RESILIENT ENGLISH SPEAKING CANADIANS: PREDICTORS FROM THE NATIONAL LONGITUDINAL SURVEY OF CHILDREN AND YOUTH

by

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Abstract

Resilience research has been growing several decades but has not addressed a national Canadian population. This study constructed a Structural Equation Model (SEM) of resilience using secondary data from the National Longitudinal Survey of Children and Youth. The sample used for analysis consisted of English speaking Canadians born in 1987 and 1988. The model analyzed two groups: Primary (642; 332 female, 310 male) and Supplemental (298; 146 female, 152 male). The model contained measures for Biological Sex and Family Income (ages 7-8), Praise, Quality Time, and Verbal Abuse (ages 9-10), Physical Abuse and Parental Alcohol Use (ages 11-12), Community Size, close relationships, and anti-social behavior (ages 13-14), and Optimism and Problem Solving (ages 21-22). Results suggest that resilience functions for Canadians as it does for previously studied American, European, and Asian populations and underscores the contributions of close relationships throughout childhood and positive Problem Solving skills in adolescence for Resilience in young adulthood.

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Introduction

The focus of this project was the relationships between variables considered to be protective factors related to resilience when applied to Canadian children and youth. The present study examined individual, family and community level variables in a longitudinal Canadian sample. Previous longitudinal studies regarding resilience have focused on a limited number of variables at a time (Benzies & Mychasiuk, 2009), whereas this study examines these variables simultaneously. Additionally, research has focused on predominantly urban populations in major American cities. Some studies have examined resilience within the Canadian Armed Forces (Skomorovsky & Stevens, 2013; Lee, Sudom, & McCreary, 2011) however, currently no literature exists in relation to resilience in Canada at the civilian population level.

It is inappropriate to assume that the Canadian population is analogous to the populations studied in the American samples despite the many similarities between the two populations. Krueger, Bhaloo, and Rosenau (2009) suggest that health lifestyles are actually more similar for Canadian and American populations living in close proximity to the Canada-United States border than within each national population. However, Canadians still demonstrate lower fertility rates and lower death rates when compared to Americans as a whole (Krueger, Bhaloo, & Rosenau; 2009). Barbieri and Oullette (2012) note that almost 80% of the Canadian population lives within 150 kilometers of the border with the United States whereas the population in the United States is comparatively more evenly distributed. Additionally, the Canadian population demonstrates a higher percentage of immigrants than the United States, especially from Asia and Africa (Barbieri & Oullette, 2012). Barbieri and Oullette (2012) also point out that the probability of dying at ages 15 to 65 is almost 30% higher in the United States than in Canada. According to Hardwick, Marcus, and Isaak (2010) Canadian national identity, as represented in Social Studies

curricula, places a greater emphasis on collaborative communal behavior, multiculturalism, multilingualism, and the importance of becoming a global citizen than curricula in the United States. This study provides much needed insight into how resilience works as part of a developmental system (Cudeck & du Toit, 2009) within a Canadian context and informs the direction of future Canadian studies.

Literature Overview

Origins and Definitions

Origins. Resilience research stems from inquiry into the negative developmental outcomes for at risk children that began in the 1970s (Luthar, Cicchetti, & Becker, 2000). Emmy Werner's initial work with the Hawaiian longitudinal study of children born in 1955 on the island of Kauai (Burt & Paysnick, 2012; Werner, Bierman, & French, 1971) identified at risk children on the basis of poverty, parental mental illness, and the death of a parent (Aldwin, Cunningham, & Taylor, 2010). Norman Garmezy's research at the University of Minnesota with vulnerable children examined the effects of parental schizophrenia on child development. Garmezy's work led to his involvement in the Project Competence longitudinal study (Burt & Paysnick, 2012). Michael Rutter's early work focused on the influence of childhood psychopathology on adolescent and adult development (Rutter, Greenfeld, & Lockyer, 1967; Rutter & Lockyer, 1967). Other longitudinal studies that have contributed to resilience research include the Minnesota Longitudinal Study of Risk and Adaptation, the Iowa Youth and Families Project, the Dunedin Health and Development Study, and the Christchurch Health and Development Study (Burt & Paysnick, 2012).The data generated by these research initiatives suggested that despite extreme disadvantage many of the children in these studies achieved

normative developmental outcomes (Aldwin, Cunningham, & Taylor, 2010; Garmezy, 1974; Luthar et al., 2000; Rolf & Garmezy, 1974; Rutter et al., 1967; Werner et al., 1971).

To date the only longitudinal study of a Canadian population that approximates the American studies is the Concordia Longitudinal Risk Project (CLRP) which was initiated in 1976 to study children from French language schools in Quebec (Stack, 2013). The CLRP is ongoing and has focused on individuals from low socio-economic urban backgrounds. Findings from the CLRP have demonstrated that early life experiences influence outcomes in early to mid-adulthood (Serbin et al., 2010).

Definitions. The 30 years following these initial observations have distinguished resilience research from developmental psychopathology as a distinct field of study in psychology. To date inquiry has primarily focused on identifying and operationalizing the characteristics of resilient individuals in comparison to their less resilient peers (Benzies & Mychasiuk, 2009; Masten & Obradovic, 2006; Olsson, Bond, Burns, Vella-brodrick, & Sawyer, 2003). However, the literature continues to identify a need for an overarching conceptual definition for resilience. Currently researchers have a tendency to define resilience in relation to their given study rather than in reference to a generally agreed upon construct.

Despite the absence of formal consensus, the literature suggests two requirements for a definition of resilience. First, it is clear that in order for an individual to be considered resilient he or she must demonstrate positive adaptation or functioning in response to some kind of adverse life event or circumstance (Aven, 2011; Davis, Luecken, & Lemery-Chalfant, 2009; Easterbrooks, Driscoll, & Bartlett, 2008; Greeff & Merwe, 2004; Greeff & Du Toit, 2009; Masten & Tellegen, 2012; McElwee, 2007; Roosa, 2000; Rutter, 2006, 2012; Shiner & Masten, 2012; Stewart, 2011; Zautra, Arewasikporn, & Davis, 2010). Second, it is important to recognize

that resilience is a dynamic process that arises out of the interaction of adverse experiences and individual and environmental protective factors (Burt & Paysnick, 2012; Easterbrooks et al., 2008; Greeff & Du Toit, 2009; Harney, 2007; Roosa, 2000; Rutter, 2006, 2012; Sameroff & Rosenblum, 2006; Ward, Martin, Theron, & Distiller, 2007).

Anne Masten and Auke Tellegen have recently proposed that resilience be defined as "the capacity of a dynamic system to withstand or recover from significant threats to its stability, viability or development" (Masten & Tellegen, 2012, p.348). This definition provides a way to focus and categorize research within an ecological framework: "cellular, neural, whole organism, family and larger social and cultural systems" (Masten & Tellegen, 2012, p.348). The complex nature of resilience is reiterated by Unger (2012) and is supported by the overarching themes in the literature.

Theoretical Frameworks

Interactionism. As early as 1951 Kurt Lewin advocated for the consideration of the complex interaction between the individual and the environment in social science research (Unger, 2012). Pangallo, Zibarras, Lewis, and Flaxman (2015) note that the interactionist approach is helpful because it is based on the assumption that the individual and environment are in constant relationship: "(a) individuals are not randomly assigned to the environments in which they live but select and create their own experiences, and (b) environments can maintain personality characteristics that initially developed in response to earlier socialization experiences" (Pangallo et al., 2015, p. 3).

Bioecological model. Bronfenbrenner and Ceci (1994) offer three propositions that characterize human development within a system:

1. Human development can be characterized by the interaction between the human organism and his/her environment. Frequent interactions are considered proximal whereas rare interactions are considered distal. Proximal interactions tend to exert greater influence on human development than distal interactions.
2. Proximal processes are a joint function of the human organism and the environment and must be considered together when assessing developmental outcomes.
3. Proximal processes influence the ability of the human organism to achieve effective psychological development through the expression of genetic potential due to the constraints of the human-environment interaction.

Reciprocity. The reciprocal influence of the individual on the environment and the environment on the individual is reiterated by Roisman et al. (2004), Harney (2007) and Easterbrooks et al. (2008). Their work emphasizes that over time the relationship between the individual and the environment changes and broadens. Nevertheless, the reciprocity of that relationship remains at the core of human development and shapes the course of developmental outcomes. Current developmental theories such as developmental systems theory, the transactional model, and organizational theory support the conceptualization of the child as a component of a larger system which both influences and is influenced by the child (Easterbrooks et al., 2008).

Protective Factors: Individual, Family, and Community

Roisman, et al. (2004) underscore that "the best predictors of adult outcomes from childhood appear to be broad developmental– adaptational [sic] attributes …that reflect cumulative, age-graded success or failure in adaptive behaviors supported by the environment" (p. 131). Recent reviews of the literature (Benzies & Mychasiuk, 2009; Masten & Obradovic,

2006; Olsson et al., 2003) support the use of a socio-ecological framework to understand how protective factors function in relation to the individual. The socio-ecological framework assumes that the individual is embedded within his or her environmental context and that the environmental context has multiple levels (Bronfenbrenner, 1977; Calkins, Blandon, Williford, & Keane, 2007; Harney, 2007; Stewart, 2011).

Benzies and Mychasiuk (2009) provide a comprehensive meta-analysis of the literature. Their review examined 40 resilience publications from 2000 to 2008 and identified 24 key factors related to resilience. In accordance with the socio ecological model (Bronfenbrenner, 1977) the authors divided these factors into three levels of influence. Each level represents a unique set of variables that are most salient at one of three levels: the individual level, the family level, or the community level (see Table 1).

Greeff and Du Toit (2009) identified similar protective factors in an independent study of resilience in remarried families: "(1) supportive family relationships, (2) affirming and supportive communication, (3) a sense of control over outcomes in life, (4) activities and routines that help the family to spend time together, (5) a strong marriage relationship, (6) support from family and friends, (7) redefining stressful events and acquiring social support, and (8) spirituality and religion within the family" (p. 114).

There has been some focus on the importance of individual characteristics in relation to resilience, especially in relation to personality and neuroscience (Fletcher & Sarkar, 2013; Karatoreos & McEwen, 2013). Nasvytienė, Lazdauskas, and Leonavičienė (2012) confirm that individual characteristics have a slightly stronger relationship to resilience. However, this is possibly due to the prevalence of studies focusing on individual characteristics in the literature compared to family and community factors.

Biological sex differences. Biological sex differences in resilience are frequently noted. According to Boardmen, Blalock, and Button (2008) these differences are an example of gene-environment interaction because biological sex implies, in addition to hormonal and genetic differences, the experience of different social environments for men and women making it an environmental moderator of latent genetic factors. This is corroborated by Waaktaar and Torgersen in their 2012 twin study which found that both biological sex and shared genetics were significant predictors of differences in trait resilience.

Socio-economic status. The discussion of socio-economic status – disease mechanisms is prevalent in epidemiological literature. From a developmental perspective socioeconomic adversity impacts cognitive and socioemotional development, parent-child social interaction, and parental ability to provide monitoring and social support (Kroenke, 2008). Starfield, Riley, Witt, and Robertson (2002) provide an overview of socio-economic research and discuss a follow up study of American adolescents ages 11 to 17. They found significant differences between social class (lower $7300 per household member; middle per household member $11300; higher $17100 per household member) in resilience, family involvement, problem solving, emotional discomfort, and self-esteem after controlling for age, sex and rurality (Starfield et al. 2002).

Attachment. Early childhood attachment is considered a protective factor against many material and psychological risks (Black-Hughes & Stacy; 2013). Schore (2001) goes so far as to claim that early secure attachment has a significant impact on right brain development and the connections from the right brain to the limbic and autonomic nervous system. Efficient right brain function is expressed though flexibility in coping with novelty and stress (Schore, 2001). In a comparative study of female inmates, and their comparatively resilient non-incarcerated siblings, Black-Hughes and Stacy (2013) demonstrated that, compared to the inmate, the non-

incarcerated sibling reported higher attachment scores for mother, father, friend, and other adult. Additionally, Karreman and Vingerhoets (2012) found that attachment style had a small significant direct effect on resilience in a Dutch sample aged 16 to 67 years.

Childhood maltreatment. It is the consensus of the literature that childhood maltreatment produces externalizing and internalizing problems regardless of the population being studied (Lansford et al., 2006; Villoda, 2015). Although impaired functioning is not necessarily an inevitable result of childhood maltreatment only 10-25% of maltreated children ever achieve a level of functioning that can be considered resilient (Cicchetti, 2013). Using the Chicago Longitudinal Study Topitzes, Mersky, Dezen, and Reynolds (2013) found that young adults who had experienced childhood maltreatment demonstrated significantly worse outcomes across several measures including resilient functioning. According to Afifi and MacMillan (2011) the only protective factors consistently identified to improve resilient outcomes for maltreated children are stable family environment and supportive relationships.

Problem solving. The literature consistently provides evidence of a relationship between problem solving and resilience (Benzies & Myachesiuk, 2009). Frydenburg and Lewis (2009) used a cross-sectional sample of Australian youth and exploratory factor analysis to validate the relationship between problem solving efficacy and productive coping. According to Li and Yang (2009) resilience produced a significant medium effect on problem solving in Taiwanese college students. Another study (Li, Eschenauer, & Yang, 2013) of college students from China, Taiwan, and the United States found that trait resilience was a significant predictor of problem solving ability.

Explained Variance

Unger (2012) notes that use of specifically child-focused theories of development have accounted for less than half of the variance in the literature. In fact, many studies do not report explained variance and for those that do Unger's (2012) criticism appears justified:

- Masten et al. (2004) accounted for 22% of the variance in social competence
- Li and Yang (2009) accounted for 25% of the variance in problem solving, 6% of the variance in social support seeking, and 11% of the variance in avoidance coping responses
- Englund et al. (2011) accounted for 39.5% of the variance in adaptive functioning
- Waaktaar and Torgersen (2012) claim that genetics accounted for almost 25% of the variance in resilience
- Karreman and Vingerhoets (2012) states that attachment style accounts for 32.8% of the variance in resilience in the sample analyzed.

Shiner and Masten's (2012) work on personality and resilience suggest that individual protective factors may be less malleable than family and community level factors because of the relative stability of personality traits. Despite the stability of personality traits, the overall contribution of individual factors to resilience is unclear. In fact, according to Stewart (2011) family level factors related to stability and caring relationships overshadowed the effects of individual psychological factors in her review of 27 publications. Harney (2007) and Afifi and MacMillan (2011) also note this superseding trend of family and community factors over individual factors in resilient outcomes. Tiet, Huizinga, and Byrnes (2009) even go so far as to suggest a hierarchy of influence placing community factors over family and individual factors in relation to resilience. Davis et al. (2009) recognize that family and community factors have a

significant influence on the development of the children they encompass especially in the context of early childhood (Harney, 2007).

Olsson and colleagues (2003) acknowledge that resilience comes about in a complex system of risks and protective factors that interact with each other across the lifespan. Resilience is not the result of one developmental path but can arise out of multiple developmental interactions depending on the individual and the environment (Calkins et al., 2007; Rutter, 2012).

Summary

Resilience is a developmental construct that is rooted in the developmental systems theory and has grown into an independent field of research in the last 30 years. Inquiry has focused predominantly on urban American populations and has identified multiple factors that increase or reduce the likelihood of resilience which is defined as positive adaptation in response to some kind of adverse life event (Aven, 2011; Davis et al., 2009; Easterbrooks et al., 2008; Greeff & Merwe, 2004; Greeff & Du Toit, 2009; Masten & Tellegen, 2012; McElwee, 2007; Roosa, 2000; Rutter, 2006, 2012; Shiner & Masten, 2012; Stewart, 2011; Zautra et al., 2010).

To date there are no studies that address resilience with a Canadian population. The present study addresses this deficiency in the literature by examining a longitudinal Canadian cohort. Whereas most longitudinal studies employ repeated measures of a limited number of variables, this study examined several different variables sampled during consecutive developmental periods that are congruent with meta-analyses of the literature performed by Greeff and Du Toit (2009) and Benzies and Mychasiuk (2009): (a) Biological Sex and Family Income (ages 7 to 8), (b) Verbal Praise, Quality Time, and Verbal Abuse (ages 9 to 10), (c) Physical Abuse and Parental Alcohol Use (ages 11 to 12), (d) Community Size, Relationship

with Parents, Friendship, Impulsivity, Coping Skills (hostility), and Reactivity (ages 13 to 14), and (e) Optimism and Problem Solving Skills (ages 21 to 22). This method of analysis emphasizes the importance of the functional relationship of the individual, time, and environment in explaining resilience as part of a larger developmental system (Cudeck & du Toit, 2009).

Method

The National Longitudinal Survey of Children and Youth (NLSCY)

Description. The National Longitudinal Survey of Children and Youth is a longitudinal study of Canadian children designed to address the deficiency of Canadian data regarding children's social, emotional and behavioural development from birth through early adulthood. The NLSCY was instituted in 1994/1995 with a sample of children ages 0 to 11 years (Statistics Canada, 2010c). Sampling was achieved using the Labour Force Survey and is thought to be representative of the non-institutionalized civilian population of Canada's 10 provinces at the time. Children living on reservations and remote regions, including the territories, were not included (Statistics Canada, 2010c). The NLSCY is now complete and consists of eight Cycles of data collection. After the initial data collection, the original cohort participated in a follow up interview every two years. The current study utilizes cycles 1, 2, 3, 4, and 8.

Data collection. Participation in the NLSCY was voluntary and confidential. Data were collected directly from participants using written response paper questionnaires and verbal response computer-assisted interviewing (CAI). Prior to data collection questionnaires underwent scrutiny by an expert advisory group and were tested in focus groups and pilot surveys (Statistics Canada, 2010a). The questionnaire consisted of questions that elicited data from the child or youth (youth component and self-completed questionnaire), the person most

knowledgeable about the child (PMK) (child component and adult component), and the spouse of the PMK if applicable (adult component). In addition, a variety of cognitive tests were administered to children and youth depending on their age (Statistics Canada, 2010a).

Structural Equation Modeling (SEM)

Experimental manipulation of the factors that explain resilience, specifically adverse experiences including abuse and neglect, is not ethically appropriate (Canadian Psychological Association, 2000). As such research relies on survey methodology which is inherently observational and cannot address causality. However, according to Saris (1999), these problems could be potentially overcome by employing the statistical technique of SEM; "[SEM] is widely and intensively used to derive causal inferences using data originating from non-experimental research" (p. 221). Saris (1999) presents a very optimistic evaluation of the capabilities of SEM. However, by applying SEM to the NLSCY data this study attempted to develop evidence for a theoretical statement about the mechanisms of resilience within this sample of the Canadian population that extends beyond the capabilities of conventional survey methods (Greenhoot & Dowsett, 2012).

Confirmatory or exploratory. According to Hayduk (1987), "if a theory, knowledge of the data collection procedures, *and* the covariance go in, substantive findings come out" (p. xv). He emphasizes the use of SEM as a confirmatory analysis where the researcher has intentionally constructed a model to test the relationships between the concepts of interest (Hayduk, 1987). This theory driven approach is helpful in its ability to identify the specific implications of the theoretical statement a model makes (Hayduk, 1996). However, this view of SEM also entails the possibility that the theoretical statement made by a model may not match what is observed. In cases of failure to fit the data the model may bring into question the theory and the literature

that initially informed its creation (Hayduk, 1996). This is confirmed by Cudeck and du Toit's (2009) assertion that mathematical modeling "makes a theory explicit, which minimizes ambiguities and encourages a critical analysis of its parts, and that it can explain data, which implies that it is a possible description of behavior" (p. 516).

The structural equation model, and its modifications, constructed for this study took careful consideration of these inherent features of SEM and proceeded appropriately at each step of analysis (see Procedure).

Measurement

Composite scores vs. individual items. The structural equation modelling (SEM) literature is divided over the use of composite scores as indicators of latent variables (Hayduk & Littvay, 2012; Hayduk, 1996; 1987). The literature identifies four main concerns regarding the use of composite scores (Yang, Nay, & Hoyle, 2010). First, Marsh and O'Neill (1984) note that composite scores can result in a loss of information about the individual items on a questionnaire. Second, Bollen and Lennox (1991) link the potential loss of information to the assumption that each item carries equal weight when combined into a composite score. Third, Coanders, Satorra, and Saris (1997) warn that the use of composite scores could influence the relationship between the indicator and the latent variable by transforming the linear or nonlinear nature of the questionnaire item. Finally, Wright (1999) reasons that a composite score calculated from binary or trichotomous questionnaire items would have a severely limited range potentially biasing the variance and covariance estimates of the latent variable.

Some of the variables in the NLSCY are derived scores (i.e. Family Functioning Score; Friends Score). These composite scores were calculated from individual questions according to prior analysis. All scales used in the NLSCY were preexisting in the literature and were further

verified by a three step procedure prior to implementation: factor analysis, score calculation based on factor structure, and reliability measurements. Consequently, the NLSCY provides a Cronbach's Alpha for each scale used in the survey (Statistics Canada, 2010c).

However, given the contention on the use of composite scores as indicators this study used scores from individual questions on the NLSCY as indicators of latent variables. Consequently, the Cronbach's alpha was not applicable to the individual items selected for the present study. The use of individual items provided protection from the potential biasing effects of composite scores (Hayduk, 1996) and allowed the model to make a clear theoretical statement (Hayduk, 1987).

Single vs. multiple indicators. The SEM literature is also contentious regarding the use of single or multiple indicators for latent variables (Hayduk & Littvay, 2012; Hayduk, 1987; 1996). Latent variables represent the "true score" free from measurement error and respondent bias. Whether a latent has one indicator or many should not change the "trueness" of the latent score. Consequently, Hayduk and Littvay (2012) argue against the excessive use of multiple indicators (three or more indicators per latent) as "more indicators … do not necessarily mean better latents, they mean more entrenched latents –where the entrenchment is provided by the indicators, with the possible sacrifice of appropriate latent-level causal connectivity" (p10). Observed data is unlikely to respond to the variance of a latent construct in equal or proportional parts. Modelling latent variables with multiple indicators creates a mathematical expectation in the estimated covariance matrix (Σ) that is rarely found in the real world (Hayduk 1987). Minimizing the number of indicators for a latent allows the researcher to use only the strongest of the available indicators. This allows for the exclusion of weaker indicators that could potentially cause the model to fail (Hayduk, 1996).

Fixed error variance coefficients. According to Hayduk (1987) it is preferable to fix the proportion of error variance for each indicator rather than allow it to be free. The practice regarding error variances allows the researcher to include information about data measurement quality that would otherwise be lost in the model. Additionally, indicators may or may not be close representations of the latents that influence them. Fixing the error variance coefficient allows the variance in the indicator thought to arise from sources other than the latent to be partitioned out and explicitly represented in the model.

The assignment of error variance accounts for the best case scenario of error variance (respondents were truthful, viewed the question the same way as the researcher, and were careful to select the appropriate response on the survey; the surveyors made no data entry mistakes) and the worst case scenario of error variance (respondents were less truthful, didn't view the question the same way the researcher did, and did not pay attention to which response they chose on the survey; the surveyors made many data entry mistakes) in accordance with the "half-double" rule. An intermediate proportion of error variance was estimated and used in the Lisrel model (See Table 3).

Common Factors or Phantom Variables. The NLSCY does not provide a specific measurement of Resilience to use as an indicator. It is possible, given the literature, to model resilience as a composite of Impulsivity, Coping Skills (hostility), Problem Solving Skills and Optimism all of which can be defined by individual questions pulled from the NLSCY. Benzies and Mychasiuk (2009) emphasize the emotional regulation and effective coping skills of resilient individuals and Masten and Tellegen (2012) call attention to the ability of resilient individuals to withstand or overcome obstacles.

However, modelling Resilience as a composite implies correlation between the indicators of Impulsivity, Coping Skills (hostility), Problem Solving Skills and Optimism because Resilience is conceptualized as a common cause, which is not the intent of a composite variable (Hayduk, 1987). Alternatively, SEM allows for latent variables to be modeled without indicators (Hayduk, 1987) - sometimes called phantom variables (Hayduk, 1996) - to place Resilience within the causal framework of the latent variables. Consequently, resilience can be modeled as an intermediary with no mathematical requirement for correlation between the measured latent variables. This study initially postulated that Resilience results from an individual's level of Impulsivity and Coping Skills (hostility) which then results in an individual's level of Optimism and Problem Solving ability (see Figure 1).

However, because Optimism influences how events are perceived and interpreted it was decided that Optimism fit in the model better as a cause, rather than an effect, of Resilience both conceptually and statistically (see Figure 4).

Latent Variable Indicators

Measured variables were chosen as indicators of the latent variables based on two criteria: content and variance. Variables were first chosen based on the relevance of their content to the latent variable. Then the variable, or variables, with the greatest variance were selected to act as an indicator for the latent variables in the model.

Collapsed categories. To preserve confidentiality some scales were collapsed due to low cell counts before the data could be released by Statistics Canada (Statistics Canada, 2010b; Statistics Act, R.S.C., 1985, c. S-19): Optimism, Problem Solving, Confidence, Physical Abuse, Verbal Abuse, Income Adequacy, Verbal Praise, and Quality Time (see Table 4).

The indicators for Relationship with Mother and Relationship with Father allowed participants to respond with a 6 indicating "not applicable". Category 6 demonstrated a low cell count and was collapsed into category 3 to maintain an expression of no relationship in the measure of parental closeness (see Table 4).

Error variance. The fixed error variances can be found in Table 3. It is generally preferable to fix the proportion of error variance for each indicator rather than allow it to be free. This allows the researcher to include information about data measurement quality that would otherwise be lost in the model (Hayduk, 1987). Additionally, indicators may or may not be close representations of the latents that influence them. Fixing the error variance coefficient allows the variance in the indicator thought to arise from sources other than the latent to be partitioned out and explicitly represented in the model.

In most cases it was assumed that the researcher understood the questions and response options in the same way the respondents did. In accordance with the "half-double" rule (Hayduk, 1987) an intermediate proportion of error variance was estimated and used in the Lisrel model.

As a result, most of the fixed error variances are quite small. Exceptions to this are discussed below.

Inverse scales. Some of the scales for variables in the NLSCY were measured, by interviewers in the original data collection, in reverse in the sense that big numbers actually indicate low amounts or frequencies and small numbers actually indicate high amounts or frequencies (see Table 2). Scales' directions were not transformed for this study and inverse scales are noted in the text where relevant.

Variables for Analysis

Exogenous or endogenous. An exogenous variable is "any latent variable that does not have a [path] pointing to it from another latent variable" (Shumacker & Lomax, 2010, p. 181). An endogenous variable is "any latent that is predicted by other latent variables in a structural equation model" (Shumacker & Lomax, 2010, p. 180).

Abuse. Abuse is addressed in the NLSCY in two ways: Physical Abuse, both witnessed and experienced, and verbal abuse. Initially both Physical and Verbal Abuse were used as indicators for the latent variable abuse however, after the initial run of the model it was decided that these indicators were not influenced by the same latent variable and were consequently divided into two different latent variables (see Figure 2).

Physical Abuse. The Cycle 4 child questionnaire allows the participants to report on their own experience of physical abuse: "My parents (or step parents or foster parents or guardians) hit me or threaten to do so" (see Table 2) (Statistics Canada, 2004, p. 108) The fixed error variance was set at 40% of the variance to account for the sensitive nature of the question and the high likelihood of the participant to minimize the extent of their experience of abuse to the

interviewer (see Table 3) resulting in a poor measure of the true score associated with Physical Abuse.

Verbal Abuse. The Cycle 2 parent questionnaire asks the PMK to report on the frequency the participants experience verbal abuse: "How often do you tell <him/her> that <he/she> is bad or not as good as others?" (Statistics Canada, 1998, p. 172)

Parental Alcohol Use. (inverse scale; see Table 2) The Cycle 3 parent questionnaire asks the PMK to report the frequency of his or her own drinking: "During the past 12 months, how often did <you/he/she> drink beer, wine, liquor or any other alcoholic beverage? PMK" (Statistics Canada, 2000, p. 44).

Sex. The Cycle 1 and Cycle 2 parent questionnaires ask the PMK to identify the participant as either male or female (Statistics Canada, 1996, p. 6; Statistics Canada, 1998, p. 2). This was converted into a numerical score with 1 indicating female and 2 indicating male.

Community size. (inverse scales; see Table 2) The NLSCY provides information on the size of each participant's resident community based on the 1996 census counts (Statistics Canada, 2004), the 2001 census counts (Statistics Canada, 2007), and the 2006 census counts (Statistics Canada, 2010a). Participants were given a designation based on the place of residence the participant occupied in two or more of the census Cycles.

Family income. Cycle 1 provides a measure of income adequacy based on how many members are living in the household in relation to the overall household income (Statistics Canada, 1996, p. 35).

Relationship with mother. (inverse scale; see Table 2) The My Parent(s) and Me Section of Cycle 4 explicitly asks youth participants about the closeness of their relationship with the mother figure they spend most time with (biological, adoptive, stepmother, or foster):"

Overall, how would you describe your relationship with your mother?" (Statistics Canada, 2004, p. 85).

Relationship with Father. (inverse scale; see Table 2) The My Parent(S) and Me Section of Cycle 4 explicitly asks the respondents about the closeness of their relationship with the father figure they spend most time with (biological, adoptive, stepmother, or foster): "Overall, how would you describe your relationship with your father?" (Statistics Canada, 2004, p. 93).

Friendships. (inverse scale; see Table 2) The Friends and Family Section of Cycle 4 asks the child participants about the level of intimacy in their friendships: "How often do you share your secrets and private feelings with your close friends?" (Statistics Canada, 2004, p. 12).

Supportive parenting. During the Child Component of the Cycle 2 NLSCY the PMK answered 18 questions that were derived from an adaptation of the Parent Practices Scale used by Strayhorn and Weidman with additional questions provided by Michael Boyle (Chedoke-McMaster Hospital) (Statistics Canada, 1995). Initially two indicators were used for the latent variable Supportive Parenting however, after the initial run of the model it made more sense to divide this latent into two different concepts: Verbal Praise and Quality Time.

Verbal praise. The Cycle 2 Child Component of the NLSCY asked the PMK to report the frequency with which he or she provides positive verbal feedback to the participant: "How often do you praise <name>, by saying something like 'Good for you!' or 'What a nice thing you did!' or 'That's good going!'?" (Statistics Canada, 1998, p. 171).

Quality Time. The Cycle 2 Child Component of the NLSCY asked the PMK to report the frequency with which he or she engages in positive interactions with the participant: "How often

do you and <he/she> talk or play with each other, focusing attention on each other for five minutes or more, just for fun?" (Statistics Canada, 1998, p. 171).

Impulsivity. The indicator for a participant's level of impulsiveness comes from Cycle 4. Cycle 4 participants were asked to rate their level of impulsiveness, "I am impulsive, I act without thinking." (Statistics Canada, 2004, p. 56), using a three-point rating scale with 1 indicating "never or not true" and 3 indicating often or very true" (see Table 2).

Reactivity. Initially Reactivity was used as a secondary indicator for Coping Skills (hostility), however after the initial run of the model it was decided that Reactivity would be more useful in the model as a separate latent variable (see Figure 2). Cycle 4 participants were asked to rate their level of reactivity, "I get into many fights" (Statistics Canada, 2004, p. 52).

Coping skills (hostility). In Cycle 4 respondents were asked about their behavior in response to the actions of others: "When another kid accidentally hurts me I assume that he/she meant to do it, and I react with anger and fighting" (Statistics Canada, 2004, p. 61). It is important to note that this indicator does not capture the entire range of coping skills and is more likely more accurately conceptualized as hostility. However, given the indicators available from Cycle 4 of the NLSCY (Statistics Canada, 2004) the researcher determined it was better to include an incomplete measure of coping than leaving the concept out of the model. The implications of this decision are discussed in the Limitations section.

Optimism. The EQ-I (BarOn, 2004) was designed to measure emotional intelligence on five dimensions: intrapersonal, interpersonal, adaptability, stress management and general mood. The indicator for Optimism comes from a single question on the EQ-I measure used in Cycle 8. Participants were asked to rate their level of optimism, "...You're optimistic about most things you do" (Statistics Canada, 2010a, p. 218).

Problem solving. An indicator of problem solving ability comes from the Abilities section of the Cycle 8 questionnaire: "How would you rate your: ...ability to solve new problems? For example, identifying problems and possible causes, planning strategies to solve problems or thinking of new ways to solve problems [sic]" (Statistics Canada, 2010a, p. 208).

Confidence. Confidence was also probed on the Cycle 8 Abilities questionnaire: "Tell me how you feel, think, or act most of the time in most situations: ...You believe in your ability to handle most upsetting problems" (Statistics Canada, 2010a, p. 213).

Weighting and Missing Data

In order to ensure that the original longitudinal cohort remained representative of the 1994/1995 Canadian population Statistics Canada calculated funnel and non-funnel weights for each participant in the NLSCY. Funnel weights were calculated for participants in the longitudinal cohort that had responded to all Cycles of data collection. Non-funnel weights were calculated for participants in the longitudinal cohort who had responded to the current Cycle of data collection but not all of the previous Cycles (Statistics Canada, 2010a). This study employed the Cycle 8 longitudinal funnel weights for analysis.

Some participants did not respond for a given Cycle. Additionally, of those who responded not all provided complete information. When data was missing for a participant it was imputed only for adult income, youth income, household income and Motor and Social Development items. All other non-responses were coded as such (Statistics Canada, 2010a). The only item used in the present study that may have been influenced by imputation is Income Adequacy.

Sample Population for the Present Study

Data screening. The data underwent an initial screening to verify that the chosen variables were appropriate for the use of SEM. Preference was given to indicators that demonstrated the greatest amount of variance within the sample population. The appropriate bootstrap weights were applied to each group using Wesvar (Westat, Inc., 2014) to ensure that the sample remained representative of the Canadian population in 1994/1995.

Selection criteria. In order to avoid the confound of potential differences in the French and English versions of the NLSCY questions only data from respondents who answered the NLSCY questions in English was included in the analysis. Consequently, the results do not represent the significant French speaking populations in Quebec and New Brunswick.

NLSCY response rates are highly variable between Cycles and questions. Only a small subset of the longitudinal cohort was found to have responded to all the questions of interest to the present study. According to Carillo, Kovacevic, and Wu (2006) the probability of dropping out or missing one visit in the NLSCY dependended on variables including age, gender, depression, level of school completed by the PMK, the region of residence, the urban-rural status, the child's parent status (family status), the household income status, and the number of hours in daycare. Given these factors it is possible that the subset used for the current study does not represent the true breadth of the Canadian experience. The issue of missing data was addressed by placing respondents into groups based on the number of complete responses available for the variables of interest. The Primary Group was required to have valid responses for all indicators used in the model and was used to find a model with acceptable fit before attempting a stacked model.

The stacked model included a Supplemental Group. In order to maximize the number of participants included in the Supplemental Group IBM SPSS 22 (IBM Corp., 2013) was used to

produce frequencies for each variable. Participants were then sorted according to the name of the variable that was missing. The participants selected for the Supplemental Group adhered to a specific pattern of missing data (Wothke, 1993) and represent a balance between the number of missing variables and number of qualifying participants. Supplemental Group participants were missing data on nine variables: Parents Hit/Threaten, Share Secrets with Friends, How Close to Mother, and How Close to Father, Difficulty Waiting, Get into fights, React Anger/Fighting, and Handle Upsetting Problems. Calculating separate covariance matrices for each group allowed the design of a multi-group model that includes incomplete observations and models missing data processes as potential group differences in the model to be analyzed.

Primary group. The complete observations consisted of respondents who were all born in 1987 and 1988. There was one exception, born in 1986, which was excluded. The final respondent count for the Primary Group was 642 (332 female, 310 male).

Supplemental group. The subset of incomplete observations demonstrated greater variability in birth year. This presented a concern for the analysis as the model was developed under the assumption that the same causal world applies to both groups. To maintain comparability between the groups the second group was limited to respondents born in 1987 and 1988. The final respondent count for the Supplemental Group was 298 (146 female, 152 male). See Table 5 for socio-demographic characteristics of the Primary and Supplemental Groups.

Modeling Procedure

Listwise vs. Pairwise Covariance Matrices

IBM SPSS 22 (IBM Corp., 2013) was used to produce a listwise covariance matrix of the observed variables. Listwise deletion was chosen over pairwise deletion to avoid computing a matrix that is not positive definite and consequently unsuitable for SEM analysis (Wothke, 1993)

as recommended in Structural Equation Modeling with Lisrel: Essentials and Advances (Hayduk, 1987). This covariance matrix was then added to the Lisrel 8.9 (Jöreskog & Sörbom, 2006) syntax (see appendix A) to estimate and evaluate the model using maximum likelihood estimation (MLE).

The analysis attempted to identify the strength of the causal relationships between the latent variables based upon the proposed model (see Figure 1) using the statistical program Lisrel 8.8 (Jöreskog & Sörbom, 2006). Testing the fit of the model, and the accuracy of the theoretical statement it made, was first done using only the data from complete observations. When an acceptable fitting model was found, the Supplemental Group was added to the Primary Group with a unique covariance matrix.

NLSCY Original Cohort Complete Observations Model

Specification and identification. In order for a model to be identified its degrees of freedom (df) must be equal to or greater than zero. The df value is obtained by subtracting the number of coefficients to be estimated from the number of variances and covariances in the S matrix (the covariance matrix generated by the data). If the number of coefficients is equal to the number of values in the S matrix, then the degrees of freedom are zero and the model is saturated. A saturated model is almost always guaranteed to fit the data however it will not allow for a χ^2 test of significance consequently eliminating the model's ability to make testable predictions about the real world (Hayduk, 1987).

Estimation of free parameters. The initial model attempted to demonstrate a causal pathway to Resilience through Impulsivity and Coping Skills (hostility) that would produce Optimism and Problem Solving Skills. See Figure 1. The model converged after 105 iterations. It

is important to note that the covariance matrix was assessed as not positive definite and could not be inverted without further transformation.

According to Ullman (2013) perfect, or extremely high, correlations between two variables preclude the inversion of the covariance matrix and consequently cannot be analyzed using SEM without modifying the covariance matrix. Lisrel was able to provide estimates by employing a ridge option.

Closer inspection of the covariance matrix revealed that the variables for Handle Problems and Optimism were collinear. Both of these items were taken from the EQ-i (BarOn, 2004) which Statistics Canada (2010b) reports as having a Cronbach's Alpha value of 0.836 for respondents born in 1987 and 1988. A high Cronbach's Alpha indicates a high degree of correlation between all the items on this scale (Trobia, 2008). Consequently, the questions that targeted Optimism and Handle Problems in the NLSCY initially elicited similar responses. Additionally, before the data was released for analysis by Statistics Canada examination of crosstabs identified that some of the response cells had low numbers that could compromise respondent confidentiality. As a result, response categories were collapsed for both Handle Problems and Optimism according to Statistics Canada Release Guidelines (Statistics Canada, 2009; Statistics Act, R.S.C., 1985, c. S-19). This could have caused an approximate collinearity arising from "a perfect linear dependency, occluded by a very small variance due to rounding error." (Wothke, 1993, p. 263; see Table 5).

As Handle Problems was both a dependent variable and a secondary indicator for Problem Solving, it was decided that it could be removed from the model with little possibility of misspecification of the model (Ullman, 2013; Wothke, 1993) (see Figure 2).

After removing the variable Handle Problems Lisrel was able to converge on a solution after 44 iterations and did not provide any warnings about the covariance matrix.

Assessment of model and model fit. This model produced a covariance matrix that was significantly different than the data, df = 68, χ^2=302.168, $p < 0.001$. The significant χ^2 and consequent poor fit was interpreted as a likely resulting from the dual indicators for Abuse (TellsBad and HitParnt), Supportive Parenting (Praise and TalkPlay), and Coping Skills (hostility) (ReactAng and ManyFigh). The problematic nature of the dual indicators is demonstrated by the low squared multiple correlations (SMC) for the secondary indicators for each of the above latents. According to Ullman (2013) "each SMC is interpreted as the reliability of the measured variable in the analysis and the proportion of the variance in the variable that is accounted for by the factor" (p.733).

Squared multiple correlations. The SMCs suggested that the second indicator for these latent variables was not being influenced to the same degree as the primary indicator by the latent variables.

Covariance Underestimation and Overestimation. The estimates generated for the pairs of indicators for Abuse, Supportive Parenting, and Coping Skills (hostility) suggested an underestimation of one covariance and an overestimation of the other covariance. This was clearly indicated by the matched positive-negative standardized residuals found for each pair (Hayduk, 1987; 1996).

Model modification.

Single indicators. The latents with two indicators were divided creating two distinct variables. This modification preserved the full set of indicators while increasing the complexity of the theory presented in the latent portion of the model (See Figure 3):

a) Abuse (Verbal Abuse: TellsBad SMC=0.95, Physical Abuse: HitParnt SMC=0.00) became Verbal Abuse (TELLBADbprcq05collapse) and Physical Abuse (HITDPMCcQ1Pcollapse)
b) Supportive Parenting (Verbal Praise: Praise SMC=0.93, Quality Time: TalkPlay SMC=0.22) became Verbal Praise (PRAISEbprcq01collapse) and Quality Time (TALKPLAYbprcq02collapse)
c) Coping Skills (hostility) (Coping Skills: ReactAng SMC=0.07, Reactivity: ManyFigh SMC=0.95) became Coping Skills (DFBCd01X), and Reactivity (DFBCQ01G),

It is important to note that the change from multiple to single indicators was implemented all at once, rather than one at a time so it is unclear whether it was a specific pair of indicators or the combined effects of pairs of indicators that caused the initial problem. These changes provided a marginally better fit, df=42, χ^2=211.11, $p < 0.001$, but did not solve the problem of the significant χ^2 value.

Re-conceptualized model. A new model was conceptualized through careful examination of the modification indices, which suggested possible ways to account for the statistical relationships between the variables, and consideration of the reasonableness of the suggestions based on the literature. This model increased the number of connections between the exogenous and endogenous variables and altered the placement of the latent variable Optimism from result to cause of Resilience. The new model asserted Optimism as a mediating mechanism for positive adaptation in response to adversity through which the effects of Impulsivity, Reactivity, and Coping Skills (hostility) traveled (see Figure 4). It must be noted that this change inherently discounts the theoretical statement that the previous model attempted to make and could have resulted in an artificially good fit because the changes may simply be mirroring the data. The

theoretical change was constructed with reference to the literature surrounding optimism (Benzies & Mychasiuk, 2009; Greeff & Merwe, 2004; Greeff & Du Toit, 2009; Rutter, 2006, 2012; Shiner & Masten, 2012; Stewart, 2011; Zautra et al., 2010) to limit the possibility that the improvement in the model was a result of capitalizing on chance and is discussed further in the Limitations section.

Lisrel did converge on a solution that was much closer to fitting the data but still provided a significant χ^2 value, df=36, χ^2 =66.38, p <0.01. The modification indices were assessed in light of the literature regarding resilience and two additional pathways were simultaneously added to the theoretical framework: Friendships to Reactivity (DiGennaro Reed, McIntyre, Dusek, & Quintero, 2011; Gaertner, Fite, & Colder, 2011; Geven, Weesie, & van Tubergen, 2013; Sturaro, van Lier, Cuijpers, & Koot, 2011) and Quality Time to Impulsivity (Russell, Londhe, & Britner, 2013; Tichovolsky, Arnold, & Baker, 2013; see Figure 5) These additional pathways made sense from a theory standpoint and were also backed up by the current literature. The direction of the pathways was established through the modification indices – one possible way of accounting for the relationship between the two variables. This model provided a χ^2 value that was lower than the previous model and was barely non-significant, df=34, χ^2=48.05, p=0.06.

Final model. Within the modification indices Lisrel suggested the addition of a pathway from Verbal Abuse to Coping Skills (hostility). According to Evans, Simons, and Simons (2012) there is evidence of a relationship between these two concepts. Therefore, the pathway from Verbal Abuse to Coping Skills (hostility) was included in the theoretical framework (see Figure 6).

Reciprocal effects. Finally, since resilience is an ongoing process, not a finite outcome, a reciprocal relationship between Resilience and Problem Solving was included. Again these pathways were added simultaneously which has the potential to limit the findings of the study. Initially Lisrel demonstrated signs that the model was under identified by providing wildly unreasonable estimates for the reciprocal coefficients. By constraining the reciprocal relationship between Resilience and Problem Solving Skills to be equal, Lisrel was able to converge on a solution, df=33, χ^2=38.19, p=0.25, with a non-significant χ^2 value (see Figure 6 and Appendix A).

Results

The explanation of results will be limited to the final two models (see Figures 6 and 7) which achieved non-significant χ^2 values and are therefore believed to accurately provide one possible explanation of resilience in young English speaking Canadian adults.

Primary Group (Complete Data)

Significant coefficient estimates. Lisrel provides estimates of direct effects that implicitly control for the effects of all the other predictors in the equation in which the effect estimate appears. The implicit control of all other effects is similar to the language used in multiple regression equations where all predictor variables except one are held constant. However, this language becomes problematic in light of the requirement of SEM that an effect must be able to produce a chain of changes within the model. Therefore, it is helpful to think of the model as a stable system where variables that are not part of the causal chain between the predictor and dependent variables remain untouched (Hayduk, 1987).

The estimated coefficients for the exogenous and endogenous pathways were considered significant if the estimate was at least two times greater than its standard error. The interpretation

of effect estimates in unstandardized solutions is usually phrased in terms of the consequences of one real unit of increase in the value of the causal latent variable which allows the appropriateness of the sign of each effect to be easily assessed.

Direct effects.

Impulsivity. According to the proposed model (see Tables 6 and 7 and Figure 6), increased Impulsivity at Cycle 4 (ages 13-14; participant report) was produced by high Physical Abuse at Cycle 3 (ages 11-12; participant report), and being male (Biological Sex; Cycle 1; PMK report). Decreased Impulsivity at Cycle 4 (ages 13-14; participant report) was produced by high Verbal Abuse and high Quality Time at Cycle 2 (ages 9-10; PMK report). This suggests parenting practices have an impact on children's Impulsivity at ages 13 to14. Respondents who experienced frequent Verbal Abuse as reported by PMK at ages 9 to 10 self-reported lower levels of impulsive behavior at ages 13 to 14. The novel effect sign from Verbal Abuse to Impulsivity is addressed in the discussion section.

Reactivity. According to the model, increased Reactivity at Cycle 4 (ages 13-14 participant report) was produced by being male (Biological Sex; Cycle 1; PMK report), low Family Income at Cycle 1 (ages 7-8; PMK report), and a lack of close friendships and high Impulsivity at Cycle 4 (ages 13-14; participant report). These effects suggest that early experiences of poverty and being male increase the risk of high reactivity at ages 13 to 14, as does concurrent Impulsivity and few close Friendships.

Coping skills (hostility). According to the model decreased Coping Skills (hostility) at Cycle 4 (ages 13-14; participant report), indicated by a greater frequency of reported physical fights, was produced by high Verbal Abuse at Cycle 2 (ages 9-10; PMK report), high Physical Abuse at Cycle 3 (ages 11-12; participant report), and low Relationship with Mom, low

Relationship with Dad, high Impulsivity, and high Reactivity at Cycle 4 (ages 13-14; participant report). These effects suggest that punitive parenting practices decreases the ability to cope at ages 13 to 14, as does concurrent Impulsivity, Reactivity, and disconnected parental relationships.

Optimism. According to the model increased Optimism at Cycle 8 (ages 21-22; participant report) was produced by close Friendships at Cycle 4 (ages 13-14; participant report). This effect suggests that early adolescent Friendships have an impact on Optimism at ages 21 to 22.

Resilience. According to the model, increased Resilience in early adulthood was produced by being male (Biological Sex; Cycle 1; PMK report) and having high Problem Solving Skills at Cycle 8 (ages 21-22; participant report). These effects suggest that being male increases resilience in early adulthood, as does concurrent problem solving skills. It is important to note that there is an effect from Optimism to Resilience. However, it is not interpretable regarding strength or magnitude because Optimism was used as a scaling variable for Resilience and consequently no coefficient was estimated.

Problem solving skills. According to the model increased Problem Solving Skills at Cycle 8 (ages 21-22; participant report) was produced by high Resilience in early adulthood. This effect, in light of the previously discussed effect of problem solving on resilience, suggests that the there is a dynamic interaction between resilience and problem solving skills at ages 21 to 22. The interchange between these effects is represented in the model (see Figures 6 and 7) by the reciprocal relationship between Problem Solving Skills and Resilience.

Total indirect effects. According to Hayduk (1987) an indirect effect is determined by calculating the product of the coefficient estimates making up a series of paths linking two

variables; "...adding the direct and indirect effects gives the total effect of X_1 on X_3 and is best interpreted as the change in X_3 produced to follow a unit change in X_1 if all variables in the model are left untouched except for the changes originating from the hypothetical unit change in X_1" (p.247) (See Tables 8 and 9 and Figure 6). Indirect effects can be a way to think about mediating variables which transform or influence the effects of stimuli on behavior (Baron & Kenny, 1986).

Coping Skills (hostility). Coping Skills (hostility) was measured by the NLSCY item about reacting with fighting and anger. This is functionally considered to be anti-social behavior along with Impulsivity and Reactivity. According to the model, variations in Verbal Abuse at Cycle 2 (ages 9-10; PMK report) produced changes at Cycle 4 (ages 13-14; participant report) in Impulsivity and possibly Reactivity, and then changes in Coping Skills (hostility). Variations in Biological Sex (Cycle 1; PMK report) produced changes at Cycle 4 (ages 13-14; participant report) in Impulsivity and Reactivity, and then changes in Coping Skills (hostility). Variations at Cycle 4 (ages 13-14; participant report) in Relationship with Mom produced changes in Impulsivity and Reactivity, and then changes in Coping Skills (hostility). Variations at Cycle 4 (ages 13-14; participant report) in Friendships produced changes in Reactivity, and then changes in Coping Skills (hostility). Variations in Quality Time at Cycle 2 (ages 9-10; PMK report) produced changes at Cycle 4 (ages 13-14; participant report) in Impulsivity and possibly Reactivity, and then changes in Coping Skills (hostility). These effects suggest that parenting practices have an impact on antisocial behavior at ages 13 to 14. Additionally, antisocial behavior and relationship quality with parents at ages 13 to 14 are interrelated.

Reactivity. According to the model, variations in Biological Sex (Cycle 1; PMK report), Verbal Abuse and Quality Time at Cycle 2 (ages 9-10; PMK report), and Physical Abuse at

Cycle 3 (ages 11-12; participant report), produced changes at Cycle 4 (ages 13-14; participant report) in Impulsivity, and then changes in Reactivity. These effects suggest that parenting practices and being male impact children's level of Impulsivity and Reactivity at ages 13 to 14.

Resilience. According to the model, variations in Biological Sex (Cycle 1; PMK report) produced variations at Cycle 4 (ages 13-14; participant report) in Impulsivity, Reactivity, and Coping Skills (hostility). Variations at Cycle 4 (ages 13-14; participant report) in Impulsivity produced further changes in Coping Skills (hostility) and Reactivity. Variations at Cycle 4 (ages 13-14; participant report) in Reactivity also produced changes in Coping Skills (hostility), and then variations in Optimism at Cycle 8 (ages 21-22; participant report). Variations at Cycle 8 (ages 21-22; participant report) in Optimism produced changes in Resilience. Because of the reciprocal relationship between Resilience and Problem Solving Skills at Cycle 8 (ages 21-22; participant report) variations in Friendship at Cycle 4 (ages 13-14; participant report) demonstrated an indirect effect on Resilience. Variations in Friendship at Cycle 4 (ages 13-14; participant report) produced changes in Resilience, and then changes in Problem Solving Skills at Cycle 8 (ages 21-22; participant report), which produced further changes in Resilience.

Problem solving skills. According to the model, variations in Resilience, as a result of variations in Biological Sex (Cycle 1; PMK report), produced changes in Problem Solving Skills. Repeated cycling through the reciprocal effects of Resilience on Problem Solving Skills and vice versa also imply Resilience has an indirect effect on Problem Solving Skills as a consequence of its direct and equality-constrained reciprocal effect.

Squared multiple correlations. The R^2 values for the endogenous variables indicate that, with the exception of Resilience, the percent of variance in each endogenous variable explained by the model is quite low (Impulsivity R^2=0.128; Reactivity R^2=0.151; Coping Skills (hostility)

$R^2 = 0.121$; Optimism $R^2 = 0.008$; Problem Solving $R^2 = 0.043$; Resilience $R^2 = 0.398$). The disparity between the explained variance of Resilience and the explained variance of Impulsivity, Reactivity, Coping Skills (hostility), Optimism, and Problem Solving Skills is an artifact of the error-variance specification for Resilience, as discussed in the Limitations section.

Stacked model using primary and supplemental groups. The stacked model provided a way to include respondents that fit a specific pattern of missing data (Wothke, 1993) without imputation. By only including participants that were missing data on specific variables (Parents Hit/Threaten, Share Secrets, How Close to Mother, How Close to Father, Difficulty Waiting, Get into fights, and React Anger/Fighting,) the variances and covariances calculated for the Primary Group were added to the covariance matrix for the Supplemental Group (see Appendix B) enabling Lisrel to analyze the model and provide estimates. Then the coefficients that related to those substituted parts of the covariance matrix were constrained to be equal to the corresponding coefficient estimates in the Primary Group. These constraints controlled the components of the model for which the Supplemental Group had no data by using the estimates calculated for the Primary Group and allowed Lisrel to calculate unique estimates for the free coefficients in the Supplemental Group. The stacked model was also non-significant, df=85, $\chi^2=85.77$, $p=0.46$ (see Figure 7 and Appendix B).

Group comparability. To be sure that the Primary and Supplemental Groups were indeed comparable all effects in the Supplemental Group were constrained to be equal to the Primary Group and the model was analyzed again, $df=103$, $\chi^2=92.73$, $p=0.77$. A χ^2 difference test between the models demonstrated resulted in a p-value of 0.99, $\chi^2_{diff} = 6.96 = 92.73-85.77$, $df_{diff} = 18 = 103-85$. This indicates that the stacked model that only constrained the coefficients related to missing data in the Supplemental Group was not significantly different than the model

that constrained all pathways to be equal to the Primary Group. The findings confirm that the two groups are comparable and operate within the same causal world, a conclusion that is further validated by the similarity in descriptive statistics for the two groups (see Table 5).

Stacked Model

Significant coefficient estimates. The estimated coefficients for the exogenous and endogenous pathways were considered significant if the estimate was at least two times greater than its standard error. The significant effects for the Primary and Supplemental Groups were generally the same as the previous model with several exceptions. The differences that arose between the groups suggests that although they share a causal world the strength of the variables to influence outcomes may not be equal in both groups.

Direct effects. Unlike the results of the previous model the path coefficients at Cycle 4 (ages 13-14; participant report) from Relationship with Mom to Impulsivity and Reactivity reached significance (coefficients constrained to be equal across groups). These effects suggest that at ages 13 to14 maternal relationship quality impacts children's concurrent level of Impulsivity and Reactivity.

The path coefficient from Relationship with Dad Cycle 4 (ages 13-14; participant report) to Resilience in early adulthood reached significance (coefficient constrained to be equal across groups) unlike the previous model. This effect suggests that paternal relationship quality at 13 to 14 years of age impacts resilience in early adulthood. Additionally, the path coefficients from Verbal Abuse at Cycle 2 (ages 9-10; PMK report) to Coping Skills (hostility) and Impulsivity at Cycle 4 (ages 13-14; participant report) and from Biological Sex (Cycle 1; PMK report) to Resilience achieved significance in the Primary Group but not in the Supplemental Group (See Tables 10 and 11). These effects suggest that parenting practices had a greater impact on

children's levels of anti-social behavior at ages 13 to 14 in the Primary Group than the Supplemental Group. Additionally, being male had an impact on resilience in early adulthood for the Primary Group but not the Supplemental Group.

Total indirect effects. The Primary Group demonstrated significant indirect effects that were both congruent and incongruent with the previous model (See Table 12 and Table 13). Two chains of effects that were significant for the Primary group were not significant for the Supplemental Group: (a) the path to Reactivity at Cycle 4 (ages 13-14; participant report) from Verbal Abuse at Cycle 2 (ages 9-10; PMK report) through Impulsivity at Cycle 4 (ages 13-14; participant report) and (b) the path to Coping Skills (hostility) at Cycle 4 (ages 13-14; participant report) from Verbal Abuse at Cycle 2 (ages 9-10; PMK report) through Impulsivity and Reactivity at Cycle 4 (ages 13-14; participant report).

Three chains of effects that were not significant for the Primary group were significant for the Supplemental Group: (a) the path to Resilience from Verbal Abuse at Cycle 2 (ages 9-10; PMK report), through Impulsivity, Reactivity, and Coping Skills (hostility) at Cycle 4 (ages 13-14; participant report), and Optimism at Cycle 8 (ages 21-22; participant report), (b) the path to increased Problem Solving Skills at Cycle 8 (ages 21-22; participant report) from Verbal Abuse at Cycle 2 (ages 9-10; PMK report) through Impulsivity, Reactivity, and Coping Skills (hostility) at Cycle 4 (ages 13-14; participant report), and Optimism and Resilience at Cycle 8 (ages 21-22; participant report), (c) and the path to Problem Solving Skills at Cycle 8 (ages 21-22; participant report) from Relationship with Dad at Cycle 4 (ages 13-14; participant report) through Resilience.

These effects suggest that parenting practices did not have as strong an impact on Coping Skills (hostility) at ages 13 to 14 in the Supplemental Group compared to the Primary Group.

However, parenting practices combined with children's level of antisocial behavior and paternal relationship quality at ages 13 to 14 did have an impact on Resilience and Problem-solving Skills at ages 21-22 for the Supplemental Group.

Squared multiple correlations. As in the Primary Group model the percent of variance explained in the endogenous variables is small with the exception of Resilience in the Primary Group. In the Supplemental Group the percent of variance in Resilience explained by the model was closer to the other variables (Impulsivity R^2=0.120; Reactivity R^2=0.121; Coping Skills (hostility) R^2 = 0.147; Optimism R^2 =0.018; Problem Solving Skills R^2=0.017; Resilience R^2=0.120).

Model Strengths

The models produced in this analysis are noteworthy for several reasons. Despite arising from the previously untested English Speaking Canadian population, the results demonstrate congruency with previous studies of diverse populations. This study and similar studies from other nations draw attention to the impact that child sex (male/female), early parenting practices, and adolescent levels of antisocial behavior and close parental relationships, have on resilience and problem solving in early adulthood.

Additionally, both the Primary Group model and the Primary and Supplemental Groups model achieved a goodness of fit in non-significant χ^2 values. Use of the χ^2 statistic as a measure of fit is fiercely contested in the literature because of its sensitivity and the difficulty of achieving a non-significant value. The debate over use χ^2 test is best demonstrated by the responses generated by Barrett's (2007) article on measuring model fit (Hayduk, 2014; Hayduk et al., 2007; Hayduk & Glaser, 2000a; 2000b; Herting & Costner, 2000). Even when differences of

significance and non-significance were noted between the models and between the groups, the direction of the effects remained consistent between the Primary and Supplemental Groups.

Model Limitations

It is important to acknowledge the limitations of the model before proceeding to interpretation of effects. The model employed secondary data with substantial respondent attrition, demonstrated estimation problems, underwent multiple modifications, and did not explain a large proportion of the variance in the endogenous variables.

The difficulty encountered in estimating a solution indicates that the model may not actually fit the data as well as the solution suggests. The accuracy of the estimates derived for the reciprocal relationship between Resilience and Problem Solving Skills is a compromise of what the estimates would be if each coefficient was free to vary. Optimism has an indicator which means that the latent is reasonable well known through the indicator. However, Optimism is not explained well by the rest of the model. Consequently, it may not have been appropriate to use Optimism as a scaling variable for Resilience.

Removal of confidence latent. According to Tomarken and Waller (2005) the majority of models omit variables because SEM only provides an approximation of reality. It is important to note that the omission of a variable does not necessarily stop a model from fitting the data well (Tomarken & Waller, 2005). Therefore, even though the removal of Confidence improved the model fit (see Figure 2), Confidence cannot be wholly ruled out as a variable in the explanation of Resilience.

Multiple model modifications. The modelling completed for this study involved 5 modifications. The modifications were consistent with theory and prior evidence but were made

after seeing feedback from other runs of the model. Such practices may raise concerns but were used effectively in this study, as discussed in the next paragraphs.

Simultaneous addition of multiple pathways. By failing to add additional pathways one at a time it is not possible to determine if it was a given pathway or an artifact of the combination of the pathways added that improved the model fit. Compared to individual additions, simultaneous addition of multiple pathways reduced the likelihood that observed changes in fit were the result of chance.

Inflated R^2. As Resilience does not have an indicator within the model it is difficult to provide a realistic R^2 value. To achieve the R^2 value of 0.803 the error variance for Resilience was set at 0.00. Once the model was estimated the latent variable variance-covariance table was examined and the variance for Resilience, 3.49, was used as the latent error variance and the model was estimated a second time. Replacing the latent error variance reduced the R^2 value from 0.803 to 0.398. The same method was used in the stacked model; the variance for Resilience (Primary Group 2.78; Supplemental Group 0.988) was used as the latent error variance and the model was estimated a second time. Replacement reduced the R^2 value from 0.758 to 0.374 (Primary Group) and 0.251 to 0.120 (Supplemental Group).

Proportion of explained variance. The non-significant χ^2 value for the model is contrasted by the relatively small proportion of explained variance for the endogenous variables Impulsivity, Reactivity, Coping Skills (hostility), Optimism, and Problem Solving Skills. There is currently no standard way to address the issue of error variance in phantom variables. For this reason, the explained variance for Resilience should be treated as undetermined and interpreted with caution.

Because SEM provides for the prospect of equivalent models (Hayduk, 1996) it is possible that there is another model that would fit just as well but provide a more complete explanation of the variance for the endogenous variables (Hayduk & Glaser, 2000a).

Optimism as a scaling variable. Optimism is the key connection to Resilience in the Primary Group model. However, less than 1% of the variance in Optimism is explained by the model. This is especially problematic because not only does Optimism act as a bridge between Resilience and the rest of the model, it is specified as a scaling variable for Resilience. If Optimism is not explained by the model, then Resilience may not be explained by the model.

Secondary data. The data analyzed for the present study was not collected by the researcher. This may be problematic because the measures used may not have been the best tool for the current study had the researcher been able to control this aspect (Greenhoot & Dowsett, 2012). Further, the present research was limited in its inclusion of variables to those available in the NLSCY data set. Other variables (e.g., genetic differences, resting cortisol levels and, personal spirituality,) are known to contribute to the development of resilience but could not be included here because they are not in the NLSCY.

Additionally, the attrition of respondents across time is not random (Carillo, Kovacevic, & Wu, 2006) and likely resulted in the exclusion of those most at risk to experience adversity. This brings into question the NLSCY's ability to truly represent the Canadian experience.

Coping skills (hostility). The measure chosen from the NLSCY used for Coping Skills was only informative regarding the use of anger and fighting as a coping response. This seriously limits the model's ability to make a strong theoretical statement about other, more productive, styles of coping in early adolescence. The limited informative value of the Coping Skills

(hostility) measure may also explain why the model failed to estimate a significant coefficient between Coping Skills (hostility) and Optimism.

As a result of these limitations the accuracy of this model in representing Resilience in the Canadian context should be interpreted with caution. Even with these limitations, the NLSCY is unique in its representation of the development of Canadian children and the present findings are confirmation that NLSCY data are worthy of secondary analysis.

Discussion

The present study makes a unique contribution to the literature on resilience. The cyclic collection of data by the NLSCY lends itself to a developmental interpretation; however, this study does not present a traditional repeated measures longitudinal study. Instead, by employing a nationally representative sample of Canadian children with repeated measurements from childhood to early adulthood, the present study places resilience within a system of normative development that provides a broad view of protective factors at different stages of development (see Figure 1). Findings confirm that, in terms of factors and pathways that contribute to the development of resilience, the English-speaking Canadian population is developmentally analogous to American, Australian, Taiwanese, Polish, and other industrialized populations. The findings underscore the importance of relationships with parents and peers that are close, without dictating what these relationships must look like, throughout childhood and positive problem-solving skills, which are effective for the individual, in adolescence for resilience in young adulthood.

In the following paragraphs findings from the present study are discussed in the context of the existing literature as a means of drawing conclusions about resilience from this study.

Where relevant, effect sizes are interpreted from the standardized solution (see Tables 14 and 15) according to the recommendations by Durlak (2009) and Cohen (1992).

Middle Childhood

Biological Sex. Gender differences have consistently been identified in the resilience literature. The Kauai Longitudinal Study identifies males as being at higher risk during the first 10 years of life however females are considered more vulnerable throughout adolescence (Werner, 1989). Analysis of the Project Competence data demonstrates that gender is a significant predictor of outcomes in social competence (Masten, et al., 2004). The present study found that biological sex, had a significant small effect on Impulsivity and Reactivity in early adolescence (boys were more impulsive and reactive than girls) and a significant large effect on Resilience in emerging adulthood (girls were less resilient than boys). In relation to the Kauai Longitudinal study these results suggest that the higher risk attributed to boys up to age 10 may be an indication of less developed emotional regulation. Whereas the risk attributed to girls during adolescence may be an indication of internalizing behaviors that were not observed or measured in childhood. Rey Peña and Pacheco (2012) found that there was a significant difference between boys and girls ages 11 to 18 regarding cognitive emotion regulation strategies; girls were more likely to use rumination and catastrophizing which informed depressive symptoms whereas boys were more likely to use higher levels of physical-verbal aggression. Lyons, Otis, Huebner, and Hills (2014) found boys to be more sensitive to the effects of differing levels of life satisfaction in early adolescence than girls. Given these results biological sex and age should be taken into consideration when planning interventions for problem behaviors.

Family income. Regarding the data collected through the Project Competence Study Garmezy, Masten and Tellegen (1984) posit that SES should mediate the effects of stressful life events so that children from a higher SES, given equal life stress, should display fewer disruptive behaviors than children from a lower SES. The present study identified a significant small effect from Family Income in middle childhood to Reactivity in early adolescence - respondents from lower income families demonstrated more reactive behavior. In relation to the findings of the Project Competence Study the present findings suggest that early experiences of poverty or affluence may influence access to coping resources including access to structured activities (Bennett, Lutz, & Jayaram, 2012) and parental availability (Chien & Mistry, 2013). In a 2011 study Kraus, Horberg, Goetz, and Keltner found that low Socioeconomic Status and Social Class elicited greater reactivity to the social environment. They interpreted this reactivity as a result of greater threat vigilence and previous experience of hostile emotion. SES is a multifaceted factor that provides many avenues for the development or methods to reduce long term reactivity starting in early childhood.

Late Childhood

Quality Time. The Kauai Longitudinal Study identifies the importance of affectionate family relationships to counteract stressful events through emotional support (Werner, 1989). Granger et al. (1998) suggested that interpersonal difficulties are more prevalent in children who demonstrate low levels of arousal in response to conflict. These interpersonal difficulties can lead to stress and insensitivity in their parents (Granger, et al., 1998). Additionally, other studies demonstrate that supportive maternal presence in early childhood predicted levels of externalizing behaviors in early adolescence (Raby, Roisman, Fraley, & Simpson, 2015; Wang, Christ, Mills-Koonce, Garrett-Peters, & Cox, 2013). Englund, et al. (2011), using the Minnesota

Longitudinal Study of Risk and Adaptation, determined that early attachment security had an indirect influence on future relationships and overall adult functioning. Additionally, the Concordia Longitudinal Risk Project, (Pougnet, Serbin, Stack, & Schwartzman, 2011) identified paternal involvement in middle childhood as a significant predictor of children's cognitive and behavioural competence in early adolescence.

The present study identified a significant small effect from Quality Time in late childhood to Impulsivity in early adolescence – respondents who experienced more one on one time with parents in childhood later demonstrated lower levels of reactive behavior. In relation to the Kauai Longitudinal Study, the Minnesota Longitudinal Study, and the Concordia Longitudinal Risk Project the effect of early Quality Time on later Impulsivity suggests that setting aside dedicated time for parent-child interaction may be more important than the specific nature of the interaction. Cicchetti, Rogosch, and Toth (2006) support this possibility by noting that secure attachment can be fostered through intervention that supports mothers in spending more quality time with their children. Increased secure attachment is achieved either through therapeutic improvement of the parent-child relationship or assistance in building a social support network that allows for dedicated parent-child time (Cicchetti, Rogosch, & Toth, 2006).

Verbal and Physical Abuse. The Christchurch Health and Development Study identifies middle childhood as a key window for addressing conduct problems and self-control issues as these risk factors have implications for later legal, academic, and occupational outcomes (Fergusson & Horwood, 2001). Childhood maltreatment is consistently linked to externalizing problems in middle childhood and early adolescence (Cicchetti & Valentino, 2006). The present study identified significant small effects from Physical Abuse and Verbal Abuse in late childhood to Impulsivity and Coping Skills (hostility) in early adolescence. Respondents who

experienced frequent Physical Abuse demonstrated higher levels of impulsive behavior and were more likely to respond with hostility. Additionally, the experience of frequent Verbal Abuse resulted in less effective coping strategies. According to Villoda et al. (2015) the pattern of externalizing problems as a result of maltreatment is consistent regardless of the specificity or generality of the population being studied. This suggests that interventions aimed at reducing punitive parenting practices may be a main way to reduce children's levels of anti-social behavior in early adolescence.

Contrary to the literature, the present study demonstrated that high levels of Verbal Abuse resulted in lower levels of impulsive behavior. The size of this effect is small and only applies to the Primary Group. It is possible that the NLSCY item interpreted as Verbal Abuse was actually a measure of authoritarian parenting. Impulsivity tends to be stable across the lifespan (Niv, Tuvblad, Raine, Wang, & Baker, 2012). Parents of children who demonstrated more impulsive behaviors tend to be less permissive and more authoritarian than parents of less impulsive children (Gau, & Chang, 2013; Moghaddam et al., 2013). The Verbal Abuse reported by the PMK may have been an attempt at controlling concurrent impulsive behavior. Predictable and frequent feedback has been demonstrated to be helpful for children who are easily frustrated (Kiff, Lengua, & Zalewski, 2011; Lengua, 2008). The frequent verbal involvement reported by the PMK could have been effective at modifying concurrent Impulsivity so that later impulsive behavior was reduced.

Another possibility is that the measure for Impulsivity was, in fact, a measure of self-awareness. Children who are more impulsive tend to be less self-aware and may have answered the question without thinking. These children would also likely elicit more Verbal Abuse. If this is the case then high levels of Verbal Abuse would result, or co-occur, with low levels of self-

awareness. These alternative interpretations of Verbal Abuse and Impulsivity could explain the unexpected direction of the effect from Verbal Abuse to Impulsivity in the present model.

Early Adolescence

Externalizing behaviors. The present study identified a significant small effect within early adolescence from Impulsivity to Reactivity and Coping Skills (hostility) as well as a significant small effect from Reactivity to Coping Skills (hostility) – respondents who demonstrated more impulsive behavior also demonstrated more reactive behavior and less effective coping strategies. A 2008 study by Wittman, Arce, and Santisteban notes that impulsivity influences verbal and physical aggression especially when the individual engages in instant gratification leisure activities such as video games and television viewing. However, Rutter (2003) argues that adolescent anti-social behavior is a phenomenon that is often limited to the period of adolescent development and not an indicator of long term anti-social tendencies. The Kauai Longitudinal Study found that by early adolescence resilient children were not overly impulsive and engaged in cooperative activities and hobbies successfully (Werner, 1996). Considered as a whole this information suggests that engagement in anti-social behavior in early adolescence may have an impact on resilience in early adulthood but the relationship deserves further investigation.

Relationships. The Kauai Longitudinal study identified supportive familial and extra-familial relationships to be key predictors of resilience (Werner, 1995; 1989). The importance of supportive relationships was also found in the Project Competence Study (Masten, et al., 2004; Masten & Tellegen, 2012), the Minnesota Longitudinal Study of Risk and Adaptation (Englund, I-Chun Kuo, Puig, & Collins, 2011), and the Christchurch Health and Development Study (Newton-Howes, Horwood, & Mulder, 2015). The present study identified that early adolescent

Friendships, Relationship with Mom, and Relationship with Dad had small but significant effects in emerging adulthood.

Friendships. The present study identified a significant small effect within early adolescence from Friendships to Reactivity and from Friendships in early adolescence to Optimism in emerging adulthood – respondents who experienced closeness in their friendships demonstrated less reactive behavior and were more optimistic. This suggests that close friendships in adolescence have the ability to influence concurrent behavior and emotional affect in early adulthood. Newman, Lohman, and Newman (2007) demonstrated that when adolescents experience a higher sense of group belonging externalizing problems decrease regardless of gender. Additional evidence from a 2015 study suggested that friendship groups may influence individual's experiences of hope through modeling and reinforcement regarding problem solving strategies and attitudes (Parker, et al., 2015). Close friendships should be considered an important resource when planning interventions for problem behaviors in adolescence.

Relationship with mom. The present study identified a significant direct small effect within early adolescence from Relationship with Mom to Reactivity, Impulsivity, and Coping Skills (hostility) – respondents that had close relationships with their mothers demonstrated less reactive and impulsive behavior and more effective coping strategies. Bradley and Corwyn (2013) found that maternal sensitivity was consistently significant in the prediction of externalizing behavior. Additionally, analysis of the NICHD Study of Early Child Care and Youth Development revealed that regular parental monitoring in early adoescence was associated with a decrease in externalizing problems and that self-control mediated the relationship between maternal sensitivity and externalizing behaviors (Bradley & Corwyn, 2013). Furthermore, German et al. (2013) found, in a group of Mexican American adolescents,

that high maternal warmth acted as a protective factor for externalizing problems even when harsh discipline was used. This suggests that a close maternal relationship in early adolescence provides an external source of emotional regulation that reduces anti-social behaviors and improves coping.

Relationship with dad. The present study identified a significant small effect within early adolescence from Relationship with Dad to Coping Skills (hostility) and from Relationship with Dad in early adolescence to Resilience in Emerging adulthood – respondents who had close relationships with their fathers demonstrated more effective coping strategies and were more resilient.

Coping skills (hostility) and aggression. Murray et al. (2014) examined the influence of father-child and mother-child relationships on aggression in adolescence. Results indicated that lower levels of female aggression were associated with higher quality parental relationships; however, this was not found to be true for male aggression in their sample. Casselman and Rosenbaum (2014) determined that perceived father rejection had significant direct and indirect effects on male aggression in late adolescence and emerging adulthood. This suggests that as with maternal relationships close paternal relationships in early adolescence provides an external source of emotional regulation that reduces anti-social behaviors and improves coping.

Resilience. Zhang, Zhao, Ju, and Ma (2015) determined a clear direct effect from father involvement to resilience in adolescence that did not differ by gender (Zhang et al., 2015). Taken together this evidence on the effects of relationships in early adolescence suggests that because executive function and the ability to self regulate internally are still developing (Zelazo & Carlson, 2012) external sources of emotional regulation are invaluable. Interventions targeting

antisocial behaviors in early adolescence should consider including parents and close friends in the intervention process.

Emerging Adulthood

Optimism. Results from the present study failed to demonstrate a significant effect from Coping Skills (hostility) to Optimism. This is problematic as the absence of this effect removes a key link in the model's ability to explain Resilience. Additionally, this zero effect causally disconnects Impulsivity, Reactivity, and Coping Skills (hostility) from Optimism, Resilience and Problem Solving Skills. As discussed in the Limitations section the measure used for Coping Skills (hostility) was incomplete at best. The insignificant effect from Coping Skills (hostility) to Optimism can be interpreted in two different ways.

First, it is possible that the Impulsivity and aggression measured in early adolescence reflected adolescence-limited antisocial behavior, characterized by onset in early adolescence and recovery in early adulthood (Rutter, 2003; Moffitt, 1993). If true, Optimism in emerging adulthood would not be explained by period limited anti-social behavior in adolescence.

Second, it is possible that a significant effect would have been present had a wider range of coping skills been assessed by the measure for Coping Skills (hostility). In fact, a 2013 study by Pietruska and Armony found that anger, temperament and reaction (Spielberger, 1996), did not predict optimism despite its strong correlation with Impulsivity which did predict Optimism. Puskar et al. (1999) did demonstrate a significant correlation between optimism and expressed anger but the size of the correlation was considered very small. These results suggest that the measure used for Coping Skills (hostility) in the present study may not have been an appropriate choice and could explain the disconnect between Impulsivity, Reactivity, and Coping Skills (hostility), and Optimism, Resilience, and Problem Solving Skills in the model.

Further investigation is needed to determine the implications of this part of the model. In the literature coping skills cover a wide range of behaviors: (a) solving the problem which is characterized by working at a problem while remaining optimistic, fit, relaxed and socially connected, reference to others which is characterized by turning to others for support whether they be peers, professionals or deities, non-productive coping which is characterized by avoidance strategies (Frydenberg et al., 2004), (b) task oriented coping, distraction oriented coping, and disengagement oriented coping (Nicholls, Levy, & Perry, 2015), and (c) problem solving, information seeking, negotiation, social support, positive cognitive restructuring, emotional regulation, distraction, rumination, avoidance, helplessness, social withdrawal, and opposition (PsychTests AIM. Inc., 2011). Follow-up analysis would ideally include multiple measures of coping skills to determine the true relationship between coping skills and optimism.

Problem solving. The present study found that Problem Solving Skills demonstrated a significant small effect on Resilience. Additionally, Resilience demonstrated a significant medium effect on Problem Solving Skills. Respondents who were more resilient demonstrated more effective problem solving strategies and vice versa. Rutter (1985) noted that Resilience involves the ability to use multiple problem solving approaches. The importance of problem solving skills was also emphasized by the Kauai Longitudinal Study (Werner, 1989). Fruiht (2015) links problem solving and hope as a reciprocal relationship; students who have trusted adults to act as mentors are exposed to collaborative problem solving, and hopeful students are more likely to seek out mentorship. Cooperative problem solving skills were also identified as a key factor in the development of resilient communities (McKay, 2011) and a 2009 study by Li and Yang of Taiwanese college students demonstrated a significant standardized effect from Resilience to Problem Solving similar to that reported in the present study (Standardized = .292)

(p.168). Collectively this line of evidence suggests that the ability to approach adversity from a solution focused perspective may be central to optimal developmental outcomes.

Implications for Future Research

Explained variance and effect size. The current study's findings are congruent with the literature regarding resilience in both results and predictive power. Although the present study demonstrates pathways to resilience similar to those seen in prior research the predictive power is low. The relatively low amount of explained variance and effect sizes in the present study and the literature in general may be due to the emphasis on analysis at a population level especially regarding longitudinal studies. Future research may be able to improve the predictive power of by modeling resilience for distinctive groups that are exposed to specific rather than general risk factors.

Intervention. A recent examination of the Big Brothers Big Sisters School-Based Mentoring program showed that one of the most significant outcomes for program participants was the benefit of a continued relationship with a trusted adult to act as an emotional support and mentor (Herrera, Grossman, Kauh, & McMaken, 2011). This finding mirrors the assertion by Fruiht (2015) that mentorship modelling collaborative problem solving increases hope and the present observation on the importance of close relationships in the development of problem solving skills and resilience. Together these results make a strong case for further investigation of mentorship programs by both family and non-family members to increase resilient outcomes for populations considered at risk.

Self-regulation. Self-regulation, the deliberate use of coping skills to modify thoughts, affect, behavior, or attention, has demonstrated utility in predicting resilience in youth from low income and homeless families (Buckner, Mezzacappa, & Beardslee, 2003). Chen (2013) argues

that within the developmental system parent modeling of emotional regulation during emotionally charged situations created a zone of proximal development (Bronfenbrenner & Ceci, 1994) for the child's own emotional regulation. Parents are an integral part of the child's environment in the development of emotional regulation skills (Guo et al., 2015).

Martel et al. (2007) demonstrated a reciprocal relationship between resilience and reactive control during development which supported the development of problem solving skills. During early adolescence children are continuing to develop the ability to regulate their emotions and even demonstrate an increase in dysregulations during middle adolescence (Zimmermann, & Iwanski, 2014) likely due to the increased emotional reactivity and salience of social interactions during this period (Collins, 2003). Maturation of the lateral prefrontal cortex also takes place during adolescence and impacts cognitive emotion regulation strategies (Vijayakumar et al., 2014).

In light of these findings the results of the present study only emphasize the importance of positive parental involvement and close friendships in early adolescence. Without these relationships to support the development of emotional regulation, through mentorship and social support, it is unrealistic to expect mature use of coping skills in early adulthood. It is possible that by exploring this relationship between resilience and self-regulation, from a longitudinal perspective future research can more clearly explain the underpinnings of resilience with regards to specific relational factors.

Executive function. Additionally, resiliency and self-regulation have been linked to Executive Functioning (EF) processes: arousal regulation, response delay and inhibition, multi-step planning, and shifting mental set as requirements of a situation change (Martel et al., 2007). The majority of resilience research has been descriptive in nature. Many protective and risk

factors identified do not lend themselves to experimental manipulation. However, problem solving skills and close relationships deserve further investigation. By including EF in future investigations an experimental design may be more easily achieved because of the prevalence of laboratory tasks and formal assessment procedures available for investigating executive functioning (Barkley, 2012; Delis, Kaplan, & Kramer, 2001; Gioia, Espy, & Isquith, 1996; Gioia, Isquith, Guy, & Kenworthy, 1996; Guy, Isquith, & Gioia, 1996; Naglieri, & Goldstein, 2013; Roth, Isquith, & Gioia, 2005; Schretlen, 2010). This would likely improve the predictive power of future models of resilience.

Conclusion

Results from this Canadian sample suggest that resilience and its identified risk and protective factors function within this Canadian English speaking populations in a way that is congruent with prior studies from the United States, Switzerland, Taiwan, China, and New Zealand:

- Biological sex has long term implications for resilience in early adulthood (Chapple & Johnson, 2007; Masten, et al., 2004; Ribeaud & Eisner, 2010)
- Early attachment has long term developmental implications for adaptive functioning in adulthood (Englund et al., 2011)
- Punitive parenting practices have long term developmental implications regarding antisocial behavior (Villodas, et al., 2015)
- SES has a significant impact on antisocial behaviors and coping in early adolescence (Garmezy et al., 1984; Kraus et al., 2011)
- Close relationships with parents and friends in early adolescence are key to the development of problem solving skills (Casselman & Rosenbaum, 2014; Fergusson &

Horwood, 2001; Germán et al., 2013; Masten & Tellegen, 2012; Murray et al., 2014; Newman, et al., 2007; Newton-Howes et al., 2015; Raby et al., 2015; Wang et al., 2013; Werner, 1996; 1989; Zhang et al., 2015)

- Mentorship though close relationships in early adolescence is crucial to the development of problem solving skills (Fruiht, 2015; Li & Yang, 2009; McKay, 2011)

Given the observational nature of the present study and limited explained variance, the findings should be generalized with caution. However, it appears that resilience is a developmental construct that is relevant for many different populations including English speaking Canadians. As the literature on resilience suggests it is a complex topic that has been explained imprecisely at best (Englund et al., 2011; Li & Yang, 2009; Masten & Tellegen, 2012). Nevertheless, the available evidence collectively makes a strong case for the importance of close relationships and problem solving skills in developing resilient individuals in English speaking Canada. Longitudinal studies that target specific risk factors and protective factors with the intention of building structural equation models are required to improve the explicative power of studies that address resilience.

Tables

Table 1

Key Protective Factors identified by Benzies and Myachesiuk (2009).

Individual	Family	Community
• internal locus of control • emotional regulation • self-efficacy • effective coping skills • increased education, skills and training • health • temperament • gender	• family structure • intimate partner relationship stability • family cohesion • supportive parent child interaction • stimulating environment • social support • family of origin influences • stable and adequate income • adequate housing	• involvement in the community • peer acceptance • supportive mentors • safe neighborhoods • access to quality schools • childcare, • access to quality health care

Benzies, K., & Mychasiuk, R. (2009). Fostering family resiliency: a review of the key protective factors. *Child and Family Social Work,* 103-114. doi:10.1111/j.1365-2206.2008.00586.x

Table 2

Exogenous and Endogenous Variables used in calculating the Covariance Matrix.

Latents and Indicators	Indicator Description	Rating Scale
Abuse[a, b] (HITDPMCcQ1Pcollapse TELLBADbprcq05 collapse)	Physical Abuse My parents (or step parents or foster parents or guardians) hit me or threaten to do so. Verbal Abuse How often do you tell him/her that he/she is bad or not as good as others?	1 = never, rarely 2 = sometimes 3 = often 4 = always 96 = not applicable, don't know, refusal, not stated 1 = never, about once a week or less, a few times a week 2 = one or two times a day 3 = many times each day 96 = not applicable, don't know, refusal, not stated
Parental Alcohol Use[c] (PMKDRINKCHLPcQ05collapse)	During the past 12 months, how often did you/he/she drink beer, wine, liquor or any other alcoholic beverage? PMK	1 = every day 2 = 4-6 times a week 3 = 2-3 times a week 4 = once a week 5 = 2-3 times a month 6 = once a month 7 = less than once a month 96 = not applicable, don't know, refusal, not stated
Biological Sex[d] (SEXReportedSex)	Gender of the Child Reported by the PMK	1 = female 2 = male
Community Size[e] (RESIDENCEResidenceSize)	Size of area of residence in which the child lives, according to 1996, 2001, or 2006 Census counts.	1 = Rural area 2 = Urban, population < 30,000 3 = Urban, population 30,000 to 99,999 4 = Urban, population 100,000 to 499,999 5 = Urban, population 500,000 or over 9 = Not stated
Family Income[d] (INCOMEAINHD07collapse)	Income adequacy	1 = Lowest[f] OR Lower middle[g] 2 = Middle[h] 3 = Upper middle[i] 4 = Highest[j]
Relationship with Mother[a] (MOMDPMCcQ06 collapse)	Overall, how would you describe your relationship with your mother?	1 = very close 2 = somewhat close 3 = not very close, not applicable 9 = not stated
Relationship with Father[a] (DADDPMCcQ09collapse)	Overall, how would you describe your relationship with your father?	1 = very close 2 = somewhat close 3 = not very close, not applicable 9 = not stated

(table continues)

Table 2

Exogenous and Endogenous Variables used in calculating the Covariance Matrix.

Latents and Indicators	Indicator Description	Rating Scale
Friendships[a] (DFFCcQ4A)	How often do you share your secrets and private feelings with your close friends?	1 = all of the time 2 = most of the time 3 = some of the time 4 = rarely 5 = never 96 = not applicable, not stated
Supportive Parenting[b] (PRAISEbprcq01collapse, TALKPLAYbprcq02collapse)	Verbal Praise How often do you praise name, by saying something like 'Good for you!' or 'What a nice thing you did!' or 'That's good going!'?	1 = never, about once a week or less 2 = a few times a week 3 = one or two times a day 4 = many times each day 96 = not applicable, don't know, refusal, not stated
	Quality Time How often do you and he/she talk or play with each other, focusing attention on each other for five minutes or more, just for fun?	1 = never, about once a week or less 2 = a few times a week 3 = one or two times a day 4 = many times each day 96 = not applicable, don't know, refusal, not stated
Impulsivity[a] (DFBCQ01S, DFBCQ01G)	Impulsivity I am impulsive, I act without thinking.	1 = never or not true 2 = sometimes or somewhat true 3 = often or very true 6 = not applicable, not stated
	Reactivity I get into many fights.	1 = never or not true 2 = sometimes or somewhat true 3 = often or very true 6 = not applicable, not stated
Coping Skills (hostility)[a] (DFBCd01X)	When another kid accidentally hurts me I assume that he/she meant to do it, and I react with anger and fighting.	1 = never or not true 2 = sometimes or somewhat true 3 = often or very true 6 = not applicable, not stated
Optimism[k,l] (OPTIMISMHEQYFQ10collapse)	Tell me how you feel, think, or act most of the time in most situations: ...You're optimistic about most things you do	1 = very seldom true or not true, seldom true 2 = sometimes true 3 = often true 4 = very often true or true 6 = valid skip, don't know, refusal, not stated

(table continues)

Table 2

Exogenous and Endogenous Variables used in calculating the Covariance Matrix.

Latents and Indicators	Indicator Description	Rating Scale
Problem Solving Skills[k,l] (PROBSOLVEHABYHQ5collapse, CONFIDENCEHEQYFQ10collapse)	Problem solving How would you rate your: ...ability to solve new problems? For example, identifying problems and possible causes, planning strategies to solve problems or thinking of new ways to solve problems.	1 = poor, fair 2 = good 3 = very good 4 = excellent 6 = don't know, refusal, not stated
	Confidence Tell me how you feel, think, or act most of the time in most situations: ...You believe in your ability to handle most upsetting problems	1 = very seldom true or not true, seldom true 2 = sometimes true 3 = often true 4 = very often true or true 6= valid skip, don't know, refusal, not stated

Note. The Covariance Matrices were calculated using the collapsed categorizations as presented above.

[a] Statistics Canada. (2004). National Longitudinal Survey of Children and Youth 10 – 17 Year old Self- Completed Questionnaires – Cycle 4, Release 2.

[b] Statistics Canada. (1998). National Longitudinal Survey of Children and Youth, 1996-1997 [Canada]: Cycle 2, Primary File .

[c] Statistics Canada. (2000). National Longitudinal Survey of Children and Youth, 1998-1999 [Canada]: Cycle 3, Primary File.

[d] Statistics Canada. (1996). National Longitudinal Survey of Children and Youth, 1994-1995 [Canada]: Cycle 1, Release 2, Primary File.

[e] Statistics Canada. (2007). National Longitudinal Survey of Children and Youth, Cycle 6, 2004 Master file (Longitudinal).

[e] Statistics Canada. (2005). National Longitudinal Survey of Children and Youth Cycle 4, Primary File – Version Two.

[f] Lowest: Household income is< 10,000 and household size is 1 - 4 persons; or Household income is < 15,000 and household size is 5 or more persons

[g] Lower middle: Household income is 10,000 - 14,999 and household size is 1-2 persons; or Household income is 10 ,000 -19,999 and household size is
3-4 persons; or House hold income is 15,000-29,999 and household size is 5 or more persons

[h] Middle: Household income is 15,000-29,999 and household size is 1 -2 persons; or Household income is 20,000-39,999 and household size is 3 -4
persons; or Household income is 30,000 -59,999 and household size is 5 or more persons

[i] Upper middle: Household income is 30,000 - 59,999 and household size is 1-2 persons; or Household income is 40,000 -79,999 and household size is 3-4 persons; or House hold income is 60,000-79,999 and household size is 5 or more persons

[j] Highest: Household income is 60,000 or more and household size is 1-2 persons; or Household size is 80,000 or more and household size is 3 or more persons

[k] Statistics Canada. (2010). National Longitudinal Survey of Children and Youth, Cycle 8, 2008 Master File (Youth).

[l] Some categories have been collapsed to protect confidentiality due to low cell counts. Statistics Canada. (2009). Microdata User Guide National Longitudinal Survey of Children and Youth Cycle 8 September 2008 to July 2009.

Table 3

Fixed Error Coefficients for the Primary Group and the Supplemental Group.

	Latent Concept	Indicator	Assessed Error Variance	Primary Group		Supplemental Group	
				Var.	Fixed Error Coefficient	Var.	Fixed Error Coefficient
Exogenous	Physical Abuse	HITDPMCcQ1Pcollapse	0.40	0.511	0.205	- -	- -
	Verbal Abuse	TELLBADbprcq05collapse	0.05	0.230	0.012	0.239	0.012
	Parental Alcohol Use	PMKDRINKCHLPcQ05collapse	0.07	3.128	0.219	3.338	0.234
	Biological Sex	SEXReportedSex	0.01	0.248	0.003	0.251	0.003
	Community Size	RESIDENCEResidenceSize	0.12	2.175	0.261	2.282	0.274
	Family Income	INCOMEAINHD07collapse	0.12	0.810	0.097	0.831	0.100
	Relationship with Mother	MOMDPMCcQ06collapse	0.02	1.003	0.024	- -	- -
	Relationship with Father	DADDPMCcQ09collapse	0.09	0.235	0.021	- -	- -
	Friendships	DFFCcQ4A	0.05	0.419	0.050	- -	- -
	Verbal Praise	PRAISEbprcq01collapse	0.07	0.688	0.048	0.619	0.043
	Quality Time	TALKPLAYbprcq02collapse	0.07	0.663	0.046	0.543	0.038
Endogenous	Impulsivity	DFBCQ01S	0.12	0.389	0.047	- -	- -
	Reactivity	DFBCd01X	0.07	0.257	0.018	- -	- -
	Coping Skills (hostility)	DFBCQ01G	0.05	0.207	0.010	- -	- -
	Optimism	OPTIMISMHEQYFQ10collapse	0.05	0.709	0.035	0.656	0.033
	Problem Solving Skills	PROBSOLVEHABYHQ5collapse	0.05	0.671	0.035	0.687	0.034
	Confidence	CONFIDENCEHEQYFQ10collapse	0.05	0.709	0.035	0.656	0.033

Note. Fixed Error Coefficients were not calculated for the missing variables in the Supplemental Group and are indicated by - -.

Table 4

Frequencies for Collapsed Exogenous and Endogenous Indicators.

Indicators	NLSCY Response Options	Collapsed Response Options [a, b]	Collapsed Frequencies
Physical Abuse	1 = never	1 = never, rarely	491
	2 = rarely	2 = sometimes	85
	3 = sometimes	3 = often	46
	4 = often	4 = always	20
	5 = always		
Verbal Abuse	1 = never	1 = never, about once a week or less, a few times	556
	2 = about once a week or less	a week	57
	3 = a few times a week	2 = one or two times a day	29
	4 = one or two times a day	3 = many times each day	
	5 = many times each day		
Family Income	1 = Lowest	1 = Lowest OR Lower middle	84
	2 = Lower middle	2 = Middle	221
	3 = Middle	3 = Upper middle	237
	4 = Upper middle	4 = Highest	100
	5 = Highest		
Relationship with	1 = very close	1 = very close	473
Mother	2 = somewhat close	2 = somewhat close	150
	3 = not very close	3 = not very close, not applicable	19
	6 = not applicable		
Relationship with	1 = very close	1 = very close	388
Father	2 = somewhat close	2 = somewhat close	199
	3 = not very close	3 = not very close, not applicable	56
	6 = not applicable		
Verbal Praise	1 = never	1 = never, about once a week or less	19
	2 = about once a week or less	2 = a few times a week	142
	3 = a few times a week	3 = one or two times a day	233
	4 = one or two times a day	4 = many times each day	248
	5 = many times each day		

(table continues)

Table 4

Frequencies for Collapsed Exogenous and Endogenous Indicators.

Indicators	NLSCY Response Options	Collapsed Response Options [a, b]	Collapsed Frequencies
Quality Time	1 = never	1 = never, about once a week or less	40
	2 = about once a week or less	2 = a few times a week	174
	3 = a few times a week	3 = one or two times a day	310
	4 = one or two times a day	4 = many times each day	118
	5 = many times each day		
Optimism	1 = very seldom true or not true	1 = very seldom true or not true, seldom true	33
	2 = seldom true	2 = sometimes true	103
	3 = sometimes true	3 = often true	270
	4 = often true	4 = very often true or true	236
	5 = very often true or true		
Problem Solving	1 = poor	1 = poor, fair	49
Skills	2 = fair	2 = good	279
	3 = good	3 = very good	226
	4 = very good	4 = excellent	88
	5 = excellent		
Confidence	1 = very seldom true or not true	1 = very seldom true or not true, seldom true	33
	2 = seldom true	2 = sometimes true	103
	3 = sometimes true	3 = often true	270
	4 = often true	4 = very often true or true	236
	5 = very often true or true		

Note. Categories were collapsed according to Statistics Canada Release Guidelines[a, b]

[a]Statistics Canada. (2009). Statistics Canada Quality Guidelines. Retrieved from http://www.statcan.gc.ca/pub/12-539-x/12-539-x2009001-eng.htm

[b]Statistics Act, Revised Statues of Canada (1985, c. S-19). Retrieved from http://laws-lois.justice.gc.ca/eng/acts/S-19/FullText.html

Table 5
Descriptive Statistics for the Primary Group and the Supplemental Group.

		Primary Group (n=642)				Supplemental Group (n=298)			
		%	SD	C.I. (95%)		%	SD	C.I. (95%)	
Child Variables				Upper	Lower			Upper	Lower
Birth Year	1987	45.44	3.017	39.52	51.36	51.49	4.647	42.37	60.6
	1988	54.56	3.017	48.64	60.48	48.51	4.647	39.4	57.63
Sex	Female	54.75	2.975	48.91	60.59	49.10	4.567	40.14	58.06
	Male	45.25	2.975	39.41	51.09	50.90	4.567	41.94	59.86
Family Variables									
Income Adequacy	Lowest or Low	11.19	1.586	8.08	14.31	12.64	2.424	7.89	17.4
	Middle	29.21	2.679	23.95	34.46	31.76	4.44	23.05	40.48
	Upper middle	41.48	3.195	35.21	47.75	39.46	4.962	29.72	49.19
	Highest	18.12	2.693	12.83	23.4	16.14	3.761	8.76	23.52
Community Size	Rural	11.89	1.315	9.31	14.47	14.25	2.714	8.92	19.57
	Urban								
	< 30,000	30.09	2.711	24.77	35.41	25.02	3.467	18.22	31.83
	30,000 - 99,999	9.41	1.624	6.22	12.6	8.00	1.867	4.34	11.66
	100,000 to 499,999	15.79	1.835	12.19	19.39	17.80	2.847	12.21	23.39
	> 500,000	32.82	3.469	26.01	39.62	34.93	5.621	23.9	45.96
Spouse in the home	Yes	88.88	2.267	84.43	93.33	89.36	2.199	85.05	93.68
	No	11.12	2.267	6.67	15.57	10.64	2.199	6.32	14.95

Table 6

Direct Effects Endogenous Pathway Estimates for the Model in Figure 6.

		Impulsivity	Coping Skills (hostility)	Reactivity	Optimism	Resilience	Problem Solving
Impulsivity	Est.	- -	- -	- -	- -	- -	- -
	SE						
	Sig.						
Coping Skills (hostility)	Est.	**0.139***	- -	**0.168***	- -	- -	- -
	SE	**0.033**		**0.038**			
	Sig.	**4.184**		**4.466**			
Reactivity	Est.	**0.166***	- -	- -	- -	- -	- -
	SE	**0.037**					
	Sig.	**4.511**					
Optimism	Est.	- -	0.066	- -	- -	- -	- -
	SE		0.077				
	Sig.		0.857				
Resilience	Est.	- -	- -	- -	1.000	- -	**0.099***
	SE						**0.038**
	Sig.						**2.563**
Problem Solving Skills	Est.	- -	- -	- -	- -	**0.099***	- -
	SE					**0.038**	
	Sig.					**2.563**	

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

* $p < .05$

Table 7

Direct Exogenous Pathway Estimates for the Model in Figure 6.

		Verbal Abuse	Physical Abuse	PMK Alcohol	Biological Sex	Community Size	Family Income	Relate Mom	Relate Dad	Friendship	Verbal Praise	Quality Time
	Est.	**-0.123***	**0.226***	-0.004	**0.180***	-0.007	-0.011	0.116	-0.018	- -	- -	**-0.100***
Impulsivity	SE	**0.054**	**0.059**	0.016	**0.051**	0.020	0.035	0.067	0.048			**0.033**
	Sig.	**-2.268**	**3.838**	-0.232	**3.549**	-0.363	-0.326	1.727	-0.383			**-2.997**
Coping	Est.	**0.112***	**0.123***	- -	-0.016	- -	- -	**0.161***	**0.067***	-0.015	-0.018	0.038
Skills	SE	**0.037**	**0.043**		0.038			**0.046**	**0.033**	0.019	0.025	0.026
(hostility)	Sig.	**3.052**	**2.902**		-0.419			**3.505**	**2.046**	-0.796	-0.728	1.473
	Est.	- -	0.075	- -	**0.148***	- -	**-0.060***	0.080	- -	**0.067***	- -	- -
Reactivity	SE		0.047		**0.042**		**0.024**	0.044		**0.021**		
	Sig.		1.588		**3.501**		**-2.509**	1.813		**3.124**		
	Est.	-0.049	- -	- -	- -	- -	- -	- -	- -	**-0.071***	- -	- -
Optimism	SE	0.073								**0.035**		
	Sig.	-0.670								**-2.031**		
	Est.	- -	- -	- -	**2.966***	- -	- -	- -	-1.024	-0.077	- -	- -
Resilience	SE				**1.377**				0.663	0.368		
	Sig.				**2.155**				-1.546	-0.209		
Problem	Est.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Solving	SE											
Skills	Sig.											

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

* $p < .05$

Table 8

Total Indirect Endogenous Pathway Estimates for the Model in Figure 6.

		Impulsivity	Coping Skills (hostility)	Reactivity	Optimism	Resilience	Problem Solving
Impulsivity	Est.	--	--	--	--	--	--
	SE						
	Sig.						
Coping Skills (hostility)	Est.	**0.028***	--	--	--	--	--
	SE	**0.009**					
	Sig.	**3.172**					
Reactivity	Est.	--	--	--	--	--	--
	SE						
	Sig.						
Optimism	Est.	0.011	--	0.011	--	--	--
	SE	0.013		0.013			
	Sig.	0.845		0.842			
Resilience	Est.	0.011	0.067	0.011	0.010	0.010	0.001
	SE	0.013	0.078	0.008	0.013	0.008	0.001
	Sig.	0.845	0.857	0.842	1.269	1.269	0.849
Problem Solving Skills	Est.	0.001	0.007	0.001	0.099	0.001	0.010
	SE	0.001	0.008	0.001	0.040	0.001	0.008
	Sig.	0.801	0.812	0.799	2.513	0.849	1.269

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

* $p < .05$

Table 9

Total Indirect Exogenous Pathway Estimates for the Model in Figure 6.

		Verbal Abuse	Physical Abuse	PMK Alcohol	Biological Sex	Community Size	Family Income	Relate Mom	Relate Dad	Friendship	Verbal Praise	Quality Time
Impulsivity	Est.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SE											
	Sig.											
Coping Skills (hostility)	Est.	**-0.020***	**0.050***	-0.001	**0.055***	-0.001	-0.012	**0.033***	-0.003	**0.011***	- -	**-0.017***
	SE	**0.010**	**0.014**	0.003	**0.014**	0.003	0.007	**0.014**	0.008	**0.004**		**0.007**
	Sig.	**-2.058**	**3.569**	-0.232	**4.017**	-0.362	-1.611	**2.317**	-0.382	**2.568**		**-2.543**
Reactivity	Est.	**-0.020***	**0.038***	-0.001	**0.030***	-0.001	-0.002	0.019	-0.003	- -	- -	**-0.017***
	SE	**0.010**	**0.013**	0.003	**0.011**	0.003	0.006	0.012	0.008			**0.007**
	Sig.	**-2.026**	**2.985**	-0.232	**2.779**	-0.362	-0.326	1.616	-0.381			**-2.486**
Optimism	Est.	0.006	0.011	0.000	0.003	0.000	-0.001	0.013	0.004	0.000	-0.001	0.001
	SE	0.008	0.014	0.000	0.004	0.000	0.001	0.015	0.005	0.001	0.002	0.002
	Sig.	0.809	0.839	-0.224	0.651	-0.334	-0.757	0.839	0.781	-0.193	-0.555	0.592
Resilience	Est.	-0.044	0.012	0.000	**0.032***	0.000	-0.001	0.013	-0.006	**-0.072***	-0.001	0.001
	SE	0.074	0.014	0.000	**0.014**	0.000	0.001	0.015	0.008	**0.035**	0.002	0.002
	Sig.	-0.591	0.839	-0.224	**2.282**	-0.334	-0.757	0.839	-0.678	**-2.048**	-0.555	0.592
Problem Solving Skills	Est.	-0.004	0.001	0.000	**0.295***	0.000	0.000	0.001	-0.101	-0.015	0.000	0.000
	SE	0.007	0.001	0.000	**0.070**	0.000	0.000	0.002	0.052	0.036	0.000	0.000
	Sig.	-0.576	0.796	-0.223	**4.204**	-0.331	-0.725	0.796	-1.943	-0.406	-0.542	0.576

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

* $p < .05$

Table 10

Stacked Model Direct Endogenous Pathway Estimates for the Model in Figure 7.

		Impulsivity		Coping Skills (hostility)		Reactivity		Optimism		Resilience		Problem Solving Skills	
Group		Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	--	--	--	--	--	--	--	--	--	--	--	--
	SE												
	Sig.												
Coping Skills (hostility)	Est.	**0.138***	***0.138****	--	--	**0.169***	***0.169****	--	--	--	--	--	--
	SE	**0.025**	***0.025***			**0.030**	***0.030***						
	Sig.	**5.408**	***5.408***			**5.602**	***5.602***						
Reactivity	Est.	**0.161***	***0.161****	--	--	--	--	--	--	--	--	--	--
	SE	**0.028**	***0.028***										
	Sig.	**5.702**	***5.702***										
Optimism	Est.	--	--	0.070	*0.070*	--	--	--	--	--	--	--	--
	SE			0.062	*0.062*								
	Sig.			1.124	*1.124*								
Resilience	Est.	--	--	--	--	--	--	1.000	1.000	--	--	**0.109***	**0.212***
	SE											**0.036**	**0.050**
	Sig.											**3.024**	**4.212**
Problem Solving Skills	Est.	--	--	--	--	--	--	--	--	**0.109***	**0.212***	--	--
	SE									**0.036**	**0.050**		
	Sig.									**3.024**	**4.212**		

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

Note. Italics indicate coefficient estimates in the Supplemental Group that were constrained to be equal to the Primary Group.

* $p < .05$

Table 11

Stacked Model Direct Exogenous Pathway Estimates for the Model in Figure 7.

		Verbal Abuse		Physical Abuse		PMK Alcohol		Biological Sex		Community Size		Family Income	
	Group	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	**-0.126***	-0.058	**0.164***	***0.164****	-0.002	0.020	**0.190 ***	**0.178***	-0.007	-0.001	-0.013	0.000
	SE	**0.055**	0.073	**0.038**	***0.038***	0.016	0.021	**0.051**	**0.069**	0.020	0.027	0.036	0.045
	Sig.	**-2.287**	-0.801	**4.375**	***4.375***	-0.136	0.924	**3.726**	**2.597**	-0.340	-0.037	-0.356	-0.008
Coping Skills (hostility)	Est.	**0.110***	0.099	**0.091***	***0.091****	--	--	-0.009	-0.001	--	--	--	--
	SE	**0.037**	0.051	**0.027**	***0.027***			0.037	0.050				
	Sig.	**2.978**	1.927	**3.405**	***3.405***			-0.247	-0.025				
Reactivity	Est.	--	--	0.057	*0.057*	--	--	**0.152***	**0.167***	--	--	**-0.060***	**-0.070***
	SE			0.030	*0.030*			**0.042**	**0.059**			**0.024**	**0.034**
	Sig.			1.909	*1.909*			**3.592**	**2.812**			**-2.511**	**-2.072**
Optimism	Est.	-0.050	-0.180	--		--		--		--	--	--	--
	SE	0.072	0.105										
	Sig.	-0.689	-1.710										
Resilience	Est.			--	--	--	--	**2.556***	0.275	--	--	--	--
	SE							**1.058**	0.497				
	Sig.							**2.417**	0.554				
Problem Solving Skills	Est.	--	--	--	--	--	--	--	--	--	--	--	--
	SE												
	Sig.												

(table continues)

Table 11

Stacked Model Direct Exogenous Pathway Estimates for the Model in Figure 7.

		Relate Mom		Relate Dad		Friendship		Verbal Praise		Quality Time	
	Group	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	**0.111***	***0.111****	-0.012	*-0.012*	--	--	--	--	**-0.110***	**-0.134***
	SE	**0.052**	***0.052***	0.038	*0.038*					**0.033**	**0.053**
	Sig.	**2.112**	***2.112***	-0.322	*-0.322*					**-3.272**	**-2.534**
Coping Skills (hostility)	Est.	**0.156***	***0.156****	**0.072***	***0.072****	-0.017	*-0.017*	-0.020	-0.027	0.034	0.028
	SE	**0.036**	***0.036***	**0.026**	***0.026***	0.015	*0.015*	0.025	0.039	0.026	0.042
	Sig.	**4.351**	***4.351***	**2.749**	***2.749***	-1.109	*-1.109*	-0.811	-0.680	1.300	0.665
Reactivity	Est.	**0.080***	***0.080****	--	--	**0.066***	**0.060***	--	--	--	--
	SE	**0.035**	***0.035***			**0.022**	**0.029**				
	Sig.	**2.296**	***2.296***			**3.031**	**2.050**				
Optimism	Est.	--	--	--	--	**-0.071***	-0.064	--	--	--	--
	SE					**0.034**	0.049				
	Sig.					**-2.061**	-1.311				
Resilience	Est.	--	--	**-0.683***	***-0.683****	0.110	*0.110*	--	--	--	--
	SE			**0.321**	***0.321***	0.196	*0.196*				
	Sig.			**-2.126**	***-2.126***	0.560	*0.560*				
Problem Solving Skills	Est.	--	--	--	--	--	--	--	--	--	--
	SE										
	Sig.										

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

Note. Italics indicate coefficient estimates in the Supplemental Group that were constrained to be equal to the Primary Group.

* $p < .05$

Table 12

Stacked Model Total Indirect Endogenous Pathway Estimates for the Model in Figure 7.

		Impulsivity		Coping Skills (hostility)		Reactivity		Optimism		Resilience		Problem Solving Skills	
Group		Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	--	--	--	--	--	--	--	--	--	--	--	--
	SE												
	Sig.												
Coping Skills (hostility)	Est.	**0.027***	***0.027****	--	--	--	--	--	--	--	--	--	--
	SE	**0.007**	***0.007***										
	Sig.	**4.013**	***4.013***										
Reactivity	Est.	--	--	--	--	--	--	--	--	--	--	--	--
	SE												
	Sig.												
Optimism	Est.	0.012	*0.012*	--	--	0.012	0.012	--	--	--	--	--	--
	SE	0.010	*0.010*			0.011	0.011						
	Sig.	1.107	*1.107*			1.102	1.102						
Resilience	Est.	0.012	*0.012*	0.071	0.073	0.012	0.012	0.012	**0.047***	0.012	**0.047***	0.001	0.010
	SE	0.011	*0.011*	0.063	0.065	0.011	0.011	0.008	**0.017**	0.008	**0.017**	0.001	0.005
	Sig.	1.107	*1.107*	1.124	1.123	1.102	1.102	1.494	**2.799**	1.494	**2.799**	1.000	1.894
Problem Solving Skills	Est.	0.001	0.003	0.008	0.015	0.001	0.003	**0.110***	**0.221***	0.001	0.010	0.012	**0.047***
	SE	0.001	0.002	0.007	0.014	0.001	0.002	**0.037**	**0.041**	0.001	0.005	0.008	**0.017**
	Sig.	1.037	1.084	1.050	1.100	1.032	1.079	**2.952**	**5.357**	1.000	1.894	1.494	**2.799**

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

Note. Italics indicate coefficient estimates from in the Supplemental Group that were constrained to be equal to the Primary Group.

* $p < .05$

Table 13

Stacked Model Total Indirect Exogenous Pathway Estimates for the Model in Figure 7.

		Verbal Abuse		Physical Abuse		PMK Alcohol		Biological Sex		Community Size		Family Income	
	Group	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	--	--	--	--	--	--	--	--	--	--	--	--
	SE												
	Sig.												
Coping Skills (hostility)	Est.	**-0.021***	-0.010	**0.037***	***0.037****	0.000	0.003	**0.057***	**0.058***	-0.001	0.000	-0.012	-0.012
	SE	**0.010**	0.009	**0.009**	***0.009***	0.003	0.003	**0.013**	**0.013**	0.003	0.003	0.007	0.007
	Sig.	**-2.153**	-1.042	**4.115**	***4.115***	-0.136	1.167	**4.471**	**4.498**	-0.340	-0.048	-1.671	-1.606
Reactivity	Est.	**-0.020***	-0.009	**0.027***	***0.027****	0.000	0.003	**0.031***	**0.029***	-0.001	0.000	-0.002	0.000
	SE	**0.010**	0.009	**0.008**	***0.008***	0.003	0.003	**0.010**	**0.010**	0.003	0.003	0.006	0.006
	Sig.	**-2.124**	-1.040	**3.499**	***3.499***	-0.136	1.161	**3.116**	**2.983**	-0.340	-0.048	-0.356	-0.010
Optimism	Est.	0.006	0.006	0.009	*0.009*	0.000	0.000	0.003	0.004	0.000	0.000	-0.001	-0.001
	SE	0.006	0.006	0.008	*0.008*	0.000	0.000	0.004	0.004	0.000	0.000	0.001	0.001
	Sig.	1.014	1.013	1.093	*1.093*	-0.135	0.809	0.842	0.898	-0.325	-0.048	-0.933	-0.921
Resilience	Est.	-0.044	**-0.182***	0.009	0.009	0.000	0.000	**0.035***	0.015	0.000	0.000	-0.001	-0.001
	SE	0.073	**0.075**	0.008	0.009	0.000	0.000	**0.013**	0.048	0.000	0.000	0.001	0.001
	Sig.	-0.604	**-2.410**	1.093	1.093	-0.135	0.809	**2.686**	0.315	-0.325	-0.048	-0.933	-0.921
Problem Solving Skills	Est.	-0.005	**-0.038***	0.001	0.002	0.000	0.000	**0.287***	0.053	0.000	0.000	0.000	0.000
	SE	0.008	**0.017**	0.001	0.002	0.000	0.000	**0.066**	0.234	0.000	0.000	0.000	0.000
	Sig.	-0.592	**-2.200**	1.025	1.071	-0.135	0.800	**4.326**	0.227	-0.323	-0.048	-0.889	-0.908

(table continues)

Table 13

Stacked Model Total Indirect Exogenous Pathway Estimates for the Model in Figure 7.

		Relate Mom		Relate Dad		Friendship		Verbal Praise		Quality Time	
	Group	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
	Est.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Impulsivity	SE										
	Sig.										
Coping	Est.	**0.032***	***0.032****	-0.002	*-0.002*	**0.011***	**0.010***	- -	- -	**-0.018***	**-0.022***
Skills	SE	**0.011**	***0.011***	0.006	*0.006*	**0.004**	**0.004**			**0.006**	**0.007**
(hostility)	Sig.	**2.890**	***2.890***	-0.321	*-0.321*	**2.666**	**2.473**			**-2.911**	**-3.389**
	Est.	0.018	*0.018*	-0.002	*-0.002*	- -	- -	- -	- -	**-0.018***	**-0.022***
Reactivity	SE	0.009	*0.009*	0.006	*0.006*					**0.006**	**0.007**
	Sig.	1.983	*1.983*	-0.321	*-0.321*					**-2.838**	**-3.271**
	Est.	0.013	*0.013*	0.005	*0.005*	0.000	0.000	-0.001	-0.002	0.001	0.000
Optimism	SE	0.012	*0.012*	0.005	*0.005*	0.001	0.001	0.002	0.002	0.002	0.002
	Sig.	1.097	*1.097*	1.032	*1.032*	-0.358	-0.412	-0.658	-0.772	0.527	0.212
	Est.	0.013	0.014	-0.003	-0.025	**-0.071***	-0.062	-0.001	-0.002	0.001	0.000
Resilience	SE	0.012	0.012	0.007	0.016	**0.035**	0.037	0.002	0.003	0.002	0.002
	Sig.	1.097	1.097	-0.399	-1.566	**-2.027**	-1.667	-0.658	-0.772	0.527	0.212
Problem	Est.	0.001	0.003	-0.071	**-0.143***	0.005	0.012	0.000	0.000	0.000	0.000
Solving	SE	0.001	0.003	0.036	**0.066**	0.021	0.042	0.000	0.001	0.000	0.000
Skills	Sig.	1.028	1.075	-1.991	**-2.169**	0.241	0.278	-0.642	-0.764	0.519	0.211

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Unstandardized.

Note. Italics indicate coefficient estimates in the Supplemental Group that were constrained to be equal to the Primary Group.

* $p < .05$

Table 14

Stacked Model Endogenous Common Metric Standardized Solution for the Model in Figure 7.

		Impulsivity		Coping Skills (hostility)		Reactivity		Optimism		Resilience		Problem Solving Skills	
Group		Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	--	--	--	--	--	--	--	--	--	--	--	--
Coping Skills (hostility)	Est.	0.185[a]	*0.185*[a]	--	--	0.187[a]	*0.187*[a]	--	--	--	--	--	--
Reactivity	Est.	0.195[a]	*0.195*[a]	--	--	--	--	--	--	--	--	--	--
Optimism	Est.	--	--	0.039	*0.039*	--	--	--	--	--	--	--	--
Resilience	Est.	--	--	--	--	--	--	0.381[b]	*0.381*[b]	--	--	0.041	0.080
Problem Solving Skills	Est.	--	--	--	--	--	--	--	--	0.290[a]	0.563[c]	--	--

Note. The table reads from the column variable to the row variable regarding causality.

Note. Estimates are Standardized.

Note. Italics indicate coefficient estimates from the Supplemental Group that were constrained to be equal to the Primary Group.

Note. Effect sizes are [a]small (.10), [b]medium (.30), and [c]large (.50) Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155-159. doi:10.1037/0033-2909.112.1.155

Table 15

Stacked Model Exogenous Common Metric Standardized Solution for the Model in Figure 7.

		Verbal Abuse		Physical Abuse		PMK Alcohol		Biological Sex		Community Size		Family Income	
	Group	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	-0.099	-0.046	0.167[a]	*0.167*[a]	-0.006	0.056	0.157[a]	0.148[a]	-0.016	-0.002	-0.018	0.000
Coping Skills (hostility)	Est.	0.116[a]	0.104[a]	0.124[a]	*0.124*[a]	--	--	-0.010	-0.001	--	--	--	--
Reactivity	Est.	--	--	0.070	*0.070*	--	--	0.152[a]	0.167[a]	--	--	-0.103[a]	-0.120[a]
Optimism	Est.	-0.029	-0.104[a]	--	--	--	--	--	--	--	--	--	--
Resilience	Est.	--	--	--	--	--	--	0.606[c]	0.055	--	--	--	--
Problem Solving Skills	Est.	--	--	--	--	--	--	--	--	--	--	--	--

		Relate Mom		Relate Dad		Friendship		Verbal Praise		Quality Time	
	Group	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental	Primary	Supplemental
Impulsivity	Est.	0.086	*0.086*	-0.013[a]	*-0.013*[a]	--	--	--	--	-0.139[a]	-0.170[a]
Coping Skills (hostility)	Est.	0.163[a]	*0.163*[a]	0.102[a]	*0.102*[a]	-0.037	-0.037	-0.036	-0.047	0.058	0.047
Reactivity	Est.	0.076	*0.076*	--	--	0.131[a]	0.119[a]	--	--	--	--
Optimism	Est.	--	--	--	--	-0.086	-0.077	--	--	--	--
Resilience	Est.	--	--	-0.194[a]	*-0.194*[a]	0.054	0.054	--	--	--	--
Problem Solving Skills	Est.	--	--	--	--	--	--	--	--	--	--

Note. The table reads from the column variable to the row variable regarding causality.

Note. Esti mates are Standardized.

Note. Italics indicate coefficient estimates from the Supplemental Group that were constrained to be equal to the Primary Group.

Note. Effect sizes are [a]small (.10), [b]medium (.30), and [c]large (.50) Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155-159. doi:10.1037/0033-2909.112.1.155

Figures

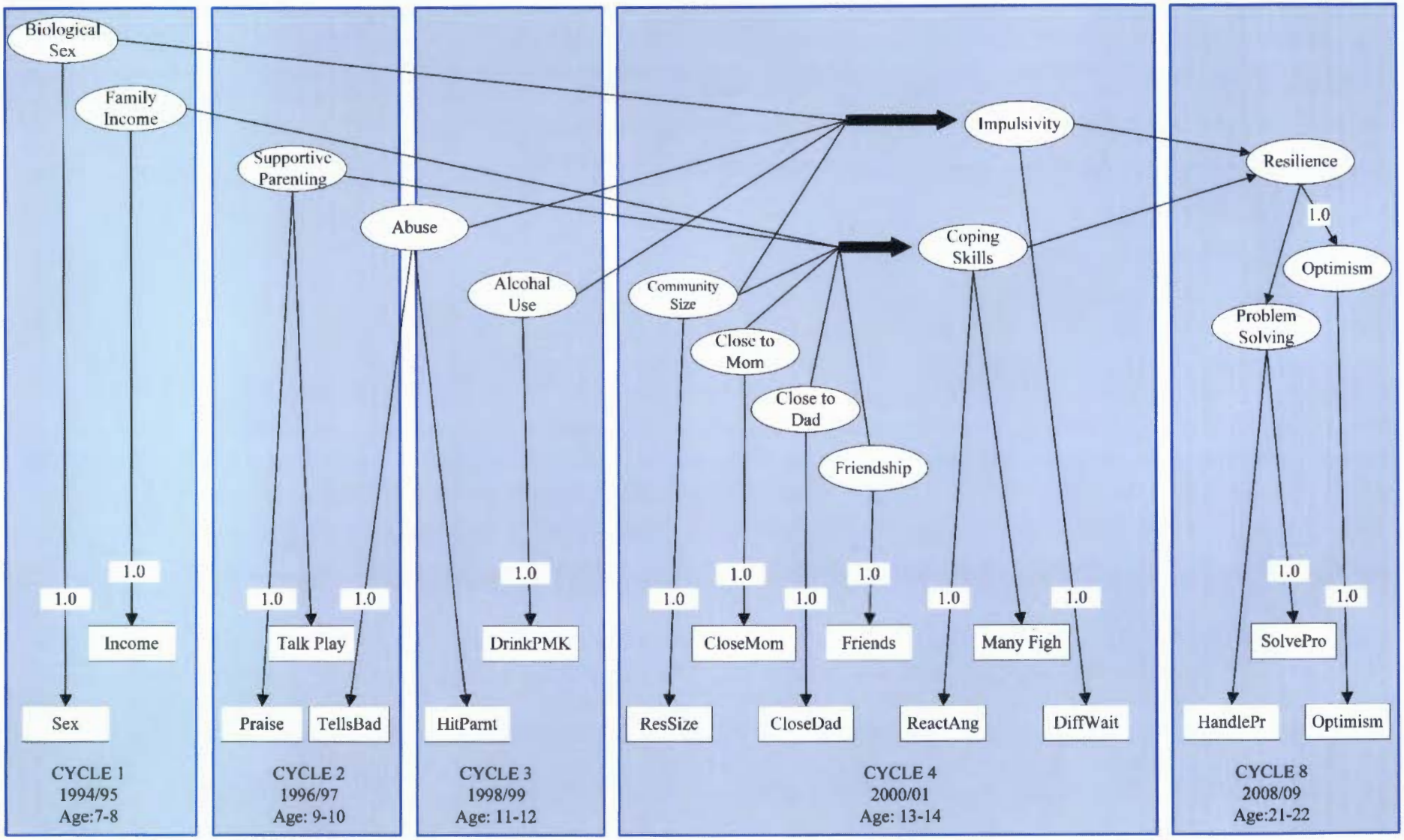

Figure 1. Proposed SEM Model

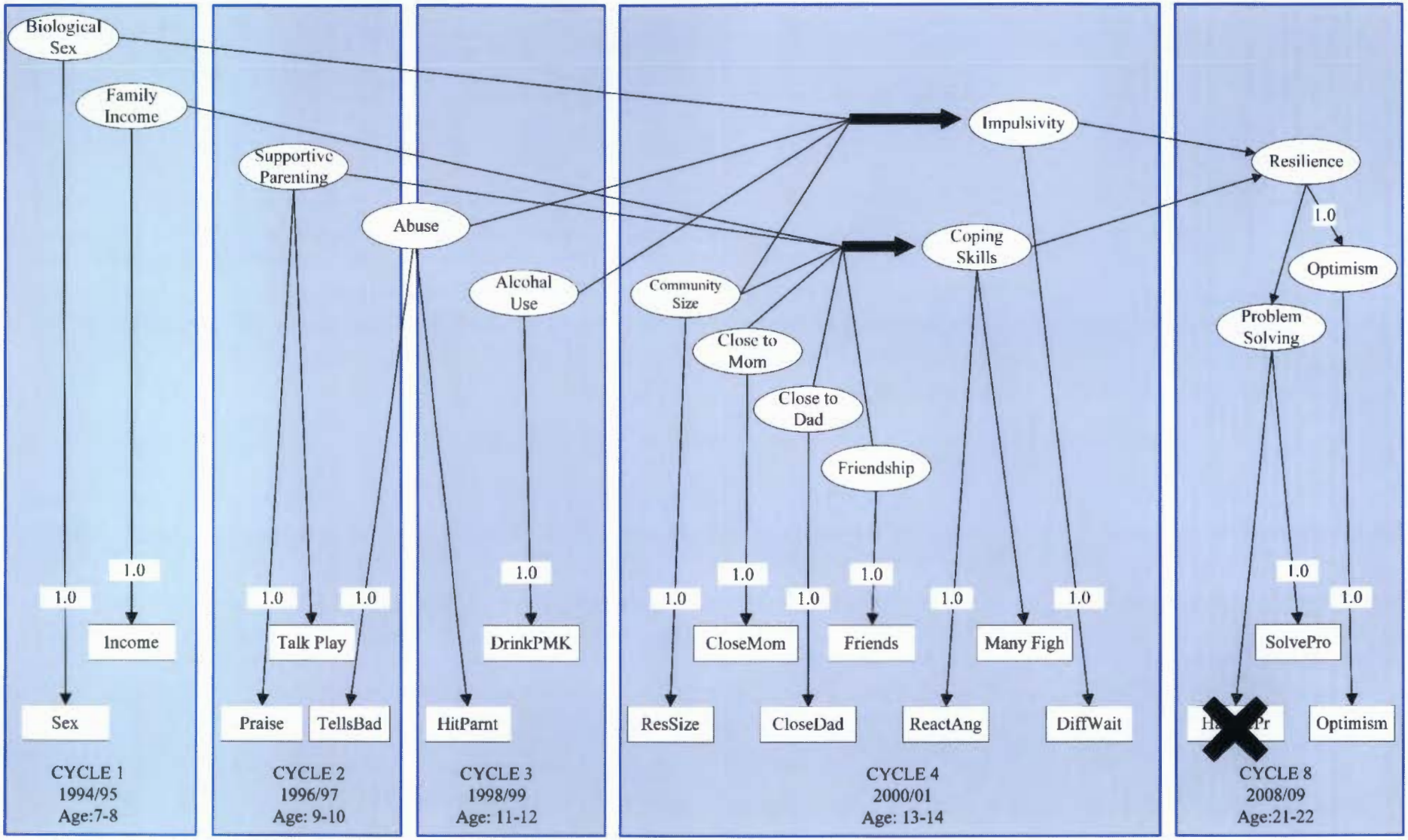

Figure 2. Proposed SEM model removal of Handle Problems Variable

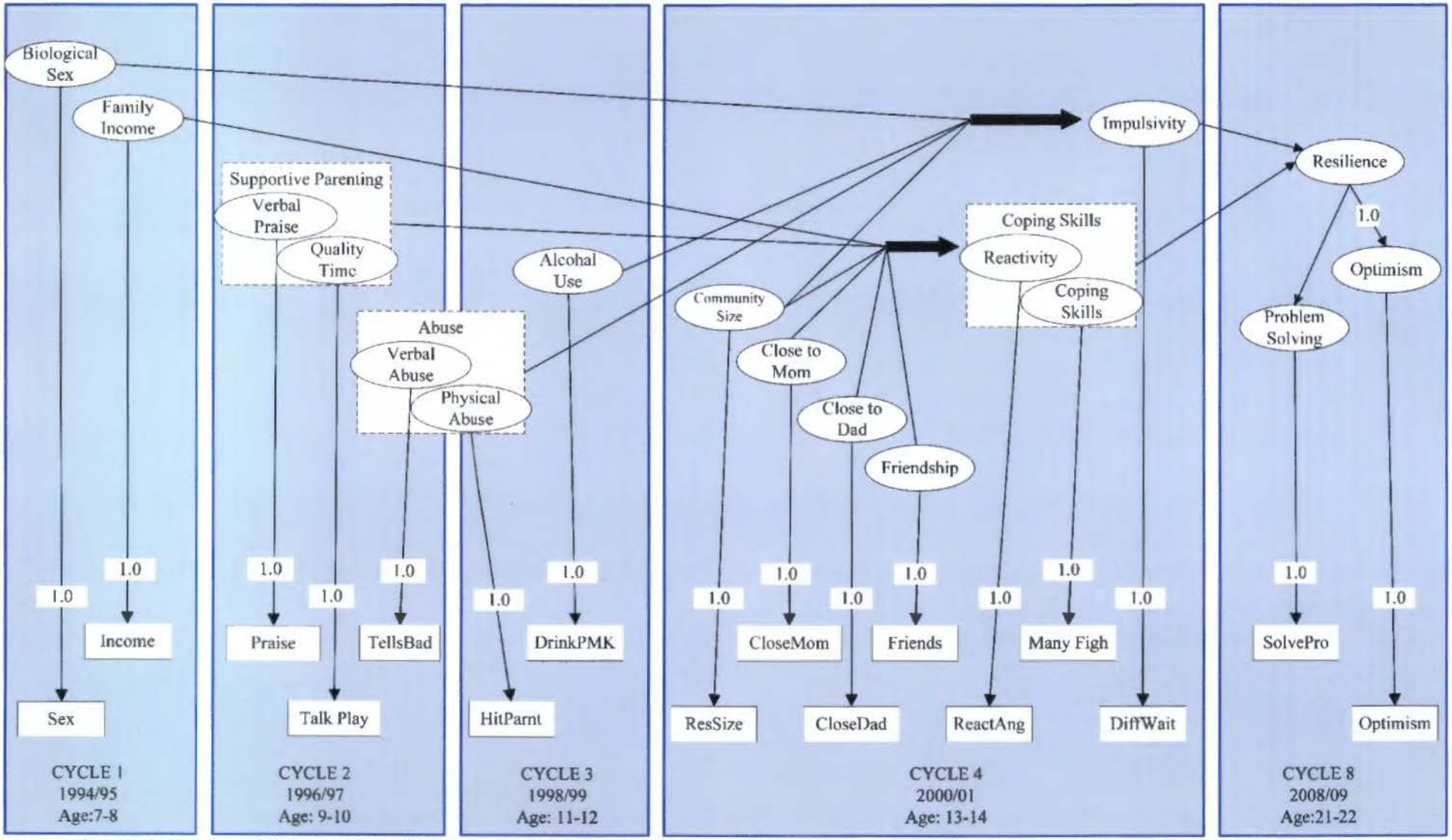

Figure 3. Proposed SEM model with single indicators.

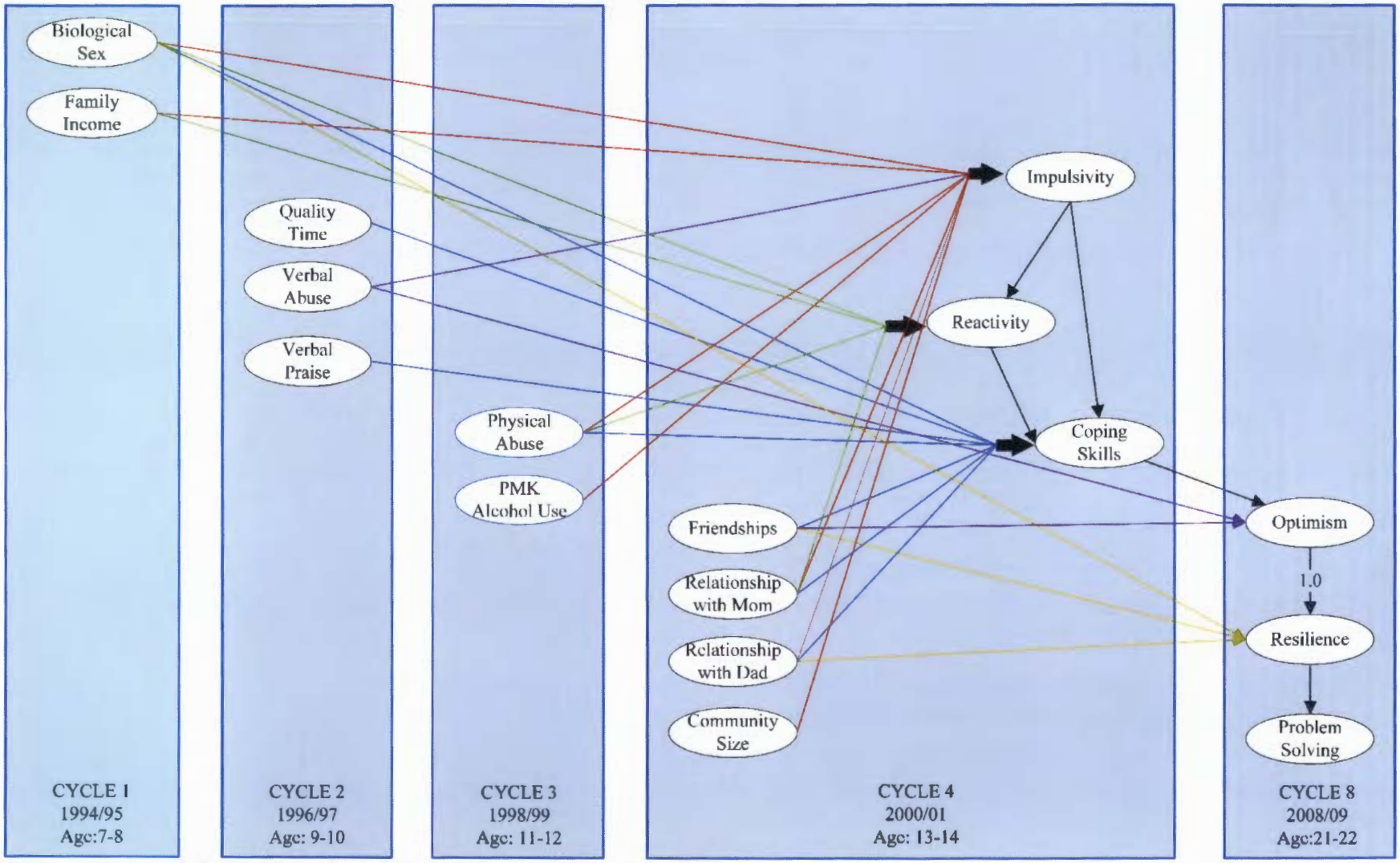

Figure 4. Proposed SEM model with Optimism as a cause of Resilience.

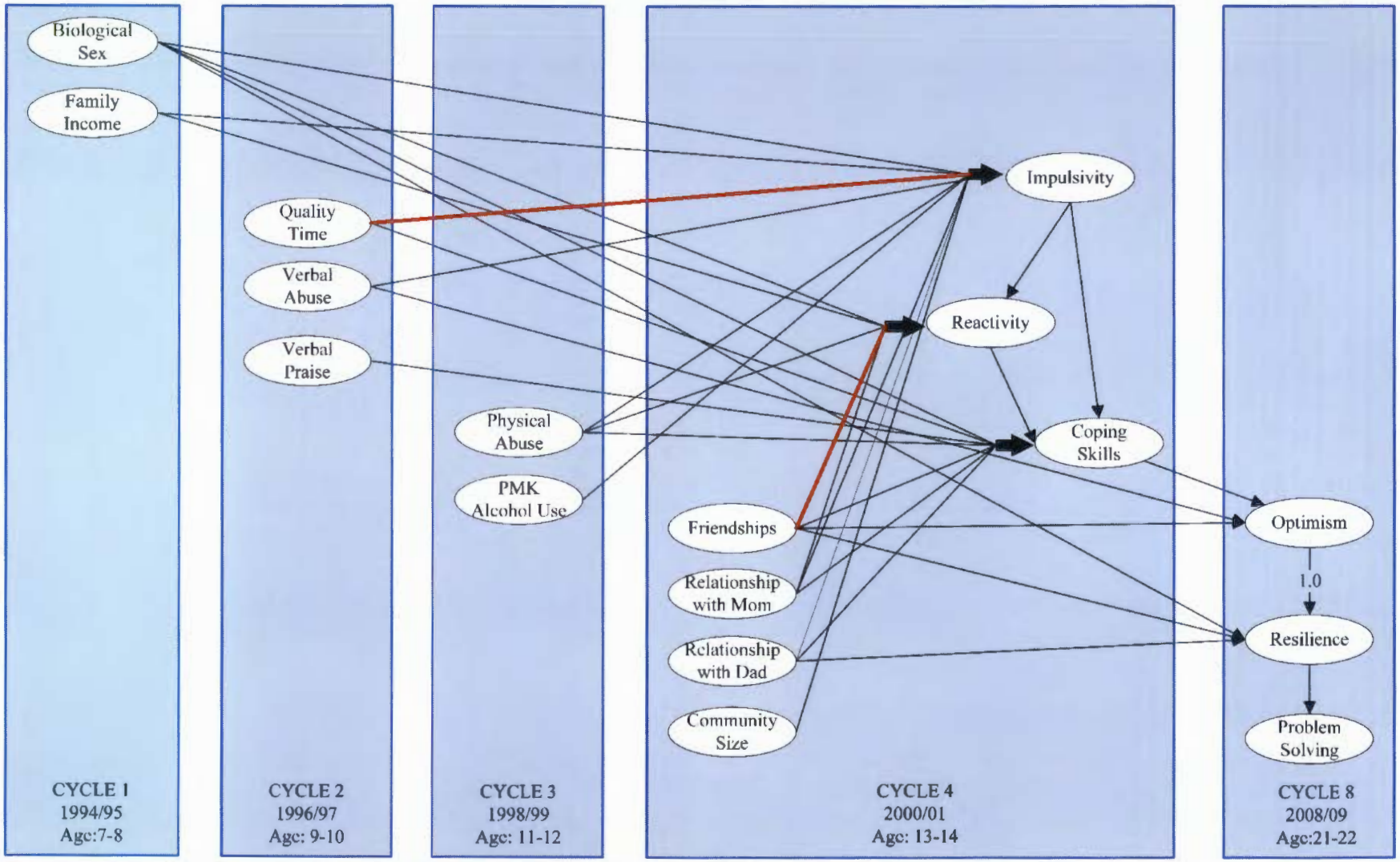

Figure 5. Proposed SEM model with additional pathways from Friendships to Reactivity and from Quality Time to Impulsivity.

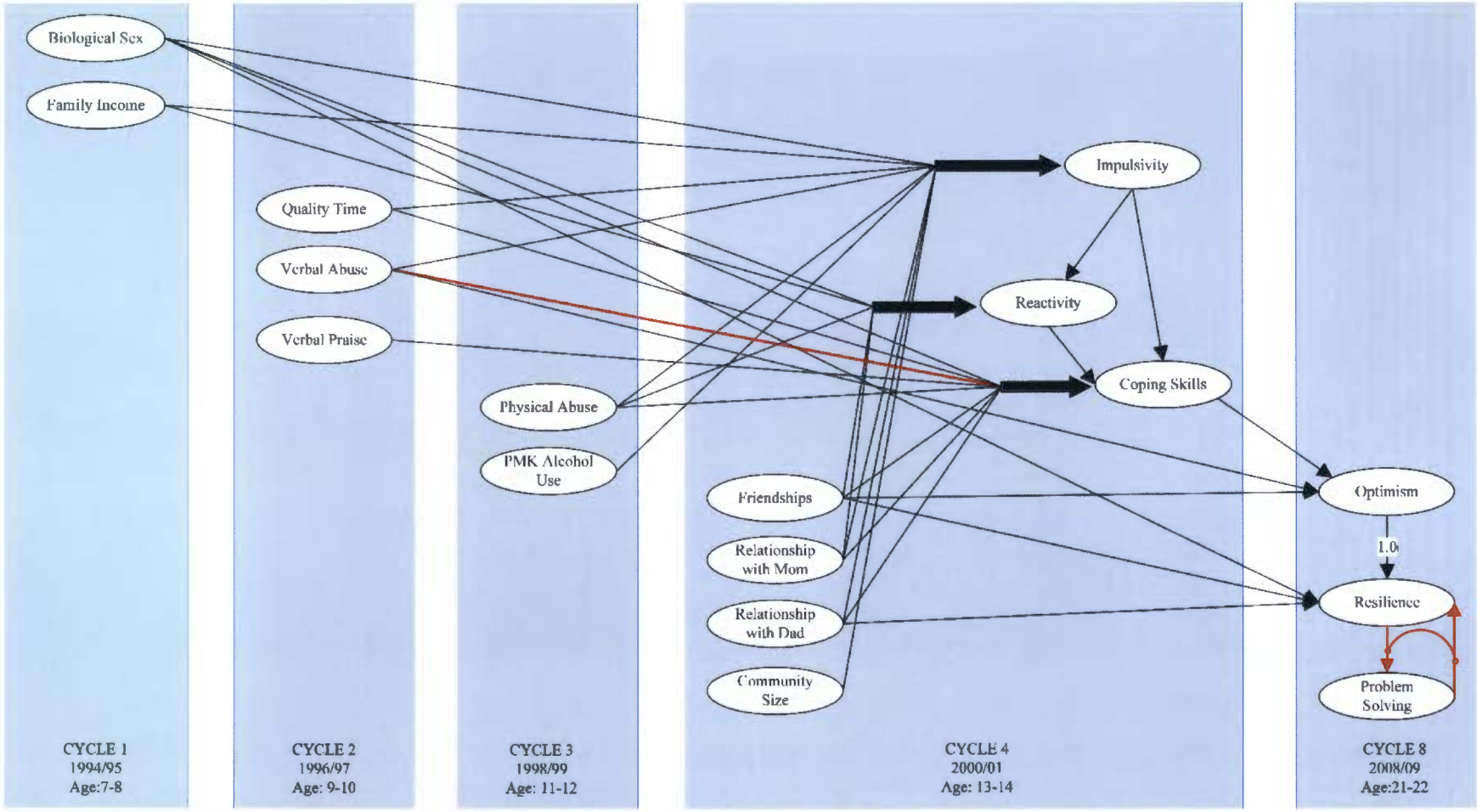

Figure 6. Proposed SEM model with the additional pathway from Verbal Abuse to Coping Skills and reciprocal effects between Resilience and Problem Solving held equal.

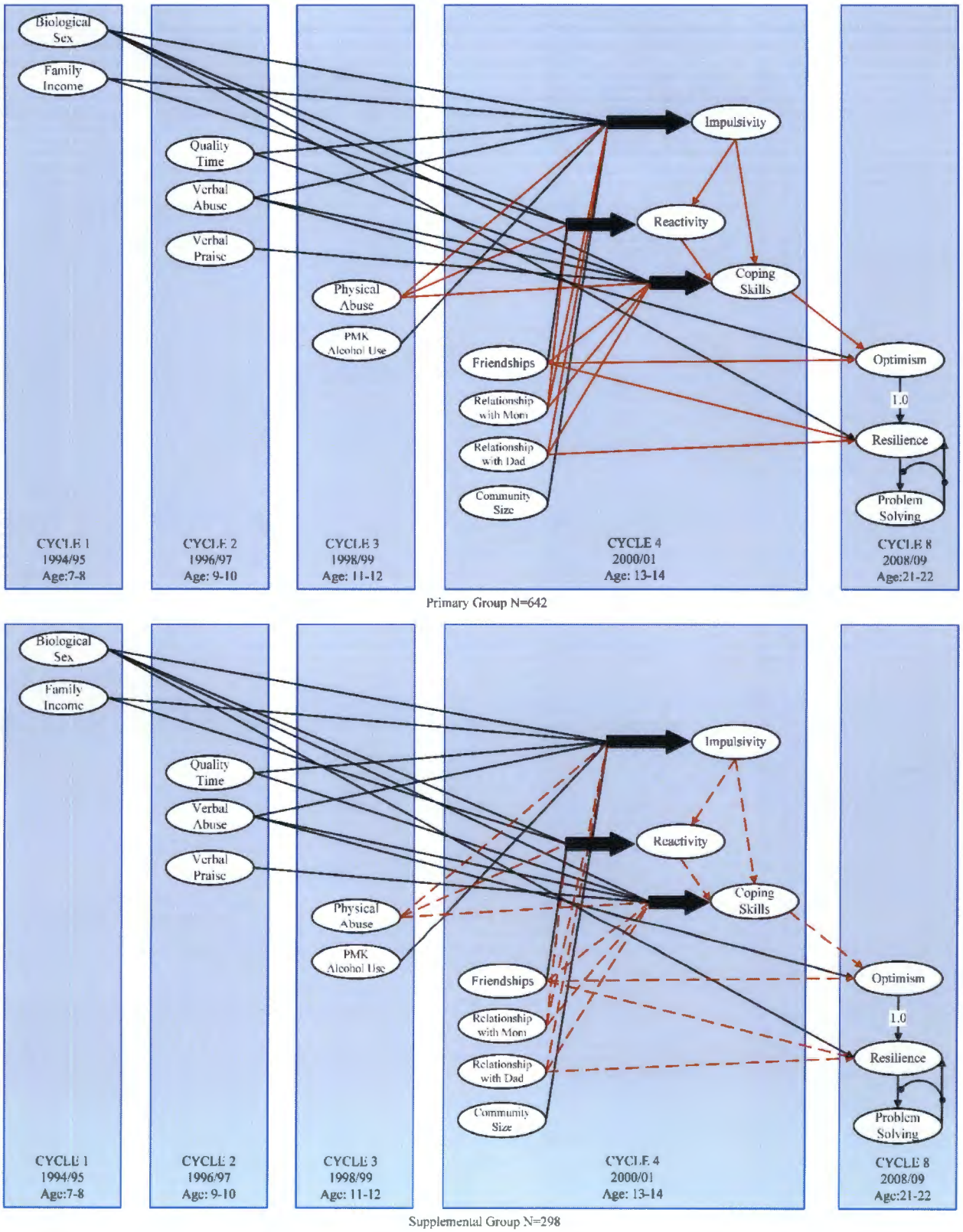

Figure 7. Proposed SEM model with two groups.

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Appendix A

Lisrel Syntax Primary Group Non-Significant Model

```
DA NI=16 NO=642 MA=CM NG=1
 CM SY
 0.2295
 0.0021 0.5111
 0.1139 0.0826 3.1278
 0.0275 0.0335 -0.0135 0.2481
 -0.0838 -0.0189 -0.2348 0.0271 2.1745
 -0.0590 -0.0288 -0.5404 -0.0173 0.3697 0.8102
 0.0285 -0.0094 -0.0896 0.1840 0.0045 -0.0526 1.0034
 0.0073 0.0398 0.1394 0.0007 -0.0395 -0.0328 -0.0095 0.2353
 0.0160 0.0373 0.0913 -0.0565 0.0002 -0.0448 -0.0785 0.1512
0.4194
 -0.0065 -0.0861 -0.1204 -0.0090 0.1957 0.0612 -0.0266 -0.0322 -
0.0159 0.6883
 -0.0493 -0.0931 -0.1485 -0.0179 0.1918 0.0375 -0.0288 -0.0311 -
0.0097 0.3036 0.6626
 -0.0151 0.0892 0.0287 0.0515 -0.0310 -0.0185 -0.0032 0.0335
0.0076 -0.0187 -0.0863 0.3893
 0.0120 0.0466 0.0245 0.0608 -0.0242 -0.0570 0.0927 0.0270
0.0043 -0.0332 -0.0306 0.0749 0.2573
 0.0242 0.0646 0.0778 0.0137 -0.0355 -0.0413 -0.0075 0.0586
0.0613 -0.0251 -0.0209 0.0716 0.0593 0.2074
 -0.0108 0.0218 0.0009 -0.0051 -0.0084 0.0449 -0.0699 -0.0097 -
0.0262 -0.0422 -0.0229 0.0260 0.0067 0.0124 0.7086
 -0.0245 -0.0178 -0.0439 0.0763 -0.0272 -0.0356 0.0473 0.0018 -
0.0596 -0.0444 0.0055 0.0043 0.0308 -0.0235 0.0685 0.6710
 LA
 'TellsBad' 'HitParnt' 'DrinkPMK' 'Sex' 'ResSize' 'Income' 'Friends'
'CloseMom' 'CloseDad' 'Praise' 'TalkPlay' 'DiffWait' 'ReactAng'
'ManyFigh' 'Optimism' 'SolvePro'
 SE
 'DiffWait' 'ManyFigh' 'ReactAng' 'Optimism' 'SolvePro'
 'TellsBad' 'HitParnt' 'DrinkPMK' 'Sex' 'ResSize' 'Income'
'CloseMom' 'CloseDad' 'Friends' 'Praise' 'TalkPlay'/

 MO NY=5 NX=11 NE=6 NK=11 LY=FU,FI LX=FU,FI
BE=FU,FI GA=FU,FI C
 PH=SY,FR PS=SY,FI TE=SY,FI TD=SY,FI

 VA 1.0 LY(1,1) LY(2,2) LY(3,3) LY(4,4) LY(5,6) LX(1,1)
LX(2,2) LX(3,3) LX(4,4) LX(5,5) LX(6,6) LX(7,7) LX(8,8)
LX(9,9) LX(10,10) LX(11,11)

 FR BE(2,1) BE(2,3)
 FR BE(3,1)
 FR BE(4,2)
 FR BE(6,5)
 FR BE(5,6)
 EQ BE(6,5) BE(5,6)
 ST 0.05 BE(2,1)
 ST 0.01 BE(3,1)
 ST 0.1 BE(2,3)
 ST 0.1 BE(4,2)
 ST 0.1 BE(6,5) BE(5,6)
 VA 1.0 BE(5,4)

 FR GA(1,I) GA(1,2) GA(1,3) GA(1,4) GA(1,5) GA(1,6) GA(1,7)
GA(1,8) GA(1,11)
 FR GA(2,1) GA(2,2) GA(2,4) GA(2,7) GA(2,8) GA(2,9)
GA(2,10) GA(2,11)
 FR GA(3,2) GA(3,4) GA(3,6) GA(3,7) GA(3,9)
 FR GA(4,1) GA(4,9)
 FR GA(5,4) GA(5,8) GA(5,9)

 ST 0.02 GA(1,1) GA(1,2) GA(1,3) GA(1,4) GA(1,5) GA(1,6)
GA(1,7) GA(1,8) GA(1,11)
 ST 0.03 GA(2,1) GA(2,2) GA(2,4) GA(2,7) GA(2,8) GA(2,9)
GA(2,10) GA(2,11)
 ST 0.02 GA(3,2) GA(3,4) GA(3,6) GA(3,7) GA(3,9)
 ST 0.02 GA(4,9)
 ST 0.02 GA(5,4)
 ST 0.1 GA(5,8)
 ST 0.001 GA(5,9)
 ST 0.1 GA(4,1)

 FR PS(1,1) PS(2,2) PS(3,3) PS(4,4) PS(6,6)
 VA 3.49 PS(5,5)
 ST 0.2 PS(3,3)
 ST 0.5 PS(4,4)
 ST 0.5 PS(6,6)
 ST 0.09 PS(1,1) PS(2,2)

 VA 0.0467 TE(1,1)
 VA 0.0180 TE(3,3)
 VA 0.0104 TE(2,2)
 VA 0.0336 TE(5,5)
 VA 0.0354 TE(4,4)

 VA 0.0115 TD(1,1)
 VA 0.2045 TD(2,2)
 VA 0.2189 TD(3,3)
 VA 0.0025 TD(4,4)
 VA 0.2609 TD(5,5)
 VA 0.0972 TD(6,6)
 VA 0.0235 TD(7,7)
 VA 0.0210 TD(8,8)
 VA 0.0502 TD(9,9)
 VA 0.0482 TD(10,10)
 VA 0.0464 TD(11,11)

 PD
 OU ML ALL AD=OFF ND=3
```

Appendix B

Lisrel Syntax Primary and Supplemental Groups Non-Significant Model

```
Stacked Model
Primary Group
 DA NI=16 NO=642 MA=CM NG=2
 CM SY
 0.2295
 0.0021 0.5111
 0.1139 0.0826 3.1278
 0.0275 0.0335 -0.0135 0.2481
 -0.0838 -0.0189 -0.2348 0.0271 2.1745
 -0.0590 -0.0288 -0.5404 -0.0173 0.3697 0.8102
 0.0285 -0.0094 -0.0896 0.1840 0.0045 -0.0526 1.0034
 0.0073 0.0398 0.1394 0.0007 -0.0395 -0.0328 -0.0095 0.2353
 0.0160 0.0373 0.0913 -0.0565 0.0002 -0.0448 -0.0785 0.1512
0.4194
 -0.0065 -0.0861 -0.1204 -0.0090 0.1957 0.0612 -0.0266 -0.0322 -
0.0159 0.6883
 -0.0493 -0.0931 -0.1485 -0.0179 0.1918 0.0375 -0.0288 -0.0311 -
0.0097 0.3036 0.6626
 -0.0151 0.0892 0.0287 0.0515 -0.0310 -0.0185 -0.0032 0.0335
0.0076 -0.0187 -0.0863 0.3893
 0.0120 0.0466 0.0245 0.0608 -0.0242 -0.0570 0.0927 0.0270
0.0043 -0.0332 -0.0306 0.0749 0.2573
 0.0242 0.0646 0.0778 0.0137 -0.0355 -0.0413 -0.0075 0.0586
0.0613 -0.0251 -0.0209 0.0716 0.0593 0.2074
 -0.0108 0.0218 0.0009 -0.0051 -0.0084 0.0449 -0.0699 -0.0097 -
0.0262 -0.0422 -0.0229 0.0260 0.0067 0.0124 0.7086
 -0.0245 -0.0178 -0.0439 0.0763 -0.0272 -0.0356 0.0473 0.0018 -
0.0596 -0.0444 0.0055 0.0043 0.0308 -0.0235 0.0685 0.6710
 LA
 'TellsBad' 'HitPamt' 'DrinkPMK' 'Sex' 'ResSize' 'Income' 'Friends'
'CloseMom' 'CloseDad' 'Praise' 'TalkPlay' 'DiffWait' 'ReactAng'
'ManyFigh' 'Optimism' 'SolvePro'
 SE
 'DiffWait' 'ManyFigh' 'ReactAng' 'Optimism' 'SolvePro'
 'TellsBad' 'HitPamt' 'DrinkPMK' 'Sex' 'ResSize' 'Income'
'CloseMom' 'CloseDad' 'Friends' 'Praise' 'TalkPlay'/

 MO NY=5 NX=11 NE=6 NK=11 LY=FU,FI LX=FU,FI
BE=FU,FI GA=FU,FI C
  PH=SY,FR PS=SY,FI TE=SY,FI TD=SY,FI

 VA 1.0 LY(1,1) LY(2,2) LY(3,3) LY(4,4) LY(5,6) LX(1,1)
LX(2,2) LX(3,3) LX(4,4) LX(5,5) LX(6,6) LX(7,7) LX(8,8)
LX(9,9) LX(10,10) LX(11,11)

 FR BE(2,1) BE(2,3)
 FR BE(3,1)
 FR BE(4,2)
 FR BE(5,6)
 FR BE(6,5)
 EQ BE(5,6) BE(6,5)
 ST 0.1 BE(2,1) BE(3,1) BE(2,3)
 ST 0.1 BE(4,2)
 ST 0.1 BE(6,5)
 ST 0.1 BE(5,6)
 VA 1.0 BE(5,4)

 FR GA(1,1) GA(1,2) GA(1,3) GA(1,4) GA(1,5) GA(1,6) GA(1,7)
GA(1,8) GA(1,11)
 FR GA(2,1) GA(2,2) GA(2,4) GA(2,7) GA(2,8) GA(2,9)
GA(2,10) GA(2,11)
 FR GA(3,2) GA(3,4) GA(3,6) GA(3,7) GA(3,9)
 FR GA(4,1) GA(4,9)
 FR GA(5,4) GA(5,8) GA(5,9)

 ST 0.02 GA(1,1) GA(1,2) GA(1,3) GA(1,4) GA(1,5) GA(1,6)
GA(1,7) GA(1,8) GA(1,11)
 ST 0.03 GA(2,1) GA(2,2) GA(2,4) GA(2,7) GA(2,8) GA(2,9)
GA(2,10) GA(2,11)
 ST 0.02 GA(3,2) GA(3,4) GA(3,6) GA(3,7) GA(3,9)
 ST 0.02 GA(4,9)
 ST 0.02 GA(5,4) GA(5,8)
 ST 0.1 GA(5,9)
 ST 0.1 GA(4,1)

 FR PS(1,1) PS(2,2) PS(3,3) PS(4,4) PS(6,6)
 VA 2.78 PS(5,5)
 ST 0.05 PS(1,1) PS(2,2) PS(3,3)
 ST 0.04 PS(4,4)
 ST 0.5 PS(6,6)

 VA 0.0467 TE(1,1)
 VA 0.0180 TE(3,3)
 VA 0.0104 TE(2,2)
 VA 0.0354 TE(5,5)
 VA 0.0354 TE(4,4)

 VA 0.0115 TD(1,1)
 VA 0.2045 TD(2,2)
 VA 0.2189 TD(3,3)
 VA 0.0025 TD(4,4)
 VA 0.2609 TD(5,5)
 VA 0.0972 TD(6,6)
 VA 0.0235 TD(7,7)
 VA 0.0210 TD(8,8)
 VA 0.0502 TD(9,9)
 VA 0.0482 TD(10,10)
 VA 0.0464 TD(11,11)
 OU

Supplemental Group
 DA NI=16 NO=289 MA=CM
 CM SY
 0.2392
 0.0021 0.5111[a]
 0.0763 0.0826 3.3385
 0.0020 0.0335 -0.0612 0.2507
 0.0519 -0.0189 -0.1482 -0.0145 2.2820
 0.0173 -0.0288 -0.1666 0.0275 0.3292 0.8307
 0.0285 -0.0094 -0.0896 0.1840 0.0045 -0.0526 1.0034[a]
 0.0073 0.0398 0.1394 0.0007 -0.0395 -0.0328 -0.0095 0.2353[a]
 0.0160 0.0373 0.0913 -0.0565 0.0002 -0.0448 -0.0785 0.1512
0.4194[a]
 0.0404 -0.0861 0.2622 -0.0355 0.0856 0.0740 -0.0266 -0.0322 -
0.0159 0.6188
 0.0350 -0.0931 0.3283 -0.0162 0.0982 0.0718 -0.0288 -0.0311 -
0.0097 0.2831 0.5425
 -0.0151 0.0892 0.0287 0.0515 -0.0310 -0.0185 -0.0032 0.0335
0.0076 -0.0187 -0.0863 0.3893[a]
 0.0120 0.0466 0.0245 0.0608 -0.0242 -0.0570 0.0927 0.0270
0.0043 -0.0332 -0.0306 0.0749 0.2573[a]
 0.0242 0.0646 0.0778 0.0137 -0.0355 -0.0413 -0.0075 0.0586
0.0613 -0.0251 -0.0209 0.0716 0.0593 0.2074
 -0.0405 0.0218 0.0325 0.0562 -0.0066 -0.0430 -0.0699 -0.0097 -
0.0262 -0.0169 -0.0183 0.0260 0.0067 0.0124 0.6559
```

```
-0.0575 -0.0178 -0.2193 0.0375 0.0417 0.0685 0.0473 0.0018 -
0.0596 -0.0711 -0.0682 0.0043 0.0308 -0.0235 0.1487 0.6868

 LA
 'TellsBad' 'XHitParnt' 'DrinkPMK' 'Sex' 'ResSize' 'Income'
'XFriends' 'XCloseMom' 'XCloseDad' 'Praise' 'TalkPlay'
'XDiffWait' 'XReactAng' 'XManyFigh' 'Optimism' 'SolvePro'
 SE
 'XDiffWait' 'XManyFigh' 'XReactAng' 'Optimism' 'SolvePro'
 'TellsBad' 'XHitParnt' 'DrinkPMK' 'Sex' 'ResSize' 'Income'
'XCloseMom' 'XCloseDad' 'XFriends' 'Praise' 'TalkPlay'/

 MO NY=5 NX=11 NE=6 NK=11 LY=FU,FI LX=FU,FI
BE=FU,FI GA=FU,FI C
  PH=SY,FR PS=SY,FI TE=SY,FI TD=SY,FI

 VA 1.0 LY(1,1) LY(2,2) LY(3,3) LY(4,4) LY(5,6) LX(1,1)
LX(2,2) LX(3,3) LX(4,4) LX(5,5) LX(6,6) LX(7,7) LX(8,8)
LX(9,9) LX(10,10) LX(11,11)

 FR BE(2,1) BE(2,3)
 FR BE(3,1)
 FR BE(4,2)
 FR BE(5,6)
 FR BE(6,5)
 EQ BE(5,6) BE(6,5)
 VA 1.0 BE(5,4)

 ST 0.1 BE(2,1) BE(3,1) BE(2,3)
 ST 0.1 BE(4,2)
 ST 0.01 BE(6,5)
 ST 0.01 BE(5,6)

 FR GA(1,1) GA(1,2) GA(1,3) GA(1,4) GA(1,5) GA(1,6) GA(1,7)
GA(1,8) GA(1,11)
 FR GA(2,1) GA(2,2) GA(2,4) GA(2,7) GA(2,8) GA(2,9)
GA(2,10) GA(2,11)
 FR GA(3,2) GA(3,4) GA(3,6) GA(3,7) GA(3,9)
 FR GA(4,1) GA(4,9)
 FR GA(5,4) GA(5,8) GA(5,9)

 ST 0.02 GA(1,1) GA(1,2) GA(1,3) GA(1,4) GA(1,5) GA(1,6)
GA(1,7) GA(1,8) GA(1,11)
 ST 0.03 GA(2,1) GA(2,2) GA(2,4) GA(2,7) GA(2,8) GA(2,9)
GA(2,10) GA(2,11)
 ST 0.02 GA(3,2) GA(3,4) GA(3,6) GA(3,7) GA(3,9)
 ST 0.02 GA(4,9)
 ST 0.02 GA(5,4) GA(5,8)
 ST 0.1 GA(5,9)
 ST 0.1 GA(4,1)

FR PS(1,1) PS(2,2) PS(3,3) PS(4,4) PS(6,6)
VA 0.988 PS(5,5)
ST 0.5 PS(1,1) PS(2,2) PS(3,3)
ST 0.4 PS(4,4)
ST 0.2 PS(6,6)

VA 0.000 TE(1,1)
VA 0.000 TE(3,3)
VA 0.000 TE(2,2)
VA 0.0343 TE(5,5)
VA 0.0328 TE(4,4)

VA 0.0120 TD(1,1)
VA 0.0000 TD(2,2)
VA 0.2337 TD(3,3)
VA 0.0025 TD(4,4)
VA 0.2738 TD(5,5)
VA 0.0997 TD(6,6)
VA 0.0000 TD(7,7)
VA 0.0000 TD(8,8)
VA 0.0000 TD(9,9)
VA 0.0433 TD(10,10)
VA 0.0380 TD(11,11)

EQ BE(1,2,1) BE(2,2,1)
EQ BE(1,2,3) BE(2,2,3)
EQ BE(1,3,1) BE(2,3,1)
EQ BE(1,4,2) BE(2,4,2)

EQ GA(1,1,2) GA(2,1,2)
EQ GA(1,1,7) GA(2,1,7)
EQ GA(1,1,8) GA(2,1,8)
EQ GA(1,2,2) GA(2,2,2)
EQ GA(1,2,7) GA(2,2,7)
EQ GA(1,2,8) GA(2,2,8)
EQ GA(1,2,9) GA(2,2,9)
EQ GA(1,3,2) GA(2,3,2)
EQ GA(1,3,7) GA(2,3,7)
EQ GA(1,5,8) GA(2,5,8)
EQ GA(1,5,9) GA(2,5,9)

EQ PS(1,1,1) PS(2,1,1)
EQ PS(1,2,2) PS(2,2,2)
EQ PS(1,3,3) PS(2,3,3)
EQ PS(1,4,4) PS(2,4,4)

PD
OU ML ALL AD=OFF
```

[a] variances and covariance's substituted from the Primary Group for the Supplemental Group