Trust within Sibling Relationships: Predicting Psychosocial Well-Being in Early Adolescence

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Abstract

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Sibling relationships are a unique and critical context through which we can investigate early adolescent development and well-being. Positive sibling relationship qualities (e.g., warmth) are implicated in many facets of adolescents' lives; for example, positive relationships promote positive self-worth (Noel et al., 2018) and fewer internalizing and externalizing symptoms (e.g., Dirks et al., 2015). An important, yet understudied, relational feature reflects the degree to which early adolescents feel that they can trust their sibling. Specifically, the extent to which they can rely on the behaviours or promises made by a sibling can have important implications for the sibling relationship and adolescent well-being. As such, the present three studies investigated the role of sibling trust and its value within the context of the sibling relationship and for adaptive and maladaptive adjustment. **Study 1** reports on a new self-report measure of sibling trust that addressed the methodological limitations of previous measures of trust and examined its association with sibling relationship satisfaction. Findings revealed a two-factor structure based on reliability trust and trust honesty, which were each positively predictive of sibling relationship satisfaction. Regarding birth order, the effect of trust honesty was stronger for older siblings than younger siblings. **Study 2** examined the predictive value of sibling trust on adolescent general self-worth in a cross-cultural sample from Canada and Colombia. Results indicated that sibling trust was positively predictive of general self-worth, social competence, and academic competence. Further, the effect of sibling trust on social competence was stronger for boys than girls, whereas no significant cultural differences were observed. **Study 3** investigated the protective function of sibling trust on adolescent perceptions of depressed affect and the intolerance of uncertainty over a two-month period. Reliability trust and trust honesty differentially predicted the stability of depressed affect, such that high reliability trust weakened the association while high trust honesty strengthened it. Together, findings are discussed relation

to established theoretical frameworks regarding the multidimensionality of trust (Rotenberg, 2010) and relationships theory (Hinde, 1979). Generally, these results supported the relative value of trust within the sibling relationship and its importance for maintaining a satisfactory relationship and individual well-being.

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Contribution of Authors

Early Adolescent Perceptions of Sibling Trust as a Predictor of Sibling Relationship Satisfaction

Ryan J. Persram	Study conception and measure design, data collection and organization, planned and executed analyses, writing, editing, and proofing
Nina Howe	Research supervisor, funding, oversaw and assisted research/measure design, editing, and proofing
William M. Bukowski	Facilitated data collection process, funding, editing, and proofing

Sibling Trust as a Predictor of General Self-Worth and Competence in Early Adolescence: Contextual Variations Related to Culture and Gender

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The Moderating Effect of Sibling Trust on Internalizing Difficulties in Early Adolescence

Ryan J. Persram	Study conception and measure design, data collection and organization, planned and executed analyses, writing, editing, and proofing
Nina Howe	Research supervisor, funding, oversaw and assisted research design, editing, and proofing
William M. Bukowski	Facilitated data collection process, funding, editing, and proofing

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General Introduction

Interpersonal relationships are a critical feature of the human experience. For children and adolescents, their experiences in close relationships (e.g., parents, siblings, peers) provides them with the opportunity to learn, develop, and refine their social skills in a variety of domains (e.g., Hartup & Laursen, 1991, 2002; Howe, Ross, & Recchia, 2011; Laursen, Bukowski, Aunola, & Nurmi, 2007; Parke & Buriel, 2006; Rubin, Bukowski, & Bowker, 2015). In addition to such opportunities, the qualities of these relationships develop and can be protective factors against outcomes related to one's well-being, such as anxiety (e.g., Gass, Jenkins, & Dunn, 2007; Wood, Bukowski, & Santo, 2017). One important relational quality to consider relates to trust, which plays an important role in maintaining positive and healthy social relationships (Rotenberg, 1991, 1994, 1995). Moreover, it is a concept that some have argued develops early in infancy (e.g., Bowlby, 1969; Erikson, 1964). Interpersonal trust (i.e., trust in other people) is often seen as a positive expectation that we hold about other individuals' behaviours (Dunn & Schweitzer, 2005). Broadly, interpersonal trust refers to a general expectation held by individuals that statements and behaviours displayed by another person can be relied upon (Rotenberg, 2010; Rotter, 1967, 1980), and is critical to forming and maintaining strong and positive relationships with others (Collins & Read, 1990).

Trust as a relational characteristic becomes apparent in children's friendships in middle childhood (i.e., ages 9 to 12 years) (Dunn & McGuire, 1992). However, very little is known about children and adolescents' beliefs about trust in their sibling relationships. Like friends, siblings are a critically important context through which relationship development can be studied. Sibling and friend relationships are quite comparable, in that they are of a similar age as their partner, and in the ways in which they interact with their partner (Dunn, 2002). However, they differ in many respects, such as in their emotional valence and styles of interaction (discussed below). Despite these similarities, there is more work in the friend and peer domain (e.g., Malti et al., 2016; Rotenberg et al., 2010), whereas siblings remain an understudied area of research. Thus, the purpose of the present research studies was to highlight the value of trust within the sibling context by examining the extent to which it is perceived within this relationship and its impact on adolescent well-being.

Theoretical Foundations of Trust

Trust is not a new factor to consider in individuals' social relationships and has been discussed by many prominent theorists. For example, Erikson's (1950, 1964) work represents some of the earliest considerations of the role of trust in individual's social-emotional development. In his theory, trust versus mistrust represents a critical stage during the first year of life. During this period, infants are quite dependent on other individuals, thus requiring their caregivers to provide for them. According to Erikson, infants must decide whether or not to trust individuals who are caring for him/her. In the case where an infant has received reliable and sensitive caretaking from a parent, for example, infants would be more likely to trust their parent than if they did not receive such care (Erikson, 1950; McGuire, Segal, Gill, Whitlow, & Clausen, 2010). In resolving this conflict of trust versus mistrust, infants may develop a basic form of interpersonal trust. As a result of the successful resolution of this 'crisis', as Erikson terms it, apparently at a very young age infants are aware of trust in a relationship because of the reliability of care that is provided by a caregiver. So, while the infant has not yet grasped the concept of trust in the way of older children, they possess an internal working model of trust within relationships, along with characteristics (e.g., responsiveness, consistency) that are associated with the construct.

Erikson's views on trust are supported by and related to other seminal work in developmental psychology. Bowlby (1969) argues that the attachment relationship is evolutionary, and is based on an infant's need for protection and care. His argument, along with that of Erikson, supports the notion that consistent and responsive caregiving, where the infant can reliably predict their caregiver's responses to their needs, becomes the basis of a secure attachment relationship. Both Bowlby and Erikson advance similar ideas regarding how social characteristics between a caregiver and an infant foster the development of trust in the infant. The outcome of both theories is that an emotional connection based on an understanding that the caregiver can be relied upon is fundamental and, therefore, results in the development of trust. In other situations, as with insecure attachments, the infant is unable to determine the manner in which their needs will be responded to or whether they will be recognized at all by their caregiver. Therefore, this inconsistency in care for the infant on the part of the caregiver is unlikely to build trust in that relationship. Thus, secure attachments are ideal to foster a healthy

and positive relationship that includes the child's sense of trust with their caregiver (e.g., Corriveau & Harris, 2010; Corriveau et al., 2009).

Mothers, in particular, are often the caregivers in question in this line of research; however, it is possible that siblings can also develop an attachment with each other. Studies where an older child was allowed to care for their younger sibling in the brief absence of the mother indicated that younger siblings use their older sibling as a secure base, just as they may do with their mothers (Howe & Ross, 1990; Stewart, 1983; Stewart & Marvin, 1984). A secure attachment with a sibling has also been documented in the absence of parents who may be emotionally or physically unable to care for them (Ainsworth, 1989; Bank & Kahn, 1997). By offering themselves as a secure base, both siblings and mothers have demonstrated their reliability for the young child. In doing so, they have begun to build relationships in which trust plays a role; importantly, children begin to trust their caregiver or sibling more than individuals they do not know (Corriveau et al., 2009). Taken together, Erikson's psychosocial stage of trust vs. mistrust (1950, 1964) and Bowlby's attachment theory (1969) view trust as a secondary variable related to a caregiver's ability to meet their child's needs. However, trust may be a primary factor as individuals develop, especially in reciprocal relationships such as with friends and siblings. Most, if not all, relationships involve a reciprocal element, where interactions are mutually and equally exchanged (Dunn, 2002; Howe et al., 2011). According to Hinde (1979), this reciprocity also serves as a ground for developing trust, where an individual's commitment and faith in their partner's commitment to the relationship can build trust within the relationship.

Interpersonal trust framework. Rotenberg's (1991, 2001, 2010) framework for conceptualizing trust suggests that it is multidimensional and based on three factors. The first factor refers to the bases of trust, of which there are three. Reliability (e.g., promise-keeping), emotional trust (e.g., not causing harm or embarrassment to an individual), and honesty (e.g., genuineness) form the three bases of trust in Rotenberg's framework. The second factor describes the three domains of trust: cognitive/affective, behaviour-enticing, and behaviour-dependent. The cognitive/affective domain refers to individual's trust beliefs that a person they want to trust demonstrates the three aforementioned bases of trust. The behaviour-enticing domain is defined as how much a person engages in trustworthy behaviour, such as promise-keeping. The behaviour-dependent domain refers to an individual relying on others to be trustworthy. The last factor of Rotenberg's framework discusses target dimensions, focusing on

specificity (i.e., general trust to trusting someone in particular) and familiarity (i.e., ranging from unfamiliar individuals to people with whom individuals are familiar).

In many ways, sibling relationships encompass multiple aspects of this framework, and thus serves as a basis through which we understand trust in this relationship, as discussed next. For example, research has demonstrated that the there are some consistencies in the bases (e.g., reliability, emotional) and domains (e.g., behaviour-enticing) of trust within sibling relationships (e.g., Howe, Aquan-Assee, Bukowski, Lehoux, & Rinaldi, 2001; McGuire et al., 2010; Rotenberg, 1991). Moreover, such studies focus on specific individuals, namely siblings, which targets the specificity component of the framework. From an empirical standpoint, research on interpersonal trust between peers supports Rotenberg's framework (e.g., Betts & Rotenberg, 2007, 2008; Rotenberg, MacDonald, & King, 2004) and also with siblings (e.g., McGuire et al., 2010). In sum, Rotenberg's framework for trust has been frequently employed as one conceptual framework within this domain of research. As such, his framework for understanding trust will provide the theoretical foundation for the present studies.

Current Measures of Children's Interpersonal Trust

To date, there are three measures to assess children's trust beliefs in other individuals. Each of these questionnaires measures children's trust beliefs in parents, teachers, and friends, but not with siblings. Similar to friends, the sibling relationship is a unique relationship for the study of children's developing social and cognitive skills, which are necessary for positive relationships later in life (Gass et al., 2007; Howe et al., 2011; McGuire et al., 2010). Thus, the lack of measures that target trust within sibling relationships makes it difficult to determine if there are similar bases of trust across other relationships.

The first known scale, developed by Rotter (1967) and adapted by Hochreich (1973), is called the Children's Interpersonal Trust Scale, which is a 22-item measure that evaluates children's frequency in promise-making in situations involving important individuals in their lives. For this questionnaire, children are presented with cartoon vignettes in which an individual would make a promise to a child. Then, children are presented with four alternatives, of which two indicated trust and two signalled distrust, and are asked to select the statement that fits closest to the hypothetical child in the scenario. According to Rotenberg et al. (2005), the Hochreich measure had difficulty capturing trusting and distrustful choices so as to avoid social

desirability. As a result, there do not appear to be any studies that have employed this measure to date.

The second measure is similar to Hochreich's (1973) and is called the Children's Trust Scale (Imber, 1973). This questionnaire is a 40-item measure of children' general trust towards their mothers, fathers, teachers, and peers. Similar to the first measure, children are presented with a vignette about a specific individual interacting with a child, and are then asked to choose from one of two alternatives. For example, in the item, "A friend loans another friend a dollar to buy a game," children are asked to choose one of two options: (a) he should not have loaned him the money since he might not get it back, or (b) he can expect to get the money back. Similar to the Children's Interpersonal Trust Scale (Hochreich, 1973), the Children's Trust Scale (Imber, 1973) has not been employed to date in published studies.

The last measure, which is currently used in the literature, is the Children's Generalized Trust Beliefs scale (CGTB; Rotenberg et al., 2005). The CGTB is a 24-item scale that measures children's trust beliefs using Rotenberg's interpersonal trust framework (1991). These items are delivered through vignettes, with different situations posed to children. Sample items of the CGTB include "Lorraine's father said that he would take her to the cinema on Saturday. How likely is it that Lorraine's father will take her to the cinema?" For this measure, responses are made on a 5-point Likert scale ranging from 1 (*very unlikely*) to 5 (*very likely*).

Although these measures show that trust is an important construct to measure in children, they are not without their limitations. Regarding the Hochreich (1973) and Imber (1973) measures, Rotenberg and colleagues (2005) note that there is ambiguity in the items within each measure. A major shortcoming refers to the fact that many items ask children to judge the degree to which another person trusts them and not how much they judge that individual. For example, in the Imber (1973) measure, children must determine the degree to which their mother trusts them in a response to a given question. As a result, the items do not accurately measure the child's own trust beliefs.

Furthermore, the responses that children are allowed to give are limited. For example, in a given vignette, the situations end with children either answering whether the person will trust the child or will not trust the child. As a result, children may not be allowed to answer freely, and may even be more drawn to make the socially desirable response, namely that an individual

would trust the child. Again, the accuracy of assessing children's actual trust beliefs is questionable because these measures do not appear to directly measure their own beliefs.

Another limitation is that these measures, mainly the Imber (1973) and Hochreich (1973) questionnaires, are out-of-date and perhaps culturally-specific, and refer to objects and vocabulary that may be unfamiliar to children. For example, some items referenced purchasing hot wheels or going to play cricket. These items are environmentally-specific and possibly difficult for children in different societies to know what they mean. Relatedly, these measures were only administered to American children. As such, they may not be as useful or applicable to children from other cultures.

Rotenberg and colleagues' CGTB scale attempted to address the limitations that emerged from Imber (1973) and Hochreich's (1973) measures. However, a main limitation of the CGTB is the use of vignettes. Similar to the use of out-of-date or culturally-specific objects or situations, vignettes do not always allow the respondent child to see the perspective of the character (Poulou, 2001). For example, one scenario in the CGTB says that a girl has asked her friend to go to the cinema, but the friend cannot because she/he is tired. Depending on many variables, including the society, the children, friends, and availability (e.g., the number of cinemas in a small town compared to a city), it is possible that going to the cinema is a rare activity. As a result, the children answering these questions may not be able to think about the situation as if they were the person inviting their friend in that story. Based on their personal situation and the environment in which they grow up, having certain freedoms or possessions may not be applicable to them, and thus the child might not be able to connect with the situation. As a result, the information that is obtained from their responses may not be accurate or valid. Furthermore, their responses may also not be accurate given that they are not the person in the vignette. Therefore, the situations in which children are asked to identify their trust preferences may not be relevant and again inaccurate according to their own beliefs about trusting specific individuals with whom they are familiar. Thus, measures of interpersonal trust might be best served when the statements reflect the child themselves, as opposed to asking them to think about how another individual might respond.

Sibling Relationships as a Context for Understanding Trust

Sibling relationships are common throughout the world. As previously mentioned, they are similar to friendships, but are unique, such that they are an enduring and long-lasting

relationship that often begins before friendships form. This relationship begins early in life and siblings have cultivated a long and mutually-constructed history in them siblings become quite intimate with respect to how well they know of each other and their capabilities (Howe, Persram, & Bergeron, in press). From childhood to adolescence, the hierarchical nature of the sibling relationship becomes more balanced, which allows for the relationship to resemble that of a friendship (e.g., Howe et al., in press).

Along with the shift into adolescence, siblings are more likely to engage in behaviours that build trust. For example, engaging in self-disclosure, which involves the sharing of personal information, is done so with the idea that the recipient of the disclosure is trustworthy (Howe et al., 2001; Campione-Barr, Lindell, Giron, Killoren, & Greer, 2015; Smetana, Metzger, Gettman, & Campione-Barr, 2006). Engaging in this type of behaviour suggests that siblings do indeed believe that they can trust their siblings. However, studies of sibling trust are rare. The limited research in this area, however, does support the notion that sibling trust is a positive relational feature (McGuire et al., 2010), but that is also implicated in various individual and relational outcomes, including aspects such as self-worth (Noel, Francis, & Tilley, 2018), sibling closeness (McGuire et al., 2010), and emotional adjustment (Gamble, Yu, & Kuehn, 2011; Gass et al., 2007).

Siblings and trust as adaptive and protective. Despite limited studies that investigate sibling relationships as protective, findings indeed support the notion that sibling relationships are influential in reducing internalizing and externalizing problems. Broadly, high levels of positive indicators of sibling relationship quality, including warmth (Dirks, Persram, Recchia, & Howe, 2015), support (Jenkins & Smith, 1990), and affection (Gass et al., 2007), are known to protect siblings from internalizing and externalizing problems. For example, Gass and colleagues (2007) found that sibling affection moderated the association between stressful life events and internalizing difficulties, such that it weakened this relationship. Specific to sibling trust, Gamble et al. (2011) reported that sibling trustworthiness was negatively related to internalizing and externalizing problems. In addition, they indicated that low sibling trustworthiness was associated with increased levels of internalizing problems, suggesting that sibling trust has some influence in one's overall well-being. The present research studies build on these findings by investigating specific bases of trust as they relate to siblings and examines their effect on specific elements of internalizing problems, rather than a composite of such problems. Given that

adolescence is a developmental period in which internalizing problems are common (e.g., Danneel et al., 2019; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999), this research focused on two specific aspects: (a) depressed affect and (b) the intolerance of uncertainty, which refers to the tendency to find vague or unclear situations or events aversive (Dugas, Schwartz, & Francis, 2004). Previous work on the intolerance of uncertainty supports the notion of its association with other internalizing problems (e.g., Boswell, Thompson-Hollands, Farchione, & Barlow, 2013), but has not been investigated in the context of sibling relationships. Given that reliability trust implies some degree of dependability, it can be speculated that sibling reliability trust could be protective of these feelings of uncertainty.

The Cultural Context

Culture plays a significant role in how we understand the dynamics of sibling relationships. The culture in which children are embedded can play a major role in children's social relationships (Hinde, 1987; Chen, French, & Schneider, 2006), and in determining the importance placed on children's beliefs in trust and with their sibling. Theoretically, the dichotomous framework of individualism (i.e., independence) and collectivism (i.e., interdependence) can be used to explore differences between cultures. However, as some scholars note, such a categorization may be overly simplistic and may not capture the uniqueness and complexity of a culture (Chen et al., 2006; Miller, 2002). Another framework that provides a more nuanced understanding of culture was provided by Vygotsky (1978), who focused on the co-construction of knowledge between individuals, as well as the transmission of culture from more to less experienced individuals and how children begin to internalize the values that represent their given background. As such, the present study utilizes the Vygotskian framework to study sibling trust, as this relationship presents multiple opportunities for children to co-construct their shared history and therefore build their relationship and the trust that is developed within it.

With respect to cultural samples, the implication that findings will vary little, if at all, among cultural samples, underemphasizes the uniqueness that culture bears in children's lives. Henrich, Heine, and Norenzayan (2010) argue that many studies across many domains in psychology utilize samples drawn from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies. Thus, the ability to generalize findings is limited mainly to individuals who fit within this categorization. Specific to children and adolescents, Henrich and colleagues posit

that while developmental studies of children, that is, examining children's development across time, are necessary, culture must also be included. In particular, it is possible that developmental milestones, trajectories, and differences will exist between a WEIRD sample and other cultures. For example, Bass, Saldarriaga, Cunha, Chen, Santo, and Bukowski (2018) examined the predictive nature of physical and relational aggression on peer victimization with samples from Canada, China, Brazil, and Colombia. There were significant differences in the prevalence of peer victimization, with Brazil children showing the highest levels and Colombian children displaying the least. Moreover, cultural differences were also found for the association between relational aggression and peer victimization, where differing positive associations were found in all countries except for Colombia. Bass et al. argue that a lack of a positive association between relational aggression and peer victimization may be due to the "normalization of aggression" (p. 8) in Colombia, as compared to the other cultures. These findings highlight the importance of including culture in studies of children's social relationships.

Studies of cross-cultural variability in the domains of child and adolescent trust as well as sibling relationships are rare. One study on cultural differences in children's trust found that beliefs related to promise- and secret-keeping (i.e., reliability trust) were higher among children from Japan compared with those from Italy and the United Kingdom (Betts et al., 2014). Even within the sibling domain, there are very few studies that investigate cultural variability in the dynamics of sibling relations and its associated quality. Although it is known that siblings take on various roles in different cultures such as caretakers and teachers (e.g., Maynard, 2002; Watson & McGoldrick, 2011), the culture-specific nuances that characterize sibling relationships are not yet established.

The present research tests this comparison, drawing a sample from Montréal, Canada, which represents a WEIRD society and a non-WEIRD population from Barranquilla, Colombia. The non-WEIRD selection of a Colombian sample was selected because it does not entirely fit with the WEIRD sample criteria, but also that it presumably emphasizes collectivist values such as group loyalty and interdependence among partners (Chen et al., 2006; Triandis, 1995). In fact, cross-cultural comparisons between Montréal and Barranquilla are observed when exploring children's feelings of self-worth, social, cognitive, and physical competence (Santo, Bukowski, Stella-Lopez, Carmago, Mayman, & Adams, 2013; Santo, Saldarriaga, Velásquez, Meyer, & Bukowski, 2016). In the context of trust beliefs, it is possible that collectivist societies might

foster greater trust, given their emphasis on interdependence amongst its members. In contrast, individualistic societies value self-importance much more, therefore fostering trust with siblings might be less important than in a collectivistic society. That is not to say that trust is not present or does not develop in individualistic societies, but the degree to which children think about trusting their siblings may not be given as much importance as they would be in other more collectivist societies. As a result, the comparison between Canada, a society that is often viewed as more individualistic, and Colombia, which can be characterized as being more collectivistic, may demonstrate cultural variabilities in children's trust beliefs with their siblings.

The Present Research Studies

The purpose of the present studies was to investigate the degree to which trust is an important consideration within the sibling relationship. Each of three studies addressed a specific goal. The purpose of the first study was to develop and assess a self-report measure of sibling trust that addressed the limitations of previous measures of interpersonal trust. In addition, it examined the effect of sibling trust on relational well-being in the form of relationship satisfaction. Stemming from these findings, the second study examined the effect of sibling trust on indices of individual well-being, namely early adolescents' own perceptions of their general self-worth, social competence, and academic competence. Given the lack of cross-cultural studies within the domain of sibling relationships, sibling trust was investigated in sample of youth from Canada (Montréal) and Colombia (Barranquilla), two geographically and culturally different environments. In the third study, sibling trust was evaluated as protective from internalizing problems among early adolescents in Montréal. In particular, this study tested the extent to which sibling trust moderated the stabilities of depressed affect and the intolerance of uncertainty across a two-month period during the school year. In each of these studies, comparisons included early adolescents' gender and birth order to understand the value and importance of sibling trust.

Taken together, the research focuses on better understanding of the role of trust within the context of sibling relationships and its role in the well-being of early adolescents. As such, this research targets specific positive (e.g., relationship satisfaction) and negative (e.g., depressed affect) aspects that are particularly salient during this developmental period to better understand the effect of sibling trust, which has not been extensively studied.

Summary of Method

To address the main research questions, a series of data collections, as part of larger longitudinal studies, took place during the 2015-2016 and 2016-2017 school years. A summary of the participants and the data collection process is described below.

Participants

Study 1. Participants included a sample of 191 early adolescents who were between 10 and 13 years of age with at least one sibling. The gender distribution of boys (n = 91, 48%) and girls (n = 100, 52%) was relatively even, as was birth order (n = 96 younger siblings, n = 95 older siblings). These participants were recruited from two English-speaking schools in Montréal, Canada. One school was located in a lower-middle SES neighbourhood while the other was in an upper-middle SES neighbourhood.

Study 2. In this study, 235 5th and 6th grade early adolescents between 10 and 13 years old and who had at least one sibling were included. They were recruited from three English-speaking schools in Montréal, Canada (n = 121) and two Spanish-speaking schools in Barranquilla, Colombia, a city on the northern coast of the Caribbean (n = 114). Schools varied in terms of socioeconomic status.

Study 3. For the third study, the sample of participants came from the data collection for Study 1. However, the sample was limited to keep sibling age gap constant, resulting in a final sample of 169 early adolescents between the ages of 10 and 13 years, with at least one sibling whose age was not greater or less than 4 years different from the participant.

Ethics

Ethical approval for the present studies was obtained from the Office of Research Ethics, Concordia University as well as the respective school boards (see Appendix A for ethics approval). For each of the studies, parental consent and participant assent was also provided before proceeding (see Appendix B).

Procedure

The questionnaires were programmed and presented on Dell Venue Pro 8" computer tablets by using the INQUISIT Millisecond (Version 4). The participants completed the questionnaires in a group session in their classrooms. The translation of the items into Spanish underwent a three-step process. First, the items for the questionnaires used for all three studies were created in English. Second, the items were then converted into Spanish by Colombian

translators who work in the fields of psychology and education. Lastly, they were back-translated into English by a separate group of translators to ensure that the true meaning of the items was retained when they were translated.

Measures

Children's perceptions of sibling trust. A scale consisting of 13 items was created to assess the various aspects of children's trust beliefs. The scale was intended to measure four different constructs: (a) reliability trust (i.e., trusting a sibling/friend to help), (b) emotional trust (i.e., trusting a sibling/friend to understand oneself), and (c) trust honesty (i.e., trusting a sibling/friend to be honest). Participants rated the items on these scales using a 5-point scale, ranging from 1 (*'not at all true*') to 5 ('*true*'; see Appendix C for a full list of items). A score of 1 indicated low trust and a maximum score of 5 indicated high trust. Participants were asked to think about the sibling closest to them in age and evaluated each of the items. Psychometric properties such as Cronbach's alpha are reported in each study and Study 1 reports findings pertaining to factor structures and measurement invariance by gender and birth order.

Sibling relationship satisfaction. In Study 1, participants completed an adapted version of the sibling relationship satisfaction scale from the Network of Relationships Inventory (Furman & Buhrmester, 1985b). Three items evaluated the degree to which early adolescents were satisfied with their sibling relationships (see Appendix D).

General self-worth. In Study 2, participants evaluated adapted items related to general self-worth, social competence, and academic competence from the revised version of the Harter (1982) Perceived Competence Scale for Children. The scale assessed the degree to which children feel sure about themselves (e.g., "I am generally sure what I am doing is right"). The children rated items using a 5-point scale, ranging from 1 ('*not at all true*') to 5 ('*true*'). A score of 1 indicates low self-worth and a core of 5 indicates high self-worth (see Appendix D).

Depressed affect. In Study 3, one measure of internalizing symptoms related to depressed affect. Participants rated three items that evaluated the extent to which they felt lonely, sad, and unhappy on a Likert scale ranging from 1 ('*never*') to 5 ('*almost always*'). Here, higher scores reflected greater feelings of depressed affect (see Appendix D).

Intolerance of uncertainty. The intolerance of uncertainty scale was used for Study 3, to measure the extent to which early adolescents were intolerant to ambiguous or vague situations in a social context. These items were developed by Panarello and Bukowski (under review).

Participants rated three items on a Likert scale from 1 (‘*never*’) to 5 (‘*almost always*’), where higher scores indicated a greater intolerance to social uncertainty (see Appendix D).

Study 1: Early Adolescent Perceptions of Sibling Trust as Predictor of Sibling Relationship Satisfaction

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Abstract

The present study evaluated the multidimensional nature of children's trust (i.e., reliability, emotional, honesty) in their siblings and associations with relational satisfaction. Participants included 191 early adolescents aged between 10 and 13 years. Findings demonstrated that trust is comprised of domains including reliability trust and trust honesty, which did not vary as a function of participant gender or birth order. Further, the domains of trust significantly and positively predicted relational satisfaction between siblings. Multigroup comparisons of birth order noted that the effects for trust honesty on satisfaction were stronger for older siblings than younger siblings. These findings emphasize the value of trust between siblings as their relationship continues to evolve over time.

Early Adolescent Perceptions of Sibling Trust as a Predictor of Sibling Relationship Satisfaction

Trust is a critical feature for the success and maintenance of close relationships (Hinde, 1979; Rotenberg, 1991, 1994, 1995). Within each relationship, interpersonal trust reflects the extent to which one's expectations of others' behaviours or actions can be relied upon (Dunn & Schweitzer, 2005; Rotenberg, 2010; Rotter, 1967, 1980). For children, trust is crucial for their social and cognitive development and well-being in close relationships with parents, siblings, and friends. Despite extensive work on children's trust with parents (e.g., Buyukcan-Tetik, Finkenauer, Siersema, Heyden, & Krabbendam, 2015; Rotenberg, 1995) and friends (e.g., Betts et al., 2014; Rotenberg, 1986), questions regarding its value for siblings are largely unaddressed. Moreover, current measures of children's trust are limited by their exclusion of siblings and present a number of conceptual and methodological issues. The present study investigated children's perceptions of trust with their sibling and associations with relationship satisfaction by constructing and testing a self-report measure of sibling trust beliefs.

Trust within Children's Relationships

Theoretical conceptions about trust in social relationships date back to prominent theorists such as Erikson (1950, 1964) and Bowlby (1969) who provided some early ideas concerning this behavior. Both Bowlby and Erikson argued that the outcome of sensitive and responsive caregiving is a secure emotional connection, based on the fundamental understanding that the caregiver can be relied upon, which results in the development of trust. Thus, secure attachments are ideal to fostering healthy, positive, and trusting relationships (e.g., Corriveau & Harris, 2010; Corriveau et al., 2009).

More recently, Rotenberg (1991, 2001, 2010) offered a multidimensional framework for conceptualizing trust. Specifically, there is a focus on three bases of trust: reliability (e.g., promise-keeping), emotional trust (e.g., not causing harm or embarrassment to an individual), and honesty (e.g., genuineness). Further, domains of trust can be cognitive/affective (i.e., beliefs that another person demonstrates the bases of trust), behaviour-enacting (i.e., how much someone engages in trustworthy behaviour), and behaviour-dependent (i.e., reliance on others to be trustworthy). Lastly, target dimensions emphasize specificity (i.e., general trust to trusting specific people), and familiarity (i.e., unfamiliar to familiar individuals). Evidence for Rotenberg's framework is mostly developed with respect to children's friendships, given that

trust becomes an important relational quality in middle childhood and adolescence and is particularly relevant to individuals' ability to keep secrets and engage in self-disclosure (Berndt, 2002; Berndt & Perry, 1986; Betts, Rotenberg, & Trueman, 2009; Rotenberg & Pilipenko, 1983; Rubin, Bukowski, & Parker, 2007; Sutter & Kocher, 2007). Clearly, children value trust in their friendships, and we argue that it is likely to be as valuable to children's sibling relations. Methodologically sound measures must be employed to capture children's trust beliefs regarding their siblings.

Measuring Children's Trust

To date, three measures exist to assess children's trust beliefs in other individuals, namely parents, teachers, and friends, but to our knowledge, there is not a single measure of sibling trust. The lack of a sibling trust measure makes it difficult to determine if there are components of trust that are potential antecedents (e.g., attachment) or related to similar components of trust (i.e., reliability, honesty, emotional) between siblings. Moreover, there are important limitations regarding the current measures.

The first trust measure developed by Rotter (1967) and then adapted by Hochreich (1973) is vignette-based, and evaluates children's frequency in promise-making in situations with important individuals. The second, by Imber (1973) also measures children's general trust towards their mother, father, teachers, and peers. Rotenberg et al. (2005) noted methodological difficulties in the Imber measure with social desirability, requiring children to make inferences regarding the degree to which another person trusts them, out-of-date and culturally specific vignettes (e.g., playing cricket), and limited responses (e.g., yes or no). Therefore, children may not be able to answer freely and may make socially desirable responses. Also, we note that the accuracy of assessing children's actual trust beliefs is questionable, because these measures do not directly measure the child's own beliefs, but their perception of how others trust them.

The third measure of trust by Rotenberg and colleagues (2005), the Children's Generalized Trust Beliefs scale (CGTB), addressed these limitations. Based on Rotenberg's interpersonal trust framework (1991), the CGTB is a 24-item scale measuring children's own trust beliefs via vignettes of different situations and includes 5-point Likert response scales (*very unlikely* to *very likely)*. Rotenberg et al's. (2005) findings support the multidimensionality of interpersonal trust (i.e., reliability, emotional, honesty).

One limitation of all three measures is the use of vignettes, which do not always allow the child to see the perspective of the character (Poulou, 2001). For example, one scenario in the CGTB says that a girl asks her friend to go to the cinema, but the friend cannot go because s/he is tired. Depending on many variables (e.g., context, the child's views of friendship, availability of cinemas in a small town compared to a city), it is possible that going to the cinema is a rare activity. Thus, children may have trouble taking the perspective of the person inviting their friend in the story; as well, they might not be able to connect with the situation for personal, cultural, or environmental reasons resulting in inaccurate or invalid responses. Hence, interpersonal trust measures might be stronger when the statements reflect the child themselves as insiders in the sibling relationship (Furman, Jones, Buhrmester, & Adler, 1989; Olson, 1977).

Relatedly, whereas the CGBT and the Rotenberg framework (1991, 2001, 2010) focuses on individuals' beliefs about what others do, such as keeping promises or not causing emotional harm, children likely have perceptions and expectations about the capabilities of their relational partners (e.g., siblings). Thus, an important consideration relates to how the focal child perceives their sibling to be trustworthy in various contexts. Furman et al. (1989) argue that children's subjective reports of their sibling relationships provides an insider's perspective of the relationship itself, given that they directly experience the relationship and the various contexts in which it exists. Moreover, given their high degree of familiarity and knowledge of each other (Howe et al., 2011), they are familiar with their siblings' attitudes, beliefs, actions, and feelings. Therefore, we propose to approach this framework from a different angle that assesses children's own perceptions that their siblings are capable of being trustworthy and not their assessment of how the sibling might behave (e.g., promise keeping) or a story character with whom they have no personal connection.

Sibling Relationships as a Context for the Development of Trust

Relationships theorists argue that an individual's development and understanding occurs in the context of their close relationships including siblings (Carpendale & Lewis, 2015; Dunn, 2002; Howe et al., 2011). Within relationships, interaction patterns vary between hierarchical (i.e., unequal distribution of power and knowledge) and reciprocal (i.e., mutually returned and equal) exchanges (Hinde, 1979). For children, relations with their parents are typically characterized as hierarchical, while relations with friends are more reciprocal (Dunn, 2002; Hinde, 1979; Tucker & Updegraff, 2009). Sibling relationships uniquely include both reciprocal

and hierarchical interactions, given the interplay of children's age and knowledge differences. Siblings spend a great deal of time with each other, and their common activities include hierarchical interactions such as teaching (Howe, Della Porta, Funamoto, & Ross, 2015) and reciprocal play exchanges (Howe et al., 2011; Leach, Howe, & DeHart, 2015). Over time, adolescent sibling relations generally become more egalitarian, less asymmetrical, and more psychologically complex (Buhrmester & Furman, 1990; Howe, Persram, & Bergeron, in press). Thus, concepts such as trust may become more relevant, especially when early adolescents choose to share personal information with their sibling (Howe, Aquan-Assee, Bukowski, Lehoux, & Rinaldi, 2001).

Additionally, siblings know each other well and mutually construct an intimate history via frequent and ongoing positive and negative interactions. Based on this history, indices of relationship quality such as warmth, conflict, and intimacy can be measured. High quality, or positive sibling relationships, are associated with individual's well-being over time, for example, greater warmth is associated with fewer externalizing and internalizing problems (Buist, Deković, & Prinzie, 2013; Furman & Buhrmester, 1985a; Whiteman, Solmeyer, & McHale, 2015). Richmond, Stocker, and Rienks (2005) reported longitudinal improvements in sibling relationship quality (i.e., greater warmth and fewer conflicts) and reduced depressive symptoms from middle childhood to adolescence for both older and younger siblings. Moreover, sibling warmth and fewer conflicts were associated with declines in depressed moods, while high intimacy for girls was also associated with fewer depressive symptoms (Kim, McHale, Crouter, & Osgood, 2007).

Given the relative importance of sibling relationships for socialization and well-being, we argue that sibling trust, like warmth, is also likely to be important. Warmth indicates that siblings generally engage in positive interactions with one another and also perceive one another as companions (Buhrmester & Furman, 1990; Furman & Buhrmester, 1985a). Similarly, interpersonal trust requires individuals to rely on a particular person, a process that is fostered as relational partners become more intimate (Dunn & Schweitzer, 2005; Rotenberg, 2010). Since siblings spend a great deal of time together, their relationship may provide one basis through which trust can be built and sustained. Conversely, a history of negative and conflictual interactions may hinder trust from developing.

Unlike friendships, the literature on sibling trust is limited. Whereas friendships are often characterized based on loyalty (Berndt, 2002), sibling relationships are rarely characterized as such. Nevertheless, findings indicate that sibling trust is positively associated with intimacy, closeness, and negatively related to conflict (Gamble, Yu, & Kuehn, 2011; McGuire, Segal, Gill, Whitlow, & Clausen, 2010). These positive dimensions appear to be similar to features of friendship quality and trust (Berndt, 2002; Dunn & McGuire, 1992). Apparently, similar to friendships in middle childhood, children value trust in their sibling relationships (McGuire et al., 2010). Given the limited research, it is imperative to build on our understanding of the development of trust between siblings so that we may better understand its role in such a significant relationship in children's lives.

The Present Study

The purpose of the present study was to develop and validate a self-report measure of sibling trust that addresses and builds upon the limitations of the reviewed measures, while also investigating associations with relationship satisfaction. Specifically, we evaluated Rotenberg's (1991, 2001, 2010) framework of the multidimensionality of children's trust by expanding to understand siblings' trust using a newly constructed self-report measure. We tested three predictions. First, consistent with Rotenberg's interpersonal trust framework, we hypothesized that there would be a three-factor structure (i.e., reliability trust, emotional trust, trust honesty) with our self-report items. Second, since greater trust is associated with positive sibling relationship features (e.g., closeness; McGuire et al., 2010), we predicted that each subscale would differentially and positively predict sibling relationship satisfaction. Third, in line with previous findings on gender differences in trust (Malti et al., 2016; Rotenberg et al., 2005), we predicted that the effects of trust on sibling relationship satisfaction would be stronger for girls than boys, possibly due to the greater importance that girls place on relationships than boys. Considering the limited literature, we did not advance any hypotheses regarding the value of each trust subscale by sibling birth order.

Method

Participants

Participants included 191 children (n = 91 boys, 100 girls) aged 10 to 13 with at least one sibling (younger sibling n = 96; older sibling n = 95). Children were recruited from two English-speaking, ethnically diverse, mixed-sex schools in Montréal, Canada. The minimum participant

rate per class was 80%. Ethical approval was obtained from the University's Human Research Ethics Committee, the school board, and schools. Parents received an information letter detailing the study's purpose, goals, and the permission form, which was subsequently returned to the child's teacher. When parental permission to participate was obtained, children also gave verbal assent. Each child received a small gift regardless of their participation in the study.

Procedure

The questionnaires were presented to participants on tablets using INQUISIT (Version 4). Participants completed the questionnaires individually while in their classrooms. Research assistants were present during the data collection to address any questions or issues. Participants were reminded prior to the start of the data collection that their information would be kept confidential and they could withdraw at any point without penalty or negative consequences.

Measures

Children's trust beliefs. Based on pilot work, a scale consisting of nine items was created to assess the three constructs of the focal children's trust beliefs regarding their sibling: (a) reliability trust (i.e., trusting a sibling to help), (b) emotional trust (i.e., trusting a sibling to understand oneself), and (c) trust honesty (i.e., trusting a sibling to be honest). Items were based on the focal child's subjective belief as both the agent ("I") of trust and the recipient ("me") of the sibling's actions (e.g., "I trust my sibling to help me …"). Participants rated the items using their closest-in-age sibling. Items were rated on a 5-point scale ranging from 1 (*'not at all true*') to 5 ('*true*'). A score of 1 indicated low trust and a score of 5 indicated high trust. Table 1 presents the items and descriptive statistics.

Sibling relationship satisfaction. Children assessed their relationship satisfaction with their sibling using an adapted version of the Network of Relationships Inventory (Furman & Buhrmester, 1985b). Children rated three items that evaluated their sibling relationship satisfaction on a scale from 1 ('*not at all true*') to 5 ('*true*'). Table 1 presents the items and Cronbach's alpha for the measure of satisfaction.

Results

Plan of Analysis

The analysis plan included three steps. First, an exploratory factor analysis was performed to determine if the three bases of reliability trust, emotional trust, and trust honesty would be identified on the self-report measure. Second, we evaluated the psychometric

properties of the sibling trust scales using measurement invariance. Third, structural equation modeling (SEM) using multigroup analyses tested whether each scale of sibling trust significantly predicted sibling relationship satisfaction and varied as a function of gender and birth order. Analyses were run using Mplus (Muthén & Muthén, 2015) and model fit was assessed using several fit indices and suggested cut-off scores defined by Hu and Bentler (1999).

Exploratory Factor Analysis and Reliability of the Trust Measure

An exploratory factor analysis (EFA) was performed to evaluate the factor structure of the sibling trust measure; we specified the number of factors to range from 1 to 3, in addition to requesting the geomin rotation. A one-factor EFA was deemed to have poor model fit, $\chi^2(27) = 167.06$, $p < .001$, CFI = .83, TLI = .77, RMSEA = .17, SRMR = .08. The two-factor model produced the best-fitting model, $\chi^2(19) = 34.26$, $p = .02$, CFI = .98, TLI = .97, RMSEA = .06, SRMR = .02. Each item loaded strongly and significantly on one of the two factors (see Figure 1). The association between the latent factors was significantly moderately positive ($r = .54$). The EFA could not compute a third factor, indicating that the items loaded strongly and uniquely on one of two factors (i.e., reliability trust and trust honesty). The next step determined reliability estimates using Cronbach's alpha; both reliability trust and trust honesty had strong internal consistency (see Table 1).

Measurement Invariance of Sibling Trust

In this analysis, we assessed measurement invariance across two different group identifications: (a) participant gender (boy or girl) and (b) participant birth order (younger or older sibling) for both sibling trust subscales. Measurement invariance evaluates the psychometric properties of latent constructs to determine the degree to which the construct derives the same meaning and equivalence between groups of individuals and is generally not influenced by group composition, sample size, or model size (Putnick & Bornstein, 2016). To accomplish this, we first established configural invariance, which tests the degree to which the overall factor structure is the same for both groups (van de Schoot, Lugtig, & Hox, 2012; Lavoie & Douglas, 2012). Next, we tested for metric invariance, which builds on configural invariance that evaluates the extent to which the items on each of the sibling trust subscales were the same across gender and birth order. Lastly, we tested scalar invariance, which evaluates the equality of the intercepts to detect possible measurement bias. Table 2 presents fit indices of the invariance tests for reliability trust and trust honesty as they vary as a function of gender and birth order.

Invariance of reliability trust. In testing for measurement invariance of sibling reliability trust by participant gender, there was no significant difference between the metric and configural tests, $\Delta\chi^2(4) = 7.02$, $p = .13$, nor between the scalar and the metric tests, $\Delta\chi^2(5) = 7.40$, $p = .19$. Similarly, for participant birth order, there were no significant differences between the metric and configural tests, $\Delta\chi^2(2) = 1.64$, $p = .44$, nor between the scalar and metric tests, $\Delta\chi^2(5) = 7.13$, $p = .21$. The lack of significant differences indicates evidence of between-group invariance in terms of gender and birth order on the sibling reliability trust scale.

Invariance of trust honesty. We compared the configural, metric, and scalar tests to determine invariance between child gender and birth order. For gender, there were no significant differences either between the metric and configural tests, $\Delta\chi^2(3) = 4.41$, $p = .22$ or the scalar and metric tests, $\Delta\chi^2(4) = 2.91$, $p = .57$. For birth order, we observed a significant difference in comparing the metric and configural tests, $\Delta\chi^2(1) = 5.43$, $p = .02$. However, there was no significant difference between the scalar and metric tests, $\Delta\chi^2(4) = 3.05$, $p = .55$.

Trust Honesty and Reliability Trust Predicting Sibling Relationship Satisfaction

A CFA was performed to evaluate the latent variables of the sibling trust measure: (a) reliability trust and (b) trust honesty and the degree to which they predicted sibling relationship satisfaction. The CFA fit was acceptable, $\chi^2(48) = 74.34$, $p = .01$, CFI = .98, TLI = .97, RMSEA = .05, SRMR = .03. With each latent variable, each factor loading was greater than .80 (see Figure 2). Further, sibling relationship satisfaction was significantly predicted by reliability trust (standardized estimate = .40, $p = .004$) and trust honesty (standardized estimate = .48, $p = .001$).

Multigroup Analysis of Gender

This analysis evaluated participant gender differences in the factor structure and predictive value of the sibling trust dimensions. The baseline model that did not include equality constraints yielded adequate fit indices, $\chi^2(114) = 164.47$, $p = .001$, CFI = .97, TLI = .96, RMSEA = .07, SRMR = .06. After placing equality constraints, the regressive paths predicting relationship satisfaction from trust honesty and reliability trust did not significantly vary as a function of gender.

Multigroup Analysis of Birth Order

Finally, we investigated the degree to which the factor structure and the role of sibling trust on relationship satisfaction varied as a function of the participating child's birth order. The unconstrained baseline model yielded adequate fit indices, $\chi^2(114) = 165.31$, $p = .001$, CFI = .97,

TLI = .96, RMSEA = .07, SRMR = .06. The equality constraint of the trust honesty path to relationship satisfaction produced a significant model decrease, $\Delta\chi^2(1) = 4.60$, $p = .03$. Similarly, the model fit was acceptable, $\chi^2(115) = 169.91$, $p = .001$, CFI = .96, TLI = .96, RMSEA = .07, SRMR = .06. Here, the effects were stronger for older siblings (standardized coefficient = .65, $t = 3.60$, $p < .001$) than for younger siblings (standardized coefficient = .18, $t = .81$, $p = .42$).

Discussion

The present study addressed two broad goals. First, the findings validated the multidimensional nature of children's perceptions of interpersonal sibling trust. Second, trust is relevant to the sibling relationship and a positive predictor of relationship satisfaction. Finally, we discuss the value of children's self-report of sibling trust beliefs, in addition to its role in predicting sibling relationship satisfaction.

Structure of the Sibling Trust Scales

Factor structure. Our analyses support previous work that interpersonal trust is multidimensional; however, our findings did not yield the same factor structure identified by Rotenberg and colleagues (2005, 2010). Specifically, our items recreated two distinct factors in the form of reliability trust and trust honesty, but not an emotional trust factor. There are three possible explanations for the lack of an emotional trust factor. First, perhaps our items did not fully capture the construct and may reflect situational issues that siblings experience (e.g., blaming, lying). Items such as "I trust my sibling will not say bad things about me," and "I trust my sibling to help me when I feel sad" did not converge to form an emotional trust scale. Rather, these items loaded quite strongly with reliability and honesty trust. Thus, emotional trust may be reflected in the other types of trust and this suggests a second explanation. Since reliability trust and trust honesty each imply that an individual would fulfill one's word truthfully and respectfully (Rotenberg, 2010), it is possible that emotional harm and embarrassment could be interwoven within each of these types rather than emerge as a separate construct. Third, Rotenberg's (2010) model provides a narrow definition of emotional trust as an individual's avoidance of emotional harm and embarrassment while being approachable when self-disclosure occurs. Emotional trust may also include elements of emotional understanding, which refers to the knowledge about emotion including accurately identifying emotional states (Howe et al., 2001; Howe, Paine, & Leach, in press), such that the individual can also be trusted to validate and help one to understand their own emotions better. Indeed, emotional understanding was

positively associated with siblings working collaboratively to find practical solutions to problems after self-disclosure occurred, while a lack of emotional understanding was associated with fewer self-disclosures (Howe et al., 2001). These speculations require further investigation.

Measurement invariance. The rationale for our analyses regarding measurement equivalence across participant gender and birth order was to understand whether there were significant differences in the meaning and interpretation of any items related to sibling trust. The findings demonstrated that children's perceptions of sibling trust were reliably measurable and invariant across both groups. There were no significant differences in model fit when we constrained the factor loadings and intercepts of the reliability trust and trust honesty scales while comparing gender or birth order. This is in line with Putnick and Bornstein's (2016) argument that measure invariance is not affected by model fit. Our finding suggests that the children who completed the measure of sibling trust interpreted the items' meaning in a similar way, regardless of gender or birth order, which may indicate that trust reflects a construct that is more sensitive for understanding the relationship than individual characteristics. In accomplishing the equivalence of this measure, we have addressed some of the limitations of previous trust measures (e.g., Rotenberg et al., 2005) to produce a psychometrically sound measure. Clearly, self-reports, rather than vignettes, were reliable indicators of sibling trust, and the items were not context-specific. Rather, items may have reflected everyday values and actions siblings display that foster a trusting relationship, which adds to the ecological validity of the measure. Moreover, they appeared to capture the focal participant's subjective view of trust in their relationship with their brother or sister. This supports Furman and colleagues' (1989) contention that children's perspectives of trust provide an insider's view of how they view their siblings and how trustworthy they are. Incorporating this insider's perspective affords a unique insight into how children feel about important relationships in their lives; in this case, it allows researchers and practitioners to better understand the various dimensions of trust that children feel are more salient and valuable.

Sibling Trust Predicts Relationship Satisfaction

Overall, both reliability trust and trust honesty were uniquely and positively associated with children's reported satisfaction with their siblings, supporting our hypothesis. Our findings complement the extant literature on the role and value of trust in sibling relationships. Previous work shows that positive sibling relationship features, such as intimacy and warmth are

positively associated with sibling trust (Gamble et al., 2011; McGuire et al., 2010). Conversely, these two studies also report negative associations between sibling conflict and trust, suggesting that trust can be viewed as a positive element of the sibling relationship. Our findings build on this literature by highlighting how the types of sibling trust differentially and positively predict relationship satisfaction and how they vary as a function of gender and birth order. Taken together, each of these findings reinforce the argument that sibling trust, although complex, is critical in the maintenance of a high quality relationship.

The present study also yielded two novel findings. First, we did not observe a significant gender effect in predicting sibling trust, which did not support our hypothesis regarding stronger effects for girls than boys. Gender differences in sibling trust are largely unaddressed, but work on trust with friends generally shows that girls report higher scores and are viewed as more trustworthy than boys (Betts & Rotenberg, 2007; Malti et al., 2016; Rotenberg, 2005). Possibly, gender differences in sibling trust vary as a function of how individuals engage in certain trust-based behaviours rather than relying on an overall perception of trust. For example, Martinez and Howe (2013) note that boys and girls both engaged in self-disclosure, but there were significant differences in types of sibling disclosure; boys were more likely to share details about activities and hobbies, while girls disclosed more about family or peer issues. Another possibility is a lack of gender differences in sibling satisfaction (Furman & Buhrmester, 1985a, 1985b), and so trust may not be a salient predictor to investigate such differences. This speculation requires replication and comparison of boys and girls on other relational (e.g., warmth) and individual qualities (e.g., self-esteem), where there may be more pronounced differences.

The second novel finding indicated a stronger positive effect of trust honesty on relationship satisfaction for older sibling participants than younger siblings. Given the paucity of research on the differential effects of sibling trust on relationship quality, we did not make specific hypotheses, yet our findings speak to the developmental complexity of sibling relations. Considering that older siblings enter into adolescence before their younger brother or sister, it is likely that they are more aware of the psychological value of the sibling relationship. Young siblings spend much of their time together (Howe et al., 2011) and must navigate challenging situations such as sharing resources (Volling, 2003). As they grow up and spend less time at home in adolescence, opportunities for sibling interaction decreases (Howe et al., in press b). Thus, siblings may be more selective in how they interact, and there may be age-related

increases in complex psychological matters such as sibling self-disclosure, especially into adolescence (Howe et al., 2001; Martinez & Howe, 2013). The shift to self-disclosure and valuing honesty may imply that the sibling relationship undergoes a psychological shift that is similar to friends (Berndt, 2002; Rubin et al., 2006).

Limitations and Implications

Two limitations should be considered. First, given that emotional trust did not emerge as a distinct construct, perhaps the items may reflect emotional understanding rather than the detrimental aspect of breaking emotional trust. Further work should create items that are particularly salient to emotional trust to determine whether it is truly distinct as a sibling trust factor. Second, our sample was limited in cultural variability, but was representative of the local community. Future studies should incorporate more diverse samples and also make cross-cultural comparisons to evaluate generalizability and salience of the measure. However, to our knowledge, the present study is one of the first to examine sibling trust using self-reports in a large community sample of participants in early adolescence. Further, the construction of a developmentally and culturally appropriate self-report measure allows us to evaluate the differential effects of reliability trust and trust honesty on various outcomes.

Our findings extend the literature on sibling trust and reinforce the emphasis of relationships theory that development occurs in the context of the close relations individuals have with parents, friends, and siblings (Hinde, 1979; Howe et al., 2011). Furthermore, the value of sibling trust for relationship satisfaction suggests that it is an important dimension through which we can better understand relationship quality, in addition to other elements such as warmth and conflict. Going forward, studies on sibling trust can further establish its developmental origins and complexity as well as the short- and long-term impact of breaches of trust. Given the ubiquity of sibling relationships in North America (Kreider & Ellis, 2011; Statistics Canada, 2011), one practical implication to improving relations could be to focus on interventions to enhance trust between siblings. Sibling relationships characterized by high warmth and low conflict are considered to be adaptive for children's well-being (Buist et al., 2013; Dirks, Persram, Recchia, & Howe, 2015), thus it stands to reason that the inclusion of trust as a positive dimension might further enhance its quality.

Taken together, our findings continue to underscore the value of the sibling relationship to children's development. This study builds on very limited literature to make the argument that

sibling trust is a unique and important dimension of the relationship that is an important facet of social experience and close relationships that develop over time. Trusting one's sibling promotes greater relationship satisfaction, and as such, indicates that siblings are as instrumental and involved in each other's lives as other close relationships.

Table 1

Items, Descriptive Statistics, and Reliability of Sibling Trust Scales and Sibling Satisfaction

Item	α	*M* (SD)
Reliability	.94	
1. I trust my sibling to help me when I need it.		3.59 (1.41)
2. I trust my sibling to help me when I'm in trouble.		3.54 (1.45)
3. I trust my sibling to help me even when I don't ask for it.		3.28 (1.48)
4. I trust my sibling to help me understand how I feel.		3.21 (1.52)
5. I trust my sibling to help me when I feel sad.		3.38 (1.54)
Honesty	.92	
6. I trust my sibling to not say bad things about me.		3.50 (1.54)
7. I trust my sibling to not lie to me.		3.36 (1.49)
8. I trust that my sibling will be honest with me.		3.39 (1.50)
9. I trust my sibling to believe me when I tell them something important.		3.69 (1.46)
Relationship Satisfaction	.94	
10. I am happy with the way things are between me and my sibling.		3.82 (1.40)
11. My relationship with my sibling is good.		3.79 (1.41)
12. I am satisfied with my relationship with my sibling.		3.86 (1.34)

Note. Outcome variable is relationship satisfaction.

Table 2

Summary of Measurement Invariance Fit Indices

Model Description	χ^2	*df*	*CFI*	*TLI*	*RMSEA*	*SRMR*
Reliability Trust						
Configural Invariance by Gender	17.58	10	.98	.96	.09	.03
Metric Invariance by Gender	24.60	14	.97	.96	.09	.06
Scalar Invariance by Gender	31.99	19	.96	.96	.08	.09
Configural Invariance by Birth Order	28.18	10	.96	.91	.14	.03
Metric Invariance by Birth Order	26.54	12	.96	.94	.11	.06
Scalar Invariance by Birth Order	33.67	17	.96	.95	.10	.07
Trust Honesty						
Configural Invariance by Gender	6.63	4	.99	.97	.08	.02
Metric Invariance by Gender	11.04	7	.98	.97	.08	.05
Scalar Invariance by Gender	13.94	11	.99	.99	.05	.08
Configural Invariance by Birth Order	8.92	4	.98	.94	.11	.02
Metric Invariance by Birth Order	3.49	5	1.00	1.00	.00	.03
Scalar Invariance by Birth Order	6.54	9	1.00	1.00	.00	.05

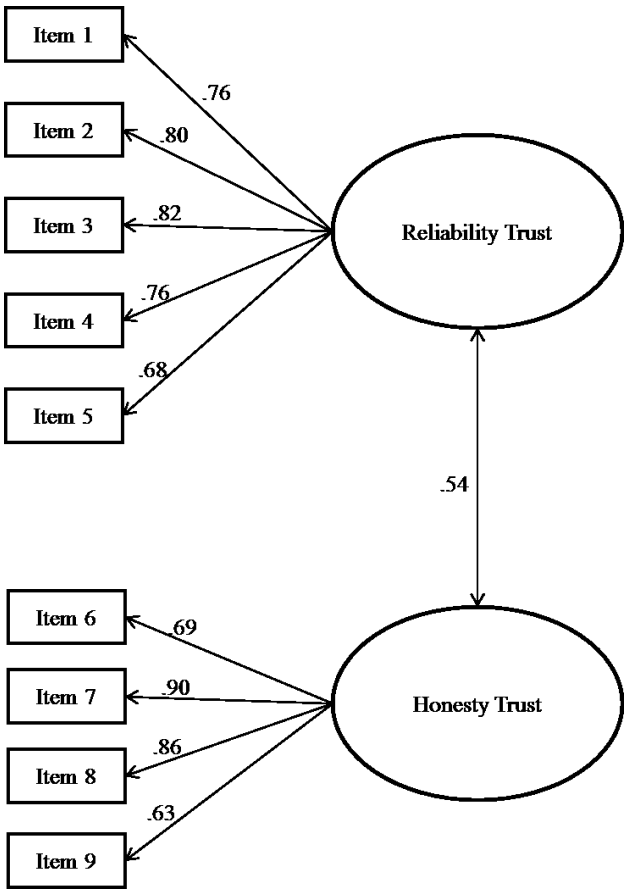

Figure 1. Exploratory factor analysis of sibling trust.

Note. All paths are significant at $p < .05$. Item labels are listed in Table 1.

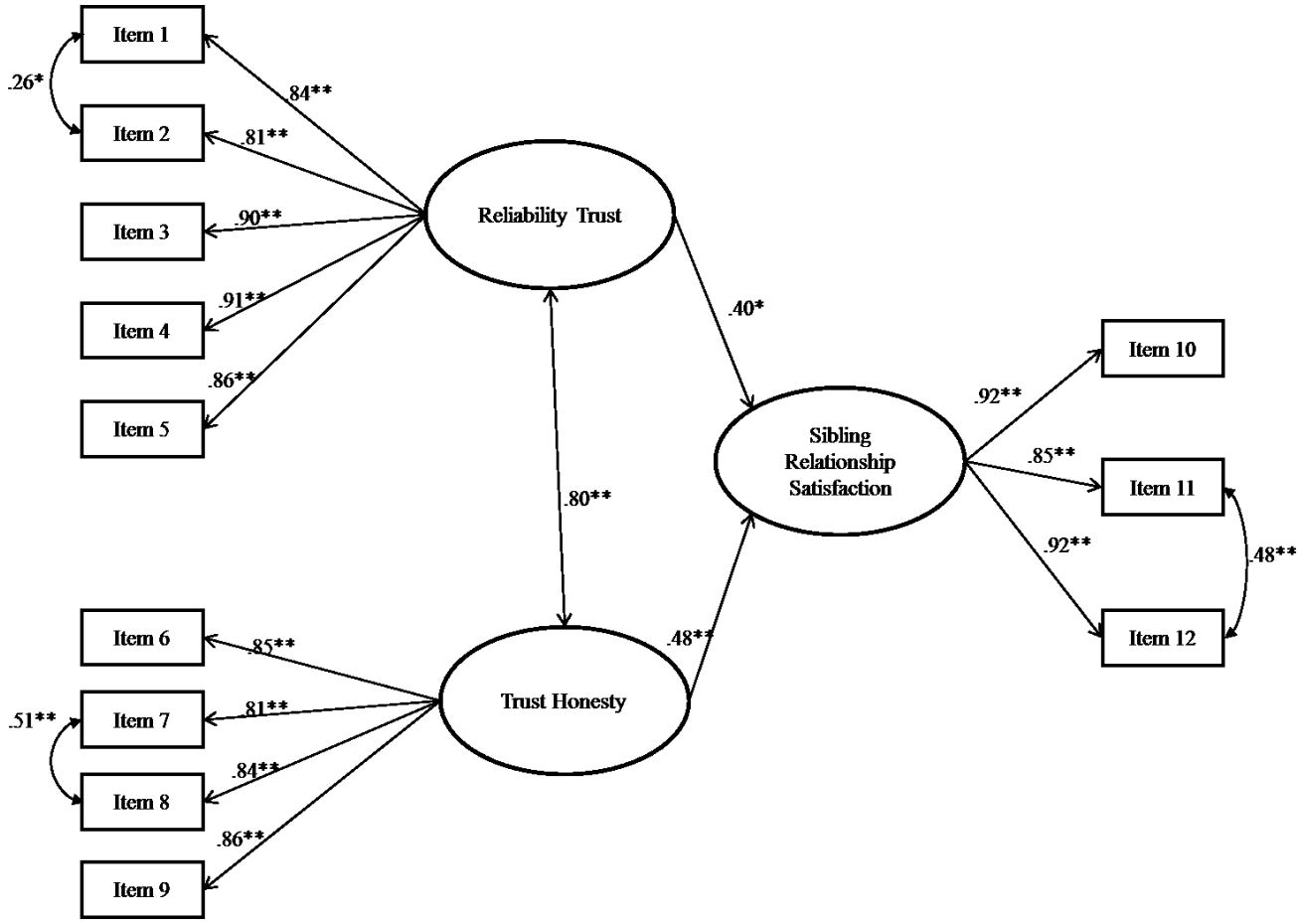

Figure 2. Structural equation model of the effects of sibling trust bases on sibling relationship satisfaction.

Note. Standardized estimates are presented. *$p < .05$, **$p < .001$. Item labels are listed in Table 1.

Bridging Studies: Evidence of Sibling Trust on Early Adolescent's Perceptions of Competence and Self-Worth

The first study addressed whether sibling trust was an important consideration for children and its value for sibling relationship satisfaction. Relationships theorists (Dunn, 2002; Hinde, 1979) argue that understanding one's development is better understood in the context of their close and meaningful relationships with others. Just as children place a value on trust with their parents and close friends, one can argue that trust is apparent and valued between siblings.

The findings of Study 1 expand on the very limited work on children's perceptions of trust with their sibling in two ways (Gamble, Yu, & Kuehn, 2011; McGuire, Segal, Gill, Whitlow, & Clausen, 2010). First, a self-reported measure of sibling trust, which broadly supported the multidimensionality of trust as defined by Rotenberg (1991, 2001, 2010), was developed to address limitations of three previous measures. Second, this new measure offered unique insights into the predictive value of the bases of sibling trust for relationship satisfaction and the degree to which these varied as a function of birth order and gender. Study 1 findings support the claim that trust has some importance for the sibling relationship. Overall, the bases of sibling trust (trust honesty and reliability) positively predicted sibling relationship satisfaction; unique birth order patterns in predicting trust on satisfaction were also observed.

Previous work argues that parent-child and friend trust are predictive of the child's children's self-worth and competence. For example, positive associations were observed between positive relational features (e.g., trust) in children's friendships and the child's social acceptance and global self-worth (Keefe & Berndt, 1996; Maunder & Monks, in press). Since the findings from Study 1 establish that trust does indeed have some importance for the sibling relationship, the aims of Study 2 were to: (a) examine the degree to which sibling trust predicted individual self-worth; and (b) investigate the extent to which the association between sibling trust and individual self-worth varied as a function of gender and cultural context. There is very limited cross-cultural research on sibling relations, thus we compared children's perceptions of trust with their sibling for global self-worth with participants from Canada and Colombia. These two countries have value systems and backgrounds that are quite distinct from one another. Comparisons of these cultural contexts further add to our understanding of the generalizability and importance of the sibling relationship on children's self-perceptions.

Study 2: Sibling Trust and Perceptions of General Self-Worth and Competence in Early Adolescence: Contextual Variations Related to Culture and Gender

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Abstract

The current study examined gender and cultural variations in the association between early adolescents' perceptions of trust in their siblings, their sense of self-worth, and competence. Participants included 235 early adolescents between the ages of 10 and 13 years from Montréal, Canada and Barranquilla, Colombia. Results indicated that sibling trust positively predicted general self-worth, academic competence, and social competence. Moreover, sibling trust had a stronger effect on social competence for boys than girls, while there were no gender associations with academic competence and general self-worth. Additionally, there was a lack of cultural differences between Canadian and Colombian early adolescents, suggesting a degree of universality associated with the concept of sibling trust. These findings underscore the importance of siblings as sources of trust and as individuals who can impact each other's development and well-being.

Sibling Trust and Perceptions of General Self-Worth and Competence in Early Adolescence: Contextual Variations Related to Culture and Gender

Sibling relationships are ever-present throughout the world, yet there is limited research on their importance for children's development. Relationships theory posits that individual development occurs in the context of one's close, intimate, and meaningful relationships (Hinde, 1979; Carpendale & Lewis, 2015). Sibling relationships are obligatory in nature, and considering their mutually constructed history based on infinite interactions and intense affect, they are an important context through which we can understand children's well-being (Howe, Ross, & Recchia, 2011). An important component of relationships relates to feelings of trust with another person (e.g., Hinde, 1979). Broadly, interpersonal trust is the extent to which individuals can rely on the behaviours and actions of other individuals (Dunn & Schweitzer, 2005; Rotenberg, 2010). Research indicates that children's interpersonal trust with parents and friends is associated with their adaptive well-being (e.g., Laible, Carlo, & Raffaelli, 2000; Rotenberg, 1994; Rotenberg et al., 2010). To date, little work investigates the value of sibling trust for children's well-being, including their self-perceptions regarding self-worth and competence. Although contextual comparisons such as gender differences in trust are extensively studied (e.g., Betts et al., 2014), cross-cultural studies of children's and early adolescent's trust are scarce, especially those examining children's trust beliefs with their siblings. The purpose of this study was to examine the degree to which the association between sibling trust and self-perceptions of worth and competence varied as a function of gender and culture in two different geographic contexts.

Interpersonal Trust Predicts Child and Adolescent Adaptive Development

Foundations of trust. Grounded in the work of Bowlby (1969) and Erikson (1950, 1964), trust develops as early as infancy, when infants develop a trusting bond with their caregiver who is ideally both sensitive and responsive to their child's needs. Attachment theory (Ainsworth, 1979; Bretherton, 1992; Bowlby, 1969) and psychosocial theory (Erikson, 1950, 1964) suggest that trust develops when an emotional bond is formed between infant and caregiver, such that the infant is aware that their caregiver can be relied upon in times of need or distress. Typically, caregivers are children's parents (Ainsworth, 1979; Bretherton, 1992); however, evidence suggests that siblings can also be attachment figures early in life and the security associated with it is similar to that observed between parents and children (Howe & Ross, 1990; Marvin & Stewart, 1990; Stewart, 1983; Teti & Ablard, 1989). Additionally, as

siblings enter early adolescence, there are notable gender differences, such that attachment quality increases in dyads including a boy (Buist, Deković, Meeus, & van Aken, 2002). In turn, this high-quality attachment, based on a strong and secure bond, is predictive of greater adaptive and positive well-being outcomes for children (e.g., Laible et al., 2000).

More recently, interpersonal trust is viewed as multidimensional, including different bases of trust such as reliability (i.e., being relied upon, engaging in promise-keeping behaviour), emotional (i.e., not causing emotional embarrassment), and honesty (i.e., being truthful). These bases can be focused generally or with specific individuals (Rotenberg, 1991, 2001, 2010). Rotenberg argues that trust can be specified in terms of the beliefs and behaviours that individuals employ to be trustworthy. Broadly, this model is supported by research with peers (e.g., Rotenberg, Macdonald, & King, 2004), parents (Rotenberg et al., 2005), and siblings (McGuire, Segal, Gill, Whitlow, & Clausen, 2010) and suggests that there are implications for children's adaptive development. Taken further, the multidimensionality of trust can reflect one's perceptions that their relational partner is capable of trustworthy behaviour. As insiders, children have intimate knowledge of their siblings' past actions and behaviours, and are in a unique position to evaluate whether their sibling can be trusted (Furman, Jones, Buhrmester, & Adler, 1989; Olson, 1977). As such, we build on this model to incorporate personal perceptions of a partner's capability of be a trusting individual.

Trust and adaptive outcomes. Regarding the role of trust in child and adolescent positive development, it is generally accepted that interpersonal trust with a relational partner, such as a friend, parent, or sibling, is associated with outcomes at both the relational and individual level. For example, Sullivan (1953) argued that close and intimate friendships are crucial to children's and adolescents' sense of self-worth. Following this, it is argued that friends trust one another when they engage in self-disclosure, with friends trusting that the shared confidential information would not be broadcast to others (e.g., Buhrmester, & Prager, 1995; Martinez & Howe, 2013). In fact, trust in the form of intimate self-disclosure is positively associated with social acceptance and global self-worth, especially in domains related to school, social interactions, and behavioural conduct (Keefe & Berndt, 1996; Maunder & Monks, in press). However, it is also apparent that family-centric variables are implicated in children's self-worth. For example, Gauze, Bukowski, Aquan-Assee, and Sippola (1996) reported that children's perceptions of their self-worth were partly influenced by friendship factors (e.g.,

stability) but also by familial variables (e.g., adaptability). Thus, we argue that other relationships, including with siblings, are implicated in children's feelings of self-worth and competence.

Sibling Relationships and Adaptive Outcomes

Sibling relationships differ from those that children have with parents or friends in terms of the types of interactions. Parent-child interactions are typically viewed as hierarchical (i.e., imbalance of power and knowledge), while those between friends are often seen as reciprocal (i.e., mutual, balanced) (Dunn, 2015; Hinde, 1979; Tucker & Updegraff, 2009). Sibling relationships are typically characterized by both reciprocal and hierarchical interactions (Dunn, 2015). Naturally, birth order and age differences reflect the imbalance of power and knowledge between siblings, but reciprocal interactions in the form of play, for example, are common between siblings (Howe et al., 2011). As children enter middle childhood and adolescence, sibling relationships become more complex, which allows for more psychological constructs, such as trust, to develop and the opportunities for abstract conversations that facilitate self-disclosure to occur, thus indicating new avenues for investigation (Howe, Aquan-Assee, Bukowski, Lehoux, & Rinaldi, 2001; Howe, Aquan-Assee, Bukowski, Rinaldi, & Lehoux, 2000; Martinez & Howe, 2013; McGuire et al., 2010).

The influence of sibling relationships on child and adolescent well-being is well documented. For example, high quality sibling relationships, typically characterized by high warmth (i.e., based on closeness and affection) and low conflict (i.e., frequency of disputes and antagonize one another) are positively associated with children's well-being (e.g., Buist, Deković, & Prinzie, 2013; Furman & Buhrmester, 1985; Richmond, Stocker, & Rienks, 2005). Conversely, poor quality sibling relationships in which there are many intense, destructive conflicts, and aggressive acts are positively associated with psychopathology (Dirks, Persram, Recchia, & Howe, 2015).

Like friendships, it is evident that positive features associated with the sibling relationship are supportive of children's feelings of self-worth in various domains. For example, findings consistently suggest that more positive sibling relationships are positively related to self-esteem (e.g., Yeh & Lempers, 2004). Stocker (1994) also reported that sibling warmth was positively associated with self-worth. Further, Buist and Vermande (2014) found that children

whose sibling relationships were characterized by high levels of warmth and low conflict had higher scores on global self-worth than those whose relationships were highly conflictual.

Limited research suggest that sibling trust is positively associated with individual and relational well-being. For example, previous work demonstrates positive associations between sibling trust and sibling closeness and satisfaction (Study 1; McGuire et al., 2010). Using Rotenberg's (2010) model of trust, Study 1 replicated the bases of honesty and reliability trust but not emotional trust with siblings. Sibling trust is also generally associated with individual indices related to self-worth (Noel, Francis, & Tilley, 2018). However, Noel et al.'s index of sibling trust appears to relate more to sibling validation and acceptance than actual trustworthiness, given that items that supposedly measure trust refer to siblings *accepting them as they are* and *respecting their feelings*. Thus, the degree to which children feel that they can trust their sibling might be supportive of their feelings of competency. Perhaps, as with friendships, trusting a sibling can reinforce a child's self-worth, especially during early adolescence, when self-esteem begins to decline due to increases in social peer comparisons (Harter, 2006; Orth, Erol, & Luciano, 2018; Robins & Trzesniewski, 2005).

Cross-Cultural Variability and Gender in Sibling Trust

Relationships are socially constructed based on the cultural demands in which they are embedded. Due to its nested nature, investigations into the nuances of relationships within the context of culture are necessary to better inform our understanding of the value of phenomena, including trust and self-worth (Hinde, 1987; Chen, French, & Schnieider, 2006). Much of the literature on psychological phenomena including trust and self-worth comes from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies (Henrich, Heine, & Norenzyan, 2010), whereas there is very little culturally informed research on children's trust, in particular with siblings. It is possible that trust and well-being outcomes such as self-worth and competence are experienced across the globe, but questions regarding the degree of importance of relationship trust and self-worth may vary as a function of the cultural context to which children and adolescents belong.

Indeed, variations in self-worth and competence among early adolescents suggest that there are significant and differential associations across cultures. Specifically, the positive association between social competence and self-worth is stronger for persons from more individualistic (i.e., Canadian) than collectivistic cultures (i.e., Colombian) (Santo, Bukowski,

Stella-Lopez, Carmago, Mayman, & Adams, 2013). However, Santo et al. also report that the positive relationship between academic competence and self-worth is stronger for individuals from cultures that are higher on collectivistic values. Together, although constructs such as interpersonal trust and self-worth may be universal, there is limited culturally informed research in this area (e.g., Betts et al., 2014).

The literature on cultural variations in sibling relationships often focuses on sibling roles, such as caretakers and teachers (e.g., Maynard, 2002; Watson & McGoldrick, 2011); yet, across cultures, it is apparent that children's sibling relationships are significant, and they spend a great deal of time together outside of school (McHale & Crouter, 2005; Updegraff, McHale, Killoren, & Rodríguez, 2011; Watson, & McGoldrick, 2011). To our knowledge, there are no studies that investigate cross-cultural differences in children's perceptions of trust with their sibling. However, research on trust with peers demonstrates that it is a feature of relationships apparent across multiple cultures, with context-specific variations in the children's beliefs regarding trustworthiness (Betts et al., 2014). Specifically, these authors reported that beliefs related to promise- and secret-keeping behaviours were higher among children from Japan compared to those from Italy and the United Kingdom.

In addition, gender effects are a contextual factor embedded within culture. Within the literature on peer trust among children aged 6 years, findings suggest that girls tend to show greater trust due to their propensity to value intimate relationships with others more than boys (e.g., Betts & Rotenberg, 2007; Malti et al., 2016; Rotenberg et al., 2005). However, in a study of children and early adolescents between 8- and 11-years old, Betts et al. (2014) reported that boys showed greater trust scores than girls regardless of cultural context. The reasoning behind these mixed findings may be due to social factors related to the changing nature of peer networks during adolescence. However, it can also be due to the contextual differences in children's perceptions of the role that the peer group serves. This logic is akin to the sibling relationship, such that the cultural meanings and roles of siblings serve different purposes in different cultures (e.g., Maynard, 2002; Zukow-Goldring, 2002).

The Present Study

The purpose of the present study was to investigate contextual variations in the predictive value of sibling trust on early adolescents' self-perceptions of their general worth and competence using a sample of early adolescents between 10 and 13 years from Montréal,

Canada, and Barranquilla, Colombia. This study applies the bases of trust that are consistent with Studies 1 and 2; namely, the bases of reliability and honesty trust. Based on the literature on the value of trust (e.g., Noel et al., 2018), we predicted that self-perceptions, including academic competence, social competence, and general self-worth would be positively predicted by sibling trust. We also predicted that the association between sibling trust and self-worth would be higher for girls than boys, especially considering that girls score higher on measures of interpersonal trust and value intimate relationships (Rotenberg et al., 2005). Lastly, related to cultural differences and extrapolating from Santo et al. (2013), we expected the association between sibling trust and self-worth would be stronger for youth from Barranquilla than Montréal. Considering that cultures such as Barranquilla may reflect more collectivistic or group-oriented mindedness, sibling trust may be a more salient and important feature compared to more individualistic societies such as Montréal.

Method

Participants

Participants included 235 5th and 6th grade children between the ages of 10 and 13 years (n = 109 boys, n = 126 girls). The birth order of the children's siblings was relatively equal (55% had an older sibling, 45% had a younger sibling). Children were recruited from three English-speaking schools in Montréal, Canada (n = 121) and two Spanish-speaking schools in Barranquilla, Colombia (n = 114), a city on the northern coast of the Caribbean. The minimum participant rate for each classroom was 80%. Ethical approval was first obtained from the home University's Office of Research, followed by the respective school boards and schools. Parental written consent was required prior to children's participation. Children were given a small gift (t-shirt) after returning their consent form whether parents provided consent to participate or not. Prior to data collection, participating children also provided their verbal assent.

Procedure

Participants completed their questionnaires individually at their desks in their classroom using tablet computers. Prior to receiving the tablets, the children were informed that only the research team would have access to the data to ensure privacy. Further, children were informed that they could withdraw from the study at any point without penalty. Trained assistants were present throughout the data collection to answer any of the children's questions.

Measures

Item translation. To ensure that the measures were linguistically and culturally equivalent, translation of the items into Spanish underwent a three-step process. First, the items were written in English to ensure they were developmentally appropriate and accurate. Second, the items were translated into Spanish by Colombian translators who work in education and psychology and are familiar with the local dialect. Lastly, they were back-translated into English by a second group of translators to ensure the item's true meaning was retained when translated.

Perceptions of sibling trust. Children evaluated the degree to which they trusted their sibling. Study 1 reported a two-factor structure of the sibling trust self-report measure, namely reliability trust (i.e., trusting a sibling to be truthful) and trust honesty (i.e., trusting a sibling to help them). Participants were asked to think about their closest-in-age sibling, and rated the items on a 5-point Likert scale that ranged from 1 ('*not at all true*') to 5 ('*true*'). A score of 1 indicated that statements were not at all true and represented low trust, while a score of 5 meant that statements were true and indicated high trust. Cronbach's alphas were high for sibling reliability trust ($\alpha = .89$) and trust honesty ($\alpha = .86$). See Table 3.

Perceptions of the self. Children completed three subscales of the revised version of the Harter (1982) Perceived Competence Scale for Children (see Table 3). The first measured positive perceptions of academic competence, which measured the degree to which children felt competent in their school skills (e.g., "I usually know the right answer on tests in school"). The second scale assessed positive indices of general self-worth (e.g., "I am generally sure what I am doing is right"). The third scale measured positive aspects of social competence (e.g., "It's easy for me to make friends"). Ratings were made using a 5-point scale, ranging from 1 ('*not at all true*') to 5 ('*true*'); a score of 1 indicated low self-worth, and a score of 5 indicated high self-worth. Cronbach's alphas were high for academic competence ($\alpha = .81$), general self-worth ($\alpha = .80$), and social competence ($\alpha = .87$).

Results

Plan of Analysis

The plan of analysis followed two steps. First, we performed a confirmatory factor analysis (CFA) of the sibling trust measure to ensure its multidimensionality. Second, structural equational modeling (SEM) with Mplus (Muthén & Muthén, 2015) using multigroup analyses of

(a) gender and (b) place (i.e., culture) assessed the degree to which sibling trust predicted social competence, academic competence, and general self-worth.

Confirmatory Factor Analysis of Sibling Trust, Self-Worth, and Competence

We evaluated the degree to which sibling trust was defined by sibling reliability trust and trust honesty. Weighted scores for each base of trust were calculated by taking the sum product of the item and their standardized CFA coefficient and then dividing by the sum of those coefficients. Overall, the model had an acceptable fit, $\chi^2(110) = 125.27$, $p = .15$, CFI = .99, TLI = .98, RMSEA = .02 (.00 – .04), SRMR = .05, which supports the multidimensionality of sibling trust. In particular, the association between reliability trust and trust honest was significantly moderate and positive ($\beta = .67$, $t = 2.91$, $p = .004$). Moreover, the loadings related to self-worth and competence were also significant. Each of the latent variables had factor loadings that were greater than .50. Further, associations between academic competence, social competence, and general self-worth were all moderately positive (see Figure 3).

Structural Equation Model of the Effect of Sibling Trust on Self-Worth and Competence

In this model, we evaluated the extent to which early adolescents' academic competence, social competence, and general self-worth were predicted by sibling trust while controlling for the sibling's birth order. Model fit was acceptable, $\chi^2(127) = 144.87$, $p = .13$, CFI = .98, TLI = .98, RMSEA = .03 (.00 – .05), SRMR = .05. Analyses indicated that birth order did not significantly predict sibling trust ($\beta = .10$, $t = 1.14$, $p = .25$). However, sibling trust significantly and positively predicted academic competence ($\beta = .29$, $t = 3.03$, $p = .002$), social competence ($\beta = .47$, $t = 5.56$, $p < .001$), and general self-worth ($\beta = .41$, $t = 4.66$, $p < .001$) (see Figure 3).

Multigroup Analysis of Gender

We assessed the degree to which gender differences were present in predicting the effect of sibling trust on academic and social competence as well as self-worth. Given that sibling birth order did not significantly predict sibling trust, it was removed from this analysis. The baseline model for the multigroup analysis had an acceptable but far from ideal fit, $\chi^2(214) = 266.24$, $p = .01$, CFI = .95, TLI = .95, RMSEA = .05 (.02 – .06), SRMR = .08. The equality constraint of the path from sibling trust to academic competence provided a significant model decrease, $\Delta\chi^2_{(1)} = 3.61$, $p = .02$. The model fit of the constraint was also significant, $\chi^2(217) = 272.33$, $p = .01$, CFI = .95, TLI = .95, RMSEA = .05 (.03 – .06), SRMR = .08, where the positive effects of sibling trust on academic competence was stronger for boys ($\beta = .42$, $t = 3.98$, $p < .001$) than girls ($\beta =$

.15, $t = 1.08$, $p = .28$). Similarly, the constraint on the path from sibling trust to general self-worth also produced a significant model decrease, $\Delta\chi^2_{(1)} = 5.82$, $p = .001$. Again, model fit was less than ideal, $\chi^2(217) = 274.54$, $p = .01$, CFI = .95, TLI = .94, RMSEA = .05 (.03 – .06), SRMR = .09, where the positive effects of sibling trust on general self-worth were stronger for boys ($\beta = .63$, $t = 9.08$, $p < .05$) than girls ($\beta = .27$, $t = 2.36$, $p = .02$). There was no significant model decrease for the constraint on the path from sibling trust to social competence, $\Delta\chi^2_{(1)} = .31$, $p = .58$, suggesting no significant difference in the positive effects for boys ($\beta = .39$, $t = 3.26$, $p = .001$) and girls ($\beta = .39$, $t = 3.68$, $p < .001$). Similarly, the associations between social competence, academic competence, and general self-worth were not significantly different between boys and girls (all ps > .05) (see Figure 4).

Multigroup Analysis of Place Differences

Similar to the previous analysis, we tested the extent to which sibling trust predicted self-worth and competence varied as a function of place, by comparing youth from Montréal and Barranquilla. The unconstrained model had an acceptable, yet less than ideal fit, $\chi^2(216) = 289.74$, $p = .001$, CFI = .94, TLI = .93, RMSEA = .05 (.04 – .07), SRMR = .09. Overall, the constrained paths from sibling trust to academic competence ($\Delta\chi^2_{(1)} = .61$, $p = .44$), social competence ($\Delta\chi^2_{(1)} = .23$, $p = .63$), and general self-worth ($\Delta\chi^2_{(1)} = .19$, $p = .91$) were not significantly different from the unconstrained model. However, the association between academic competence and general self-worth produced a significant model decrease, $\Delta\chi^2_{(1)} = 3.93$, $p = 04$. Model fit was minimally acceptable, $\chi^2(217) = 293.67$, $p = .001$, CFI = .94, TLI = .93, RMSEA = .05 (.04 – .07), SRMR = .10, where the association was stronger for participants from Montréal ($\beta = .52$, $t = 4.43$, $p < .001$) than Barranquilla ($\beta = .24$, $t = 1.56$, $p = .06$). In addition, there was a significant model decrease in the association between social competence and general self-worth, $\Delta\chi^2_{(1)} = 2.86$, $p = 04$). Again, model fit was acceptable but not ideal, $\chi^2(217) = 292.60$, $p = .001$, CFI = .94, TLI = .93, RMSEA = .05 (.04 – .07), SRMR = .10, where the association was stronger in Barranquilla ($\beta = .74$, $t = 6.65$, $p < .001$) than Montréal ($\beta = .55$, $t = 5.77$, $p < .001$). There were no group differences in the association between social competence and academic competence for youth from either place (see Figure 5).

Discussion

In this study, we considered the question of whether beliefs of trust regarding a sibling were positively associated with early adolescents' self-perceptions of their general worth and

social and academic competence. To our knowledge, this is the first study to examine this question, especially as it varies as a function of cultural context and gender. We focus on sibling relationships and trust as critical to individual development and well-being, and highlight the nuances related to studying cultural and gender variations of sibling trust.

Sibling Trust, Self-Worth, and Competence

One of the broader findings is that our model of sibling trust included multiple observed indicators, namely reliability trust and trust honesty. This supports the notion that trust is a multidimensional construct (2005, 2010); however, the emotional trust component was not replicated, also reported in Study 1. That said, our findings broadly emphasize the value of early adolescents' insider's expectations of the degree to which their siblings are trustworthy individuals (Furman et al., 1989; Olson, 1977).

In addition, our findings support the positive value of trust in the sibling relationship and for early adolescents' self-concepts. Specifically, sibling trust predicted greater feelings of academic competence, social competence, and general self-worth, even though birth order was not a significant covariate. There is converging evidence that supports the hypothesis that children's and adolescent's perceptions of trust in others is related to various outcomes; for example, our findings regarding children's perceptions of their academic competence is in line with research showing positive associations with school adjustment (Betts, Rotenberg, & Trueman, 2009, 2013). Further, perceptions of trust are also negatively associated with more social aspects of one's well-being (e.g., reduced loneliness, depression, and anxiety (e.g., Bernath & Feshbach, 1995; Rotenberg, Boulton, & Fox, 2005). One explanation of these findings relates to the fact that relational stability may enhance one's well-being. Trust is necessary for maintaining healthy and positive relationships (e.g., Rotenberg, McDougall, Boulton, Vaillancourt, Fox, & Hymel, 2004). Moreover, the relative contributions of each trust base may provide an increased sense of stability within an important and intimate relationship, which can then foster positive individual well-being. Although the literature on sibling trust is limited, the argument that siblings are important relational partners who can have a significant impact on one's development is clear (Dirks et al., 2015; Howe et al., 2011). Taken further, findings from this study and others demonstrate that beliefs that one can trust one's sibling are also positively associated with relational and individual outcomes such as sibling closeness and general worth (e.g., Gamble et al., 2011; McGuire et al., 2010; Noel, et al., 2018). As such, trust

as a positive feature of the sibling relationship may help to promote the quality and perceived stability of the relationship, such that children and early adolescents have beliefs that their sibling would be truthful to them and would be there to provide help when needed. In turn, this positive perception may promote positive adaptive outcomes at the individual level.

The intersection of relationships theory and findings related to interpersonal trust reflects the idea that trust is developed and requires maintenance in close relationships (Hinde, 1979; Rotenberg, 1994, 1995). Sibling relations represent an enduring and long-lasting bond that often begins before children form meaningful friendships, thus trust is likely to continue to be an important relational feature as children enter adolescence. Over time, siblings will have had infinite opportunities to interact with one another and learn about each other's personalities and behaviours. In turn, these interactions may help them to evaluate whether or not they feel that their sibling is someone who is trustworthy. It is well established that high levels of positive attributes coupled with low levels of negative features of the sibling relationship are adaptive for children's development and well-being; namely, indices such high warmth and intimacy along with low levels of conflict support this claim (e.g., Buist et al., 2013; Dirks, et al., 2015; Richmond et al., 2005). Moreover, warm and close sibling relations tend to elicit trusting behaviours such as the self-disclosure of intimate information and feelings to one another (Howe et al., 2001; Martinez & Howe, 2013). From there, it is logical to assume that the trust established between siblings may be positively associated with the individual's overall adjustment and their self-perceptions regarding overall worth and competence (Yeh & Lempers, 2004). Although our findings support the latter part of this argument, future studies would be best served to investigate this question more fully.

Contextual Variations Related to Sibling Trust

The main novel question of the current study was examining how the positive effects of sibling trust on early adolescents' self-perceptions varied as a function of their gender and cultural background. Together, these findings offer unique insights into the adaptive value that sibling trust has for early adolescent boys and girls from two unique cultural backgrounds in Montréal and Barranquilla.

Gender. While sibling trust was positively related to each of the outcomes for boys and girls, there was a stronger prediction of academic competence and general self-worth for boys than girls, whereas social competence did not vary as a function of gender. Although these

findings are not entirely in line with the literature (e.g., Rotenberg et al., 2005) and our hypotheses, we pose two plausible explanations. First, clear and consistent gender differences are not evident in studies on children's and adolescents' trust and self-concepts. Within the domain of trust, girls tend to show greater trust than boys (e.g., Malti et al., 2016; Rotenberg et al., 2005), yet some authors find the opposite among youth in middle childhood and early adolescence (e.g., Betts et al., 2014). There are also inconsistencies in boys' and girls' reports of their self-concept (e.g., Gentile et al., 2009; Rentzsch, Wenzler, & Schütz, 2016).

Second, there could be a distinction between two related constructs: (a) overall perceptions of sibling trust and (b) trust-based behaviours (e.g., keeping promises) that vary as a function of the self-concept domain. For boys, generalized perceptions that their sibling is a trustworthy individual may have a more stabilizing and reinforcing effect on the academic domain, rather than putting considerable emphasis on specific trust-based and relational behaviours such as not disclosing intimate information. For girls, however, it may be their emphasis on trust-based behaviours (e.g., self-disclosure) is more salient in promoting academic competence, given their tendency to be more relationally focused (Buhrmester & Prager, 1995; Howe et al., 2001; Martinez & Howe, 2013). Previous work also reports that friendship intimacy, which tends to be higher among girls (Rose & Rudolph, 2006), is positively associated with self-worth (Berndt, 2002). We speculate that this link between specific trust-based behaviours and self-worth may be more apparent for girls than for boys and possibly domain-dependent. Given the paucity and mixed findings within the sibling literature, this is speculative, and merits further and longitudinal investigations.

Despite these mixed findings, it is evident that relationships are valuable assets. In the case of siblings, positive, supportive, and harmonious relationships do foster academic adjustment (e.g., Tucker, McHale, & Crouter, 2001) and competence (Buist & Vermande, 2014). Some authors report that support from a brother is positively associated with school attitudes and self-esteem (Milevsky & Levitt, 2005). This may suggest that for boys, or possibly girls with a brother, having these positive perceptions of a sibling reinforces adaptive attitudes and feelings of school competence. Since trust is viewed as a positive relational feature, (Gamble et al., 2011; McGuire et al., 2010), it is likely that sibling trust and its related bases in honesty (e.g., not receiving misrepresentative or inaccurate information) and reliability (e.g., being available to help) promote greater confidence in one's academic competence. This is not to suggest that it

may not be the case for girls, but future work comparing dyadic compositional differences would provide more a more nuanced understanding of this link.

Culture. There are three findings to note regarding sibling trust and culture. First, the significant effects of sibling trust on self-worth and competence combined with the lack of place differences between Canadian and Colombian children suggests that sibling trust might be a universal relationship phenomenon. This is supported by theoretical arguments promoting the generalizability of attachment and trust around the world (Bowlby, 1969; Erikson, 1950, 1964). Indeed, this finding is also supported by the limited cross-cultural work on trust beliefs in peers conducted in the United Kingdom, Italy, and Japan; trust beliefs accounted for a significant proportion of the variance in how children rated and were rated by their peers on interpersonal trust (Betts et al., 2014). Given that trust is fundamental to the maintenance of healthy relationships (Rotenberg, 1994, 1995), our results build on Betts and colleagues (2014) to highlight its universality, and with siblings in particular, in other parts of the world.

Second, despite the support for trust as being common across cultures, there was a lack of any notable cultural differences in the effect of sibling trust on each of the outcomes in our study. This diverges from existing cross-cultural evidence; specifically, Betts and colleagues (2014) reported that children and early adolescents from more collectivist societies, and Japan in particular, had higher overall ratings of trust beliefs, as well as beliefs related to secret-keeping that contributed to trustworthiness, compared to British and Italian participants. It is possible that while trust as a feature of relationships may have some degree of universality associated with it, the types and frequency with which trusting behaviours (e.g., self-disclosure, secret-keeping, promise-keeping) varies by culture. In this case, more collectivistic cultures in which trust is implicated in all aspects of children's lives, including at the relational and societal levels, might place a greater emphasis on specific behaviours that promote trust rather than cultures that are described as more individualistic. Although we did not investigate specific trusting behaviours, this would be an avenue for further work, especially as it relates to siblings.

Although not specifically related to sibling trust, the third finding reflects the association between the outcomes. Specifically, the association between academic competence and general self-worth was stronger for participants from Barranquilla than Montréal, which is consistent with previous work (Santo et al., 2013). Santo and colleagues also reported the association between social competence and general self-worth was stronger in Montréal than Barranquilla, a

finding that we did not replicate. Despite a similar sample, these discrepant findings might be due to other contextual factors that should be considered in future work. For example, Santo et al. (2013) argued that their strongest effects related to children's socioeconomic status (SES) that moderated the association of self-worth and competence in both Canada and Colombia. Future research should focus explaining the processes of the effects of sibling trust on one's development and well-being by considering other contextual factors such as SES.

Limitations and Implications

Although our findings build on an understudied area of research, there are three limitations to consider. First, the cross-sectional nature of this study only allows for our findings to be interpreted as positive and concurrent associations; future work should include longitudinal designs to understand the predictive value of both specific behaviours and perceptions of sibling trust on development and well-being at the individual and relational level. Second, our index of cultural variability was limited to the specific locations of Colombia and Canada. As such, certain contextual factors including the extent to which early adolescents identify with their cultural values and the meanings attributed to them might provide more nuanced findings regarding the effect of sibling trust than the geographical location of their residence. Third, although theoretical models of interpersonal trust specify an emotional trust component, which relates to trusting someone to not embarrass them (Rotenberg, 2010), our models did not account for this. Additional work on developing self-report items that best capture emotional trust would help to clarify this component of sibling trust by gender and culture.

In conclusion, this study further supports the notion that close and intimate relationships are a foundation for understanding development and well-being (Hinde, 1979; Dunn, 2015). More specifically, siblings are a critical relational partner in addition to parents and friends who children use to help them comprehend their social worlds. Our findings make a novel contribution to the empirical and theoretical literature, while raising a number of questions for future research. The applied implications of these findings relate to the fact that, as with trust in friends and with parents, early adolescents' beliefs that they can trust their sibling are related to greater feelings of self-worth and competency, which may enhance their confidence when navigating the social milieu. As such, more work is warranted to further illuminate the role of siblings and trust in the maintenance of individual and relational well-being.

Table 3

Descriptive Statistics of Sibling Trust, Self-Worth, and Competence by Place

	Montréal	Barranquilla
Scale	M (SD)	M (SD)
Reliability Trust	3.99 (1.05)	4.06 (1.12)
1. I trust my sibling to help me when I need it.		
2. I trust my sibling to help me when I'm in trouble.		
3. I trust my sibling to help me even when I don't ask for it.		
4. I trust my sibling to help me understand how I feel.		
5. I trust my sibling to help me when I feel sad.		
Trust Honesty	4.01 (1.06)	4.15 (1.12)
1. I trust my sibling to not say bad things about me.		
2. I trust my sibling to not lie to me.		
3. I trust that my sibling will be honest with me.		
4. I trust my sibling to believe me when I tell them something important.		
Academic Competence	4.03 (.78)	3.81 (.85)
1. I am very good at school.		
2. I am just as smart as other kids my age.		
3. I do well in school.		
4. I usually know the right answer on tests in school.		
5. I do well on tests in school.		
Social Competence	3.95 (.87)	3.99 (.98)
1. I know how to get along with well with others.		
2. It's easy for me to make friends.		
3. I have a lot of friends.		
4. Most kids in my class like being with me.		
5. I am good at interacting with others.		
General Self-Worth	4.03 (.75)	4.02 (.89)
1. I feel good about the way I act.		
2. I am generally sure that what I am doing is right.		

3. There are a lot of things about myself that I am proud of.
4. I am sure of myself.
5. I am happy the way I am.

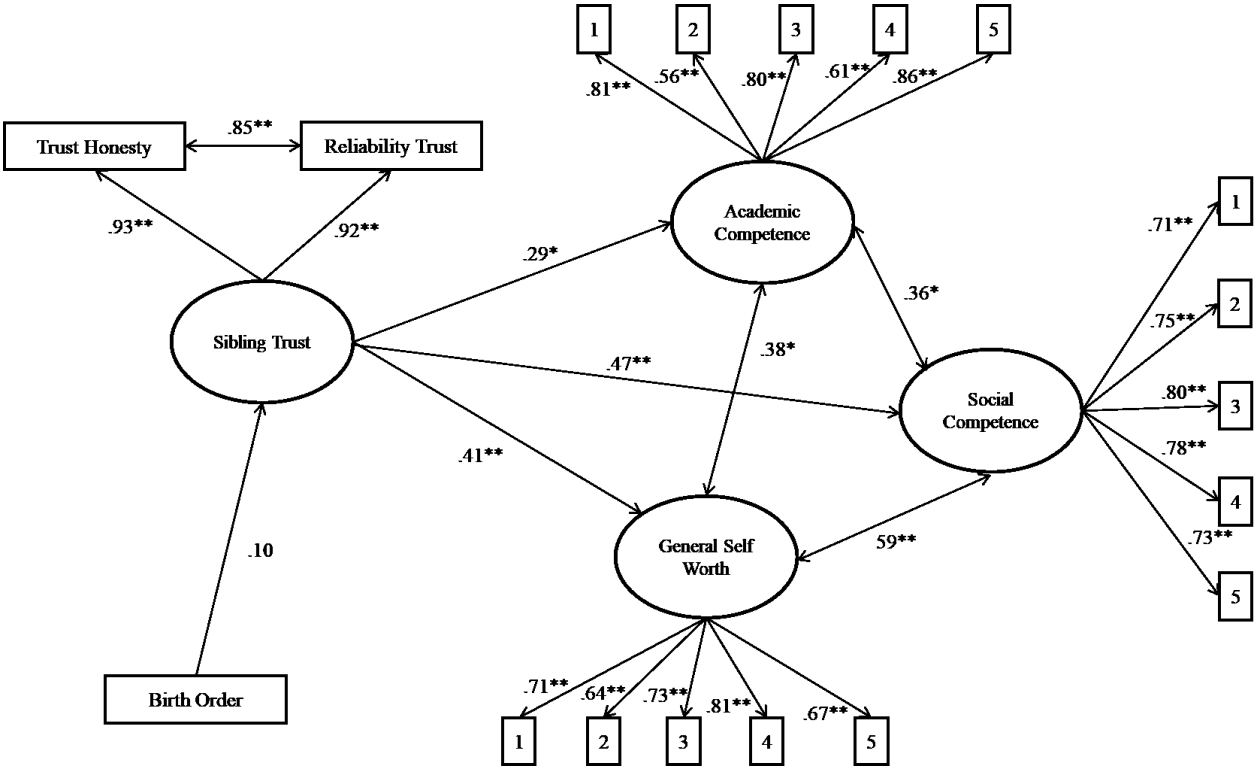

Figure 3. Structural equation model of the effects of sibling trust on self-worth, social competence, and academic competence.

Note. Standardized estimates are presented. *$p < .05$, **$p < .001$. The item numbers for each variable refer to the items listed in Table 3.

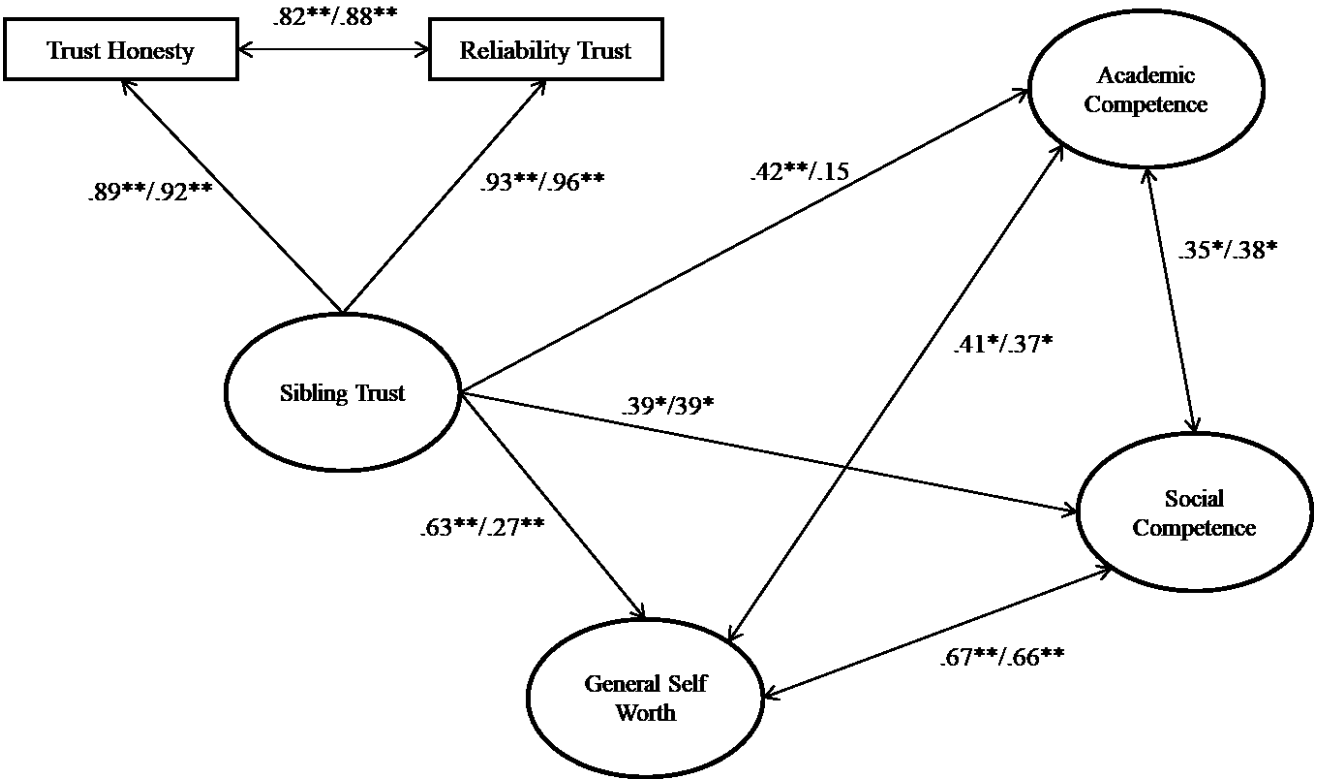

Figure 4. Structural equation model of the effects of sibling trust on self-worth, social competence, and academic competence by gender.

Note. Standardized estimates are presented. Estimates for boys and girls are reported first and second, respectively. Indicator variables are presented in Figure 3. *$p < .05$, **$p < .001$.

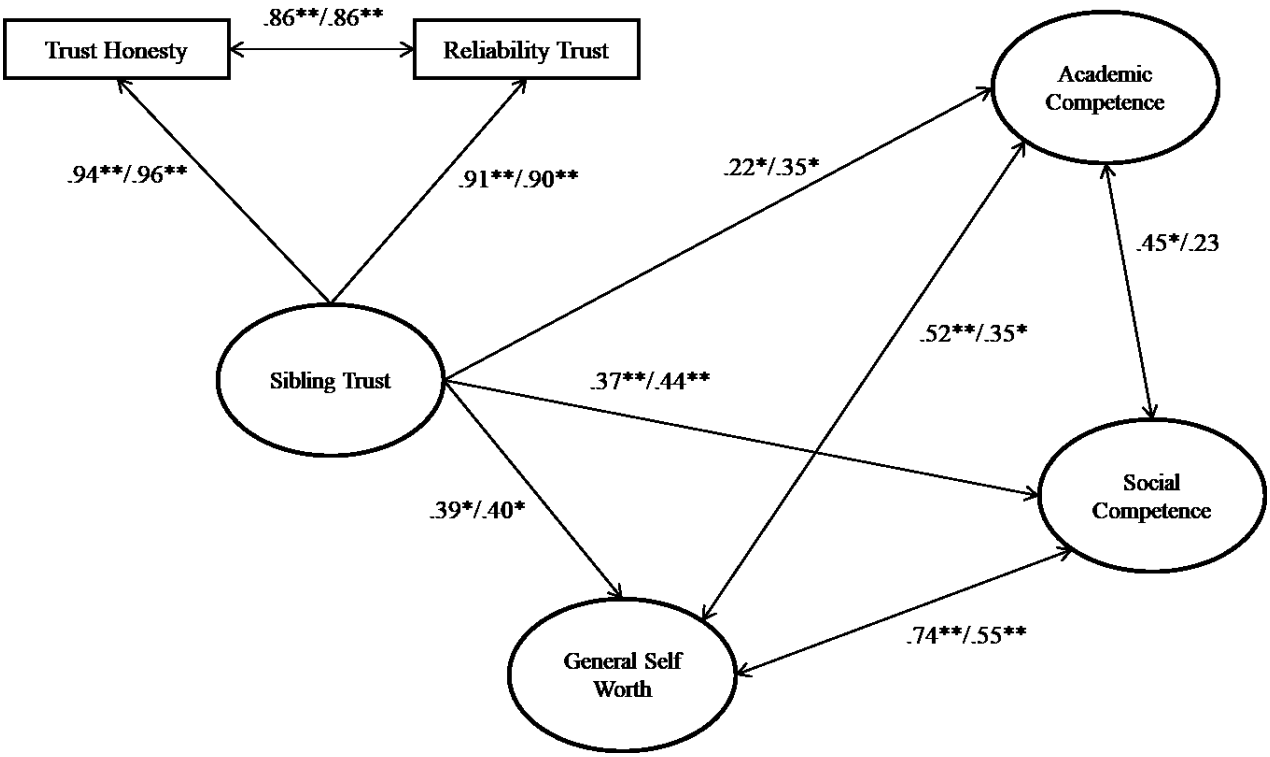

Figure 5. Structural equation model of the effects of sibling trust on self-worth, social competence, and academic competence by place.

Note. Standardized estimates are presented. Estimates for Barranquilla and Montréal are reported first and second, respectively. Indicator variables are presented in Figure 3. *$p < .05$, **$p < .001$.

Bridging Studies: The Protective Role of Sibling Trust

Studies of child well-being and self-worth point to the importance of relationships in fostering or hindering one's well-being (Buist & Vermande, 2014; Stocker, 1994; Sullivan, 1953). In the second study, this argument was tested in the context of sibling relationships. More specifically, the study evaluated the hypothesis that sibling trust would play an adaptive role in children's and early adolescents' perceptions of their general self-worth and feelings of social and academic competence.

Results from the second study supported this idea and expand on the sibling relationship literature in three ways. First, Study 2 reinforces findings from Study 1, such that there is further empirical support that sibling trust is another salient feature of the relationship. Moreover, the self-report questionnaire regarding sibling trust, specifically the reliability and honesty scales, were replicated, which emphasizes the multidimensionality of interpersonal trust as articulated by Rotenberg (1991, 2001, 2010). Second, these scales were deemed to have acceptable fit with a different sample of fifth- and sixth-grade children from two cultural contexts (i.e., Canada and Colombia). Third, the positive effect of sibling trust on early adolescents' self-perceptions of their general self-worth and competence was apparent.

It is evident that positive perceptions of sibling trust have some adaptive value for early adolescents, and therefore might also serve as a protective factor as well. Previous studies show that positive and high-quality sibling relationships may alter the direction of effects between negative and maladaptive behaviours. For example, trusting and dependable relationships moderated the association between illegal substance use and risky sexual behaviour (Briggs, Kim, Mowbray, Orellana, & Elkins, 2018; Gass, Jenkins, & Dunn, 2007). As such, it is apparent that a trusting relationship can protect against negative outcomes. Given the findings from Study 2 that support the adaptive value of sibling trust on early adolescents' self-perceptions of their worth and competence, there were two broad goals for Study 3. The first goal examined the extent to which sibling trust uniquely and negatively predicted early adolescent perceptions of elements related to social anxiety (i.e., worry, arousal, intolerance of uncertainty) and depressed affect concurrently and across a 2-month period. The second goal investigated the degree to which sibling trust moderated the association between components of social anxiety and depressed affect, and how this varied as a function of gender and birth order.

Study 3: The Moderating Effect of Sibling Trust on Internalizing Difficulties in Early Adolescence

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Abstract

A 2-month longitudinal study conducted with 169 early adolescents (51% girls) between 10 and 13 years of age with an older or younger sibling investigated the domain-specific facets of sibling trust on early adolescent well-being. There were three main findings to note. First, the concurrent association between sibling's reliability trust and trust honesty was strong and positive. Second, both intolerance of uncertainty and depressed affect were stable across the two time points. Third, the univariate effects of sibling reliability trust and trust honesty did not predict concurrent or longitudinal depressed affect; however, both types of trust differentially moderated the stability of depressed affect. Specifically, high levels of reliability trust attenuated the stability of depressed affect, whereas high levels of trust honesty appeared to strengthen it. Results emphasize the influence that sibling relationships, and trust between siblings, has on adolescent well-being. Findings are discussed in relation to theory and application to future interventions.

The Moderating Effect of Sibling Trust on Internalizing Difficulties in Early Adolescence

Recent evidence documents the effect and influence of sibling relationships on relational and individual well-being (Campione-Barr & Killoren, 2019; Howe, Persram, & Bergeron, in press). Given the close and intimate bond shared between siblings (Howe, Ross, & Recchia, 2011), positive relational features are often viewed as predictors of well-being (Buist, Deković, & Prinzie, 2013; Kim, McHale, Crouter, & Osgood, 2007; Whiteman, Solmeyer, & McHale, 2015). One such feature relates to interpersonal trust. Interpersonal trust is defined as the degree to which an adolescent relies on the behaviours and actions made by another person, such as a sibling (Dunn & Schweitzer, 2005; Rotenberg, 2010). Studies of the effect of sibling trust are limited and focus on the positive and adaptive aspects related to well-being, including sibling closeness and satisfaction (Study 1; McGuire, Segal, Gill, Whitlow, & Classen, 2010) and self-worth (Study 2; Noel, Francis, & Tilley, 2018). Given the positive value of sibling trust, the current study examines the hypothesis that sibling trust would protect against negative experiences such as depressed affect for early adolescents.

Internalization and Adolescence

During adolescence, experiences of internalizing difficulties, including feelings of depression, anxiety, and loneliness, are not uncommon (e.g., Daneel et al., 2019; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999). One particular aspect of internalization that has received less attention is the intolerance of uncertainty, a cognitive bias that refers to the tendency of finding vague situations or events aversive (Dugas, Schwartz, & Francis, 2004). Previous research supports the intolerance of uncertainty as related to other internalization factors (e.g., Dugas et al., 2004; Boswell, Thompson-Hollands, Farchione, & Barlow, 2013). Given the high co-morbidity among internalizing problems, much of the work on the protective function of relational trust for siblings examines this issue broadly (Gamble, Yu, & Kuehn, 2011). However, investigations into specific aspects of internalizing as well as specific relational features that either attenuate or exacerbate such problems are necessary to better understand the mechanisms at play, which may result in more targeted interventions. For example, one study in the behavioural medicine literature suggests that trust in a physician moderates the association between the intolerance of uncertainty and other internalized cognitive vulnerabilities, including worrying about health ailments impeding daily functioning (Torbit et al., 2016). In the present study, we extend the work by Torbit et al. (2016) and speculate that sibling trust would protect

from feelings of depressed affect and the intolerance of uncertainty because of the functions siblings serve in being accessible and providing stability during challenging times.

Trust as a Protective Relational Feature

Close and intimate relationships are critical to understanding the development and well-being of individuals (Hinde, 1979). Built on these meaningful relationships is the notion of trust, which some argue is necessary for maintaining positive and healthy relationships (Rotenberg, 1991, 1995). A current model of interpersonal trust proposed by Rotenberg (1991, 2010) suggests that trust is multidimensional, containing various domains or bases. Specifically, trust bases include reliability (e.g., being relied upon), honesty (e.g., being truthful), and emotional (e.g., no emotional embarrassment). Taken further, these bases can be applied broadly or directed towards specific individuals, including parents (Rotenberg et al., 2005) and siblings (Study 1, Study 2; McGuire et al., 2010). Previous work in Studies 1 and 2 found a two-factor structure on a self-report measure of sibling trust. In particular, reliability trust and trust honesty were more prevalent among siblings than emotional trust. As a result, the present study investigates the effect of the two bases on internalizing difficulties.

Although this model posits that trust is comprised of different types, we argue that another important distinction is with respect to whether individuals perceive that their relational partners are capable of engaging in these trust-related behaviours and if they actually do so. Thus, the present study builds on Rotenberg's model and focuses on early adolescents as insiders or experts in their sibling relationships. Since the sibling relationship is one of children's longest and most enduring by early adolescence, they are intimately aware of how well they believe their sibling is a trusting person (Furman, Jones, Buhrmester, & Adler, 1989; Olson, 1977).

The positive value of trust is well established (Study 1, Study 2; Gamble et al., 2011; Noel et al., 2018), which suggests that it can serve as a form of protective factor from negative outcomes. Indeed, as an element of emotional support, adolescent trust in mothers, fathers, and teachers seems to protect them from lower levels of behavioural and emotional problems and moderates associations between peer victimization and maladjustment (Yeung & Leadbeater, 2010). Specific to trust, studies of parent-adolescent trust show that a high level of trust within this relationship is associated with decreased engagement in high-risk behaviours (Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003; Kerr, Stattin, & Trost, 1999; Leas & Mellor, 2000). In particular, Borawski et al. (2003) found that greater perceived parental trust protected teens

against high-risk behaviours such as tobacco and marijuana use for females and alcohol use for males. Theoretically, this work supports the seminal ideas of trust proposed by Erikson (1950, 1964) whose ideas focused on the important relational bonds of parents and their children that fosters adaptive development. Given that children and adolescents form strong and emotional attachments with others, the adaptive value of trust is likely to extend to friendships and siblings.

A long-standing hypothesis by Sullivan (1953) suggests that positive friendship experiences can protect children from adverse outcomes. Given that early adolescents spend a great deal of time with one another, it is likely that friendships and their associated quality are another relationship that may protect youth from maladjustment (Bukowski & Adams, 2005). Given time to cultivate the relationship, adolescent friendships are characterized as reciprocal, mutual liking, and are based on trust (Berndt, 2002; Dunn & McGuire, 1992). Given this, high-quality friendships can serve a similar protective function. For example, adolescents who reported friendships with high levels of trust were protected from experiences of victimization, while low trust relationships increased such experiences (Goldbaum, Craig, Pepler, & Connolly, 2003). Moreover, high-quality friendships weaken the association between externalizing behaviours and bullying behaviours, suggesting that the features that make up friendship quality form an internal working model of healthy relationships (Bollmer, Milich, Harris, & Maras, 2005). Together, these findings offer the conclusion that high-quality, close, and meaningful parent-adolescent and friend relationships offer provisions such as trust that protect children and adolescents from maladjustment. Given that sibling relationships are an early and enduring relationship, we speculate that trust may also be protective for youth.

Siblings as Sources of Protection

Like both parent-adolescent and friend relations, sibling relationships are an important consideration for individual well-being. By adolescence, siblings will have had spent a great deal of time together and have infinite opportunities for interaction, resulting in a close and intimate bond (Howe et al., in press). Moreover, the interaction of complementary (i.e., hierarchical) and reciprocal (i.e., balanced) interactions between siblings make it a unique context through which relationship development and quality can be understood (Hinde, 1979; Howe et al., 2011). Since trust is borne out of relationships that are intimate, meaningful, and necessary for maintaining them (Hinde, 1979), individuals are just as likely to view trust in their sibling relationship as an important factor in line with perceptions of friendships and parent-child relationships. This

argument is supported by prior studies that show that sibling trust is positively related to individual outcomes, including self-worth and competence (Study 2; Noel et al., 2018), as well as relational outcomes including intimacy and satisfaction (Study 1; McGuire et al., 2010). Moreover, McGuire et al. (2010) reported sibling trust was negatively associated with sibling conflict. Together, these findings support the notion that trust is a positive relational attribute that is associated with adaptive development.

The protective effect of sibling relationships, as well as the role of sibling trust, have not received the same level of attention from researchers as parent-adolescent and friend relationships. Nevertheless, the limited evidence points to the value of siblings in protecting one another from adverse life experiences, as well as internalizing and externalizing difficulties. For example, Jenkins and Smith (1990) indicated that positive and supportive sibling relationships moderated the association between parental marriage quality (i.e., high marital conflict) and child emotional and behavioural problems. Although this study was cross-sectional in nature, additional work by Gass, Jenkins, and Dunn (2007) expanded on these findings using a two-wave longitudinal study to investigate the value of sibling affection. Consistent with prior findings, Gass et al. reported that sibling affection moderated the association between stressful life events and internalizing problems; this effect was not true for externalizing problems.

Sibling warmth is another positive relational feature that has a strong protective role (Dirks, Persram, Recchia, & Howe, 2015). Warmth reflects the affection and nurturance associated with sibling relationships and promotes self-disclosure, a key feature associated with a trusting relationship (Howe, Aquan-Assee, Bukowski, Lehoux, & Rinaldi, 2001). For early adolescents, greater sibling warmth protected them from depressive symptoms for family events (e.g., family member's death), but not for personal life events (Waite, Shanahan, Calkins, Keane, & O'Brien, 2011). In addition, sibling warmth can be protective in other contexts, such as peer victimization (Wolke & Samara, 2004) and behavioural conduct (e.g., getting into trouble, acting in inappropriate ways; Stocker, 1994).

The protective effect of sibling trust is noted in reducing sibling engagement in risky behaviour and individual adjustment. Briggs, Kim, Mowbray, Orellana, and Elkins (2018) found that sibling relationships characterized as trusting and dependable moderated the association between the exposure to and use of marijuana and engaging in risky sexual behaviour among African American adolescents. In addition, Gamble et al. (2011) explored the moderating effect

of sibling trustworthiness on individual adolescent adjustment. Their findings suggest that sibling trustworthiness was negatively correlated with internalizing and externalizing symptomology; moreover, low sibling trustworthiness was associated with greater internalizing problems. Gamble and colleagues also reported birth order differences, where high trustworthiness attenuated the association between sibling conflict and externalizing scores for older siblings; for younger siblings, greater sibling trust buffered the association between sibling conflict and both internalizing and externalizing scores. In addition, brother pairs, reported greater trustworthiness, despite the fact that girls tend to demonstrate more intimacy and warmth towards their sibling (McHale, Updegraff, Tucker, & Crouter, 2000). Indeed, findings are mixed with respect to gender differences in trust; some show that girls have higher levels of trust with peers (e.g., Betts & Rotenberg, 2007), whereas others report the opposite for boys for peers and siblings (Study 2; Betts et al., 2014). Despite the lack of clarity on this particular aspect, the limited evidence does point to the importance of trust within sibling relationships to protect youth from adverse experiences and maladjustment.

The Present Study

The purpose of the present study was to build on previous work and assess the protective effect of sibling trust on internalizing problems among early adolescents between the ages of 10 and 13 years. Specifically, we tested the hypothesis that the bases of sibling trust would moderate the stability for both depressed affect and intolerance on uncertainty, which were measured twice during a two-month period. There are two unique aspects to this study. First, we employed a self-report measure that represents adolescent siblings' insider perspectives of how trusting they believe their sibling to be. Second, studies of sibling relationships have examined internalizing problems broadly (e.g., anxious/depressed, withdrawn) and are based on maternal reports, rather than self-reports (e.g., Gamble et al., 2011). We focus on two specific facets of internalizing problems, namely depressed affect and the intolerance of uncertainty. Both the intolerance of uncertainty and depressed affect are known to be positively correlated (e.g., Boswell et al., 2013; Talkovsky & Norton, 2018; Yook, Kim, Suh, & Lee, 2010). To our knowledge, the literature is limited on the moderating effect of youth trust, especially with siblings, on specific internalizing problems. Thus, the present study aims to investigate these various facets of trust in the context of the sibling relationship and its protective function on specific internalizing problems.

Together with the bases of sibling trust, we examined the domains that may target and buffer the specific elements associated with specific internalizing problems. By applying the specific bases of trust regarding trust reliability and honesty (Study 1), three predictions were advanced. First, we hypothesized that both bases of trust (i.e., reliability, honesty) would attenuate the stability for depressed affect and the intolerance of uncertainty, such that they would weaken said associations. Second, given the mixed findings on gender differences, we hypothesized that the moderating role of sibling trust would be stronger for girls than boys. This prediction was made because girls generally experience higher levels of internalizing difficulties (Leadbeater et al., 1999). Based on previous findings that having an older sibling is associated with changes in internalizing symptomology (Gamble et al., 2011; Gass et al., 2007), the third hypothesis predicted that the moderating effect of sibling trust would be stronger for younger early adolescent siblings than older siblings.

Method

Participants

The sample included 169 early adolescents (n = 82 boys, n = 87 girls) between the ages 10 and 13 years (M = 11.35, SD = .73) with at least one sibling. Of the total sample, 95 participants reported having an older sibling (Mage = 14.00 years, SD = 1.72 years), whereas 74 participants indicated that they had a younger sibling (Mage = 8.62 years, SD = .86 years). Recruitment took place at two English-speaking, ethnically and socioeconomically diverse, mixed-sex schools in Montréal, Canada. The students were recruited in their classrooms during class time. Given that they were minors, information letters were sent home to parents describing the study's purpose and goals as well as a consent form. Parental consent forms were signed and returned to the classroom teacher; once parental consent was given, adolescents provided assent to participate. Ethical approval was obtained from the home university's Human Research Ethics Committee, as well as from the local school board and participating schools.

Procedure

Data collection took place over two time points across a two-month period. The first collection occurred in February, which is approximately half-way through the school year (T1), while the second collection occurred two months later (T2). Participants responded to self-report questions using computer tablets while in their classrooms. Trained members of the research teams were present during the data collection to answer questions and address any issues that

may have arisen. Participants were informed about response confidentiality and study withdrawal without penalty prior to and during the study.

Measures

Perceptions of sibling trust. At T1, participants assessed the degree to which they felt that they could trust their sibling. A two-factor structure, which included five items that measured reliability trust (e.g., "I trust my sibling to help me when I'm in trouble") and four items that assessed trust honesty (i.e., I trust my sibling to not lie to me) (reported by Study 1) were used in the present study. Participants were asked to think about their closest-in-age sibling and rated how true the statements were on a 5-point Likert scale, ranging from 1 ('*not at all true*') to 5 ('*true*'). Higher scores on these items indicated greater perceptions of sibling trust. Internal consistency measured with Cronbach's alphas indicated high reliability for sibling reliability trust ($\alpha = .94$) and trust honesty ($\alpha = .92$) (see Table 4 for descriptive statistics).

Depressed affect. At both time points, participants responded to three self-report items that measured depressed affect on a 5-point Likert scale, ranging from 1 ('*never*') to 5 ('*almost always*'). They were asked to rate how much the items described them (e.g., 'I feel lonely'). For this measure, higher scores indicated greater depressed affect. Cronbach's alpha was high at both T1 ($\alpha = .83$) and T2 ($\alpha = .88$) (see Table 4).

Intolerance of uncertainty. Similar to depressed affect, intolerance of uncertainty was measured with three self-report items based on work by Panarello and Bukowski (under review). These items measured participants' perceptions regarding the intolerance of uncertainty in social situations (e.g., "It frustrates me when unexpected things happen with I am with other kids") at both times. These items were rated on a 5-point Likert scale, ranging from 1 ('*never*') to 5 ('*almost always*'), and higher scores reflected greater intolerance of uncertainty. Scores were reliable at both T1 ($\alpha = .80$) and T2 $\alpha = .78$) (see Table 4).

Results

Plan of Analysis

All analyses were performed with Mplus (Muthén & Muthén, 2015). The analysis followed three main steps. First, confirmatory factor analyses were conducted to verify the factor structures of all study variables. Second, structural equation modeling within- and across-time tested the effects of sibling trust on depressed affect and the intolerance of uncertainty. The last step was to test the moderating effects of sibling trust, participant gender, and birth order on the

stability of depressed affect and the intolerance of uncertainty. Goodness of fit was assessed by the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean squared residual (SRMR), using cutoffs established by Hu and Bentler (1999).

Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was performed to test the fit of all latent variables in the model at T1 and T2, respectively. At T1, the model had acceptable fit, $\chi^2(81) = 88.41$, $p = .27$, CFI = .99, TLI = .99, RMSEA = .02 (.00 – .05), SRMR = .05. Each of the loadings related to sibling trust, depressed affect, and intolerance of uncertainty were significant and had factor loadings of at least .60 (all ps < .001). At T1, the covariances between sibling trust honesty and reliability trust (standardized coefficient = .83, $t = 19.06$, $p < .001$) as well as depressed affect and intolerance of uncertainty were significant (standardized coefficient = .58, $t = 5.37$, $p < .001$. The association between reliability trust, depressed affect (standardized coefficient = -.13, $t = -1.48$, $p = .07$), and the intolerance of uncertainty (standardized coefficient = -.16, $t = -1.58$, $p = 06$) were not significant. Similarly, the association between trust honesty, depressed affect (standardized coefficient = -.13, $t = -1.32$, $p = .09$), and the intolerance of uncertainty (standardized coefficient = -.06, $t = -.63$, $p = .26$) were also not significant.

A second CFA for the outcome variables (i.e., depressed affect and intolerance of uncertainty) at T2 also had acceptable fit, $\chi^2(7) = 11.09$, $p = .14$, CFI = .99, TLI = .97, RMSEA = .06 (.00 – .12), SRMR = .02. Similar to T1, each of the latent variables had factor loadings of at least .60 (all ps < .001). At T2, the covariance between the intolerance of uncertainty and depressed affect was statistically significant and strong positive (standardized coefficient = .75, $t = 8.67$, $p < .001$).

Structural Equation Models

A series of models were assessed to evaluate the stability of the outcome measures and the univariate effects of reliability trust and trust honesty at T1 on the outcomes at T2. First, we tested the concurrent association between each of the latent variables at T1 and T2. Overall, the fit indices suggested an adequate fit, $\chi^2(174) = 232.85$, $p = .002$, CFI = .97, TLI = .96, RMSEA = .04 (.03 – .06), SRMR = .09. At T1, there were statistically significant associations between the intolerance of uncertainty and depressed affect (standardized coefficient = .47, $t = 4.31$, $p < .001$) as well as trust honesty and reliability trust (standardized coefficient = .79, $t = 15.13$, $p < .001$).

At T2, the association between the intolerance of uncertainty and depressed affect was also significant (standardized coefficient = .71, $t = 8.78$, $p < .001$).

Two paths were added to the next model to test the stabilities of depressed affect and the intolerance of uncertainty. The model was adequate, $\chi^2(180) = 240.88$, $p = .002$, CFI = .97, TLI = .96, RMSEA = .04 (.02 – .06), SRMR = .09. The stabilities for depressed affect (standardized coefficient = .64, $t = 13.79$, $p < .001$) and intolerance of uncertainty (standardized coefficient = .56, $t = 8.36$, $p < .001$) from T1 to T2 were observed to be statistically significant.

From there, the next model tested the concurrent and longitudinal associations between trust honest, reliability trust, and each of the outcome variables (i.e., depressed affect and intolerance of uncertainty) at T1 and T2. Again, the model had overall acceptable fit indices, $\chi^2(175) = 235.46$, $p = .002$, CFI = .97, TLI = .96, RMSEA = .04 (.02 – .06), SRMR = .09. Concurrently, T1 depressed affect was not significantly predicted by reliability trust (standardized coefficient = .01, $t = .03$, $p = .49$) and trust honesty (standardized coefficient = -.11, $t = -.71$, $p = .24$). However, T1 intolerance of uncertainty was negatively predicted by reliability trust (standardized coefficient = -.24, $t = -1.77$, $p = .03$) but not trust honesty (standardized coefficient = .16, $t = 1.19$, $p = .12$). Longitudinally, T2 depressed affect was not significantly predicted by T1 reliability trust (standardized coefficient = -.13, $t = -1.24$, $p = .11$) or trust honesty (standardized coefficient = .11, $t = 1.11$, $p = .13$). Similarly, T2 intolerance of uncertainty was not significantly predicted by T1 reliability trust (standardized coefficient = .02, $t = .15$, $p = .44$) or trust honesty (standardized coefficient = .05, $t = .39$, $p = .35$) (see Figure 6).

Moderation Analyses

Despite the lack of observed direct effects of sibling trust on each of outcome variables, the following models tested the degree to which each base of sibling trust moderated the stabilities of depressed affect and intolerance of uncertainty. To do this, we included the direct paths of reliability trust and trust honesty and computed interactions via latent moderation analyses. For depressed affect, two latent interactions were created, which were the latent interactions between T1 depressed affect and trust reliability and the interaction between T1 depressed affect and trust honesty. We used the same process for creating the latent interactions as was used for the intolerance of uncertainty. In addition, gender and birth order were each added to the interactions.

Depressed affect. In the first model, we tested the moderating effect of each sibling trust base on the stability of depressed affect, as well as interactions with gender and birth order. In this analysis, T2 depressed affect was significantly predicted by the univariate effect of T1 depressed affect (standardized coefficient = .70, t = 10.66, p < .001), but not trust honesty (standardized coefficient = .11, t = 1.24, p = .12) or reliability trust (unstandardized coefficient = -.12, t = -1.21, p = .11). However, the interactions between T1 depressed affect and each of the trust bases differentially predicted T2 depressed affect. Specifically, the T1 depressed affect by reliability trust negatively predicted T2 depressed affect (standardized coefficient = -.25, t = -1.73, p = .04). Figure 7 clarifies the significant interaction between T1 depressed affect and reliability trust on T2 depressed affect; the association between T1 and T2 depressed affect was weaker for early adolescents who reported high levels of reliability trust (expressed as 1 SD above the mean). Conversely, T1 depressed affect by trust honesty positively predicted T2 depressed affect (standardized coefficient = .26, t = 1.92, p = .03). Specifically, the association between T1 and T2 depressed affect was stronger among early adolescents who reported high levels of trust honesty with their siblings (see Figure 8). Effects for birth order and gender were statistically nonsignificant (all ps > .08).

Intolerance of uncertainty. Similar to depressed affect, we tested the moderating effect of sibling trust on the intolerance of uncertainty, along with the interactions with gender and birth order. In this model, only T1 intolerance of uncertainty predicted T2 intolerance of uncertainty (unstandardized coefficient = .72, t = 5.73, p < .001); neither trust honesty (unstandardized coefficient = .04, t = .20, p = .42) nor reliability trust (unstandardized coefficient = .01, t = .02, p = .49) were significant. Moreover, each of the interactions, including those with gender and birth order, were statistically nonsignificant (all ps > .18).

Discussion

The purpose of the present study was to examine the moderating effect of sibling trust on the stabilities of depressed affect and the intolerance of uncertainty in a sample of early adolescents. Findings from this study add to the limited research that investigates the protective function that sibling relationships and sibling trust has on child and adolescent well-being.

Sibling Trust as Protective

The main hypothesis of the current study, specifically that elements of sibling trust, namely honesty and reliability, would be protective of internalizing problems for early

adolescents received support from two findings. First, reliability trust moderated the association between depressed affect over a 2-month period. Specifically, high reliability trust (+1 *SD*) attenuated the stability of depressed affect of early adolescents. Second, reliability trust negatively predicted the intolerance of uncertainty at Time 1. This suggests that adolescents who perceived that they could trust their sibling to be relied upon could also be more tolerant of uncertain social situations and/or events. Together, our findings support previous research on the influence and protective function of sibling relationship features, which often includes indices of warmth (Dirks et al., 2015), affection (Gass et al., 2007), and even trustworthiness (Gamble et al., 2011). These results also expand on this limited literature by investigating domain-specific facets of sibling that mitigate specific maladaptive adjustment among adolescents.

A possible explanation for the findings on reliability trust relates to adolescence as a developmental period. The transition into adolescence can be particularly challenging and adolescent vulnerability to internalizing problems such as depressed affect and the intolerance of uncertainty is well documented (Daneel et al., 2019; Leadbeater et al., 1999; Boelen, Vrinssen, & van Tulder, 2010). Given such uncertainty, trusting individuals with whom adolescents have cultivated a close and intimate relationship can help to mitigate such feelings. For adolescents, the perception that they can trust their sibling to be relied upon in times of need supports this point. It also demonstrates that despite the stresses of this developmental period, siblings are still accessible sources of support even though adolescents spend more time outside of the home (Howe et al., in press).

Another possibility is that reliability trust might also be associated with security or reliable alliance in a given relationship. Weiss (1974) describes reliable alliances as a key social provision, in which there is an understanding that relationships are enduring. Furman and Buhrmester (1985) add that reliable alliances involve an understanding that individuals within a relationship are dependable. In this way, reliability trust is based on the perception adolescents can trust their siblings to be there for them when they need it. Along with the challenges of navigating adolescence, it is possible that trusting the dependability or reliability of one's sibling can have a stabilizing effect on one's well-being. The effect of reliable alliance is seen more often within the friendship context; Wood, Bukowski, and Santo (2017) found that friendship security weakened the stability of anxiety among early adolescents. Conversely, self-disclosure, characterized as friendship intimacy, appeared to strengthen this association. Given these

findings, we speculate that reliability trust and security between siblings reflect an ongoing understanding that the relationship is both enduring and dependable, which serves to provide stability to adolescent well-being. This further supports relationships theorists' arguments that close and intimate relationships such as those between siblings are long-lasting bonds that play a significant role in the development and well-being of individuals (Dunn, 2002; Hinde, 1979).

Sibling Honesty as a Potential Risk Factor

Given the domain-specific approach to the current study, the results also showed that trust honesty moderated the stability of depressed affect. Whereas high reliability trust weakened this association, high levels of trust honesty (+1 *SD*), appeared to strength the stability for depressed affect. Although it was hypothesized that high levels of both reliability trust and trust honesty would weaken the stabilities of internalizing problems, the fact that high trust honesty did not underscores the need to investigate specific domains and features of sibling relationships, to gain a better understanding of the processes at play.

Similar to reliability trust, one explanation for this finding reflects the intimacy that exists within the sibling relationships, but with a negative twist. By adolescence, siblings will have spent a great deal of time of together, resulting in a long and complex mutually constructed history (Buist et al., 2013; Howe et al., in press). This history allows children and adolescents to be able to predict their siblings' actions and behaviours. One of the results of developing such a long history for siblings are the opportunities to connect by sharing information. Self-disclosure, which refers to the ability to reveal personal information and details to other individuals, is fostered in relationships where there is a high degree of intimacy and companionship (Jourard, 1958, 1971; Rotenberg, 1995). In some ways, self-disclosure can be seen as a type of behaviour that could increase trust honesty, which reflects the perception that individuals can trust that others are being honest and truthful (Martin, Anderson, & Mottet, 1997; Rotenberg, 2010).

Engaging in self-disclosure can be a means towards improving trust and is also associated with lower levels of depressed mood (Campione-Barr, Lindell, Giron, Killoren, & Greer, 2015; Smetana, Metzger, Gettman, & Campione-Barr, 2006). However, there are two caveats to the positive value of sibling self-disclosure. First, self-disclosure varies as a function of sibling characteristics (i.e., birth order, composition), in which there are findings that suggest that girls who are disclosed to by brothers report greater levels of depressed mood (Campione-Barr et al., 2015). Second, co-rumination, which refers to excessively discussing interpersonal

problems, is seen as a risk factor for increased feelings of depression and anxiety in the friendship context (Rose, Carlson, & Waller, 2007). Given the increasingly similar characteristics of sibling and friend relationships in adolescence, we speculate that co-rumination as an excessive form of self-disclosure might have a similar effect within the sibling relationship. Since co-rumination has yet to be investigated between siblings, this is an avenue for future research.

Our results did not yield differences in sibling trust bases as a function of adolescent birth order or gender. Although girls tend to report greater intimacy and warmth within the sibling relationship (McHale et al., 2000) and show higher levels of internalizing problems (e.g., Leadbeater et al., 1999), the interactions of reliability trust and trust honest with gender followed a trend, but were not significant. Within the sibling context, gender differences are indeed mixed, with some reporting differences in gender constellation or participant gender (Study 2; Campione-Barr et al., 2015), while others do not (Howe-Aquan-Assee, Bukowski, Rinaldi, & Lehoux, 2000; Howe et al., 2001). Similarly, birth order differences are also mixed with studies reporting significant differences (Gamble et al., 2011) and others that do not (Howe et al., 2000, 2001). Even so, in Study 1 the effect of sibling trust honesty on relationship satisfaction was stronger for older siblings, which might mean that the bases of sibling trust vary as a function of the aspect of well-being under study. In this case, it is possible that the provisions of reliability trust and trust honesty within the sibling relationship and their interactions with depressed affect are common occurrences among adolescents regardless of their gender or birth order. Given the limited literature on sibling trust, it is clear that more work required to further clarify the role of gender and birth order in sibling trust.

Limitations and Implications

Although these findings advance our understanding of the specific facets of sibling relationships and the value of trust on maladaptive adjustment, there are three main limitations to note. First, the use of longitudinal research methods allowed for the investigation of trust as a moderator of internalizing problems. However, sibling trust was only measured at one time point; therefore, we could not test the stability of reliability trust and trust honesty in the overall model. Future studies that employ longitudinal designs should consider the stability of these sibling trust bases so as to understand its effects on adolescent well-being, but also consider the developmental changes across the entire adolescent period. Second, participants only rated their

perceptions of sibling trust towards their own sibling, and thus were not recipients of the ratings themselves. Given the increasing reciprocal nature of the sibling relationship into adolescence, ratings from both siblings on their own and each other's perceptions of trust would increase our understanding of how they view trust within the relationship and as a whole. Third, these findings are limited in their generalizability to other populations. Study 2 showed that sibling trust promotes feelings of self-worth and competence among adolescents from individualistic and collectivistic cultural contexts. Since there is an increased push for research to extend beyond the Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies (Henrich, Heine, & Norenzayan, 2010), it is incumbent on researchers to explore the function that sibling trust serves in societies that may be more collectivistic or group-oriented in nature.

These limitations should not undermine the strengths and implications of this study. Theoretically, these findings continue to underscore the importance of the sibling relationship as an influential force. Just as the parent-child and friend relationships are considered to be crucial indicators of adjustment and well-being, so too should sibling relationships. Moreover, these findings raise a number of important questions for future research to address, namely in how trust is understood among siblings and the ways in which it has an effect on one's social and emotional development. With respect to applied implications, only a few interventions focus on improving sibling relationships (e.g., Feinberg, Solmeyer, Hostetler, Sakuma, Jones, & McHale, 2013). These interventions focus on ways to better manage conflict interactions, increase positive interactions (e.g., fair play), and increase sibling warmth. Moving forward, interventions with a focus on adolescent siblings should seek to include these elements, but also reinforce the ways in which sibling trust, specifically reliability trust, can help to improve both the relationship and individual's well-being.

Table 4

Descriptive Statistics of Study Variables

Item	T1	T2
	M (*SD*)	M (*SD*)
Sibling Reliability Trust	3.45 (1.33)	
Sibling Trust Honesty	3.53 (1.34)	
Depressed Affect	2.23 (1.04)	2.04 (1.21)
Intolerance of Uncertainty	2.25 (1.03)	2.34 (1.09)

Figure 6. Concurrent and longitudinal associations between reliability trust, trust honesty, depressed affect, and the intolerance of uncertainty.

Note. Coefficients are standardized estimates and individual correlations between items have been omitted for clarity. Solid lines depict significant paths. *$p < .05$, **$p < .001$

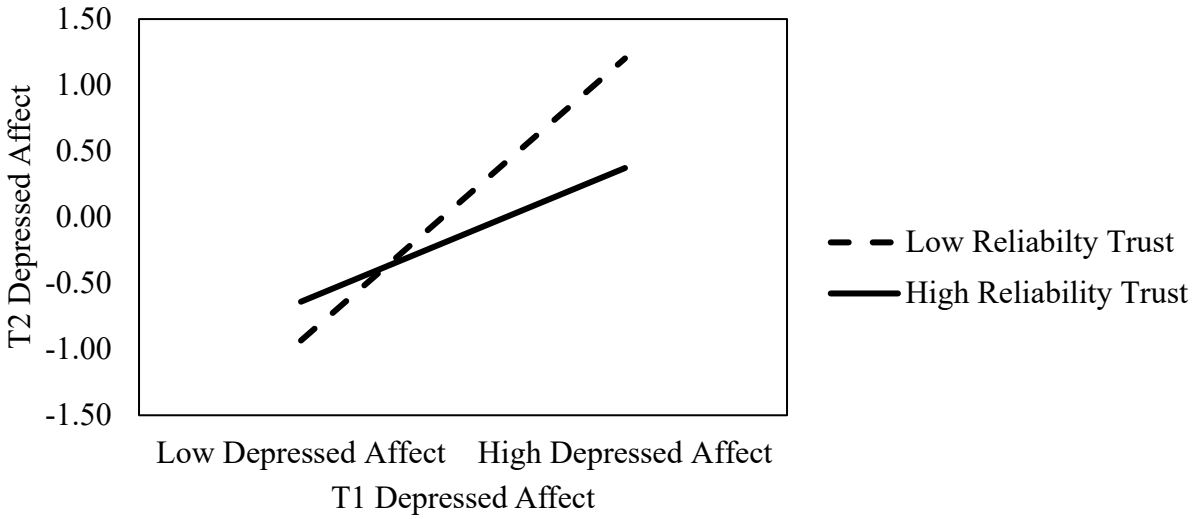

Figure 7. Time 1 (T1) reliability trust moderates the association between T1 and T2 depressed affect.

Note. Low and high depressed affect represent one standard deviation above and below the mean.

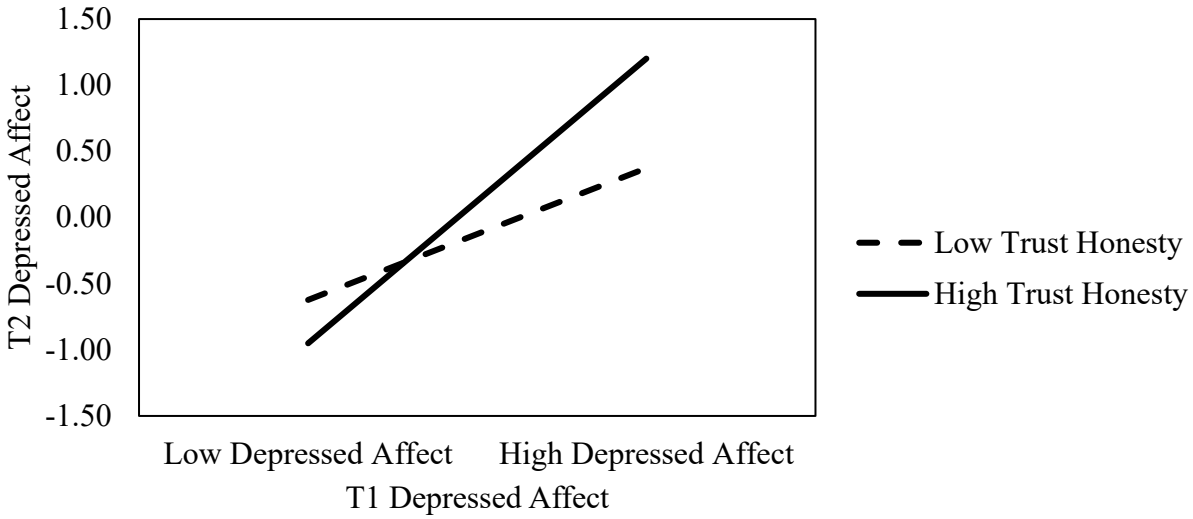

Figure 8. Time 1 (T1) trust honesty moderates the association between T1 and T2 depressed affect.

Note. Low and high depressed affect represent one standard deviation above and below the mean.

General Discussion

The main goal of the present research program was to investigate the degree to which trust within the sibling relationship was an important feature and its role in early adolescent well-being. There were two important components of these studies. First, the studies contribute to existing theories on trust and social relationships by broadly replicating the multidimensionality of trust between siblings, an understudied, yet crucial relationship in child and adolescent development. Second, the use of various research designs (i.e., cross-sectional, longitudinal, cross-cultural) and complex statistical techniques (e.g., measurement invariance) were employed to capture the nuances of sibling trust and its association with other variables during early adolescence.

Summary of Findings

Broadly, it is apparent that trust is a positive feature of the sibling relationship, which was replicated in the present studies. First, the trust bases were associated with relational elements of sibling relationship quality in line with other research (e.g., McGuire et al., 2010). Second, sibling trust was positively associated with early adolescents' perceptions of self-worth and competence and provides support for previous findings (e.g., Noel et al., 2018). Third, results from a short-term longitudinal design revealed that scores on each of the sibling trust bases were differentially associated with the stability of internalizing problems as documented by other researchers (Gamble et al., 2011; Gass et al., 2007).

In addition to providing further support for the significant value and influence of sibling relationships, the results presented in the present research studies provide further insights that build on this existing literature. In Study 1, a self-report measure of sibling trust was developed and then used to predict sibling relationship satisfaction; this measure largely replicated Rotenberg's (2010) model of the multidimensionality of trust. In the present study, the bases of reliability trust and trust honesty emerged from this measure, while emotional trust did not. It is possible that emotional trust did not emerge because not enough of the current items reflected the construct of causing emotional embarrassment, as defined by Rotenberg (2010). However, it is could also be that emotional trust may not be limited solely to causing embarrassment; rather sibling emotional trust may also reflect the trust that siblings place in helping to understand one's emotional states and feelings (Howe et al., 2001). Even so, the results from Study 1 examined the specific bases of sibling trust that emerged and demonstrated that both sibling reliability trust and

trust honesty positively predicted sibling relationship satisfaction. Moreover, birth order differences offered unique insights into the provisions related to trust that older and younger siblings' value. Specifically, the effect of sibling trust honesty on relationship satisfaction was stronger for older siblings, which might suggest that the provision of trusting their sibling to be honest and truthful outweighs the trust placed on being reliable and available. Given the complex and mutually constructed history that has developed between siblings at this point in time, the ability to trust one's sibling to be honest is a likely result, especially if that means that engaging in actions that build honesty (e.g., self-disclosure) can occur. Indeed, self-disclosure between siblings is a common occurrence (Martinez & Howe, 2013), which suggests that some degree of trust between the siblings has been established. This process does continue throughout adolescence and is implicated in youth well-being (Campione-Barr et al., 2015).

Given the positive value of sibling trust on relational satisfaction, Study 2 examined the associations between sibling trust and indices of individual well-being, with a specific focus on general self-worth, social competence, and academic competence. Taken further, comparisons were made between gender and culture, using a sample drawn from a traditionally WEIRD population in Montréal, Canada and one sample of early adolescents from Barranquilla, a coastal city in Northern Colombia. Previous work by Noel and colleagues (2018) shows that the association between sibling trust and general self-worth is positive; yet, their index of trust appears to be more focused on validation and acceptance (e.g., accepting a sibling as they are) than the expectation that siblings are capable of engaging in trusting behaviours such as being reliable and truthful. Despite this, Study 2 builds on these findings and also investigated these effects from a cross-cultural perspective. Although there is some research on ethnic sibling relationships (e.g., Whiteman et al., 2015), very little research in the sibling domain takes a cross-cultural perspective. Thus, the current study adds to our understanding of the nuances of sibling relationships and trust from adolescents from different backgrounds. As with Study 1, sibling trust was expected to be a positive predictor of indices related to the self, namely general self-worth, social competence, and academic competence. Moreover, it was predicted that the effect of sibling trust on each of these outcomes would be stronger in societies that are more collectivistic in nature, in this case, Colombia. The results demonstrated that the association between reliability and trust honesty loaded significantly onto the latent variable of sibling trust and were positively correlated. In addition, sibling trust positively predicted each of the outcome

variables. In other words, greater sibling trust was positively associated with more positive feelings of one's overall worth, and how socially and academically competent the child feels. Furthermore, the effect of sibling trust on the aforementioned outcomes did not vary significantly as a function of culture. The lack of significant differences between Canada and Colombia might suggest that the effect and value of sibling trust may be generalizable beyond culture. Taken together, these results support the broader literature on sibling relationships and trust by highlighting the links between early adolescents' perceptions of trust within their sibling relationship and the influence it plays on their individual self-concept.

Lastly, Study 3 attempted to build from the positive value of sibling trust for children's well-being as supported by the previous two studies. Specifically, the hypothesis that sibling trust would be protective of maladjustment was tested. Previous work on siblings as protective resources (Gamble et al., 2011; Gass et al., 2007) showed that the positive features of the sibling relationship, including trust, were protective of maladjustment and particularly for internalizing problems. Study 3 expanded on these findings to incorporate longitudinal and base-specific analyses to investigate the extent to which each sibling trust base predicted specific aspects of internalizing problems. Despite the fact that internalizing problems are often co-morbid (e.g., Cummings, Caporino, & Kendall, 2014), the examination of the role that particular bases of sibling trust play in specific internalizing problems offers useful and crucial insights for future prevention and intervention. In this study, early adolescent reports of depressed affect and the intolerance of uncertainty were tested as individual, yet correlated features related to internalized adjustment. The results from this study revealed two main findings. First, reliability trust was negatively associated with the intolerance of uncertainty at Time 1. Second, both sibling reliability trust and trust honesty differentially moderated the stability of depressed affect over a 2-month period. In particular, reliability trust weakened the stability of depressed affect, whereas trust honesty appeared to strengthen it. Hence, this study demonstrated that it is important and necessary to tease apart various aspects of sibling relationship features along with outcomes such as internalizing problems. This is especially the case because of the findings that suggest certain bases of trust appear to protect from maladjustment, whereas others might serve as a risk factor. It is important to note that while gender differences and variations of birth order did not emerge, that is not to say they do not exist. In other studies, reports of gender differences in terms of the composition of the dyad (e.g., older male-younger male) are unclear; Gass et al. (2007) did not

find any significant effects, whereas Gamble and colleagues (2011) did. Thus, future work would greatly benefit from replicating such patterns at the level of the participant and of the dyad to gain a better grasp the role of gender.

In sum, the present studies offer unique insights into the provision of trust as a positive feature of sibling relationships. The findings presented in this dissertation support the fact that adolescents are aware that trust is an important feature of their sibling relationships, just as trust is an important consideration for friendship (Berndt, 2002). A major strength of this dissertation is that each of the studies presented a different way in which sibling trust plays a role in adolescent development. Moreover, these studies presented findings that pertain to variations in structural (birth order) and contextual (culture) features related to the adolescent experience. For example, Study 1 showed that trust is valued differently for older and younger siblings and Study 2 highlighted the universality of trust for adolescents from Montréal and Barranquilla, suggesting that it is a positive feature for sibling relationships regardless of cultural background. The development of a self-report measure for sibling trust is important as it addresses limitations of previous measures (Hochreich, 1973; Rotenberg et al., 2005; Rotter, 1967) and the focus can be customized to a particular individual (e.g., best friend). This measure can then be used to make meaningful comparisons of trust between important socializing agents in an adolescent's environment. In addition, the cultural component of Study 2 is another major strength, because it is one of the first to utilize a cross-national sample to study an important aspect of sibling relations. Although the ability to generalize across populations is an important goal, the investigation into the nuances of sibling relationships and the role that trust has within them is even more valuable. In doing so, it allows for a clearer understanding of how trust is processed and even developed within a given society.

With this in mind, the study of these features also underscores the complexities of studying sibling relationships and trust. Sibling relationships are quite unique, especially considering that they are nested within the broader family network. Theoretical frameworks such as family systems theory (Minuchin, 1988, 2002) suggest that subsystems such as the parent-adolescent or sibling relationships are interdependent on one another. As such, teasing apart the unique effect of sibling relationships is a complex process. For example, whereas Study 1 reported birth order differences, Studies 2 and 3 did not yield significant effects of birth order and trust on self-worth and internalizing problems. It is possible that these differences, or lack

thereof, could be a result of other factors at play, such as parent-child relationship quality, the quality of other sibling relationships in the home, to name a few.

Nevertheless, this research program represents some of the first steps in gaining a better grasp of the role of sibling trust in adolescence. It is apparent that the effect of sibling trust on relational and individual adjustment is a critical avenue worthy of study, and these findings present many questions for future studies to investigate. Taken together, there are important implications for research, practice, and everyday considerations.

General Implications for Theory and Practice

Overall, the results from the present research studies suggest that trust is a positive relational feature of the sibling relationship and that base-specific analyses vary as a function of the outcomes under study. First, sibling reliability trust and trust honesty were positively associated with relational satisfaction and outcomes related to the self. Second, variables that describe the sibling dyad (i.e., birth order) and the participant (i.e., gender, cultural background) were positively associated with the aforementioned outcomes. Third, each sibling trust base differentially moderated the stability of depressed affect among adolescents.

The findings from the present studies have a number of theoretical and practical implications. From a theoretical perspective, it is evident that trust is an important relational feature of the sibling relationship. Dating back to the seminal works of Erikson (1950, 1964) and Bowlby (1969), the development of relational attachment implies that trust is a necessity for the maintenance of a strong bond between infant and caregiver. Although the caregiver is often a mother or father, siblings are very capable of serving this role at least in some situations (Howe & Ross, 1990; Stewart & Marvin, 1984; Maynard, 2002). As the relationship develops, siblings will have mutually constructed a history based on infinite experiences and opportunities for interactions. In particular, reciprocal interactions, based on equal exchanges between siblings helps to foster trust (Hinde, 1979). Thus, experiences that include these positive and reciprocal interactions, such as play (Leach, Howe, & DeHart, 2019), teaching (Howe, Persram, & Bergeron, 2019), and prosocial behaviour (Tavassoli, Recchia, & Ross, 2019), will likely be predictive of developing greater trust than less positive interactions such as conflict (Howe et al., 2011; Persram, Scirocco, Della Porta, & Howe, 2019). The wealth and type of experiences that siblings share helps to facilitate a bond that relationships theory would characterize as close, meaningful, and intimate (Hinde, 1979). The result is the co-constructed history that each sibling

can use as a means to evaluate how trusting the other may be and the ways in which this trust is manifested. In Study 1, the fact that the bases of reliability trust and trust honesty were positively predictive of relationship satisfaction suggests that a moderate to high level of trust is necessary to maintain a high-quality sibling relationship, broadly supporting the ideas put forth by Erikson (1950, 1964) and Bowlby (1969).

The present studies also generally support the argument that trust is multidimensional (Rotenberg, 2010). Although the base of emotional trust did not emerge in the self-report measure of sibling trust, it was clear that reliability trust and trust honesty did. Moreover, each of the studies indicated that both bases were significantly related to how satisfied early adolescents perceived their sibling relationship, in addition to feelings about their self-worth and internalizing behaviours. Further, the insider's perspective that early adolescents have of their sibling's behaviour gives insights into the domains of trust described by Rotenberg (2010), namely the cognitive/affective (i.e., beliefs that a person wants to demonstrate trust) and behaviour-enticing (i.e., how much a person engages in trusting behaviours) domains. Using early adolescents as experts who can describe their sibling relationships (Furman et al., 1989; Olson, 1977), their perceptions regarding how motivated and capable they are of being trusting helps to further our understanding of the ways in which trust is considered in this unique context. Lastly, the specificity component clearly demonstrates that trust can be applied within the sibling relationship, just as it is in the other significant and influential relationships (i.e., parents and friends) in an adolescent's life (Malti et al., 2016; Rotenberg, 1995). Taken together, these results build on existing theories related to social relationships and trust by considering the influence of siblings as important socializing agents in child and adolescent development.

As with theory, the present findings also have important implications for practice. From a clinical perspective, Dirks et al. (2015) posit that clinical assessments of the quality of sibling relationships would help to identify problematic behaviours as well as inform interventions for children and adolescents. Even though trust is an understudied feature of sibling relationships, its inclusion could work to accomplish what Dirks and colleagues suggest. Given the results of the present studies that were associated with positive and negative indices of well-being, measuring the level of trust between siblings in addition to other positive (e.g., warmth) and negative (e.g., conflict) features of relationship quality would help to further understand the dynamics that exacerbate or attenuate the onset and maintenance of internalizing and externalizing problems.

As in Study 3, the findings that reliability trust was currently and negatively associated with the intolerance of uncertainty and also attenuated the longitudinal stability of depressed affect supports the argument that features of sibling relationship quality could be an index to help identify problematic behaviours.

Moreover, the addition of sibling trust as an index of the health of the relationship would also assist in the development of prevention and intervention work to improve individual well-being and the quality of the sibling relationship. To date, there are only a small handful of published intervention programs designed to improve sibling relations. Intervention programs such as *More Fun with Sisters and Brothers* (Kennedy & Kramer, 2008; Kramer & Radey, 1997) and *Siblings are Special* (Feinberg, Solmeyer, Hostetler, Sakuma, Jones, & McHale, 2013; Feinberg, Solmeyer, & McHale, 2011) focus on improving warmth and positive interactions between siblings, whereas others target reducing conflict by training parents in mediation, which promotes greater perspective-taking and empowerment (Ross & Lazinski, 2014; Smith & Ross, 2007). The efficacy of these interventions is apparent, but they are limited to younger sibling dyads in early and middle childhood. Nevertheless, intervention work designed for improving adolescent sibling relationships can be accomplished by using these programs as templates with attention to the issues more prominent in adolescence. For example, Kramer (2010) outlines a set of competences for fostering positive sibling relationships in early childhood, which include positive engagement (e.g., conversation, mutual interest), cohesion (e.g., cooperation, trust), and perspective-taking. Such competencies can also be applied to adolescents, but the means in which they can be accomplished would need to be adapted to be developmentally appropriate. For adolescents, providing education on the influence and effect that siblings have on their development and well-being is a natural first step. That, along with activities that promote these competencies, such as engaging in joint and cooperative activities based on mutual interest and conversing about personal issues that not only encourage self-disclosure, but require siblings to see the other's perspective could foster greater trust. Indeed, high engagement in perspective-taking is positively associated with trust among adolescents (Fett et al., 2014). Hence, increasing adolescent awareness of their siblings' perspectives through teaching and practice should help youth to internalize these behaviours and remove any perceptions that siblings have little influence on development. In turn, this would also improve the overall relationship quality and the trust that has been developing over a long period of time.

Generally, these findings help to inform both parents and adolescents regarding the often understudied, yet critical role that siblings have in an adolescent's life. Although sibling interactions may decrease as adolescents spend more time with friends and peers, their influence is still present. The findings presented in this dissertation may be a reminder to parents and adolescents that the quality of the sibling relationship is still one of considerable value. Unlike friendships, sibling relationships are characterized as an enduring emotional bond (Howe et al., 2011). The trust that develops between siblings is one result of such a bond and should not be taken for granted. Thus, the greater awareness and knowledge regarding the effect of trust and the sibling relationship can serve as a motivator for parents to encourage positive sibling interactions during various developmental periods and transitions (i.e., middle-childhood to adolescence). Moreover, this knowledge would be a powerful reminder for youth to remember that their siblings may be critical agents for support for a long time, and in fact, perhaps over their lifetime.

Limitations

Although the present studies provide further insights regarding the role of trust within the sibling relationships, there are four main limitations to note. First, the sample size utilized participants as insiders into their sibling relationship; however, they were the sole respondents who reported on the level of perceived trust within the relationship. Future studies would benefit from including both siblings in the dyad to better gauge the effects of trust on adolescent well-being. Nevertheless, the rich information provided by these experts still demonstrates the positive effect of sibling trust on early adolescent well-being. Second, the self-report measure yielded a two-factor structure of sibling trust, which extracted scales regarding reliability trust and trust honesty. Rotenberg's (2010) model argued for an emotional trust base, which is characterized as trusting someone to not cause emotional embarrassment. It may be that emotional trust between extends to include emotional understanding, which includes providing knowledge about one's emotional states. Howe and colleagues (2001) found that emotional understanding between siblings was positively related to problem solving after self-disclosure. Hence, it can be speculated that broadening the definition of emotional trust and expanding items to include emotional trust may yield a third factor. It is clear that further investigation is required to test this speculation. Despite not replicating the emotional trust base, the self-report measure still broadly supports the multidimensionality of trust in the sibling context. Third, the majority

of the studies are cross-sectional and web survey-based (e.g., Gamble et al., 2011). Longitudinal designs based on multiple assessments from multiple methods (e.g., interviews) would greatly enhance the quality of the findings presented here. Given the enduring nature of sibling relationships, multiple methods of inquiry along with multiple time points can assess the long-term effect of sibling trust. Fourth, it is possible that the adolescents possess dispositional traits that work to promote the outcomes under study. For example, there is some work to suggest that personality traits such as extroversion, agreeableness, and openness to experiences are positively associated with higher self-worth (e.g., Davey, Eaker, & Walters, 2003). Given the embeddedness of sibling relationships within the family, parent-adolescent relationships might also play a role; for example, the quality of parent-adolescent relationships is positively correlated with adolescent self-esteem (e.g., Bulanda & Majumdar, 2009). Controlling for the effects of personal disposition and also factors such as parent-adolescent relationship quality would also help to gauge the unique effect of sibling relationships and trust on adolescent well-being.

Future Directions

Despite the previously noted limitations, the results from the current studies shed light on important avenues for future research. These studies are the first to examine the effect of different bases of sibling trust on various relational and individual outcomes. The pattern of findings suggests that sibling trust represents an emerging field that requires further study.

First, future research would benefit from investigations using the newly developed measure of sibling trust with both siblings in a dyad offering their perspective. In doing so, the trust between siblings can be gauged more accurately and statistical analyses such as Actor-Partner Interdependence Models (APIM; Cook & Kenny, 2005) can better estimate the effects of sibling trust. Future studies can also build on the contextual findings of the current findings by investigating sibling trust in other cultural settings. Although there were no significant differences in the effect of sibling trust on indices of self-worth and competence, it is possible that such differences might exist in other outcomes (e.g., risky behaviour, loneliness) or vary as a function of family-centric variables, such as socioeconomic status (Orth, 2017; Whitbeck, Simons, Conger, Lorenz, Huck, & Elder, 1991) or parenting styles (Milevsky, Schlecter, Netter, & Keehn, 2007).

A second avenue for future work would be to further clarify the emotional trust component of interpersonal trust. Rotenberg and colleagues (2005, 2010) argue that emotional trust is characterized by an individual trusting others not to cause emotional harm to them (e.g., avoiding acts that likely result in being embarrassed). It is possible that this definition may be too narrow in the context of sibling relationships. Given the variety of hierarchical and reciprocal interactions that siblings share that are quite unique to this relationship, it could be that emotional trust emerges in other ways. For example, emotional understanding refers to having knowledge about emotions, such as accurately labelling them (Howe et al., 2001, in press). A study by Howe and colleagues (2001) found that emotional understanding was positively associated with sibling self-disclosure. As a result, it may be that for siblings, emotional trust may include other elements that promote trust-increasing behaviours such as self-disclosure. Thus, future work to develop items that reflect emotional trust and that are compared against the other trust bases would help to researchers to better understand the utility of emotional trust between siblings.

Third, future research would also benefit from a longitudinal study of sibling trust in which there are multiple and longer intervals between time points. Given that adolescence is a developmental period that includes a number of concurrent and consecutive transitions, such as schooling, biological, and social changes, sibling trust may evolve over this time. The present studies examined sibling trust at the outset of adolescence and yielded largely positive findings, with the exception of the effect of trust honesty on depressed affect. That said, longitudinal research, coupled with both siblings, as respondents of trust would capture the dynamics and value of sibling trust. Specifically, it would show how trust varies as a function of age and development across the adolescent period.

Fourth, considering the fact that sibling trust appears to be a positive relational feature, future studies of sibling relationship quality could investigate the unique effects of trust in comparison to other related features, including warmth and affection. It is possible that many of these relational features are highly and positively correlated, but each feature is likely to contribute uniquely, even to a small degree, to the development and well-being of children and adolescents, especially when considering their effects in other studies. For example, Gass et al. (2007) found that sibling affection moderated the relationship between children's stressful life events and internalizing problems. Hence, future studies could explore the unique role that

relationship features such as affection, trust, and even sibling warmth (Dirks et al., 2015) play in improving adolescent adjustment.

Lastly, considering the findings from Study 3 along with the fact that adolescents spend greater time with peers and friends than family members, an avenue for further work would be to investigate the unique contributions of sibling trust, along with other positive indices of sibling relationship quality (e.g., warmth) on adolescent well-being, after controlling for the effects of trust between best friends. In doing so, there would be a much clearer understanding of the type of role that sibling trust plays to protect or exacerbate potential internalizing and externalizing problems that adolescents are likely to experience. Taken further, this information would greatly inform future prevention and intervention programs that would help to promote adolescent well-being.

General Conclusions

Siblings are important individuals in the study of child and adolescent development. Features that make up the quality of sibling relationships are related to one another and implicated in the psychological adjustment of youth (Buist & Vermande, 2014; Buist et al., 2013; Dirks et al., 2015). The notion of trust as a positive relational feature between siblings has received limited attention, despite adolescents characterizing other relationships such as those with a best friend as being based on trust (e.g., Berndt, 2002). Given their level of influence, it is necessary to understand the extent to which trust is considered an important component between siblings. Gaining more insight into this process would clearly benefit multiple stakeholders, including parents, clinicians, practitioners, and adolescents.

As a result, the goal of the present research emphasized the significant role that siblings play and expanded the existing literature on sibling relationship quality and trust. These findings demonstrate that sibling trust is implicated in adolescent well-being both at the relational level and at the individual level. Moreover, it is apparent that sibling trust has some effect on both ends of the spectrum of well-being, and contributes to perceptions of self-worth and competence, in addition to feelings of depressed affect and the intolerance of uncertainty. Clearly, there is more work to be done, but this dissertation has begun to illuminate the contributions and complexities of sibling trust. In doing, it has raised a considerable number of important questions to consider when study sibling relationships and development.

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Appendix A
Ethics Certificates

CERTIFICATION OF ETHICAL ACCEPTABILITY FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Dr. William Bukowski

Department: Faculty of Arts and Science\Psychology

Agency: N/A

Title of Project: One World / Whole Child - 2014

Certification Number: 30002779

Valid From: December 10, 2015 to: December 09, 2016

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Dr. James Pfaus, Chair, University Human Research Ethics Committee

UNIVERSITÉ Concordia UNIVERSITY

CERTIFICATION OF ETHICAL ACCEPTABILITY FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Dr. William Bukowski

Department: Faculty of Arts and Science\ Psychology

Agency: Social Sciences & Humanities Research Council

Title of Project: One World / Whole Child - 2014

Certification Number: 30002779

Valid From: May 04, 2017 **to:** May 03, 2018

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Dr. James Pfaus, Chair, University Human Research Ethics Committee

Appendix B

Parental Consent Form

Dear Parent(s),

I am a professor at Concordia University, where I teach and do research on the development of children and adolescents. One of the topics I study is how children's experiences with their parents, friends, and teachers affect their well-being. This topic is of interest to many parents, teachers, and health professionals. The purpose of this letter is to tell you about a study my students and I are conducting with fifth- and sixth-graders at the Harold Napper School. This study will help us learn more about children, their health, and their development.

As part of the study, we will meet with the participating children in their classrooms two times during the school year, once in October or November and again in January. These meetings will last about 20 minutes. We will meet the children in their school and I will ask them to complete a questionnaire at their desks.

In these questionnaires, we will be asking children to identify:

- Who they typically associate with in school (for example who are their friends);
- The characteristics of other children in their class (that is, what are their peers like);
- Behaviours performed by other children in the class (e.g. helping, participating in certain types of activities, etc.);
- How they think about themselves;
- How they perform in school and in their social relationships.

All the questionnaires will be completed at the child's desk at school and none of the other children or the teachers will know how any other child has answered the questions.

In individual interviews the participating children will also play a set of games on a computer that will assess generosity toward others.

We will also ask the participating children's parent(s) to complete a questionnaire for us. It will ask questions about family functioning, parental education and employment, and family income. As an expression of our gratitude we will give two tickets to a local movie theater to parents who return the parent questionnaire to us. Parents who choose not to fill out the parent questionnaires can still allow their children to take part in the study.

Teachers will be asked to complete a short questionnaire about the academic and social functioning of the participating children.

As a token of thanks, all participating children will receive a gift of a t-shirt from the research team at the conclusion of the final data collection. In addition, we will be giving talks to

the students about mental health, and about ways to cope with the stressors they encounter in their daily lives.

We ask the children to keep their answers private and we make certain that their answers are kept confidential. The information collected in this study will be completely confidential, and participation is entirely voluntary. Your child is not required to participate in this study. Furthermore, you or your child may change your mind at any time even if you already gave your permission.

People who do research with children or adults are required to describe the risks and benefits related to participating in their studies. We assure you that this study poses no risks, other than what children encounter in their day-to-day lives. It is not a treatment study and it is not intended to provide direct benefits to the students who participate, though most children enjoy participating in such studies.

This study has been approved by both the School Board and the Concordia University Human Research Ethics Committee. If at any time you have questions or concerns regarding your rights or your child's rights as research participants, please feel free to contact the Research Ethics and Compliance Advisor of Concordia University, at ethics@alcor.concordia.ca.

If you have any other questions about the study, please call me at 514-848-2424 Ext. 2184 or send me a letter at: Department of Psychology, Concordia University, 7141 Sherbrooke Ouest, Montreal, QC, H4B 1R6. You can also email me at william.bukowski@concordia.ca.

Please fill out the attached form and have your child return it to his/her teacher tomorrow.

As an incentive for the children to return the assent form, any child who returns a slip, regardless of whether his/her parent has given permission for participation, will be given a set of Concordia University highlighters by the research team.

Thank you for your help. We very much appreciate it.

Sincerely,

William M. Bukowski
Professor

ONE WORLD WHOLE CHILD PROJECT

Grades 5 and 6 _____ School

PARENTAL CONSENT FORM

Please read and sign the following:

I understand that my daughter/son has been asked to be in a study conducted by Dr. W. M. Bukowski.

I understand that the study is about how children's experiences with their peers and how they think about themselves affects their well-being. I understand that if my daughter/son participates she/he will be asked to answer questionnaires at his/her desk in the classroom. I understand that the questionnaires are about how young people think and feel about themselves and their friends. I understand that the children will complete the questionnaires two times during the school year. I understand that all participating children will receive a gift of school supplies and a t-shirt from the research team at the conclusion of the final data collection.

I understand that my daughter/son does not have to be in the study. I understand that even if she/he participates at first but changes her/his mind she/he can quit at any time. I understand that all answers are confidential and will NOT be shown to anyone. Only Dr. Bukowski and the members of his research team will know what is in the questionnaires.

Please check one of the following and ask your daughter/son to bring this consent form the homeroom class tomorrow.

____ My son/daughter has permission to take part in Dr. Bukowski's study

____ My son/daughter DOES NOT have permission to take part in Dr. Bukowski's study.

Parent's Name: _____

Signature: _____ DATE: _____

Child's Name: _____ CHILD'S GENDER: □ Male □Female

Child's date of birth: DAY:_____MONTH:_____YEAR: _____

Appendix C

Sibling Trust Items in English and Spanish

Scale	Item in English	Item in Spanish
Reliability Trust	I trust my sibling to help me when I need it.	Confío en mis hermanos para que me ayuden cuando lo necesito.
	I trust my sibling to help me when I'm in trouble.	Confío en mis hermanos para que me ayuden si tengo problemas.
	I trust my sibling to help me even when I don't ask for it.	Confío en mis hermanos para que me ayuden, aun cuando no lo he pedido.
Emotional Trust	I trust my sibling to help me understand how I feel.	Confío en mis hermanos para que me ayuden a entender cómo me siento.
	I trust my sibling to help me when I feel sad.	Confío en mis hermanos para que me ayuden cuando me siento triste.
	I trust my sibling to be there for me.	Confío en que mis hermanos estarán ahí.
Trust Honesty	I trust my sibling to not say bad things about me.	Confío en que mis hermanos no dicen cosas malas sobre mí.
	I trust my sibling to not lie to me.	Confío en que mis hermanos no dirían mentiras sobre mí."
	I trust that my sibling will be honest with me.	Confío en que mis hermanos van a ser honestos conmigo.
	I trust my sibling to believe me when I tell them something important.	Confío en mis hermanos para contarles algo importante.

Appendix D

Relational and Individual Indices of Well-Being by Study

Scale	Item in English	Study
Sibling Relationship Satisfaction[a]	1. I am happy with the way things are between me and my sibling. 2. My relationship with my sibling is good. 3. I am satisfied with my relationship with my sibling.	1
General Self-Worth[b]	6. I feel good about the way I act. 7. I am generally sure that what I am doing is right. 8. There are a lot of things about myself that I am proud of. 9. I am sure of myself. 10. I am happy the way I am.	2
Social Competence[b]	6. I know how to get along with well with others. 7. It's easy for me to make friends. 8. I have a lot of friends. 9. Most kids in my class like being with me. 10. I am good at interacting with others.	2
Academic Competence[b]	6. I am very good at school. 7. I am just as smart as other kids my age. 8. I do well in school. 9. I usually know the right answer on tests in school. 10. I do well on tests in school.	2
Depressed Affect[c]	1. I feel lonely. 2. I feel sad. 3. I feel unhappy.	3
Intolerance of Uncertainty[d]	1. It bothers me when I am with other boys and girls my age and I don't know what we will be doing. 2. It bugs me when I am with other boys and girls my age and I don't know what we will be doing. 3. It frustrates me when unexpected things happen when I am with other kids.	3

Note. [a]Furman & Buhrmester (1985b); [b]Harter (1982); [c]Panarello & Bukowski (under review)