* (SAPROF-YV; de Vries Robbé et al., 2015), is a measure that only includes protective factors and no risk factors. It consists of 16 items and was designed to be used in combination with risk assessment tools (SAPROF-YV; de Vries Robbé et al., 2015).

The different compositions of these risk assessment measures suggest different theoretical positions on protective factors. Some risk assessment measures, such as the START-AV, were constructed based on the assumption that protective factors are the positive end of a risk factor. For each item on the START-AV, items are rated on a scale of 0-2 in terms of risk and on a scale of 0-2 in terms of strength (Webster et al., 2004). The EARL is constructed in a similar way to the START-AV. Although protective factors are not listed specifically on the EARL, for many items scoring a 0 on risk is defined as having the positive version of that variable. For example, a 0 on “peer socialization” is “allotted to a boy/girl who demonstrates the ability to establish positive ties with peers who are unambiguously prosocial” (EARL 20-B, pg. 47; EARL 21-G, pg. 39) as opposed to simply the absence of negative peer socialization. Conversely, the designs of the SAVRY and the SAPROF-YV suggest that protective factors can exist independently of risk factors. The SAVRY includes six protective factors that are listed separately from the risk factors, and the SAPROF-YV only lists protective factors.

Risk assessment measures that also include protective factors most commonly assess the following specific factors, from the individual level outwards toward the family, peer, and community levels: self-control (SAPROF-YV; de Vries Robbé et al., 2015; START-AV; Nicholls et al., 2010), treatment motivation (SAVRY; Borum et al., 2006; START-AV; Nicholls et al., 2010), strength of attachment relationships (SAPROF-YV; de Vries Robbé et al., 2015; SAVRY; Borum et al., 2006; START-AV; Nicholls et al., 2010), comfortable household circumstances (START-AV; Nicholls et al., 2010), commitment to education (SAPROF-YV; de Vries Robbé et al., 2015; SAVRY; Borum et al., 2006), and social support and network (SAPROF-YV; de Vries Robbé et al., 2015; SAVRY; Borum et al., 2006; START-AV; Nicholls et al., 2010).

Positive Relationships as Protective Factors

In the present project, I focussed on two potential protective factors in the context of risk assessment: positive parent-child relationships and positive peer relationships. These two factors were chosen because the importance of relationships in healthy child development is frequently underscored (Pepler, Craig, Jiang, & Connolly, 2011; Search Institute, 2014). Developmental relationships are relationships which help young people achieve academically and socially. More specifically, children thrive when they have relationships with attachment figures and peers, who express care, challenge growth, provide support, share power, and expand possibilities (Search Institute, 2014; Thompson, 2008). Researchers have also begun to suggest that nurturing social environments, at the family, school, and neighbourhood levels, can prevent the development of behavioural and psychological difficulties in children and youth (Biglan, Flay, Embry, & Sandler, 2012).

Moreover, positive relationships have been well established, in the scientific literature, as important contributors to resilience (Luthar & Zigler, 1991; Rutter, 1987) and more specifically in reducing risk of criminal offending and violence (Lösel & Farrington, 2012; Pardini et al., 2012). Consistent with Rutter's (1987) framework for the interaction of protective and risk factors, positive relationships mitigate the risks of developing or maintaining antisocial behaviour. More specifically, positive relationships provide children with a context in which to be supported in confronting the challenges posed by risks, increase children's self-esteem, and provide an opportunity for children to have prosocial behaviours reinforced and experience healthy relationship models (Cummings & Davies, 1996; Hartup & Moore, 1990; Lösel & Farrington, 2012; McFayden-Ketchum, Bates, Dodge, & Pettit, 1996; Stouthamer-Loeber et al., 1993; Rutter, 1987). Researchers from a social bonds perspective posit another reason that

positive relationships protect against antisocial behaviour. They suggest that youth who have more fulfilling relationships are less likely to engage in antisocial behaviour which may jeopardize these relationships (Hirschi, 1969).

The importance of positive relationships in the reduction of antisocial behaviour is indicated by their inclusion in all of the existing risk assessment measures listed above. The SAPROF-YV is divided into four categories of protective items, and one category is entitled “Relational” and exclusively includes information about parent, peer, and other supportive relationships (de Vries Robbé et al., 2015). Following the risk assessment phase, building positive parent-child and peer relationships is the focus of many evidence-based interventions for childhood aggression (Farrington & Welsh, 2007; Webster-Stratton & Hammond, 1997). These are areas of focus in the Stop Now and Plan (SNAP®) program, a program which currently incorporates the EARLs. SNAP® is a well-validated, multi-component, gender-specific program that focusses on self-control and problem solving skills for children with antisocial behaviour and their families (Koegl, Farrington, Augimeri, & Day, 2008b). It is important to confirm that building positive relationships is an appropriate avenue for intervention. Finally, although their importance has been recognized, positive relationships have not been explicitly addressed in the context of risk assessment, particularly in measures for children with antisocial behaviour. I examined how positive relationships interact with risk factors and affect the latter’s prediction of future criminal outcomes and mental health outcomes.

Positive parent-child relationships.

Positive parent-child relationships consist of shared enjoyment and mutuality. These types of relationships are associated with a decreased likelihood of children developing psychopathology (Cummings & Davies, 1996). Since relationship difficulties within the family

system are known to contribute to the development of antisocial behaviour in children (Loeber & Stouthamer-Loeber, 1986; Patterson, 1982; Pepler et al., 2006), it follows that positive parent-child relationships are protective and reduce antisocial behaviour. Researchers have shown that positive parent-child relationships, particularly those characterized by bonding, warmth, and clear and consistent discipline, are protective in terms of reducing children's likelihood of developing antisocial behaviour (Farrington, 2002; Lösel & Farrington, 2012; Stouthamer-Loeber et al., 1993). These positive parent-child relationships likely give children a sense of security and a positive context for learning appropriate social behaviour.

Positive peer relationships.

Peer relationships are particularly important in middle childhood, as children are beginning to move from dependence on their parents to interactions with their wider social contexts (Erikson, 1968). At this age, positive peer relationships involve a pursuit of mutual interests with sensitivity and nurturance (Eccles, 1999). These relationships provide a context for emotional support and an understanding of prosocial relationships (Hartup & Moore, 1990). Children who lack appropriate social skills have difficulty forming relationships and can become a part of deviant peer groups (Dishion, 1990). Being a part of a deviant peer group is a crucial risk factor in the development of antisocial behaviour (Patterson & Dishion, 1985). Thus, it follows that close and positive relationships with prosocial peers reduce antisocial behaviour risk. Researchers have confirmed that this is the case (Pardini et al., 20012; Vance, Bowen, Fernandez & Thompson, 2002). Since the present project is an initial exploration of the interaction of positive relationships with risk factors in risk assessment, I have grouped positive parent-child and positive peer relationships together as “positive relationships” for ease of analysis and interpretation. Researchers have found that children, particularly girls, who have

challenges in their parent relationships often have difficulty in their peer relationships as well (Pepler et al., 2011). Thus it follows that positive relationships in these domains are also likely closely related. There are also key similarities in positive parent and peer relationships, e.g., that they buffer negative life events and provide healthy modelling (Cummings & Davies, 1996; Hartup & Moore, 1990). Furthermore, other researchers have combined different positive relationships on risk assessment tools in the past, e.g., on the SAVRY, the “strong social support” item refers to support from an adult or a peer (Borum et al., 2006).

EARLs and the Prediction of Criminal and Mental Health Outcomes

The predictive validity of the EARLs has been well-established (Enebrink, Långström, & Gumpert, 2006a). Predictive validity refers to the extent to which a score on one measure predicts scores on an outcome measure. Longitudinal studies have shown that EARL total risk scores predict prevalence of convictions for boys one to nine years later (Augimeri et al., 2012, 2010b; Hyrniw-Augimeri, 2005; Koegl, 2011).

Although Koegl (2011) found that total risk score also predicts prevalence of convictions for girls, generally researchers have found variable results for girls. For example, Augimeri and colleagues (2012) found that total risk score predicted convictions for both boys and girls when they were grouped together in the sample; however, they noted that it was difficult to draw specific conclusions for girls since fewer girls had committed offences. Other researchers found that the relationship between total risk score and convictions for girls was in the expected direction but not significant. They also noted that this non-significant finding was likely because girls tend to have fewer convictions than boys (Levene et al., 2001).

In addition to total risk scores, individual EARL risk items and combinations of items have also predicted antisocial outcomes for boys and girls (Augimeri et al., 2012, 2010b;

Hyrnkiw-Augimeri, 2005; Koegl, 2011). For example, researchers found that scores on the EARL family subscale predicted criminal outcomes for girls (Augimeri et al., 2012). Thus, it was appropriate in the present project to identify individual items and combinations of items as possible protective factors.

Since the EARLs were designed to predict future antisocial behaviour, there is less research associating EARL scores with mental health outcomes; however, researchers have demonstrated that the EARL-20B total scores predicted Child Behavior Checklist (CBCL/4-18; Achenbach, 1991) delinquency scores six months after discharge (Augimeri, Enebrink, Walsh, & Jiang, 2010a). The delinquency subscale was a component of the externalizing behaviour scale which is now called rule-breaking behaviour (Achenbach, 2001).

The EARL-20 B has also been shown to predict future parent and teacher ratings of aggressive and disruptive behaviour after six and 30 months (Enebrink et al., 2006a). Further, Koegl (2011) found that boys with higher EARL-20B risk scores were more likely to experience mental health problems, particularly mood and anxiety, several years after their initial assessments. Although girls in the study had a high rate of mood and anxiety difficulties, these problems were not associated with higher EARL scores. This is likely because there were fewer girls in the sample, thus it could have been a problem with power. Further, the association between risk for antisocial behaviour and mental health outcomes may be different in boys and girls.

Due to less conclusive findings for girls regarding criminal outcomes, it is particularly important to look at both criminal and mental health outcomes when samples include both boys and girls. Aggressive boys and girls show differences when it comes to frequency and types of problem behaviours. In a sample similar to that of the present project, boys were 2.5 times more

likely to commit an offence than girls by age 20 (Augimeri et al., 2010b). On the other hand, aggressive girls are more likely than boys to develop mental health difficulties (Moffit et al., 2001; Stack et al., 2005). Although studies have shown positive changes in girls' externalizing symptoms after the SNAP® intervention, they have also shown that 60% of girls remain within the clinical range for externalizing problems and experience depression after treatment (Pepler, Levene, & Walsh, 2004; Yuile, 2007). Thus, for the present project, I included both criminal and mental health outcomes.

Addition of Protective Factors in the Prediction of Negative Outcomes

Protective factors can add predictive validity to risk assessment measures in different ways. First, they can add value in predicting non-offending. For example, on the START-AV, total strength score inversely predicts violence, offending, and street drug use (Viljoen et al., 2012). Moreover, protective factors, including positive relationships, have been shown to interact with risk factors, with a larger impact for youth at a moderate or high level of risk in the prediction of future offending (de Vries Robbé, de Vogel, & Douglas, 2013; Lodewijks, de Ruiter & Doreliejers, 2010). Researchers have demonstrated with the SAVRY and SAPROF that adding protective factors into risk assessment tools can increase their predictive validity above using risk factors alone (de Vries Robbé et al., 2013; Lodewijks et al., 2010). Based on the assumptions of Rutter's (1987) framework, and the findings of de Vries Robbé et al. (2013) and Lodewijks et al. (2010), I hypothesized that protective factors would have a greater impact in mitigating negative outcomes at a greater level of overall risk.

Importance of Positive Relationships for Girls with Antisocial Behaviour

In the past ten years, research on the development and outcomes of girlhood aggression has increased (Pepler & Ferguson, 2013); however, less research is available on risk and

protective factors for aggressive girls than for boys (Massetti et al., 2011; Pepler et al., 2010).

Risk assessment tools, such as the SAPROF and SAVRY have mostly been developed and researched in male populations (de Vogel et al., 2011; Klein, Yoon, Briken, Turner, & Spehr, 2012; Lodewijks et al., 2010). The EARL-21G is unique in that it was designed specifically for use with female populations.

Researchers have demonstrated that many risk factors for aggression are similar for boys and girls, for example: academic challenges, school drop-out, substance use, and family violence (Hart, O'Toole, Price-Sharps, & Shaffer, 2007; Moffitt et al., 2001); however, it has been consistently demonstrated that family and peer relationships play a larger role in the development and prevention of antisocial behaviour for girls than for boys (Ehrensaft, 2005; Lösel & Farrington, 2012; Pepler et al., 2010; Pepler et al., 2011). In the present project, I hypothesized that positive relationships play a stronger protective role for girls than for boys.

Relationships are generally seen as more central to female development than male development (Cross & Madson, 1997). In terms of the development of aggression specifically, researchers suggest that relational factors play a larger role for girls than boys (Ehrensaft, 2005; Moffitt et al., 2001). It is important to note that there is likely a transactional relationship between girls' aggression and their unhealthy relationships: girls' troubled relationships may contribute to their aggressive behaviour, but girls' aggressive behaviour will also interfere with their development of healthy relationships. Further, girls who use aggression with peers also tend to have aggressive conflicts at home, likely due to underlying social difficulties, aggressive interactional style, and aggressive home environments (Pepler et al., 2011).

Past researchers have explored aggressive girls' decreased capacity for future relationships using the EARL-21G. More specifically, a factor analysis of the EARL-21G

yielded a “Relational Disturbance” factor made up of items pertaining to a girl’s inability to develop a strong relational capacity. It includes the following items: “caregiver continuity”, “abuse/neglect/trauma”, “antisocial values and conduct”, and “sexual development.” “Relational Disturbance” predicted future criminal offences for girls (Augimeri et al., 2010b). Instead of exploring factors that decrease girls’ potential capacity for future relationships, for the present project, I looked at the existence of girls’ current positive relationships.

STUDY 1:

POSITIVE RELATIONSHIPS IN THE PREDICTION OF CRIMINAL OUTCOMES

The validity of the EARLs in the prediction of criminal outcomes has been well-established, particularly for boys (Augimeri et al., 2012; Enebrink, Långström, & Gumpert, 2006a). In other studies, researchers have also found that positive relationships reduce criminal outcomes (Lösel & Farrington 2012; Pardini et al., 2012), with a particular impact at higher levels of risk (de Vries Robbe, 2013; Lodewijks et al., 2010; Lösel & Farrington 2012). Finally, relational factors have been found to be more important for girls than boys in the development of antisocial behaviour (Ehrensaft, 2005; Moffitt et al., 2001).

The purpose of the present study was to confirm whether the EARL total risk score predicted criminal outcomes and to explore whether positive relationships moderated this association at different levels of risk. In addition, I examined whether the strength of this moderation effect differed depending on gender.

Hypotheses

In this study, there were four primary hypotheses:

- 1) High overall risk predicts criminal outcomes.
- 2) Positive relationships moderate the association between overall risk and criminal outcomes

- 3) Positive relationships have a greater impact on the prediction of criminal outcomes at a higher level of risk.
- 4) Positive relationships impact girls more than boys in the prediction of criminal outcomes.

Method

Participants

The participants for this study were 256 boys and 176 girls who were previously recruited for a larger program evaluation study at a children's mental health agency in Toronto, Ontario. These children participated in the evaluation of SNAP® between 2001 and 2009 and met the following admission criteria: a) 6 to 11 years of age, b) score in the borderline or clinical range on the externalizing or conduct subscales using a standardized behavioral assessment, or had police contact. For girls, a score in the borderline or clinical range on the oppositional subscale was also sufficient for admission. Children were excluded from the program if they had a significant developmental delay. To be selected for the present study, participants were required to have demographic information and be at least 12 years of age, when the criminal records were searched in 2013, because 12 is the age of criminal liability in Canada. That way, participants were old enough to be eligible for youth or adult court contact. At the time of the criminal record retrieval, participants were 12-23 years old.

Given the gender lens of the study, demographic data for boys and girls are presented separately. Boys' ages at admission ranged from 6.1 to 11.9 years old ($M = 9.1$). The sample was culturally diverse and made up of the following ethnicities: White/European (54.0%), Caribbean (12.4%), African Canadian (9.3%), Biracial (6.8%), Hispanic (5.6%), Other (5.0%), Asian (3.1%), Aboriginal (2.5%), and Pacific Islander (1.2%). Household languages spoken included:

English (93.2%), Portuguese (3.4%), Spanish (1.3%), Other (1.3%), French (0.4%) and Italian (0.4%). Regarding marital status, at the time of admission, 57.4% of the primary caregivers were single parents and 42.6% had a partner or spouse. In terms of education, 41.0% of the primary caregivers had completed community college or university, 15.4 % had completed some community college or university, and 43.6% were at most high school educated. Regarding household income, 74.0% of primary caregivers reported a household income below \$60,000, and 25.1% reported a household income of \$60,000 or higher. At the time of the criminal record retrieval, 58 boys (22.7%) had been convicted of a criminal offence. The types of crimes that boys were convicted for included: crimes against a person (67.2%), crimes against property (51.7%), administration of law and justice (44.8%), drugs (34.5%), and weapons offences (20.7%). It is important to note that these percentages were calculated based on the total number of boys with convictions. In addition, some boys had more than one type of crime. See Table 1 for a detailed description of the boys' demographic variables.

There were missing values for some of these demographic variables. Information about ethnicity was not available for 95 participants, because clinicians did not always ask about it directly. Forty one primary caregivers did not report their household income, 22 did not report their household language or educational status, and 21 did not report their living arrangement. All percentages are based on the number of valid cases for that variable.

Girls' ages at admission ranged from 6.2 to 11.6 years old ($M = 9.1$). The sample was culturally diverse and made up of the following ethnicities: White/European (50.9%), Other (13.9%), African Canadian (10.2%), Biracial (8.3%), Caribbean (7.4%), Hispanic (4.6%), Aboriginal (2.8%), Asian (0.9%), and Pacific Islander (0.9%). Household languages spoken included: English (93.8%), Portuguese (3.1%), Spanish (1.3%), Other (0.6%), Chinese (0.6%)

and Italian (0.6%). Regarding marital status, at the time of admission, 63.2% of the primary caregivers were single parents and 36.8% had a partner or spouse. In terms of education, 33.9% of the primary caregivers had completed community college or university, 17.3 % had completed some community college or university, and 48.8% were at most high school educated. Regarding household income, 81.9% of primary caregivers reported a household income below \$60,000, and 18.1% reported a household income of \$60,000 or higher. At the time of the criminal record retrieval, 16 girls (9.1%) had been convicted of a criminal offence. The types of crimes that girls were convicted for included: crimes against a person (62.5%), crimes against property (56.3%), administration of law and justice (31.3%), drugs (6.3%), and weapons offences (6.3%). Again, it is important to note that these percentages were calculated based on the total number of girls with convictions and that some girls had more than one type of crime. See Table 1 for a detailed description of these girls' demographic variables.

Similarly to the boys, there were missing values for some of these demographic variables. Information about ethnicity was not available for 68 participants, because clinicians did not always ask about it directly. Twenty one primary caregivers did not report their household income, 16 did not report their household language, 14 did not report their educational status, and 13 did not report their living arrangement. All percentages are based on the number of valid cases for that variable. Girls had significantly fewer convictions than boys overall, $z = 3.70, p < .001$, and fewer drug-related convictions than boys, $z = 2.21, p < .05$. Otherwise there were no significant differences in the boys' and girls' demographic data.

Measures

Demographic information.

The Brief Child and Family Phone Interview (BCFPI; Boyle et al., 1993) was completed over the phone by a parent and an intake worker for every participant before treatment began. For the present project, this form was used to determine basic demographic information about the family's living arrangements, language, education, ethnicity, and income. See Appendix for the BCFPI. The BCFPI has acceptable reliability in a high-risk sample, as evidenced by Cronbach's alpha estimates from 0.75 to 0.83 and concurrent validity evidenced by moderate to strong correlations with measures from the Conners Parent Rating Scale (Cook et al., 2013). Since clinicians did not always ask about ethnicity directly, it was determined based on self-reported ethnicity on the Early Assessment Risk Lists (EARL-20B for boys; Augimeri et al., 2001 and EARL-21G for girls; Levene et al., 2001) and Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001).

Overall risk.

The Early Assessment Risk Lists (EARL-20B for boys; Augimeri et al., 2001 and EARL-21G for girls; Levene et al., 2001) were completed by clinicians before the participants started treatment as part of a comprehensive clinical assessment to inform treatment planning. Clinicians completed the EARLs based on a structured interview process and a case conference and utilized information from a variety of informants (e.g., teachers, parents, health care providers) and sources (e.g., clinical records, school reports) (Augimeri et al., 2010a). In the present project, the EARLs were used to assess the presence and severity of risk factors in the sample.

The EARL items are scored on a three point scale: 0 (not present), 1 (somewhat present), and 2 (present). Items fall into three categories, family items, child items, and responsivity to

treatment items. The EARL-21G has the same main items as the EARL-20B except for two added items (“caregiver-daughter interaction” and “sexual development”) and one deleted item (“authority contact”). A total risk score is summed across all items and there is an overall clinical judgment rating which allows clinicians to determine a low, moderate, or high risk designation for each young client, regardless of risk score. Studies have shown that the total score and overall clinical judgment ratings are highly correlated (Augimeri et al., 2012). I used the total risk score to estimate overall level of risk. I proposed conducting all analyses using the total risk score twice, first intact to retain its psychometric properties, and then with the relationship items: “parenting style”, “caregiver-daughter interaction”, and “peer socialization” removed because they were included in subsequent analyses as potential protective factors. However, since the correlations between total risk score and total risk score minus relationship items were so high, $r(209) = .99, p < .001$ for boys and $r(144) = .99, p < .001$ for girls, I only used total risk score for ease of subsequent analyses. Keeping the total risk score intact also allowed me to compare my studies’ results with the results of past studies which used the EARL total risk score more easily.

Studies have shown that the EARL-20B has acceptable mean inter-rater reliability, $M = 0.92$ (Enebrink, Långström, Hultén, & Gumpert, 2006b) and the EARL-21G has acceptable inter-rater reliability (.86) with multiple raters (Levene et al., 2001). Both tools have validity in terms of predicting mental health and criminal outcomes (Enebrink et al., 2006a; Koegl, 2011).

Positive relationships.

To assess positive relationships for boys, I reverse coded and summed scores on the “parenting style” and “peer socialization” risk items on the EARL 20-B (Augimeri et al., 2001). Currently, a 0 on “parenting style” is “given to parents who reinforce their children in a contingent manner, monitor their activities, and adopt a consistent and nurturing parenting style.

These parents are able to enforce house rules singly or jointly, establish consistent routines, communicate effectively and engage in positive activities with their children.” A 1 is “allotted to parents who, though generally attentive to their children, have difficulty setting boundaries, monitoring their children, maintaining routines, and being consistent.” A 2 is “reserved for parents who use a violent, punitive or extremely lax or permissive discipline style; do not adequately monitor or supervise their children; do not enforce home rules; and do not take a problem-solving approach to parenting issues.” It is important to note that while this item primarily captures parental discipline, the component concerning engagement in positive activities captures parent-child relationship quality. Moreover, no other items on the EARL-20B address the quality of parent-child relationship directly.

Currently, a 0 on “peer socialization” is “allotted to a boy who demonstrates the ability to establish positive ties with peers who are unambiguously prosocial” (Augimeri et al., 2001). A 1 is “given to a boy who, although he may have positive peer influences, spends time with other children who get into trouble. A boy who tends to be isolated with few friends and has difficulty connecting to age-appropriate positive peers would also be given this rating.” A 2 is “reserved for a boy who associates with children who get into trouble routinely or embrace antisocial beliefs (e.g., defiance of authority figures, consistent breaking of rules, gang membership). Such a score may also apply in extreme cases where a boy is bullied, or in other circumstances, where he is rejected or ostracized to the point where he suffers the harsh effects of exclusion.” The reverse coded scores on “parenting style” were called the “positive parent-child relationship score” and the reverse coded scores on “peer socialization” were called the “positive peer relationship score.” These scores were summed and called “positive relationship score” for future analyses. For boys, “positive parent-child relationship score” and “positive peer

relationship score” were significantly correlated, $r(215) = .20, p = .002$, which provided some further support for combining them, in addition to the theoretical reasons mentioned above, e.g., that they tend to both point to underlying social difficulties (Pepler et al., 2011). They were also combined because there were so few items used to calculate each score. Furthermore, past studies using the EARLs have also used combinations of items to predict outcomes (Augimeri et al., 2012, 2010b; Hyrkiw-Augimeri, 2005; Koegl, 2011). See Table 2 for a frequency table of the “positive parent-child relationship” and “positive peer relationship” scores.

To assess positive relationships for girls, I used the same items as above, as well as “caregiver-daughter interaction.” On the EARL-21G, a 0 on “parenting style” is “given to parents who reinforce their children in a contingent manner, monitor their activities, adopt a firm and nurturing parenting style, and communicate effectively.” A 1 is defined in the same way for boys and girls. A 0 is also defined in the same way for boys and girls, except for an additional line on the EARL-21G: “This may also apply to families in which there are highly inconsistent and conflictual parenting practices.” For the girl’s measure, this item does not include a positive interaction, because the EARL-21G has a separate item for parent-child relationship, called “caregiver-daughter interaction.”

A 0 on “caregiver-daughter interaction” is “given to families where there is strong evidence that the girl and her caregiver have a close, supportive attachment.” A 1 is “given to cases where the caregiver-daughter relationship is marked by high conflict and difficulties in problem-solving but could also be characterized by an appreciable degree of warmth, acceptance, and close connections.” A 2 is “reserved for cases involving a caregiver-daughter relationship that is marked by high conflict, weak attachment, rejection (emotional, verbal) of the daughter,

and poor problem-solving interactions. For girls, the “positive parent-child relationship score” was the sum of the reverse coded scores on both of these items.

For “peer socialization”, 0 and 1 are defined in the same way for boys and girls. For girls, a 2 is defined slightly differently than it is for boys. It does not refer to gang membership, and does refer to victimization in the context of being bullied, rejected, or ostracized. Girls’ “positive peer relationship score” was the reverse coded scores on “peer socialization.” Again, both the “positive parent-child relationship score” and the “positive peer relationship score” were summed and called “positive relationship score” for future analyses. For girls, “positive parent-child relationship score” and “positive peer relationship score” were significantly correlated, $r(146) = .15, p = .04$, which provided some further support for combining these scores, in addition to the reasons mentioned above in the description of the boys’ measure. See Table 3 for a frequency table of the “positive parent-child relationship” and “positive peer relationship” scores.

Treatment factors.

Ninety-eight percent of the children in this study received treatment between the initial risk assessment and the mental health questionnaire and criminal record review. The main treatment components include: 1) A 12-week SNAP® children’s group, and 2) a 12-week SNAP® parent group. In addition, boys and girls and their families were able to access the following treatment components on an as-needed basis: 1) individual counseling/mentoring, 2) individualized family counselling, 3) youth leadership, 4) school advocacy/teacher support, 5) an arson prevention program, and 6) a homework club/academic tutoring. Girls also had access to a mother-daughter group.

Koegl and colleagues (2008) demonstrated that a higher number of child group sessions attended and treatment components received predicts better treatment outcomes, particularly for girls and older children. They also found that higher group attendance and number of treatment components received predicted fewer criminal convictions. Since treatment may have affected the likelihood of offending and having mental health problems, it was essential to control for group attendance and number of treatment components received in the statistical analyses for this study. More specifically, the number of parent and child group sessions attended was summed for each participant. Although the program content lasts 12 weeks, there is a party for the final session. Thus participants could have received up to 13 sessions. Furthermore, the boys' group had 14 sessions from 2003-2005. Girls' groups have always had 13 sessions. The total number of treatment components, of the nine possible components listed above was also summed for each participant. In past studies, the EARLs have remained a significant predictor of criminal offending, even when treatment attendance (Augimeri et al., 2010a; Koegl, 2011) and number of components have been controlled (Koegl, 2011).

Criminal outcomes.

Criminal outcomes were measured by federal and provincial criminal record data retrieved in 2013 when children were aged 12-23. On average, criminal records were retrieved approximately eight years after the initial intake assessment (for boys, $M= 7.90$, $SD= 2.18$, for girls, $M=8.47$, $SD= 1.95$). Criminal record data were obtained through a court order and under a section of the Youth Criminal Justice Act (YCJA) and the Ministry of Children and Youth Services (MYCS) which allows retrieval of data for research purposes. These court orders permitted access to the following databases: 1) federal criminal records for offenders of all ages, and 2) provincial young offender and adult intake records from the Ministry of Community

Safety and Correctional Services. For this study, the presence of a criminal conviction, coded as yes or no, was used. This variable was chosen because convictions were consistently listed across databases.

Baseline mental health.

Baseline mental health was measured by parental report on the Child Behavior Checklist for ages six to 18 (CBCL; Achenbach & Rescorla, 2001) at intake. For the present project, the intake CBCL was used as a control variable to control for baseline mental health challenges, since they likely impact subsequent criminal and mental health outcomes. It is important to note that the EARL scores remain a significant predictor of subsequent CBCL delinquency scores when baseline delinquency scales are controlled (Augimeri et al., 2010a)

The CBCL consists of 112 items for which parents rate the frequency of child behaviours that have occurred over the past two months on a 3-point scale. There is also an opportunity for parents to write in three additional problems. The CBCL yields standardized T-score for externalizing and internalizing symptoms. The externalizing score includes rule-breaking and aggressive behaviour, and the internalizing score includes anxious/depressed, withdrawn/depressed, and somatic complaints. A T-score less than or equal to 59 indicates normal behaviour, between 60 and 63 indicates borderline behaviour, and greater than or equal to 64 indicates clinical behaviour. The CBCL has a good test-retest reliability of .90 and internal consistency of its scales ranging from .63 to .91 (CBCL; Achenbach & Rescorla, 2001). The CBCL scales have strong convergent and discriminative validity with the DSM (Nakamura, Ebeustani, Bernstein, & Chorpita, 2009).

Procedure

After families completed the Brief Child and Family Phone Interview (BCFPI; Boyle et al., 1993) over the phone with an intake worker, they were enrolled in the children's mental health agency services. Before beginning treatment, they signed standard treatment and research consent. The consent form included information about the voluntary nature of research and confidentiality. It also included a request to consent for research, specifically for long-term follow-up and evaluation purposes. At admission, clinicians, e.g., social workers, are trained on the Early Assessment Risk Lists (EARL-20B for boys; Augimeri et al., 2001 and EARL-21G for girls; Levene et al., 2001) completed this risk assessment measure. Clinicians were encouraged to incorporate information from multiple agents (e.g., teachers, parents, caregivers, doctors) and from multiple sources (e.g., clinical records, school reports, and standardized tests) into their EARL scores. In addition to reviewing the manual, there are one and two-day training modules for clinicians to become competent with the EARL. Clinicians also obtain reliability on gold standard files and are able to consult with each other about ratings (Augimeri, et al., 2001; Levene et al., 2001).

At the intake, families also completed measures including the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) to assess children's baseline mental health concerns. Following this intake, families went through the treatment program. Measures including the CBCL were collected to assess children's mental health outcomes every six months. For the present project, the CBCL scores used were from post-treatment, six months after the initial assessment. Criminal records were reviewed at a later date to examine rates of criminal offending.

Research Procedure

Prior to conducting statistical analyses, I cleaned and compiled the existing clinical data from client files. Next, I recoded variables as required for this study and then combined this new dataset with the criminal outcome data.

Data Analysis

All statistical analyses were conducted using SPSS versions 23.0 and 24.0. The significance level for all hypotheses was set at the standard $p < .05$. All statistical tests were two-tailed unless there was an *a priori* hypothesis about the direction of the relationship and the results were consistent with this direction. In those cases, one-tailed tests were used. Many data were missing or incomplete because the data came from a community mental health sample. Families characterized by high socioeconomic status risk with children who are displaying aggressive tendencies frequently have challenges returning measures. It is assumed that measures were not returned because the families were preoccupied, and not due to dramatic events related to increased criminal difficulties. It was determined that data were missing at random since there were no known methodological errors which could have contributed to missing data. Multiple imputation was not used since it is recommended for missing items as opposed to missing scales (Gottschall, West, & Enders, 2012), and most of the data that were missing in the present project were entire scales. Due to slight differences in the composition of the EARLs, all analyses were run separately for boys and for girls. Gender was not entered into a step-wise regression because it was important to retain the unique information from the boys' and girls' measures.

Results

Descriptive Statistics for Variables of Interest

Descriptive statistics were calculated for boys and girls. See Table 4 for the means and frequencies of the main variables including: total risk score, positive relationship score, and criminal outcomes, and the means of the control variables including: number of treatment components, number of SNAP sessions, and baseline externalizing behaviour. Both boys and girls had baseline externalizing behaviour in the clinical range (for boys, $M = 69.90$, $SD = 7.56$, and for girls, $M = 70.56$, $SD = 7.27$). This result was to be expected in a high risk sample, in which high levels of externalizing symptoms were a criterion for participation. The only significant difference between the boys' and girls' data was the number of SNAP sessions attended. Boys and their parents attended more SNAP sessions ($M = 18.39$, $SD = 6.87$) than girls ($M = 15.57$, $SD = 6.74$) and this difference was significant, $t(430) = 4.22$, $p < .001$. This difference may have occurred since the boys were offered additional SNAP sessions for a three-year period.

Preliminary Bivariate Correlations

Bivariate correlations were performed for the boys' and girls' models. As mentioned above, significance tests were two-tailed, unless there was an *a priori* hypothesis about the direction of the relationship and the results were consistent with this direction. In those cases, one-tailed tests were used. More specifically, one-tailed tests were used for the correlation between each of the variables with the dependent variable when the results were in the expected direction. Convictions were included in the correlations even though they were coded as a binary variable.

Boys' convictions model.

Bivariate correlations were performed for the boys' convictions model. The total risk score on the EARL was significantly correlated with convictions, $r(211) = .25, p < .001$. The positive relationship score was significantly negatively correlated with convictions, $r(215) = -.23, p < .001$. Baseline externalizing behaviour was significantly correlated with convictions, $r(226) = .13, p = .03$. The number of treatment components approached a significant negative correlation with convictions, $r(253) = -.09, p = .07$. The number of SNAP sessions also approached a significant negative correlation with convictions, $r(251) = -.10, p = .07$. See Table 5 for the bivariate correlations of variables for the boys' convictions model.

Girls' convictions model.

Bivariate correlations were performed for the girls' convictions model. The total risk score on the EARL was significantly correlated with convictions ($r(146) = .17, p = .02$). The positive relationship score was not significantly correlated with convictions ($r(146) = -.09, p = .14$). Baseline externalizing behaviour was significantly correlated with convictions ($r(151) = .15, p = .03$). The number of treatment components was not significantly correlated with convictions ($r(175) = -.02, p = .41$), and nor was the number of SNAP sessions ($r(173) = -.04, p = .29$). See Table 6 for the bivariate correlations of variables for the girls' convictions model.

Preliminary Partial Correlations

Partial correlations were conducted to explore the relationships between the variables in preparation for the logistic regression analyses. It is important to note that the relationship variable was transformed at this point. More specifically, it was reversed by subtracting the participant's positive relationship score from the total possible positive relationship score. This reversal was performed for ease of interpretation of the interaction coefficient-- so that a

significant positive interaction term would mean that higher positive relationships are moderating the relationship between total risk and mental health outcomes. The interaction term was calculated by multiplying total risk by the reverse-coded positive relationship score. Correlations between total risk score, reverse-coded positive relationship score, the interaction term (total risk*reverse-coded positive relationship score), and convictions were tested, controlling for: baseline externalizing behaviour, number of treatment components, and the number of SNAP sessions.

Boys' convictions model.

In the boys' convictions model, when baseline externalizing behaviour, number of treatment components, and total SNAP sessions were controlled for, total risk was significantly correlated with convictions, $r(186) = .23, p < .001$, reverse-coded positive relationship score was significantly correlated with convictions, $r(186) = .20, p = .003$, and the interaction between total risk and the reverse-coded positive relationship score was significantly correlated with convictions, $r(186) = .22, p = .002$. See Table 7 for the partial correlations for the boys' model. See Figures 1 and 2 for scatterplots of these significant partial correlations. Essentially, when each variable was controlled by the control variables, as opposed to only the dependent variable being controlled by control variables, there were significant associations between the independent and dependent variables.

More specifically, when the reverse-coded positive relationship score was controlled for by baseline externalizing behaviour, number of treatment components, and total SNAP sessions, and convictions were controlled for by baseline externalizing behaviour, number of treatment components, and total SNAP sessions, there was a significant association between the reverse-coded positive relationship score and convictions. Further, when the interaction term was

controlled for by baseline externalizing behaviour, number of treatment components, and total SNAP sessions, and convictions were controlled for by baseline externalizing behaviour, number of treatment components, and total SNAP sessions, there was a significant association between the interaction term and convictions.

Girls' convictions model.

No partial correlations of interest were significant for the girls' model. See Table 8 for the partial correlations for the girls' model.

Logistic Regressions

Since there were theoretical reasons to retain the control variables, none was removed from the regression models. Regression diagnostics were run and the data met all assumptions of logistic regression including goodness of fit, independent residuals, and limited multicollinearity. Logistic regressions were run separately for boys and for girls. Outliers were identified if they had standardized residuals greater than 3.00 or leverage statistics greater than .20. These cases were examined and there were no errors in data entry, nor were there any reasons for these cases to be different than any of the others. Since outliers are considered part of the population, current researchers suggest retaining them unless they are data or measurement errors and presenting findings with and without outliers (Alves & Nascimento, 2007; UCLA: Statistical Consulting Group, 2017). It is particularly important to retain outliers when they occur due to unusual combinations of variables, as opposed to extreme values, and this was the case for many of the outliers in the present study (Alves & Nascimento, 2007). For example, sometimes the outliers had low total risk scores given that they had convictions. This discrepancy likely occurred since the EARLs are imperfect predictive tools and not because of data error.

Analyses were conducted again with outliers removed in case future investigation warranted their removal; however, for the present study, the main interpretations were based on data including outliers. In the full model with outliers included, there was some departure from normality in the standardized residuals; however, removing the outliers with the largest residuals did not change the results notably. Future researchers may wish to explore possible improvements in model fit.

Hypothesis 1: Overall risk as a predictor of criminal outcomes.

Logistic regressions were conducted to determine whether high levels of overall risk predicted criminal outcomes.

Boys' convictions model.

A logistic regression model including total risk and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions was significant, $\chi^2(4) = 18.84, p = .001$. Total risk significantly predicted convictions, such that a higher total risk score predicted higher odds of having a conviction, $B = 0.10, Wald = 9.12, df = 1, p = .002, OR = 1.11$. More specifically, if total risk score increases by one unit, there is a ten percent increase in the odds of having a conviction. Two outliers were identified. When analyses were conducted without these outliers, the results did not change notably.

Girls' convictions model.

A logistic regression model including total risk and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions was not significant, $\chi^2(4) = 4.42, p = .35$. Total risk did not significantly predict convictions, $B = 0.05, Wald = 0.68, df = 1, p = .21, OR = 1.04$. Seven outliers were identified and notably, all of them had convictions. When analyses were conducted without these outliers, the overall model was significant, $\chi^2(4) =$

22.89, $p < .001$. Furthermore, total risk approached significance in terms of predicting convictions, $B = 0.42$, $Wald = 2.58$, $df = 1$, $p = .05$, $OR = 1.52$. See Table 9 for a summary of the logistic regressions for hypothesis 1 for boys and girls.

Hypothesis 2: Positive relationships as a moderator between overall risk and criminal outcomes

Reverse-coded positive relationship score and the interaction between reverse-coded positive relationship score and total risk were added into the logistic regression models. The significance of the interaction term was tested in order to determine whether positive relationships moderated the association between overall risk and criminal outcomes.

Boys' convictions model.

A logistic regression model including total risk, reverse-coded positive relationship score, and total risk*reverse-coded positive relationship score, and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions was significant, $\chi^2(6) = 24.41$, $p < .001$. The interaction between total risk and reverse-coded positive relationship score was not significant in predicting the odds of having a conviction, $B = -.09$, $Wald = 3.55$, $df = 1$, $p = .06$, $OR = 0.91$. Three outliers were identified, and notably all three had convictions. When analyses were conducted without these outliers, the interaction between total risk and reverse-coded positive relationship score was significant in predicting higher odds of having a conviction, $B = -0.19$, $Wald = 7.91$, $df = 1$, $p = .005$, $OR = 0.83$. More specifically, if the interaction term increases by one unit, there is a 17 percent decrease in the odds of having a conviction. This relationship was in an unexpected direction; however signs on interaction terms can switch to compensate for large odds ratios for each variable in the interaction term. It is

important to note that in both models, reverse-coded positive relationship score was significant in predicting the odds of having a conviction.

Since the reverse-coded positive relationship score was significant, the role of positive relationships was explored. Given that the interaction term did not need to be interpreted in this context, the model was run with the positive relationship score instead of the reverse-coded positive relationship score for ease of interpretation. A logistic regression was run with total risk, positive relationship score, and total risk* positive relationship score, and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions. This model was significant, $\chi^2(6) = 24.41, p < .001$, and positive relationship score was significant in predicting the odds of having a conviction, $B = -2.02$, $Wald = 4.30$, $df = 1$, $p = .02$, $OR = 0.13$. More specifically, if the positive relationship score increases by one unit, there is an 87 percent decrease in the odds of having a conviction. Three outliers were identified, and notably all three had convictions. When analyses were conducted without these outliers, the results did not change notably.

Girls' convictions model.

A logistic regression model including total risk, reverse-coded positive relationship score, and total risk*reverse-coded positive relationship score, and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions was not significant, $\chi^2(6) = 6.43, p = .38$. The interaction between total risk and reverse-coded positive relationship score was not significant in predicting the odds of having a conviction, $B = 0.03$, $Wald = 0.61$, $df = 1$, $p = .22$, $OR = 1.03$. Six outliers were identified and notably, five out of six had convictions. When analyses were conducted without these outliers, the model was significant, $\chi^2(6) = 17.39, p = .008$; however there were no notable changes regarding the role

for the interaction term. See Table 10 for a summary of the logistic regressions for hypothesis 2 for boys and girls.

Hypothesis 3: Higher impact of positive relationships at higher level of risk

Boys' convictions model.

Although positive relationships were not a significant moderator of the relationship between total risk and convictions, total risk and positive relationships significantly predicted convictions separately. Thus the impact of positive relationships at different levels of risk could still be compared. Participants were divided by low, medium, and high risk, based on the overall total risk score on the EARL, and the effect of positive relationships was compared at each level of risk. The low, medium, and high risk cut-offs were determined in the following way. Continuous total risk score range was divided by a tertile split, with the top 25% deemed as low risk, the middle 50% deemed as medium risk, and the top 25% deemed as high risk. The tertile split method is recommended by Loeber et al. (2008) for criminal outcome research. In this sample, low risk was determined to be a total risk score ≤ 14 , medium risk was a total risk score > 14 and ≤ 21 and high risk was a total risk score > 21 . Figure 3 demonstrates that positive relationships reduced the likelihood of convictions across all levels of risk, with a slightly higher impact at a medium level of risk than at a low level of risk, and a slightly higher impact at a high level of risk than at a medium level of risk.

For example, at the cut-off point of low to medium risk (total risk = 14), the difference in probability of a conviction from a high positive relationship score to a low positive relationship score is .08. Essentially at the beginning of the medium level of risk, if a child has a high positive relationship score as opposed to a low positive relationship score, there is approximately a 1/13 drop in the probability of them having a conviction. At the cut-off point of medium to high risk

(total risk = 21), the difference in probability of a conviction from a high positive relationship score to a low positive relationship score is .10. Essentially at the beginning of the high level of risk, if a child has a high positive relationship score as opposed to a low positive relationship score, there is approximately a 1/10 drop in the probability of them having a conviction. These results demonstrate that positive relationships have an important impact on the probability of a conviction and that this impact is different at different levels of risk.

Girls' convictions model.

Since positive relationships did not significantly moderate the relationship between total risk and convictions for girls, the interaction could not be probed further to determine whether positive relationships had a stronger impact at higher levels of risk. Since total risk and positive relationships did not predict convictions separately either, the impact of positive relationships at different levels of risk could not be compared. Thus, hypothesis 3 was not tested for the girls' model.

Hypothesis 4: Higher impact of positive relationships for girls than boys in the prediction of criminal outcomes

The results for the separate analyses for boys and girls from Hypothesis 2 were compared. It is important to note that since the female and male versions of the variables are distinct, the comparison between the two variables is not strictly comparable; however, they are roughly comparable, because they are made up of conceptually similar items. Since there are different theoretical minimums and maximums for the total risk variable and positive relationship variables, one group's variables were transformed. More specifically, the girls' moderation regression coefficients and standard errors were multiplied by 20/21 since the EARL21G has 21 items and the EARL20B has 20 items. The girls' moderation regression

coefficients and standard errors were also multiplied by 2/3 since the EALR20G has three items related to positive relationships and the EARL20B has two. Then, the moderation regression coefficients for the two groups were compared using independent samples t-tests. The Quick Calc Graph Pad program was used to conduct the independent samples t-tests. Statistics from models including outliers were used.

The difference between the girls' moderation coefficient ($M = .02$, $SE = .02$, $N = 127$) and the boys' moderation regression coefficient ($M = -.09$, $SE = .05$, $N = 191$) was significant in the expected direction, $t(316) = 1.73$, $p = .04$. Essentially, positive relationships are a stronger protective factor for girls than boys in the prediction of criminal outcomes. Although these two moderation coefficients can be compared, it is important to interpret this result with some caution since the moderation coefficients were not significant for either boys or girls.

Discussion

In the present study, I explored the role of positive relationships as a potential moderator between overall risk and criminal outcomes. Although positive relationships were not found to be a significant moderator in this association, other notable findings emerged. More specifically, the results from this study indicated some interesting associations between overall risk, positive relationships, and criminal outcomes for both genders, and confirmed that total risk is a significant predictor of criminal outcomes for boys. The results also demonstrated that for boys, positive relationships reduced the likelihood of criminal outcomes across all levels of risk with a high impact at a medium level of risk and an even higher impact at a higher level of risk. Finally, the results suggest some possible gender differences in the interaction between overall risk and positive relationships.

Associations between Overall Risk, Positive Relationships, and Criminal Outcomes

For boys, overall risk, was weakly correlated with criminal outcomes, and positive relationships were weakly negatively correlated with criminal outcomes, and these associations persisted when the control variables were included. Furthermore, the interaction between overall risk and reversed relationships was weakly correlated with criminal outcomes. These findings suggest that these are valuable associations to study for boys. Since no researchers have derived positive relationships from the EARLs in the past, it is important to note that the positive relationship variable is correlated with other variables in ways consistent with other research findings (Viljoen et al., 2012).

For girls, overall risk was very weakly correlated with criminal outcomes. However, this association was no longer significant when control variables were included. It is important to note that this correlation was significant without control variables, because it confirms that there is an association between overall risk and criminal outcomes for girls (Koegl, 2011) but suggests that other factors, such as baseline externalizing behaviour, may influence this association.

Overall Risk and Criminal Outcomes

For boys, hypothesis 1 was confirmed, as overall risk was a significant predictor of criminal outcomes. This finding was expected, as the EARLs were designed with this purpose (Augimeri et al., 2001) and many studies have demonstrated this link (Augimeri et al., 2012, 2010b; Hyrniw-Augimeri, 2005; Koegl, 2011).

For girls, hypothesis 1 was not confirmed, as overall risk was not a significant predictor of criminal outcomes. Again, this finding may not have reached significance because of the girls' smaller sample size (there were approximately 148 girls in this analysis compared to 217 boys) and fewer convictions (9.1% of girls in the sample had convictions while 22.7% of boys had

them) compared to the boys' sample. However, this finding is not surprising, because many past researchers have combined samples of boys and girls and have made less conclusive statements about the relationship between risk and criminal outcomes for girls (Augimeri et al., 2012). By separating the samples of boys and girls, Koegl (2011) found that overall risk predicted criminal outcomes for girls specifically; however, some different control variables were used (e.g., child age and clinician's rating confidence on the EARL). These control variables were not used in the present study, because there were no specific hypotheses about child age and because clinician's rating confidence scores were not available. Future researchers may choose to incorporate these variables.

Future researchers may also want to explore whether it is more valuable to look at other combinations of EARL items, as opposed to only total score, in the prediction of convictions for girls. For example, other researchers have demonstrated that the family items subscale (Augimeri et al., 2012) and the "Relational Disturbance" factor (Augimeri et al., 2010b) has predicted convictions for girls. It is also important to note that when the outliers were removed from the girls' model, this finding did approach significance. Although the models are interpreted including outliers in this study, since there were no reasons to remove outliers, future researchers may want to explore this relationship further.

Impact of Positive Relationships on Criminal Outcomes

For boys, hypothesis 2 was not confirmed, as positive relationships were not a significant moderator between overall risk and criminal outcomes. It is important to note that positive relationships did have a significant main effect in the prediction of criminal outcomes. This finding suggests that positive relationships could be acting as a direct protective factor (i.e., a factor which positively impacts all children in an at-risk sample and reduces their negative

outcomes) (Lösel & Farrington, 2012), as opposed to an interactive protective factor (i.e., a factor which interacts with a child's level of risk in the reduction of negative outcomes) (Farrington & Ttofi, 2011). Although past researchers have suggested that positive relationships act as an interactive protective factor (Lodewijks et al., 2010; Lösel & Farrington, 2012), this finding is consistent with a study by Pardini and colleagues (2012) where low peer delinquency measured at age 12 was a direct protective factor in the prevention of violence at age 15-18.

Protective factors were found to be a significant moderator between overall risk and criminal outcomes in two studies (de Vries Robbé et al., 2013; Lodewijks et al., 2010). A closer look at these two studies suggests why they had different findings than the present study. In de Vries Robbé and colleagues' (2013) study, an adult sample was used and all protective factors were combined without looking at positive relationships specifically. In Lodewijks and colleagues' (2010) study, a youth sample was used and protective factors were explored individually, including "social support" (from a peer or adult), and "attachment" (with a prosocial adult) which map onto the positive relationship variables in the present study. However, both of these studies used samples of individuals who had already been convicted and they were measuring their likelihood of re-offending. It is possible that risk and protective factors interact differently in a population of individuals who have already offended as opposed to the present sample of youth and young adults most of whom had not offended. Furthermore, the individuals in these two studies were receiving different treatment than in the present study (e.g., treatment targeting relapse prevention) and treatment was not always controlled for in the statistical analyses.

Similarly to the present study, Viljoen and colleagues (2012) found that protective factors did not significantly moderate the relationship between overall risk and criminal outcomes.

Viljoen and colleagues used the START-AV, a risk assessment tool that is based on the conceptualization of protective factors as the opposite of risk factors, which is similar to the conceptualization of protective factors in the present study. Perhaps protective factors which are the opposite ends of risk factors are less likely to moderate the relationship between risk factors and criminal outcomes. It is important to note that Viljoen and colleagues' (2012) study was not completely comparable to the present study. Similarly to the studies mentioned above, they used a sample of youth who had already offended, grouped both genders together, grouped all protective factors together, and did not control for treatment. These mixed findings suggest that there is more research to be done on the associations among risk factors, protective factors, and criminal outcomes.

For girls, hypothesis 2 was not confirmed, as positive relationships were not a significant moderator between overall risk and criminal outcomes. Unlike in the boys' sample, positive relationships did not have a significant main effect for girls. It is not surprising that for girls positive relationships were not a significant moderator (i.e., the interaction between overall risk and positive relationships was not a significant predictor of convictions), considering neither overall risk nor positive relationships had significant main effects. Again, this finding may have occurred because of the smaller sample and very low rate of convictions for girls. Additionally, researchers have less understanding of how risk and protective factors work for aggressive girls than for boys (Masseti et al., 2011; Pepler et al., 2010). Researchers have explored the concept of "Relational Disturbance" for girls and found that factors related to a girl's inability to develop a strong relational capacity predict their future convictions (Augimeri et al., 2010b). It is possible that while low relational capacity is a risk factor for girls' criminal offending, positive relationships are not necessarily protective for them. This postulation underscores that protective

factors which are the opposite end of a risk factor, do not always have exactly the opposite effect of their risk counterpart.

Another possible explanation is that it is particularly important for girls to have positive relationships during adolescence as well as during childhood. Positive relationships may buffer the unique difficulties that girls experience during adolescence. For example, researchers have demonstrated that early puberty is a risk factor for aggressive behaviour in girls (Caspi & Moffitt, 1991). Furthermore, girls' social relationships, especially with male peers with aggressive behaviour, can interact with puberty in the development of aggressive behaviour (Caspi, Lynam, Moffitt, & Silva, 1993). Since negative relationships have such an impact on girls in this developmental period, it follows that positive relationships may as well. In a review by Rose and Rudolph (2006), it was reported that adolescent girls are more likely than younger girls or adolescent boys to enlist emotional support from their peer relationships when faced with life stress.

Positive Relationships at Different Levels of Risk

For boys, hypothesis 3 was confirmed, as positive relationships had a stronger impact at a medium level of risk than at a low level of risk, and an even stronger impact at a high level of risk than at a medium level of risk. Although positive relationships had a greater impact at higher levels of risk, it was not strong enough to yield an interaction effect. This finding indicates some consistency with the studies by Lodewijks and colleagues (2010) and de Vries Robbé and colleagues (2013). It is possible that their findings could have been strong enough to yield an interaction effect because their sample consisted of individuals who had not received early intervention and had all already offended. Overall, their sample was likely at a higher level of

overall risk compared to the sample in the present study and higher levels of risk may lead to stronger interaction effects

For girls, hypothesis 3 could not be tested since the interaction and the main effects were not significant.

Positive Relationships and Rutter's Framework

The present study indicated some support for Rutter's framework, since positive relationships interacted with level of risk for boys. Although positive relationships did not significantly moderate the association between overall risk and criminal outcomes, a closer exploration revealed that they had different impacts at different levels of risk. Future researchers should continue to explore whether positive relationships function as direct or interactive protective factors and whether their role changes at different levels of risk or in different contexts. Furthermore, conceptualizing a protective factor as the opposite end of a risk factor may make it less likely to have an interactive effect. Perhaps a protective factor needs to be unrelated to risk to impact a sample at different levels of risk, a question for future research. It is also important to explore the unique factors that impact girls.

Gender Differences in Positive Relationships

Hypothesis 4 was confirmed as the overall risk and positive relationship interaction was stronger for girls than for boys. This finding must be interpreted with caution since the moderation regression coefficients were not significant for either girls or boys.

In the present study, there were differences for boys and girls in terms of the associations between overall risk and positive relationships. It may be that relational protective factors are more important for girls than for boys, which would be consistent with past studies (Ehrensaft, 2005; Lösel & Farrington, 2012; Pepler et al., 2011; Pepler et al., 2010). Girls' risk factors are

measured differently (e.g., with the unique “caregiver-daughter interaction” item on the EARL21G) and the interaction of general risk with positive relationships appears to be different than for boys. Past studies in which boys’ and girls’ samples have been combined appear to have lost valuable information (Augimeri et al., 2012). Results from the present study underscore the importance of studying girls separately from boys in the context of risk assessment.

Conclusion

The results from the present study indicated that for boys, overall risk predicted criminal outcomes and positive relationships reduced the likelihood of criminal outcomes across all levels of risk, with greater impact at higher levels of risk. The study also revealed some possible gender differences in risk, positive relationships, and criminal outcomes. Issues around the conceptualization of protective factors as the opposite end of risk factors and as interacting with levels of risk were discussed.

Limitations and Future Directions

The present study has some limitations. As mentioned above, the sample size was smaller for girls and girls had fewer convictions than boys. This difference may account for some of the insignificant findings for girls. This is a frequently noted challenge in conducting research with girls who display antisocial behaviour (Augimeri et al., 2012; Levene et al., 2001).

A second limitation of the present study is that there could have been untested variables that influenced the results. Other possible variables of interest could have included: family familial trauma histories and children’s educational success. These variables were not explored in the present study either because they were unavailable, or because they were beyond the scope of this study. Furthermore, since the approach of exploring positive relationships using the

EARLs was novel, there were no specific predictions about the impact of additional variables available in the literature.

An additional limitation of the present study, and possibly its greatest limitation, is the way in which positive relationships were measured. More specifically, they were not measured directly but were calculated by recoding the scores of risk factors. In other studies, researchers were able to measure protective factors directly (de Vries Robbé et al., 2013; Lodewijks et al., 2010; Viljoen et al., 2012). In the present sample, explicit information on protective factors was not available. One of the challenges of using an archival dataset is not being able to use measures which specifically address one's research questions. Although the EARL items were designed in such a way that allows for the interpretation of protective factors (e.g., a "0" on the peer socialization risk item is defined as establishing positive ties with prosocial peers), it was not constructed with this purpose in mind. Furthermore, calculating protective factors in this way relies on defining protective factors as the opposite end of risk factors. Past researchers have relied on this assumption while constructing risk assessment tools (Webster et al., 2004); however, others have suggested that protective factors exist independently of risk factors (Borum et al., 2006; de Vries Robbé et al., 2015).

Another limitation of the present study is that positive relationships were only measured by trained raters and at one time point. Although this is typically how protective factors have been measured (de Vries Robbé et al., 2013; Lodewijks et al., 2010), this method does not allow for an understanding of the child or family's perception of their own positive relationships, nor the impact of treatment on the quality of relationships. It also fails to take into account the dynamic influence of positive relationships over time. This may be particularly relevant for girls because positive relationships continue to play an especially important role during adolescence.

A final limitation of the present study is the type of positive relationships that were studied. Since the present study was novel, and there were theoretical and methodological reasons for doing so, positive relationships with parents and peers were combined to create an overall positive relationship score. Thus, it was not possible to determine whether they were each contributing differently to the results. Although some researchers have combined similar positive relationships (Borum et al., 2006), others suggest that it is important not to combine them and create one vague construct (Cording & Christofferson, 2017). In the present study, the correlations between these two scores provided some additional support for combining them; however, stronger correlations would have been more compelling. In the present study, approximately 3.2% of boys and 10.8% of girls had high scores on either parent or peer relationships and low scores on the other. Although those numbers are fairly small, future researchers may want to study these cases, particularly the girls, in more depth. In addition positive relationships with siblings and other supportive adults were not captured by the EARLs, and these relationships are also important in reducing criminal outcomes (de Vries Robbé et al., 2015).

There is a need for future researchers to explore the unique and understudied population of girls who demonstrate aggressive behaviour. More specifically, it would be helpful to find larger samples of girls who have convictions or to combine several existing samples. It would also be useful to explore whether specific EARL items and combinations of items predict convictions for girls better than the total score. Finally, unique potential protective factors for girls, such as a positive body image, could be examined.

In future studies, it may be more accurate to measure protective factors directly instead of calculating them from risk factors. Protective factors should also be reported by parents and

children in addition to trained raters. This approach may demonstrate the importance of the perception of protective factors in addition to clinical ratings of them. Protective factors should also be measured at multiple time points to elucidate how they can change over time, especially with treatment. Due to the mixed findings in the literature, as well as in the present study, the relationships between risk and protective factors at different levels of risk should continue to be studied. Samples at varying levels of risk should be used. Multi-site studies could be used to explore the relationship between risk and protective factors at different levels of risk and within different geographic and socioeconomic contexts.

Regarding the specific protective role of positive relationships, future researchers may want to separate parent-child and peer relationships and see whether they contribute differently to outcomes. Researchers are also beginning to tease apart whether specific protective factors interact with specific risk factors. For example, Farrington, Ttofi and Piquero (2016) found that good child-rearing acts as an interactive protective factor when the risk factor of having one convicted parent is present. This may be a beneficial approach for future researchers to use to determine which protective factors to include on risk assessment tools and which ones to build upon in interventions in specific risk contexts. Finally, positive relationships with siblings and other supportive relationships could also be included when assessing protective factors in the future.

STUDY 2:

POSITIVE RELATIONSHIPS IN THE PREDICTION OF MENTAL HEALTH OUTCOMES

Although the EARLs were designed to predict future antisocial behaviour, there is some evidence that they can also predict both externalizing and internalizing mental health outcomes, particularly for boys (Augimeri et al., 2010a; Enebrink et al., 2006a, Koegl, 2011). It is

particularly important to study mental health outcomes in samples that include girls, since aggressive girls are less likely to have criminal outcomes than boys (Augimeri et al., 2010b) and are more likely to develop mental health difficulties (Moffitt et al., 2001; Stack et al., 2005).

Researchers have found that positive relationships reduce childhood psychopathology (Cummings & Davies, 1996). Positive relationships have been found to have a greater impact on the reduction of criminal outcomes at a greater level of risk (de Vries Robbe, 2013; Lodewijks et al., 2010; Lösel & Farrington 2012), thus it follows that they may also have a greater impact on mental health outcomes at a higher level of risk. Finally, relational factors have been found to be more important for girls than boys in the development of aggression (Ehrensaft, 2005; Moffitt et al., 2001).

The purpose of the present study was to confirm whether the EARL total risk score predicted mental health outcomes and to explore whether positive relationships moderated this association at different levels of risk. In addition, I examined whether the strength of this moderation effect differed depending on gender.

Hypotheses

In this study, there were four primary hypotheses:

- 1) High overall risk predicts mental health outcomes.
- 2) Positive relationships moderate the association between overall risk and mental health outcomes.
- 3) Positive relationships have a greater impact on mental health outcomes at a higher level of overall risk.
- 4) Positive relationships impact girls more than boys in the prediction of mental health outcomes.

Method

The method for Study 2 was the same as that described above for Study 1, with the exception of different outcome variables in Study 2. CBCL externalizing and internalizing scores from six months after the initial assessment were the outcome variables, instead of convictions coded from criminal records. All children who received treatment received it within the six-month period between the initial assessment and the measurement of the outcome variables. Since treatment lasted three months, the time between treatment discharge and the measurement of outcome variables only varied up to three months.

Results

Descriptive Statistics for Variables of Interest

Descriptive statistics for the main variables can be found in Table 4. See Table 11 for additional variables used in Study 2. It is important to note that baseline internalizing behaviour is in the borderline clinical range for boys ($M = 63.00$, $SD = 9.66$) and in the clinical range for girls ($M = 64.18$, $SD = 10.61$). After treatment, boys' internalizing symptoms decreased into the normal range ($M = 58.15$, $SD = 10.95$) and girls' internalizing symptoms decreased into the borderline clinical range ($M = 61.21$, $SD = 11.71$). The difference between boys' and girls' internalizing symptoms post-treatment was significant, $t(430) = 2.77$, $p < .001$. This result is consistent with the finding that internalizing symptoms are more relevant for aggressive girls than boys (Stack et al., 2005). Both boys' and girls' externalizing symptoms decreased after treatment, yet remained in the clinical range ($M = 65.42$, $SD = 9.3$ for boys, and $M = 66.43$, $SD = 9.10$ for girls).

Preliminary Bivariate Correlations

Bivariate correlations were performed for each model. See Study 1 for details on significance levels.

Boys' externalizing model.

Bivariate correlations were performed for the boys' externalizing model. The total risk score on the EARL was significantly correlated with baseline externalizing behaviour, $r(193) = .21, p = .002$ and externalizing outcomes, $r(131) = .20, p = .001$. The positive relationship score was significantly negatively correlated with externalizing outcomes $r(135) = -.30, p < .001$. Baseline externalizing behaviour was significantly correlated with externalizing outcomes $r(141) = .63, p < .001$. The number of treatment components was significantly correlated with externalizing outcomes in an unexpected direction, $r(152) = .31, p < .001$. The number of SNAP sessions was not significantly correlated with externalizing outcomes, $r(151) = .10, p = .23$. See Table 12 for the bivariate correlations of variables for the boys' externalizing model.

Boys' internalizing model.

Bivariate correlations were also performed for the boys' internalizing model. All the correlations that were significant in the externalizing model were also significant in the internalizing model. The total risk score on the EARL was significantly correlated with baseline internalizing behaviour, $r(193) = .21, p = .002$ and internalizing outcomes, $r(132) = .17, p = .03$. The positive relationship score was significantly negatively correlated with internalizing outcomes, $r(136) = -.23, p = .004$. Baseline internalizing behaviour was significantly correlated with internalizing outcomes, $r(142) = .72, p < .001$. The number of treatment components was significantly correlated with internalizing outcomes in an unexpected direction, $r(153) = .31, p < .001$. The number of SNAP sessions was not significantly correlated with internalizing

outcomes, $r(151) = .07, p = .37$. See Table 13 for the bivariate correlations for the boys' internalizing model.

Girls' externalizing model.

Bivariate correlations were performed for the girls' externalizing model. Except for treatment components, all the correlations that were significant for the boys' externalizing model were also significant in the girls' externalizing model. The total risk score on the EARL was significantly correlated with baseline externalizing behaviour, $r(129) = .28, p = .001$ and externalizing outcomes, $r(103) = .29, p = .002$. The positive relationship score was significantly negatively correlated with externalizing outcomes, $r(103) = -.21, p = .02$. Baseline externalizing behaviour was significantly correlated with externalizing outcomes, $r(108) = .71, p < .001$. The number of treatment components was not significantly correlated to externalizing outcomes, $r(112) = .16, p = .09$, nor was the number of SNAP sessions, $r(111) = .025, p = .80$. See Table 14 for the bivariate correlations of variables for the girls' externalizing model.

Girls' internalizing model.

Bivariate correlations were also performed for the girls' internalizing model. All the correlations that were significant for the boys' internalizing model were also significant in the girls' externalizing model. Girls' total risk score on the EARL was significantly correlated with baseline internalizing behaviour, $r(129) = .22, p = .006$ and internalizing outcomes, $r(103) = .34, p < .001$. The positive relationship score was significantly negatively correlated with internalizing outcomes, $r(103) = -.24, p = .009$. Baseline internalizing behaviour was significantly correlated with internalizing outcomes, $r(108) = .68, p < .001$. The number of treatment components was significantly correlated with internalizing outcomes in an unexpected direction, $r(112) = .23, p = .004$. The number of SNAP sessions was not significantly correlated

with internalizing outcomes, $r(111) = -.062$, $p = .26$. See Table 15 for the bivariate correlations of variables for the girls' internalizing model.

Across both boys' models and the girls' internalizing model, treatment components were weakly correlated to mental health outcomes in an unexpected direction, with more treatment components related to worse mental health outcomes. This association occurred because children who had more mental health symptoms at the outset of treatment received more treatment components. In the boys' externalizing model, baseline externalizing behaviour was significantly correlated with the number of treatment components, $r(224) = .14$, $p = .02$. In the boys' internalizing model, baseline internalizing behaviour was significantly correlated with the number of treatment components, $r(224) = .13$, $p = .02$. In the girls' internalizing model, baseline internalizing behaviour approached a significant correlation with the number of treatment components, $r(150) = .12$, $p = .08$. Future researchers who study treatment effects may want to explore this association further.

Preliminary Partial Correlations

Partial correlations were conducted to explore the relationships between the variables further in preparation for the multiple regression analyses. It is important to note that the positive relationship variable was transformed at this point. See Study 1 for details on how it was transformed and the purpose of this transformation. Correlations between the total risk score, the reverse-coded positive relationship score, the interaction term (total risk*reverse-coded positive relationship score), and mental health outcomes were tested, controlling for: baseline mental health behaviour, number of treatment components, and total SNAP sessions. See Tables 16-19 for the partial correlations for all four models. No partial correlations of interest were significant, except for in the boys' externalizing model. In the boys' externalizing model, when baseline

externalizing behaviour, the number of treatment components, and the number of SNAP sessions are controlled for, the reverse-coded positive relationship score was significantly correlated with externalizing outcomes, $r(116) = .23, p = .01$. In other words, when a boy had less positive relationships they were more likely to have more elevated externalizing outcomes. The interaction term was also significantly correlated with externalizing outcomes, $r(116) = .21, p = .01$. See Figures 4 and 5 for scatterplots of these significant partial correlations. Essentially, when each variable is tested with the control variables, as opposed to only the dependent variable being tested with the control variables, there are significant relationships between the independent and dependent variables.

Multiple Regressions

Since there were theoretical reasons to retain the control variables, none was removed from the regression models. Regression diagnostics were run and the data met all assumptions of regression including normality, linearity, and homoscedasticity. Multiple linear regressions were run separately for externalizing and internalizing outcomes and for boys and for girls. Outliers were identified if they had standardized residuals greater than ± 1.96 and Cook's distances greater than $4/N-k-1$. These cases were examined and there were no errors in data entry, nor were there any reasons for these cases to be different than any of the others. As mentioned above, since outliers are considered part of the population, current researchers suggest retaining them unless they are data or measurement errors and presenting findings with and without them (Alves & Nascimento, 2007; UCLA: Statistical Consulting Group, 2017). It is particularly important to retain outliers when they occur due to unusual combinations of variables, as opposed to extreme values, and this was the case for many of the outliers in the present study (Alves & Nascimento, 2007). For example, sometimes the outliers had low total risk scores given that they had high

levels of internalizing or externalizing outcomes. This discrepancy likely occurred since the EARLs are imperfect predictive tools and not because of data error. Analyses were conducted again with these outliers removed in case future investigation warrants their removal. For the present study, the main interpretations are based on data including outliers.

Hypothesis 1: Overall risk as a predictor of mental health outcomes.

Multiple regressions were conducted to determine whether overall risk predicted mental health outcomes.

Boys' externalizing model.

A regression model including total risk and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in externalizing outcomes, $R^2 = .46$, $F(4,120) = 24.67$, $p < .001$. However, total risk did not significantly predict externalizing outcomes, $B = 0.11$, $t(120) = 0.95$, $p = .17$. Six outliers were identified. When analyses were conducted without these outliers, the results did not change notably.

Boys' internalizing model.

A regression model including total risk and controlling for: baseline internalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in internalizing outcomes, $R^2 = .60$, $F(4,121) = 42.12$, $p < .001$. However, total risk did not significantly predict internalizing outcomes, $B = -0.04$, $t(121) = -0.30$, $p = .77$. Four outliers were identified. When analyses were conducted without these outliers, the results did not change notably.

Girls' externalizing model.

A regression model including total risk and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in externalizing outcomes, $R^2 = .53$, $F(4,96) = 26.38$, $p < .001$. However, total risk did not significantly predict externalizing outcomes, $B = .09$, $t(96) = 0.79$, $p = .22$. Four outliers were identified. When analyses were conducted without these outliers, the results did not change notably.

Girls' internalizing model.

A regression model including total risk and controlling for: baseline internalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in internalizing outcomes, $R^2 = .53$, $F(4,96) = 25.19$, $p < .001$. However, total risk did not significantly predict internalizing outcomes, $B = 0.17$, $t(96) = 1.11$, $p = .14$. Five outliers were identified. When analyses were conducted without these outliers, the results did not change notably. See Table 20 for a summary of the multiple regressions for hypothesis 1 for boys and girls.

Hypothesis 2: Positive relationships as a moderator between overall risk and mental health outcomes.

Reverse-coded positive relationship score and the interaction between reversed positive relationship score and total risk were added into the multiple linear regression models. The significance of the interaction term was tested in order to determine whether positive relationships moderate the relationship between overall risk and mental health outcomes.

Boys' externalizing model.

A regression model including total risk, reverse-coded positive relationship score, and total risk*reverse-coded positive relationship score, and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in externalizing outcomes, $R^2 = .47$, $F(6,120) = 18.83$, $p < .001$. The interaction between total risk and reverse-coded positive relationship score approached significance in predicting externalizing outcomes, $B = 0.16$, $t(120) = 1.50$, $p = .07$. Four outliers were identified. When analyses were conducted without these outliers, the interaction between total risk and reverse-coded positive relationship score significantly predicted externalizing outcomes, $B = 0.19$, $t(116) = 1.96$, $p = .03$. See Figure 6 for a scatterplot of this significant interaction.

Boys' internalizing model.

A regression model including total risk, reverse-coded positive relationship score, and total risk*reverse-coded positive relationship score, and controlling for: baseline internalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in internalizing outcomes, $R^2 = .60$, $F(6,121) = 28.50$, $p < .001$. The interaction between total risk and reverse-coded positive relationship score approached significance in predicting internalizing outcomes, $B = 0.16$, $t(121) = 1.43$, $p = .08$. Four outliers were identified. When analyses were conducted without these outliers, the interaction between total risk and reverse-coded positive relationship score significantly predicted internalizing outcomes, $B = 0.18$, $t(117) = 1.77$, $p = .04$. See Figure 7 for a scatterplot of this significant interaction. See Table 21 for a summary of the multiple regressions for hypothesis 2 for boys.

Girls' externalizing model.

A regression model including total risk, reverse-coded positive relationship score, and total risk*reverse-coded positive relationship score, and controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in externalizing outcomes, $R^2 = .53$, $F(6,96) = 17.54$, $p < .001$. However, the interaction between total risk and reverse-coded positive relationship score did not significantly predict externalizing outcomes, $B = -0.04$, $t(96) = -0.46$, $p = .64$. Three outliers were identified. When analyses were conducted without these outliers, the interaction between total risk and reverse-coded positive relationship score significantly predicted externalizing outcomes in an unexpected negative direction, $B = -0.19$, $t(93) = -2.39$, $p = .02$. However, when they were explored separately in this model without outliers, reverse-coded positive relationship score and total risk were each significant in predicting externalizing outcomes in the expected direction.

Girls' internalizing model.

A regression model including total risk, reverse-coded positive relationship score, and total risk*reverse-coded positive relationship score, and controlling for: baseline internalizing behaviour, number of treatment components, and total SNAP sessions, explained a significant proportion of variance in internalizing outcomes, $R^2 = .53$, $F(6,96) = 16.89$, $p < .001$. The interaction between total risk and reverse-coded positive relationship score did not significantly predict internalizing outcomes, $B = -0.08$, $t(96) = -0.74$, $p = .46$. Four outliers were identified. When analyses were conducted without these outliers, the results did not change notably. See Table 22 for a summary of the multiple regressions for hypothesis 2 for girls.

Hypothesis 3: Higher impact of positive relationships at higher level of risk.

In the main models, since positive relationships did not significantly moderate the relationship between total risk and mental health outcomes for boys or for girls, the interaction could not be probed further to determine whether positive relationships had a stronger impact at higher levels of risk. Furthermore, when total risk and positive relationships were separated they remained non-significant predictors of mental health outcomes.

In the boys' models without outliers, positive relationships did significantly moderate the relationship between total risk and mental health outcomes for boys. Thus hypothesis 3 was tested in these models. In the boys' externalizing model without outliers, positive relationships have more of an impact at higher level of risk. At the mean of the low total risk category (total risk= 11.36), if a child has a high positive relationship score as opposed to a low positive relationship score, their externalizing score is 1.62 points lower. At the mean of the medium total risk category (total risk= 17.63), if a child has a high positive relationship score as opposed to a low positive relationship score their externalizing score is 3.94 points lower. At the mean of the high total risk category (total risk= 26.14), if a child has a high positive relationship score as opposed to a low positive relationship score their externalizing score is 7.09 points lower. These results demonstrate that positive relationships have an important impact on externalizing outcomes and that this impact differs significantly at different levels of risk.

In the boys' internalizing model without outliers, positive relationships have more of an impact at higher level of risk. At the mean of the low total risk category (total risk= 11.36), if a child has a high positive relationship score as opposed to a low positive relationship score, their internalizing score is 0.25 points higher. At the mean of the medium total risk category (total risk= 17.63), if a child has a high positive relationship score as opposed to a low positive

relationship score their internalizing score is 2.01 points lower. At the mean of the high total risk category (total risk= 26.14), if a child has a high positive relationship score as opposed to a low positive relationship score their internalizing score is 5.07 points lower. These results demonstrate that positive relationships have an important impact on externalizing outcomes and that this impact differs significantly at different levels of risk.

It is important to note that the removal of the outliers is not justified at this time, since they occurred due to combinations of variables that could exist in the population, e.g., a low total risk score and a high externalizing outcome as opposed to data entry or measurement errors. However, these results provide support to future researchers who may wish to explore the potential moderating effect of positive relationships in the future.

Independent Samples T-Tests

The results for the separate analyses for boys and girls from Hypothesis 2 were compared. See Study 1 for details on variability and transformations for this analysis. Then, the moderation regression coefficients for the two groups were compared using independent samples t-tests. The Quick Calc Graph Pad program was used to conduct the independent samples t-tests. Statistics from models including outliers were used.

Hypothesis 4: Higher impact of positive relationships for girls than boys in the prediction of mental health outcomes.

Externalizing models.

The girls' moderation coefficient ($M = -.03$, $SE = .05$, $N = 97$) was not significantly greater than the boys' moderation regression coefficient ($M = .16$, $SE = .11$, $N = 121$), $t(216) = 1.45$, $p = .15$. In other words, positive relationships were not a stronger protective factor for girls than boys in the prediction of externalizing outcomes.

Internalizing models.

The girls' moderation coefficient ($M = -.05$, $SE = .07$, $N = 97$) was not significantly greater than the boys' moderation regression coefficient ($M = .16$, $SE = .11$, $N = 122$), $t(217) = 1.52$, $p = .13$. Essentially, positive relationships were not a stronger protective factor for girls than boys in the prediction of internalizing outcomes.

Discussion

In the present study, I explored the role of positive relationships as a potential moderator between overall risk and mental health outcomes. Although positive relationships were not found to be a significant moderator in the main models, other notable findings emerged. More specifically, the results from this study indicated associations between overall risk, positive relationships, and mental health outcomes for both genders. Overall risk was not a significant predictor of mental health outcomes for boys or for girls. Although positive relationships were not a significant moderator between total risk and mental health outcomes for boys or for girls, they approached significance as a moderator for boys for both externalizing and internalizing outcomes and were significant when outliers were removed from these models. Finally, there were no significant gender differences in the interaction between overall risk and positive relationships.

Associations between Overall Risk, Positive Relationships, and Mental Health Outcomes

For boys, overall risk was weakly correlated with externalizing outcomes and very weakly correlated with internalizing outcomes. Although this finding was not significant in the regression models, it is important to note that the associations were significant. This result confirms that there are associations between overall risk and externalizing and internalizing outcomes (Enebrink et al., 2006a; Koegl, 2011) but suggests that other factors, including

baseline mental health, may influence this association. Positive relationships were weakly negatively correlated with externalizing and internalizing outcomes. Again, since positive relationships have never been derived from the EARLs in this way, it is important to note that they are associated with both externalizing and internalizing outcomes in expected ways. Finally, the interaction between overall risk and reversed relationships was also weakly correlated with externalizing outcomes. Although this relationship was not significant in the regression model, it is important to note that the association was significant. It could suggest that this is a valuable association to explore and positive relationships may even have a moderating effect on risk in other samples.

For girls, overall risk was weakly correlated to externalizing and internalizing outcomes and positive relationships were weakly negatively correlated to both externalizing and internalizing outcomes. Although these associations were not significant with control variables entered or in regression models, they still may be important associations for future researchers to explore and it will be worthwhile to tease apart which specific additional variables play a role. Furthermore, for girls, positive relationships were significantly associated with mental health outcomes but not criminal outcomes. This finding suggests that mental health outcomes could be more relevant for girls (Stack et al., 2005).

Overall Risk and Mental Health Outcomes

For boys, hypothesis 1 was not confirmed, as overall risk was not a significant predictor of externalizing or internalizing outcomes. This hypothesis may not have been confirmed for a few reasons, including the intended purpose of the EARLs, the time frame of the present study, the measurement of mental health outcomes, and the strong association between baseline mental health and mental health outcomes in the present study.

The EARLs were designed to predict future antisocial behaviour, particularly convictions (Augimeri et al., 2001, 2010; Levene et al., 2001), thus it follows that they may not be effective in predicting mental health outcomes, specifically less severe rule-breaking and aggressive outcomes or internalizing outcomes. In the present study, the time frame between risk and mental health outcomes was only six months. In other similar studies, mental health outcomes were explored up to fifteen years after intake (Koegl, 2011). This longer time frame is particularly important since children with aggressive behaviour can develop externalizing and internalizing symptoms into adolescence and young adulthood (Caspi, Moffitt, Newman, & Silva, 1996; Pihlakoski et al., 2006; Stack et al., 2005).

In the present study, mental health outcomes were measured by parental report of externalizing and internalizing symptoms on the CBCL 6/18. In similar studies using the EARLs, externalizing and internalizing symptoms were measured with the CBCL 6/18 delinquency scale (Augimeri et al., 2010), a 21-item rating scale on proactive and reactive aggression (Enebrink et al., 2006a), and mental health hospital visits (Koegl, 2011). It is important to note these studies gathered information about mental health outcomes from multiple sources, whereas the present study relied on parental report. In the present study, parents may have underreported children's symptoms because they wanted to demonstrate that the treatment had worked.

For girls, hypothesis 1 was not confirmed, as overall risk was not a significant predictor of externalizing or internalizing outcomes. It is surprising that overall risk was not related to mental health outcomes for girls, considering that girls with aggressive behaviour typically develop more mental health difficulties than boys (Moffitt et al., 2001; Stack et al., 2005) and these difficulties can even remain after treatment (Pepler et al., 2004; Yuile, 2007). This finding may not have been significant for similar reasons as the boys (e.g., the intended purpose of the

EARLs, the short time frame, the reliance on parental report, and the strong association between baseline mental health and mental health outcomes). It may have been particularly important for girls' outcomes to be measured well into adolescence and adulthood, as opposed to after a six-month period, because girls develop externalizing symptoms later than boys, with a peak around age 16 as opposed to age 10 for boys (Cohen et al., 1993). Thus, only measuring outcomes at age 6-13 may have failed to capture the development of these symptoms.

Girls were not included in the studies mentioned above by Augimeri and colleagues (2010) and Enebrink and colleagues (2006a). They were included in Koegl's (2011) study and he found that the EARL did not predict internalizing symptoms for girls. He attributed this finding to a smaller sample size for girls (N=39). The present study had a larger sample of girls (N=176), thus there may be other qualitative differences for girls' trajectories. As mentioned in Study 1, for girls, it may be more valuable to look at other combinations of EARL items, e.g., the family items subscale or the "Relational Disturbance" factor.

Different mental health outcome measurements may also be more relevant for girls. For example, some researchers suggest that indirect aggression (e.g., relational aggression, in which one tries to harm a peer through rejection and/or social exclusion) is a more pertinent aggression outcome for girls (Crick & Grotpeter; 1995; Stack et al., 2005). In a study with a similar sample of girls to the present study, Pepler and colleagues (2010) used indirect aggression as an outcome measurement.

The Impact of Positive Relationships on Mental Health Outcomes

For boys, hypothesis 2 was not confirmed, as positive relationships were not a significant moderator between overall risk and mental health outcomes. This finding is not surprising, considering neither overall risk nor positive relationships had significant main effects.

This finding may not have reached significance due to the reasons listed in hypothesis 1: a short-time frame, the parental report of child symptoms, and the strong association between baseline mental health and mental health outcomes. When researchers look at the impact of protective factors, they frequently look at their impact over periods of time from 3-6 years, as opposed to six months, with information gathered from multiple sources (Lodejiwicks et al., 2010; Pardini et al., 2012).

It is also important to note that when outliers were removed from these models, positive relationships were a significant moderator. In these models, high levels of positive relationships reduced the impact of risk on both externalizing and internalizing mental health outcomes. The finding that positive relationships moderated risk and mental health outcomes is consistent with past research. Criss and colleagues (2002) found that positive peer relationships moderated the impact of family adversity on child externalizing behaviour. However, this finding must be interpreted with caution, as there was no support for removing outliers at this time. Future researchers may wish to explore this moderation effect further.

For girls, hypothesis 2 was not confirmed, as positive relationships did not moderate the association between overall risk and mental health outcomes. This finding is not surprising, considering neither overall risk nor positive relationships had significant main effects.

This finding may not have been significant for the girls for the same reasons as the boys': the short time frame, the reliance on parental report, and the strong association between baseline mental health and mental health outcomes. It may be particularly important for the impact of relationships on girls' outcomes be measured well into adolescence and adulthood, as opposed to after a six-month period. Past researchers have shown that negative relationships impact mental health outcomes for girls into their adolescence and young adulthood (Ehrensaft et al., 2005;

Pepler et al., 2011). Thus, the present study may not have captured the potential longer term impact of relationships.

In addition to these general reasons, there are unique factors that may only impact the girls' results. As mentioned in Study 1, the girls have a smaller sample size, relationships play a unique role in the development of aggression for girls, and positive relationships may not be as helpful for girls as negative relationships are hurtful for them. Furthermore, girls develop externalizing symptoms later than boys (Cohen et al., 1993). Finally, indirect aggression, an outcome which captures relational processes, may be a more valuable outcome variable for girls, particularly when measuring the impact of a relational protective factor like positive relationships.

Positive Relationships at Different Levels of Risk

In the main models, neither the main effects of overall risk and positive relationships nor the interaction between overall risk and positive relationships were significant for either boys or girls. However, in the boys' models without outliers, the interactions between overall risk and positive relationships were significant so they could be explored at different levels of risk.

In these models, it was confirmed that positive relationships had a stronger impact at a medium level of risk than at a low level of risk, and an even stronger impact at a high level of risk than at a medium level of risk. This finding is consistent with findings of other researchers who have looked at the moderating effect of positive relationships on mental health outcomes (Criss et al., 2002). It also suggests the importance of fostering positive relationships in boys who are at particularly high levels of risk in order to reduce their problematic outcomes. Finally, although mental health outcomes were initially included in the study because of their potential relevance for girls (Stack et al., 2005), this finding suggests that mental health outcomes may

also be a valuable outcome measurement for boys. In the future, researchers who study the trajectories of boys with antisocial behaviour may wish to explore mental health outcomes in addition to criminal outcomes.

Again, these results should be interpreted with caution since there was no support for removing outliers at this time and future researchers should explore this moderation effect at different levels of risk.

Positive Relationships and Rutter's Framework

The present study found some support for Rutter's framework, since positive relationships almost functioned as an interactive protective factor for boys. Although positive relationships did not significantly moderate the association between overall risk and mental health outcomes they approached significance and were significant when outliers were removed. Furthermore, in this study positive relationships did not have a significant main effect, which means that they did not function as a direct protective factor. Perhaps positive relationships are more likely to act as an interactive protective factor than a direct protective factor in the context of mental health outcomes, whereas they act as both in the context of criminal outcomes. Since Rutter's conceptualization of interactive protective factors has been grounded in research on mental health outcomes, this finding is consistent with his work (Rutter, 1985). This suggestion should be advanced with caution due to the nonsignificant findings of the present study; however, future researchers may wish to explore the possibility more fully. Girls' unique mental health trajectories also warrant more study.

No Difference in Positive Relationships for Boys and Girls

Hypothesis 4 was not confirmed, as the overall risk and positive relationship interaction was not stronger for girls than for boys for either externalizing or internalizing outcomes.

Essentially, positive relationships, as measured in this study, were not a stronger protective factor for girls than for boys in the prediction of externalizing or internalizing outcomes. This finding must be interpreted with caution since neither of the moderation regression coefficients was significant for boys or for girls. However, this finding may suggest that there are no significant differences in the protective effect of positive relationships on mental health outcomes for girls with aggressive behaviour compared to boys with aggressive behaviour. This implication would not be entirely surprising, since some researchers have demonstrated that many risk and protective factors are similar for boys and for girls (Hart et al., 2007; Moffitt et al., 2001).

Conclusion

The results from the present study indicated that for boys, positive relationships approached significance in the moderation of overall risk in the prediction of mental health outcomes and were significant in the models with the outliers removed. The potential role of positive relationships as an interactive protective factor for boys was discussed. There were no gender differences between the moderating effect of positive relationships for boys or girls.

Limitations and Future Directions

The present study has some limitations. Several of the limitations are the same for Study 1 and Study 2: 1) the sample size was smaller for girls, 2) untested variables (e.g., family income) may have influenced the results, 3) positive relationships were not measured directly and they were only measured at one time point, and 4) positive relationships were a combination of parent-child relationships and peer relationships and did not include other types of relationships (e.g., sibling relationships).

The present study also has two unique limitations. First, mental health outcomes were measured only six months after the risk assessments were completed. In similar studies, mental

health outcomes were explored up to fifteen years after initial risk assessments (Koegl, 2011). This longer time frame may be particularly relevant for girls, since they typically develop aggressive behaviour into adolescence and later than boys do (Cohen et al., 1993). Second, in the present study, mental health outcomes relied on parental report. Other similar studies used a variety of sources of information including teacher ratings and mental health hospital visits (Enebrink et al., 2006a; Koegl, 2011). Parents may be under-endorsing their children's symptoms in the present study because they want to demonstrate that treatment has helped them. Furthermore, although treatment effects were controlled for by controlling for the number of sessions and treatment components, there may still have been a treatment effect that was not captured by these variables. In the future, researchers may wish to explore the association between overall risk and baseline mental health, instead of outcome mental health, in order to alleviate the possible impact of treatment effects.

Future researchers could conduct studies with larger samples of girls and explore whether different items and combinations of EARL items predict mental health outcomes better than total risk. They could also study whether there are unique protective factors for girls. Future researchers may also want to measure protective factors directly, separate parent-child and peer relationships and see whether they are contributing differently, and examine other types of relationships. In the future, those who want to explore the impact of positive relationships on mental health outcomes may wish to measure mental health outcomes at multiple time points and by multiple raters using a range of questions and methods. If future researchers take this careful approach, they may find that positive relationships are a significant moderator for mental health outcomes for boys. Finally, future researchers may want to incorporate indirect aggression as an

outcome measure for girls. Perhaps relational protective factors (e.g., positive relationships) can reduce relational outcomes (e.g., social ostracizing).

GENERAL IMPLICATIONS AND CONCLUSIONS FOR BOTH STUDIES

Taken together, results from both studies suggest that the EARLs are accurate tools for measuring future risk of antisocial behaviour, particularly for boys. The results also suggest that adding positive relationships explicitly into this risk assessment measure would be valuable, especially when predicting convictions for boys. Positive relationships may not be as useful for assessing the likelihood of future convictions for girls, or mental health outcomes for boys or for girls. Perhaps other protective factors may be more valuable additions in those risk assessments. However, adding positive relationships into all risk assessments will still help to create more balanced and less stigmatized view of clients and help them find strength and motivation for treatment (Rogers, 2000; de Ruiter & Nicholls, 2011).

Positive relationships should be a focus in prevention programs that aim to reduce convictions and mental health outcomes for boys. Programs that focus on ameliorating boys' relationships with parents and peers should be funded by government agencies. This type of intervention appears as if it will help all boys, but be particularly important for boys who are at a high level of overall risk. Future researchers should continue to assess how positive relationships fit within Rutter's framework and whether they reduce challenges directly or interact with levels of risk. The accuracy and implications of conceptualizing positive relationships as the opposite end of risk factors should also continue to be explored. Cording and Christofferson (2017) highlighted the importance of a proper conceptualization of protective factors and their relationship to risk factors before including them on risk assessment tools. They raise important questions to consider, for example, if a protective factor acts as the opposite end of a risk factor,

will adding it to a risk assessment tool add any additional information, or is it only valuable to add interactive protective factors because they interact with levels of risk.

Positive relationships may not be as useful in the prevention of convictions for girls or of mental health outcomes for boys or for girls. However, this finding could be due to particular challenges in the current study (e.g., a sample of girls with few convictions, and a short time frame between risk assessment and the measurement of mental health outcomes) and needs to be explored further, particularly since the boys' mental health outcomes models were significant when outliers were removed. This finding suggests that positive relationships may be a significant moderator in other samples and warrant further study. Furthermore, positive relationships are often at the forefront of clinical interventions for aggression already and have been demonstrated to be important mechanisms of change (Farrington & Welsh, 2007; Koegl et al., 2008; Webster-Stratton & Hammond, 1997).

Boys and girls should continue to be studied separately in terms of measures and outcomes. Results from both studies suggested that while the EARL total risk score is a strong predictor of convictions for boys, other EARL items or combinations of items may be more valuable for predictions for girls. Based on the results of the correlations, mental health outcomes appeared to be slightly more relevant for girls than convictions. Indirect aggression may also be a valuable outcome measure for girls. There were gender differences in the impact of positive relationships on convictions but not for mental health outcomes; however, this may have been due to challenges in the current study (e.g., a small sample of girls with few convictions). Future researchers should continue to tease apart these gender differences and similarities.

The present project was distinctive because of its particular attention to the understudied population of girls who demonstrate aggressive behaviour. Trajectories of risk factors, protective

factors, and outcomes for girls who demonstrate aggressive behaviour warrant further study. In addition, this study is one of the first to focus on children with antisocial behaviour. It is important to continue to focus on children to target prevention and early intervention efforts for children and families before more serious criminal behaviours develop.

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Table 1

Demographic characteristics

Demographic Characteristic	Boys (n= 256)	Girls (n=176)
Child's Age		
Mean years (<i>SD</i>)	9.1 (1.5)	9.1 (1.4)
Range	6.1-11.9	6.2-11.6
Child's Ethnicity: Frequency (%)		
White/European	87 (54.0)	55 (50.9)
African Canadian	15 (9.3)	11 (10.2)
Asian	5 (3.1)	1 (0.9)
Hispanic	9 (5.6)	5 (4.6)
Aboriginal	4 (2.5)	3 (2.8)
Pacific Islander	2 (1.2)	1 (0.9)
Biracial	11 (6.8)	9 (8.3)
Caribbean	20 (12.4)	8 (7.4)
Other	8 (5.0)	15 (13.9)
Household Language: Frequency (%)		
English	218 (93.2)	150 (93.8)
Chinese	-	1 (0.6)
French	1 (0.4)	-
Italian	1 (0.4)	1 (0.6)
Portuguese	8 (3.4)	5 (3.1)
Spanish	3 (1.3)	2 (1.3)
Other	3 (1.3)	1 (0.6)
Living Arrangement: Frequency (%)		
Single Parent	135 (57.4)	103 (63.2)
Partner or Spouse	100 (42.6)	60 (36.8)
Primary Caregiver's Education: Frequency (%)		
No Schooling	3 (1.3)	-
Some Elementary	3 (1.3)	1 (0.6)
Complete Elementary	8 (3.4)	3 (1.9)
Some Secondary	34 (14.5)	31 (19.1)
Complete Secondary	54 (23.1)	44 (27.2)
Some Community College	19 (8.1)	18 (11.1)
Complete Community College	47 (20.1)	24 (14.8)
Some University	17 (7.3)	10 (6.2)
Complete University	49 (20.9)	31 (19.1)

Table 1 Continued: *Demographic characteristics*

Demographic Characteristic	Boys (n= 256)	Girls (n=176)
Household Income: Frequency (%)		
0-9,999	18 (8.4)	10 (6.5)
10,000-14,999	24 (11.2)	34 (21.9)
15,000-19,999	23 (10.7)	20 (12.9)
20,000-29,999	45 (20.9)	23 (14.8)
30,000-39,999	19 (8.8)	22 (14.2)
40,000-49,999	18 (8.4)	9 (5.8)
50,000-59,999	14 (6.5)	9 (5.8)
Over 60,000	54 (25.1)	28 (18.1)
Convictions: Frequency (%)		
Yes	58 (22.7)	16 (9.1)
No	198 (77.3)	160 (91.1)
Types of Crimes: Frequency (%)		
Crimes Against a Person	39 (67.2)	10 (62.5)
Crimes Against Property	30 (51.7)	9 (56.3)
Administration of Law and Justice	26 (44.8)	5 (31.3)
Drugs	20 (34.5)	1 (6.3)
Weapons Offences	12 (20.7)	1 (6.3)

Table 2

Frequency table of boys' positive parent-child relationship and positive peer relationship scores (N = 256)

Positive Peer Relationship: Frequency (%)	Positive Parent-Child Relationship: Frequency (%)		
	Low	Medium	High
Low	16 (6.3)	21 (8.2)	1 (0.4)
Medium	38 (14.8)	95 (37.1)	11 (4.3)
High	5 (2.8)	23 (9.0)	5 (2.0)

Table 3

Frequency table of girls' positive parent-child relationship and positive peer relationship scores (N = 176)

Positive Peer Relationship: Frequency (%)	Positive Parent-Child Relationship: Frequency (%)		
	Low	Medium	High
Low	21 (11.8)	19 (10.8)	11 (6.3)
Medium	18 (10.2)	29 (16.5)	22 (12.5)
High	8 (4.5)	11 (6.3)	7 (4.0)

Table 4

Descriptive statistics for variables of interest

Variable of Interest	Boys (<i>n</i> = 256)	Girls (<i>n</i> = 176)
Total Risk Score		
Mean EARL Total Risk Score (<i>SD</i>)	17.61 (5.58)	17.07 (6.22)
Range	4-33	2-30
Positive Relationship Score		
Mean Positive Relationship Score (<i>SD</i>)	1.78 (0.88)	2.77 (1.34)
Range	0-4	0-6
Number of SNAP Sessions		
Mean (<i>SD</i>)	18.39 (6.87)	15.57 (6.74)
Range	0-28	0-26
Number of Treatment Components		
Mean (<i>SD</i>)	3.60 (1.36)	3.41 (1.71)
Range	0-7	0-8
Baseline Externalizing Behaviour		
Mean CBCL Time 1 Externalizing Score (<i>SD</i>)	69.90 (7.56)	70.56 (7.27)
Range	40-84	47-88

Table 5

Pearson correlation matrix of boys' variables in convictions model (N = 256)

Variable	1	2	3	4	5	6
1. Total Risk Score	-	-.67***	.21**	.10	-.10	.25***
2. Positive Relationship Score		-	-.27***	-.09	.13	-.23***
3. Baseline Externalizing Behaviour			-	.14	.06	.13*
4. Number of Treatment Components				-	.40**	-.09
5. Total SNAP Sessions					-	-.10
6. Convictions						-

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

Table 6

Pearson correlation matrix of girls' variables in convictions model (N = 176)

Variable	1	2	3	4	5	6
1. Total Risk Score	-	-.76***	.28**	.13	-.19*	.17*
2. Positive Relationship Score		-	-.25**	-.08	.10	-.09
3. Baseline Externalizing Behaviour			-	.06	-.004	.15*
4. Number of Treatment Components				-	.32***	-.02
5. Total SNAP Sessions					-	-.04
6. Convictions						-

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

Table 7

Boys' convictions model partial correlations controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions (N = 256)

Variable	1	2	3	4
1. Total Risk Score	-	.62***	-	.23***
2. Reverse-Coded Positive Relationship Score		-	-	.20**
3. Total Risk*Reverse-Coded Positive Relationship Score Interaction			-	.22**
4. Convictions				-

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

Table 8

Girls' convictions model partial correlations controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions (N = 176)

Variable	1	2	3	4
1. Total Risk Score	-	.75***	-	.08
2. Reverse-Coded Positive Relationship Score		-	-	-.01
3. Total Risk*Reverse-Coded Positive Relationship Score Interaction			-	.04
4. Convictions				-

*** $p < .001$

Table 9

Summary of logistic regressions: Convictions regressed on to total risk and control variables

	<i>B</i>	<i>Wald</i>	<i>p</i>	<i>OR</i>
<u>Boys' Convictions</u>				
Total Risk Score	0.10 (0.11)	9.12 (10.48)	.002 (.0005)	1.11 (1.11)
Baseline Externalizing Behaviour	0.02 (0.02)	0.39 (0.37)	.26 (.27)	1.02 (1.01)
Number of Treatment Components	-0.30 (-0.35)	3.72 (4.99)	.03 (.01)	0.75 (0.70)
Total SNAP Sessions	-0.03 (-0.03)	0.83 (0.69)	.18 (.20)	0.97 (0.97)
<u>Girls' Convictions</u>				
Total Risk Score	0.05 (0.42)	0.68 (2.58)	.21 (.05)	1.04 (1.52)
Baseline Externalizing Behaviour	0.06 (0.43)	1.34 (4.21)	.12 (.02)	1.06 (1.54)
Number of Treatment Components	0.05 (-0.49)	0.07 (0.50)	.80 (.24)	1.05 (0.61)
Total SNAP Sessions	-0.05 (-0.04)	0.64 (.08)	.21 (.39)	0.95 (0.97)

Boys' Convictions: $\chi^2(4) = 18.84, p = .001$; Boys' Convictions without outliers: $\chi^2(4) = 21.74, p = .02$; Girls' Convictions: $\chi^2(4) = 4.42, p = .35$; Girls' Convictions without outliers: $\chi^2(4) = 22.89, p < .001$

Note () = models without outliers

Table 10

Summary of logistic regressions: Convictions regressed on to total risk and reverse-coded positive relationship and their interaction

	<i>B</i>	<i>Wald</i>	<i>p</i>	<i>OR</i>
<u>Boys' Convictions</u>				
Total Risk Score	0.31 (0.57)	5.48 (9.82)	.01 (.001)	1.36 (1.77)
Reverse-Coded Positive Relationship Score	2.02 (4.22)	4.30 (9.48)	.02 (.001)	7.56 (67.87)
Total Risk*Reverse-Coded Positive Relationship Score	-0.09 (-0.19)	3.55 (7.91)	.06 (.005)	0.91 (0.83)
Baseline Externalizing Behaviour	0.02 (.02)	0.42 (.62)	.26 (.22)	1.02 (1.02)
Number of Treatment Components	-0.32 (-0.51)	4.23 (8.03)	.02 (.003)	0.72 (0.60)
Total SNAP Sessions	-0.03 (-0.01)	0.60 (0.10)	.22 (.76)	0.98 (0.99)
<u>Girls' Convictions</u>				
Total Risk Score	0.06 (0.52)	.20 (2.59)	.33 (.05)	1.06 (1.68)
Reverse-Coded Positive Relationship Score	-1.02 (-1.68)	1.52 (0.77)	.22 (.38)	0.36 (0.19)
Total Risk*Reverse-Coded Positive Relationship Score	0.03 (-0.05)	0.61 (0.21)	.22 (.65)	1.03 (0.96)
Baseline Externalizing Behaviour	0.07 (0.22)	1.52 (3.16)	.11 (.04)	1.07 (1.24)
Number of Treatment Components	0.08 (0.26)	0.16 (0.74)	.69 (.39)	1.09 (1.30)
Total SNAP Sessions	-0.04 (-0.12)	0.36 (1.58)	.28 (.10)	0.97 (0.89)

Boys' Convictions: $\chi^2(6) = 24.41, p < .001$; Boys' Convictions without outliers: $\chi^2(6) = 39.28, p < .001$; Girls' Convictions: $\chi^2(6) = 6.43, p = .38$; Girls' Convictions without outliers: $\chi^2(6) = 17.39, p = .008$.

Note () = models without outliers

Table 11

Additional descriptive statistics for Study 2

Variable of Interest	Boys (<i>n</i> = 256)	Girls (<i>n</i> =176)
Baseline Internalizing Behaviour		
Mean CBCL Time 1 Internalizing Score (<i>SD</i>)	63.00 (9.66)	64.18 (10.61)
Range	34-84	39-87
Mental Health Outcome (Internalizing)		
Mean CBCL Time 2 Internalizing Score (<i>SD</i>)	58.15 (10.95)	61.21 (11.71)
Range	34-78	33-89
Mental Health Outcome (Externalizing)		
Mean CBCL Time 2 Externalizing Score (<i>SD</i>)	65.42 (9.3)	66.43 (9.10)
Range	33-83	34-86

Table 12

Pearson correlation matrix of boys' variables in externalizing model (N = 256)

Variable	1	2	3	4	5	6
1. Total Risk Score	-	-.66***	.21**	.10	-.10	.20*
2. Positive Relationship Score		-	-.27**	-.09	.13	-.30***
3. Baseline Externalizing Behaviour			-	.14*	.06	.63***
4. Number of Treatment Components				-	.40***	.32***
5. Total SNAP Sessions					-	.10
6. Mental Health Outcome (Externalizing)						-

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

Table 13

Pearson correlation matrix of boys' variables in internalizing model (N = 256)

Variable	1	2	3	4	5	6
1. Total Risk Score	-	-.66***	.21**	.10	-.10	.17*
2. Positive Relationship Score		-	-.21**	-.09	.13	-.23**
3. Baseline Internalizing Behaviour			-	.13*	.02	.72***
4. Number of Treatment Components				-	.40***	.31***
5. Total SNAP Sessions					-	.07
6. Mental Health Outcome (Internalizing)						-

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

Table 14

Pearson correlation matrix of girls' variables in externalizing model (N = 176)

Variable	1	2	3	4	5	6
1. Total Risk Score	-	-.76***	.28**	.13	-.18*	.29**
2. Positive Relationship Score		-	-.25**	-.08	.10	-.21*
3. Baseline Externalizing Behaviour			-	.06	-.004	.71***
4. Number of Treatment Components				-	.32***	.16
5. Total SNAP Sessions					-	.03
6. Mental Health Outcome (Externalizing)						-

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

Table 15

Pearson correlation matrix of girls' variables in internalizing model (N = 176)

Variable	1	2	3	4	5	6
1. Total Risk Score	-	-.76***	.22**	.13	-.18*	.34***
2. Positive Relationship Score		-	-.05	-.08	.10	-.24**
3. Baseline Internalizing Behaviour			-	.12	-.04	.68***
4. Number of Treatment Components				-	.32***	.27**
5. Total SNAP Sessions					-	-.06
6. Mental Health Outcome (Internalizing)						-

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

Table 16

Boys' externalizing model partial correlations controlling for: baseline externalizing behaviour, number of treatment components, and total SNAP sessions (N = 256)

Variable	1	2	3	4
1. Total Risk Score	-	.62***	-	.09
2. Reverse-Coded Positive Relationship Score		-	-	.23**
3. Total Risk*Reverse-Coded Positive Relationship Score Interaction			-	.21**
4. Mental Health Outcome (Externalizing)				-

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

Table 17

Boys' internalizing model partial correlations controlling for: Baseline internalizing behaviour, number of treatment components, and total SNAP sessions (N = 256)

Variable	1	2	3	4
1. Total Risk Score	-	.62***	-	-.03
2. Reverse-Coded Positive Relationship Score		-	-	.01
3. Total Risk*Reverse-Coded Positive Relationship Score Interaction			-	.02
4. Mental Health Outcome (Internalizing)				-

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

Table 18

Girls' externalizing model partial correlations controlling for: Baseline externalizing behaviour, number of treatment components, and total SNAP sessions (N = 176)

Variable	1	2	3	4
1. Total Risk Score	-	.70***	-	.08
2. Reverse-Coded Positive Relationship Score		-	-	-.01
3. Total Risk*Reverse-Coded Positive Relationship Score Interaction			-	.03
4. Mental Health Outcome (Externalizing)				-

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

Table 19

Girls' internalizing model partial correlations controlling for: Baseline internalizing behaviour, number of treatment components, and total SNAP sessions (N = 176)

Variable	1	2	3	4
1. Total Risk Score	-	.72***	-	.12
2. Reverse-Coded Positive Relationship Score		-	-	.14
3. Total Risk*Reverse-Coded Positive Relationship Score Interaction			-	.12
4. Mental Health Outcome (Internalizing)				-

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

Table 20

Summary of multiple regressions: Mental health outcomes regressed on to total risk and control variables

	<i>B</i>	<i>SE(B)</i>	<i>t</i>	<i>p</i>
<u>Boys' Externalizing</u>				
Total Risk Score	0.11 (0.13)	0.12 (0.10)	0.95 (1.27)	.17 (.10)
Baseline Externalizing Behaviour	0.76 (0.67)	0.09 (0.08)	8.36 (8.31)	<.001 (<.001)
Number of Treatment Components	1.69 (1.76)	0.50 (0.43)	3.41 (4.09)	.001 (<.001)
Total SNAP Sessions	0.20 (0.21)	0.15 (0.14)	1.31 (1.51)	.19 (.14)
<u>Boys' Internalizing</u>				
Total Risk Score	-0.04 (.11)	.12 (.11)	-0.30 (0.95)	.77 (.17)
Baseline Internalizing Behaviour	0.85 (0.85)	0.07 (0.07)	11.63 (12.77)	<.001 (<.001)
Number of Treatment Components	1.79 (1.21)	0.52 (0.48)	3.45 (2.54)	<.001 (.007)
Total SNAP Sessions	0.39 (0.52)	0.16 (0.14)	2.47 (3.60)	.02 (<.001)
<u>Girls' Externalizing</u>				
Total Risk Score	0.09 (-0.004)	0.12 (0.11)	0.79 (-0.03)	.22 (.97)
Baseline Externalizing Behaviour	0.80 (0.87)	0.09 (0.08)	9.09 (11.51)	<.001 (<.001)
Number of Treatment Components	0.53 (0.43)	0.35 (0.30)	1.53 (1.44)	.13 (.15)
Total SNAP Sessions	-0.15 (-0.22)	0.13 (0.12)	-1.15 (-1.89)	.13 (.03)
<u>Girls' Internalizing</u>				
Total Risk Score	0.17 (0.15)	0.15 (0.14)	1.11 (1.07)	.14 (.15)
Baseline Internalizing Behaviour	0.67 (0.71)	0.08 (0.07)	8.00 (9.72)	<.001 (<.001)
Number of Treatment Components	1.10 (1.38)	0.47 (0.43)	2.37 (3.25)	.02 (.002)
Total SNAP Sessions	-0.27 (-0.34)	0.17 (0.16)	-1.53 (-2.13)	.06 (.02)

Boys' Ext: $R^2 = .46$, $F(4,120) = 24.67$, $p < .001$; Boys' Ext without outliers: $R^2 = .36$, $F(4,114) = 15.55$, $p < .001$; Boys' Int: $R^2 = .60$, $F(4,121) = 42.12$, $p < .001$; Boys' Int without outliers: $R^2 = .64$, $F(4,117) = 50.87$, $p = .001$; Girls' Ext: $R^2 = .53$, $F(4,96) = 26.38$, $p < .001$; Girls' Ext without outliers: $R^2 = .64$, $F(4,92) = 39.70$, $p < .001$; Girls' Int: $R^2 = .53$, $F(4,96) = 25.19$, $p < .001$; Girls' Int without outliers: $R^2 = .62$, $F(4,91) = 36.40$, $p < .001$.

Note () = models without outliers

Table 21

Summary of multiple regressions: Boys' mental health outcomes regressed on to total risk and reverse-coded positive relationship and their interaction

	<i>B</i>	<i>SE(B)</i>	<i>t</i>	<i>p</i>
<u>Boys Externalizing</u>				
Total Risk Score	-0.50 (-0.47)	0.30 (0.26)	-1.69 (-1.81)	.09 (.07)
Reverse-Coded Positive Relationship Score	-0.18 (01.29)	2.01 (1.78)	-.09 (-1.81)	.93 (.07)
Total Risk*Reverse-Coded Positive Relationship Score	0.16 (0.19)	0.11 (0.09)	1.50 (1.96)	.07 (.03)
Baseline Externalizing Behaviour	0.70 (0.61)	0.09 (0.08)	7.66 (7.56)	<.001 (<.001)
Number of Treatment Components	1.76 (1.83)	0.49 (0.42)	3.63 (4.34)	<.001 (<.001)
Total SNAP Sessions	0.22 (0.25)	0.15 (0.14)	1.49 (1.81)	.14 (.07)
<u>Boys Internalizing</u>				
Total Risk Score	-0.46 (-0.42)	0.31 (0.29)	-1.48 (-1.46)	.14 (.15)
Reverse-Coded Positive Relationship Score	-2.26 (-2.17)	2.13 (1.90)	-1.06 (-1.14)	.29 (.26)
Total Risk*Reverse-Coded Positive Relationship Score	0.16 (0.18)	0.11 (.10)	1.43 (1.77)	.08 (.04)
Baseline Internalizing Behaviour	0.84 (0.85)	0.08 (0.07)	11.29 (12.73)	<.001 (<.001)
Number of Treatment Components	1.85 (1.35)	0.52 (0.49)	3.56 (2.78)	.001 (.006)
Total SNAP Sessions	0.41 (0.50)	0.16 (0.14)	2.57 (3.49)	.01 (.001)

Boys' Ext: $R^2 = .47$, $F(6,120) = 18.83$, $p < .001$; Boys' Ext without outliers: $R^2 = .52$, $F(6,116) = 19.76$, $p < .001$; Boys' Int: $R^2 = .60$, $F(6,121) = 28.50$, $p < .001$; Boys' Int without outliers: $R^2 = .66$, $F(6, 117) = 35.44$, $p < .001$.

Note () = models without outliers

Table 22

Summary of multiple regressions: Girls' mental health outcomes regressed on to total risk and reverse-coded positive relationship and their interaction

	<i>B</i>	<i>SE(B)</i>	<i>t</i>	<i>p</i>
<u>Girls Externalizing</u>				
Total Risk Score	0.30 (0.79)	0.31 (0.29)	1.00 (2.68)	.16 (.005)
Reverse-Coded Positive Relationship Score	0.11 (3.18)	1.71 (1.70)	0.06 (1.87)	.48 (.03)
Total Risk*Reverse-Coded Positive Relationship Score	-0.04 (-0.19)	0.08 (0.08)	-0.46 (-2.39)	.64 (.02)
Baseline Externalizing Behaviour	0.80 (0.85)	0.09 (0.08)	8.97 (11.12)	<.001 (<.001)
Number of Treatment Components	0.49 (0.26)	0.35 (0.30)	1.39 (0.86)	.17 (.39)
Total SNAP Sessions	-0.17 (-0.29)	0.14 (0.12)	-1.22 (-2.42)	.11 (.02)
<u>Girls Internalizing</u>				
Total Risk Score	0.29 (0.22)	0.40 (0.36)	0.71 (0.60)	.28 (.27)
Reverse-Coded Positive Relationship Score	2.33 (2.15)	2.26 (2.04)	1.03 (1.05)	.15 (.15)
Total Risk*Reverse-Coded Positive Relationship Score	-0.08 (-0.07)	0.11 (0.10)	-0.74 (-0.71)	.46 (0.48)
Baseline Internalizing Behaviour	0.68 (0.70)	0.09 (0.08)	8.02 (9.30)	<.001 (<.001)
Number of Treatment Components	1.08 (1.24)	0.47 (0.44)	2.28 (2.83)	.03 (.006)
Total SNAP Sessions	-0.30 (-0.40)	0.18 (0.17)	-1.66 (-2.32)	.05 (0.01)

Girls' Ext: $R^2 = .53$, $F(6,96) = 17.54$, $p < .001$; Girls' Ext without outliers: $R^2 = .65$, $F(6,93) = 27.47$, $p < .001$; Girls' Int: $R^2 = .53$, $F(6,96) = 16.89$, $p < .001$; Girls' Int without outliers: $R^2 = .61$, $F(6,92) = 22.33$, $p < .001$.

Note () = models without outliers

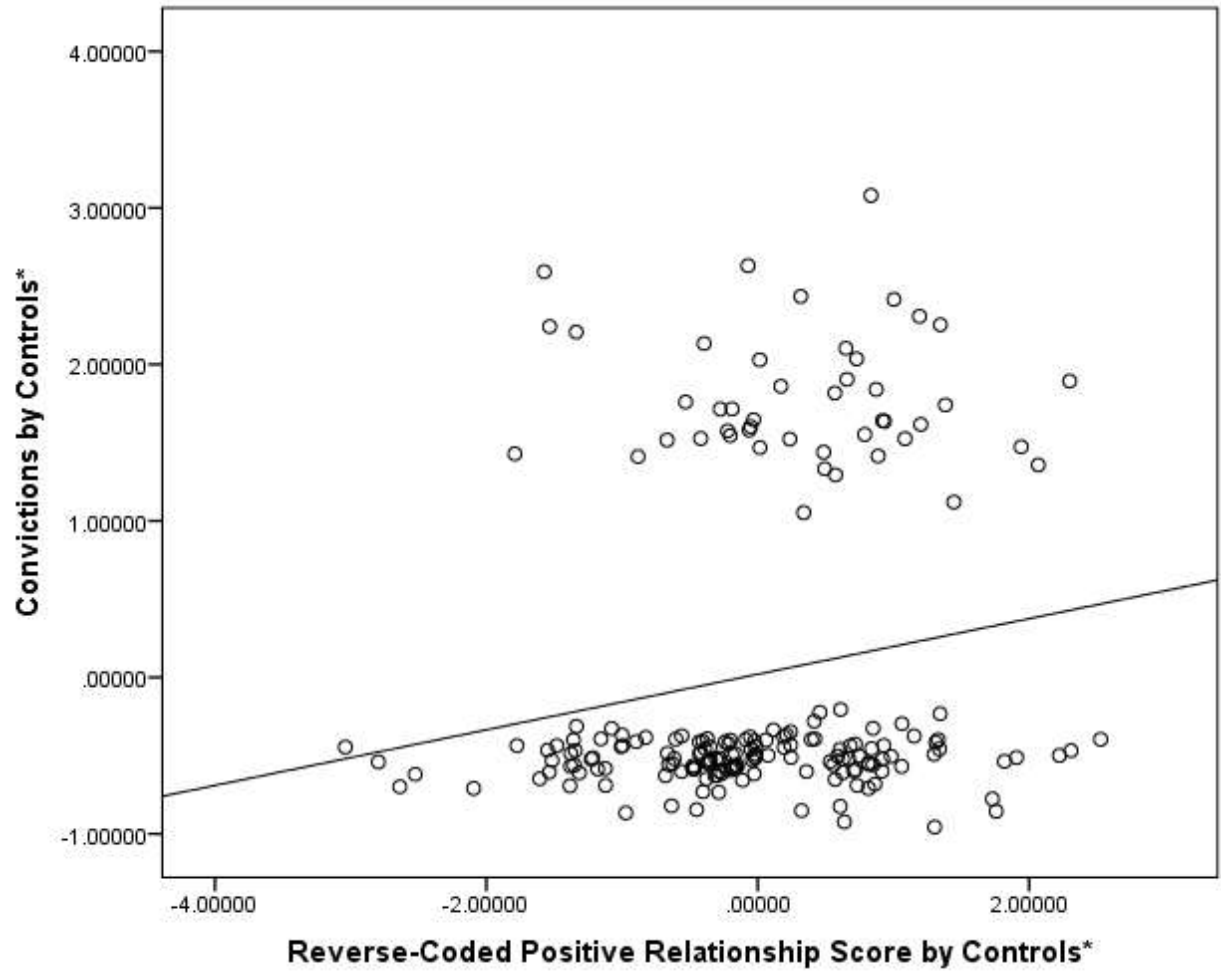


Figure 1. Scatterplot of convictions vs. reverse-coded positive relationship score by controls.**

* Standardized residuals

**Control variables include: baseline externalizing behaviour, number of treatment components, and total SNAP sessions.

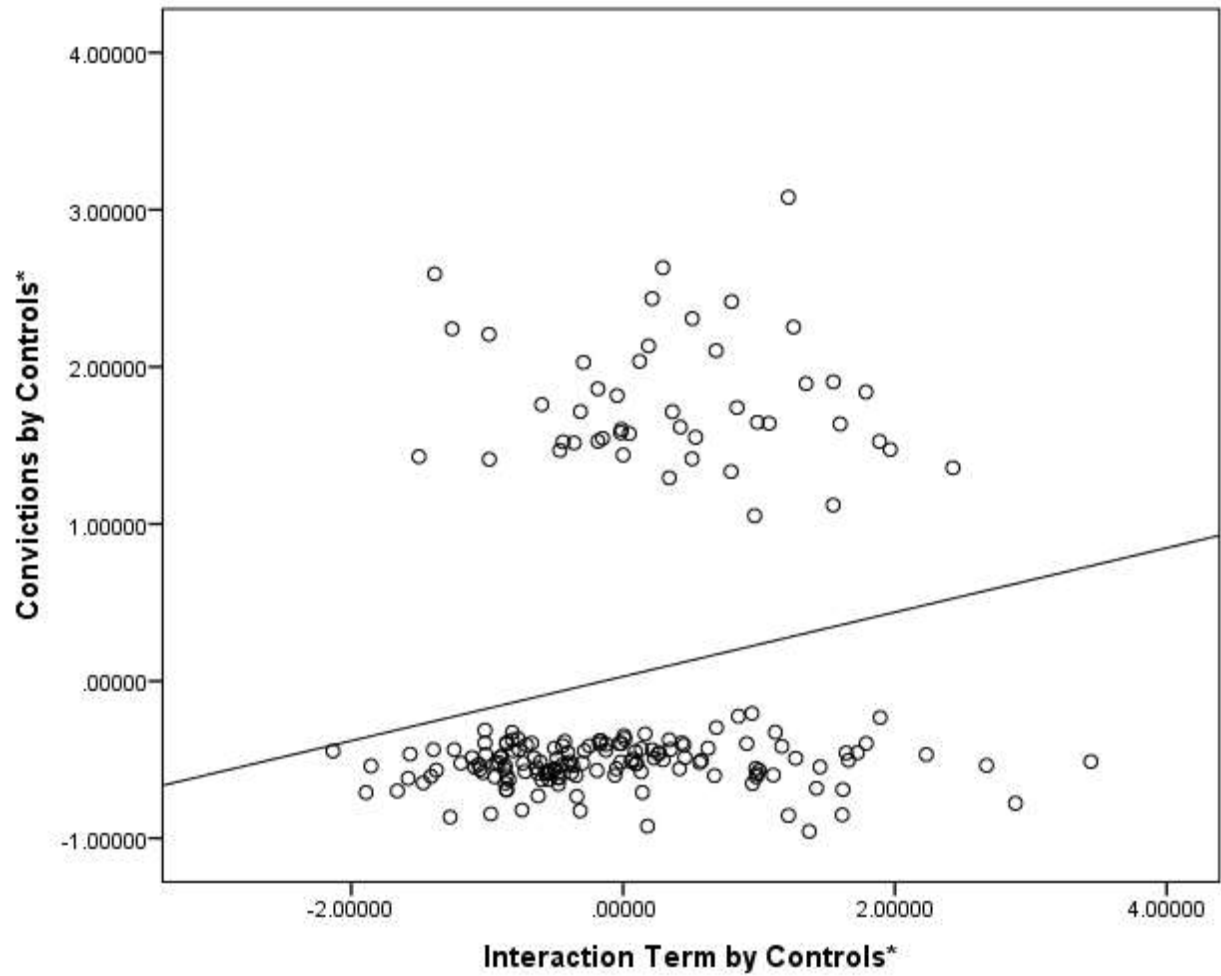


Figure 2. Scatterplot of convictions vs. interaction term (total risk*reverse-coded positive relationship score) by controls.**

* Standardized residuals

**Control variables include: baseline externalizing behaviour, number of treatment components, and total SNAP sessions.

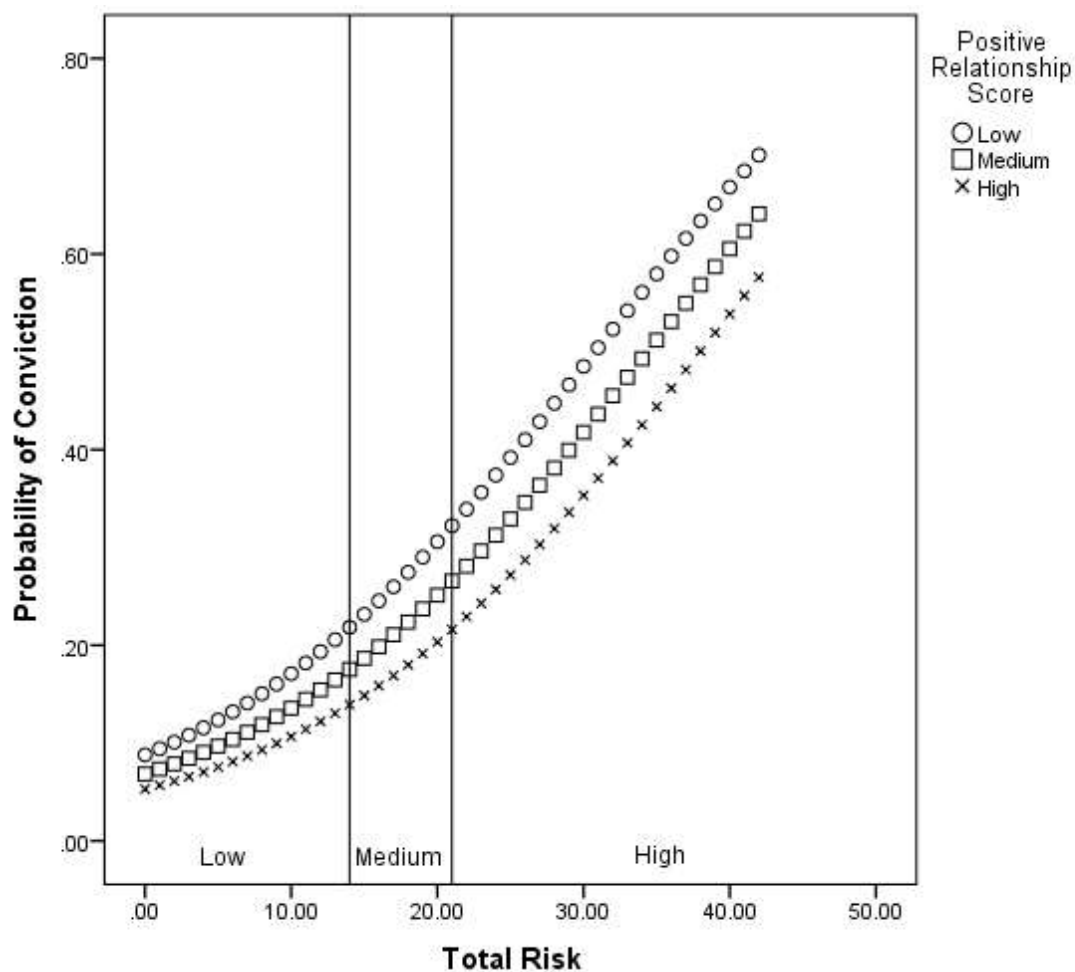


Figure 3. Scatterplot of the relationship between total risk and probability of conviction by positive relationship score. *

*Lines are placed at cut-off points for total risk tertiles.

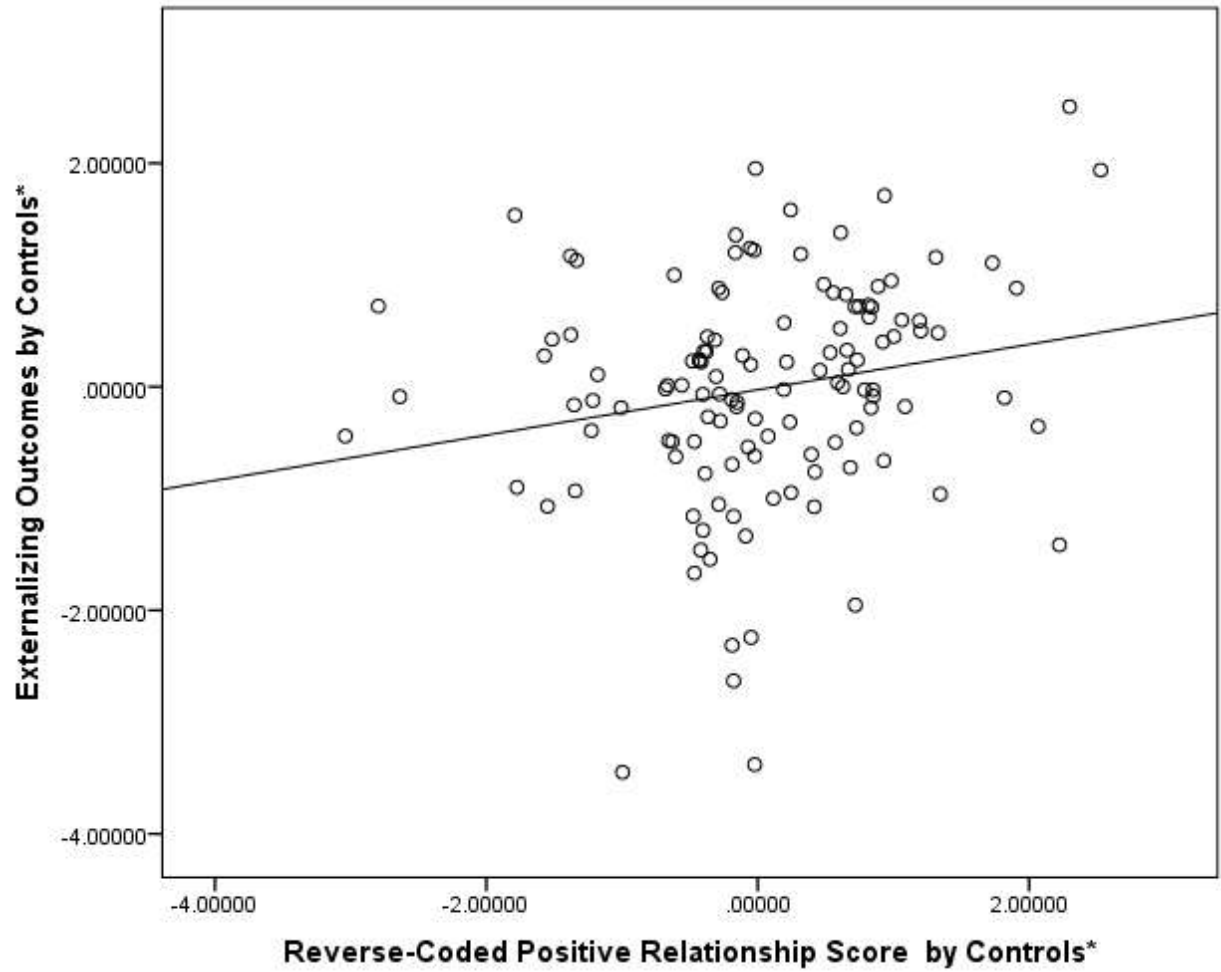


Figure 4. Scatterplot of externalizing outcomes vs. reverse-coded positive relationship score by controls.**

* Standardized residuals

**Control variables include: baseline externalizing behaviour, number of treatment components, and total SNAP sessions.

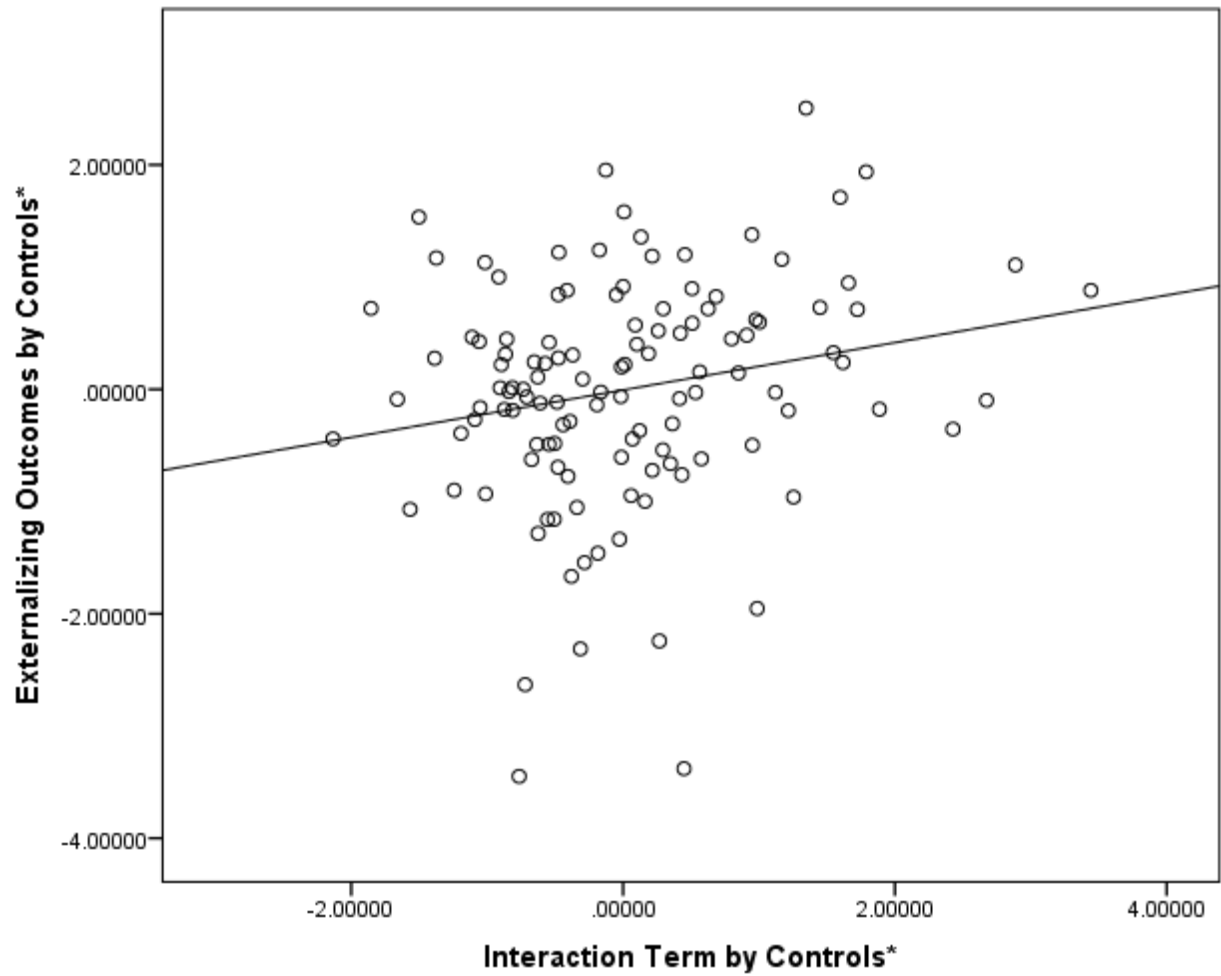


Figure 5. Scatterplot of externalizing outcomes vs. interaction term (total risk*reverse-coded positive relationship score) by controls.**

* Standardized residuals

**Control variables include: baseline externalizing behaviour, number of treatment components, and total SNAP sessions.

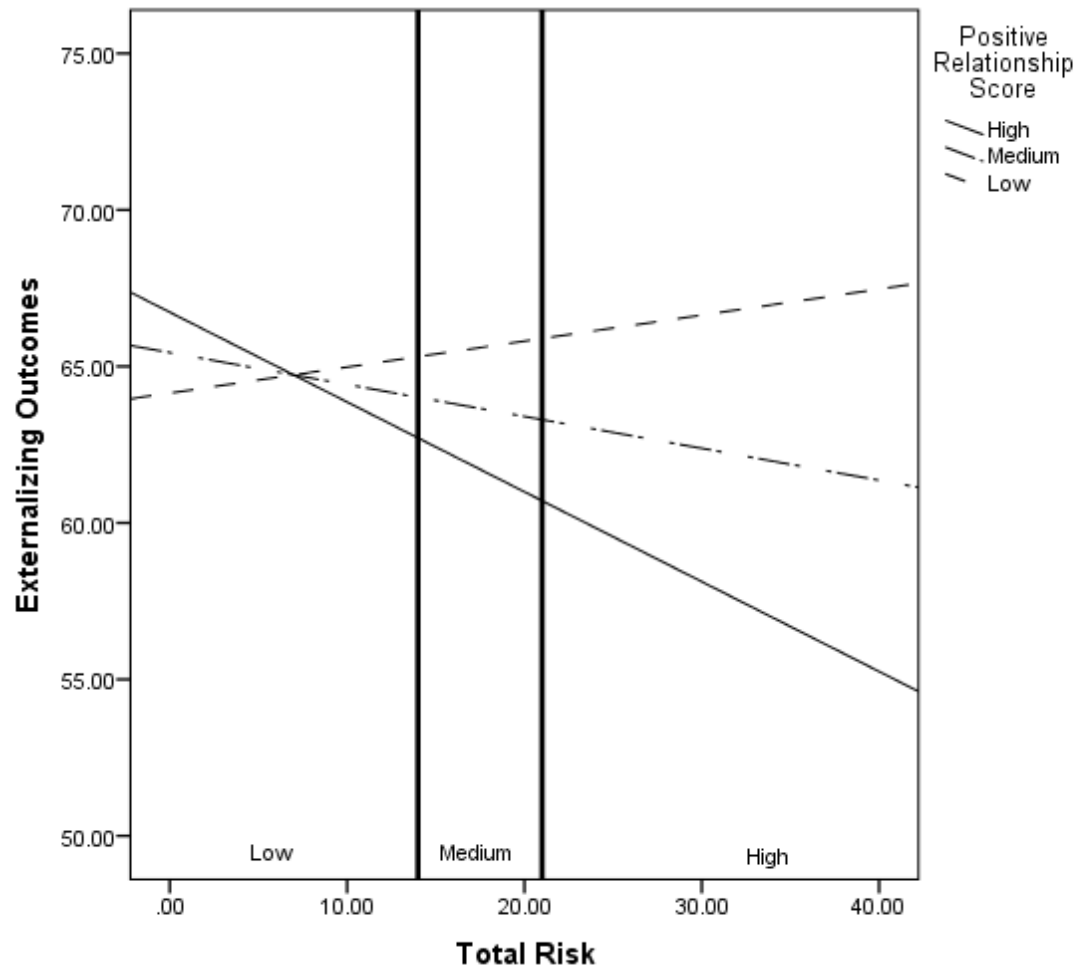


Figure 6. Scatterplot of the relationship between total risk and externalizing outcomes by positive relationship score. *

*Thick lines are placed at cut-off points for total risk tertiles.

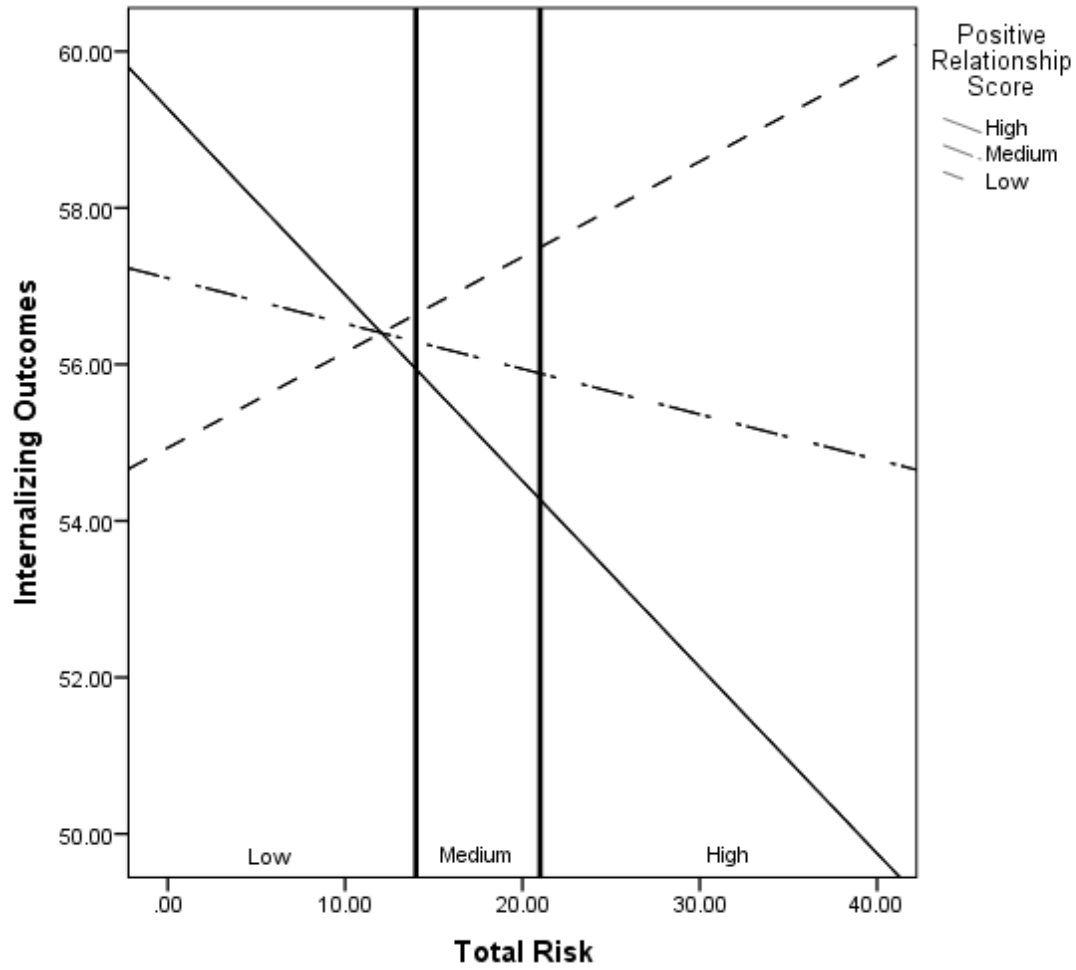


Figure 7. Scatterplot of the relationship between total risk and internalizing outcomes by positive relationship score. *

*Thick lines are placed at cut-off points for total risk tertiles.

Appendix

The Brief Child and Family Phone Interview – Demographics Questions

- Are you a single parent, or do you live with a spouse or partner?
- What language is most often used in your home?
- How do you identify yourself and your ethnicity or ethnic background?
- What is the highest level of education you have completed?
- What is the highest level of education your spouse or partner has completed?
- Could you tell me which of the following describes your total family income over the last year?
*(Optional) What is the primary source of your income?