



---

Theses and Dissertations

---

2021-06-17

## Determining Predictors of Peer Relations: A Study on Youth in Ethiopia, India, Peru, and Vietnam

Susanna Fullmer  
*Brigham Young University*

Follow this and additional works at: <https://scholarsarchive.byu.edu/etd>



Part of the [Education Commons](#)

---

### BYU ScholarsArchive Citation

Fullmer, Susanna, "Determining Predictors of Peer Relations: A Study on Youth in Ethiopia, India, Peru, and Vietnam" (2021). *Theses and Dissertations*. 9084.

<https://scholarsarchive.byu.edu/etd/9084>

This Thesis is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of BYU ScholarsArchive. For more information, please contact [ellen\\_amatangelo@byu.edu](mailto:ellen_amatangelo@byu.edu).

Determining Predictors of Peer Relations: A Study on Youth in  
Ethiopia, India, Peru, and Vietnam

Susanna Fullmer

A thesis submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Master of Science

Ross A. Larsen, Chair  
Randall S. Davies  
Richard R. Sudweeks

Department of Instructional Psychology and Technology  
Brigham Young University

Copyright © 2021 Susanna Fullmer

All Rights Reserved

## ABSTRACT

### Determining Predictors of Peer Relations: A Study on Youth in Ethiopia, India, Peru, and Vietnam

Susanna Fullmer

Department of Instructional Psychology and Technology, BYU  
Master of Science

Across the world countries are currently striving to eliminate poverty, improve the quality of education, optimize well-being, among other areas of improvement. In an effort to help such improvements, a group called Young Lives ran a longitudinal study on youth in Ethiopia, India, Peru, and Vietnam that studied the many facets of poverty. The purpose of this study is to utilize the Young Lives dataset to determine how countries can more readily improve social-emotional skills by looking at important experiences in adolescents' lives.

Specifically, this study examines what factors increase a child's ability to socialize with peers, which is shown to be linked to higher academic success as well as a fuller development into adulthood. In order to measure the ability to socialize with peers, Young Lives used the relationships with Peers Scale (RPS). I examined, through implementing structural equation modeling techniques, what factors significantly predict RPS scores, as well as which time point the factors are most predictive. I also inspected the psychometric properties of the RPS on the Young Lives' population and observed measurement invariance across time and country in order to ensure this scale is a valid measure. Steps to improve *relationships with peers* can be taken by encouraging higher intrinsic locus of control, providing equal educational opportunities, improving safety conditions, providing nutritional education, and eliminating competition for resources.

Keywords: adolescents, developing nations, educational improvement, child development, multiple regression analysis

## TABLE OF CONTENTS

TITLE .....	i
ABSTRACT .....	ii
TABLE OF CONTENTS .....	iii
LIST OF TABLES .....	vi
LIST OF FIGURES .....	vii
CHAPTER 1: Introduction .....	1
Statement of the Problem .....	1
Statement of the Purpose .....	2
Research Questions .....	2
CHAPTER 2: Literature Review .....	4
Child Demographics .....	5
Child Psychological Aspects .....	5
Family Demographics .....	6
Child Health .....	6
Significant Events .....	7
Community Information .....	8
CHAPTER 3: Methods .....	10
Data .....	10
Data Collection .....	10
Independent Variables .....	11
Dependent Variables .....	13
Analytical Strategies .....	14

Reliability.....	14
Measurement Invariance and Model Fit.....	14
Predictive Relationships With Independent Variables.....	16
CHAPTER 4: Results .....	18
Descriptive Statistics.....	18
Child Demographics .....	18
Child Psychological Aspects.....	20
Family Demographics.....	20
Child Health.....	22
Significant Events .....	22
Community Information .....	26
Psychometric Results.....	30
Confirmatory Factor Analysis.....	31
Cronbach's Alpha.....	33
Multigroup.....	33
Multiwave .....	34
Model Results .....	35
Child Demographic.....	35
Child Psychological Aspects.....	36
Family Demographics.....	37
Child Health.....	37
Significant Events .....	40
Community Information .....	40

CHAPTER 5: Discussion.....	42
Findings.....	42
Child Demographics .....	42
Child Psychological Aspects.....	43
Family Demographics.....	43
Child Health.....	44
Significant Events .....	45
Community Information .....	46
Limitations .....	47
Implications for Future Research.....	48
Implications for Practitioners.....	48
Conclusions.....	49
REFERENCES.....	50

## LIST OF TABLES

Table 1	<i>Sample Size and Frequency From Each Country.....</i>	11
Table 2	<i>Variable Overview.....</i>	12
Table 3	<i>Descriptive Statistics for Child Demographics.....</i>	19
Table 4	<i>Descriptive Statistics for Child Psychological Aspects.....</i>	21
Table 5	<i>Descriptive Statistics for Family Demographics.....</i>	23
Table 6	<i>Descriptive Statistics for Child Health.....</i>	24
Table 7	<i>Descriptive Statistics for Family Death and Illness.....</i>	25
Table 8	<i>Descriptive Statistics for Family Divorce and Birth.....</i>	26
Table 9	<i>Descriptive Statistics for Economic Threats and Natural Disasters.....</i>	27
Table 10	<i>Descriptive Statistics for Community Size.....</i>	28
Table 11	<i>Descriptive Statistics for Social and Mental Services.....</i>	29
Table 12	<i>Descriptive Statistics for Community Education.....</i>	29
Table 13	<i>Descriptive Statistics for Community Safety Issues.....</i>	30
Table 14	<i>Confirmatory Factor Analysis for RPS Round 4 by Country.....</i>	31
Table 15	<i>Factor Loadings From CFA for RPS Round 4.....</i>	32
Table 16	<i>Confirmatory Factor Analysis for RPS Round 5 by Country.....</i>	32
Table 17	<i>Factor Loadings From CFA for RPS Round 5.....</i>	33
Table 18	<i>Measurement Invariance Across Country for Relationships With Peers Round 4 .....</i>	34
Table 19	<i>Measurement Invariance Across Country for Relationships With Peers Round 5.....</i>	35
Table 20	<i>Measurement Invariance Across Time for Relationships With Peers.....</i>	35

## LIST OF FIGURES

Figure 1	<i>Visualization of Older Cohort Ages Throughout Rounds.....</i>	11
Figure 2	<i>SEM Diagram of RPS Round 4 Regressed on All Covariates.....</i>	38
Figure 3	<i>SEM Diagram of RPS Round 5 Regressed on All Covariates.....</i>	39



## CHAPTER 1

### Introduction

When most of us think back to our childhood and reflect on what our typical day-to-day concerns were, chances are that those concerns were not where to obtain clean drinking water. Likewise, those concerns were probably not where we would sleep, whether we had enough food, or what discrimination we would face. Unfortunately, 90% of adolescents live in low-to-middle income countries (LMICs) with these issues. Specifically, in parts of Ethiopia, India, Peru, and Vietnam, many children are facing problems like these and more (Boyden et al., 2019; Sawyer et al., 2012). This study investigated the relationships between these important experiences in early adolescence and the effect of those experiences on social-emotional skills for adolescents in Ethiopia, India, Peru, and Vietnam.

In 2000, the United Nations established the Millennium Development Goals (MDGs), which were focused on reducing poverty in half by 2015. In 2015, these goals evolved into the Sustainable Development Goals (SDGs), which aimed to eliminate poverty, increase economic growth, and improve many social needs by the year 2030 (United Nations, 2021). In response to the MDGs, the United Kingdom's Department for International Development funded Young Lives, a longitudinal study of children in Ethiopia, India, Peru, and Vietnam that measured a plethora of factors of poverty, such as health, education, wealth, community safety, and more (Harpham, 2002). This wide variety of factors measured makes the Young Lives data set suitable to use in this study.

#### Statement of the Problem

Miyamoto et al. (2015) defined social-emotional skills as “achieving goals, working with others, and managing emotions” (p.148). Social-emotional competency is crucial to adolescents’

mental health and well-being (Barblett & Maloney, 2010). Barblett and Maloney (2010) noted four benefits of high social-emotional competency were: (a) more inclusion with peers and teachers, (b) quality of life and overall happiness, (c) success in academic settings, and (d) increased development in many areas such as communication skills. Denham (2005) highlighted similar benefits and addressed the converse that children with lower social-emotional competency experience: (a) adjustment issues, (b) less academic success, and (c) higher likelihoods of delinquency or drug abuse. The high association between social-emotional skills and mental health combined with the fact 79% of global suicides happened in LMICs as of 2016 indicate a study of social-emotional skills in LMICs is crucial (United Nations, 2021).

### **Statement of the Purpose**

The purpose of this study is to examine the relationships between important experiences in early adolescence and their effect on social-emotional skills for adolescents in Ethiopia, India, Peru, and Vietnam.

### **Research Questions**

The research questions can be stated generally as follows:

1. Which of the following variables from the following domains significantly predict a child's *relationship with peers*:
  1. Child demographics (e.g., ethnic advantage),
  2. Child psychological aspects (e.g., agency),
  3. Family demographics (e.g., caregiver's education level),
  4. Child health (e.g., body mass index for age),
  5. Significant events (e.g., death of a family member), and
  6. Community information (e.g., safety threats in the community)

2. Does the timing of the predictor variables impact *relationships with peers* differently?

## CHAPTER 2

### Literature Review

According to Denham (2005), two staples in determining a child's social-emotional skills are their ability to relate with peers and manage emotions. The ability to relate with peers was measured in the Young Lives dataset. Thus, the latent construct *relationship with peers* will be used as the outcome variable in this study.

The latent construct *relationship with peers* measures a child's ability to make and retain friends as well as their likability among peers. Studies have shown positive relationships with peers to predict higher academic success in addition to better overall well-being, mental health, and regulated emotions ( Bowen et al., 2008; Denham, 2005; Walters & Bowen, 1997). Conversely, negative relationships with peers are associated with higher post-traumatic stress disorder (PTSD) symptoms (Morley & Kohrt, 2013). Additionally, the relationship between relationships with peers and academic success has also been seen to swing the opposite direction meaning that education has been pivotal towards developing socially (Boyden et al., 2019). In these studies, and many others, relationships with peers is used as a predictor variable, which presents the need for a study with relationships with peers as an outcome variable.

There are many variables that could potentially affect this outcome. I have focused on the following that appear to be the most important according to the literature. The predictor variables for relationships with peers are addressed in terms of six categories: (a) child demographics, (b) child psychological aspects, (c) family demographics, (d) child health, (e) significant events, and (f) community information.

## Child Demographics

Gender is one of the demographic variables that was observed. Gender norms have been shown to affect relationships with peers in that girls are both disadvantaged by their responsibility for care in the home and higher likelihood of marrying before completing their education (Boyden et al., 2019; Tafere & Chuta, 2016). Meanwhile, boys also experience challenges by being more likely to miss school - a fundamental building block to child development according to Bronfenbrenner's bioecological model - to complete work for their household (Boyden et al., 2019; Tafere & Chuta, 2016). Whether a child resides in an urban or rural locality also impacts social-emotional skills. Rural citizens have less access to basic services and more exposure to natural disasters, which both add to limiting educational opportunities (Boyden et al., 2019).

## Child Psychological Aspects

Two variables to be observed for child psychological aspects are the *locus of control* and *life satisfaction*. *Locus of control* assesses a child's perception of how much of their environment is in their control. An *internal locus of control* indicates the belief that each person controls their own future while an *external locus of control* indicates the belief that outside sources solely control future outcomes. Higher *internal locus of control*, or the perception of more control, is often shown to have a positive relationship with retention in school allowing more time for relationships with peers to develop (Barón, 2009; Singh et al., 2018).

*Life satisfaction* is also referred to as well-being. Similar to a higher *locus of control*, higher *life satisfaction* is associated with longer retention in school (Singh et al., 2018). Thus, we can infer higher *life satisfaction* indirectly affects the outcomes of interest through higher retention in school.

## **Family Demographics**

Family circumstances can impact a child's overall development into adulthood (Heissler & Porter, 2013; Rolleston & James, 2011; Tafere & Chuta, 2016). Some components of family circumstances that play a big role are socioeconomic status, the parents' or caregiver's education, and the size of the family or household. Specifically, women with lower socioeconomic status have reported social exclusion based on poverty (Boyden et al., 2019).

Caregiver literacy is another important factor in a child's non-cognitive skill levels (Rolleston & James, 2011; Helmers & Patnam, 2010). Additionally, Dercon and Krishan (2009) found that caregivers with more education were more invested in the child's education and had higher aspirations for the child. This could lead to longer school retention and in turn, higher relationships with peers.

Household size is another determinant of social-emotional skills. Helmers and Patnam (2010) found that larger household sizes were associated with decreases in non-cognitive skills. Household size also determines whether a child is needed to work rather than attend school. Tafere and Chuta (2016) noted that in Ethiopia the number of siblings determined how many responsibilities a child was given, and Heissler and Porter (2013) found that the composition of siblings, as well as birth order, determined which responsibilities a child was given. And as previously mentioned, more focus on work and less focus on school in turn affects relationships with peers.

## **Child Health**

A very common health issue among the countries studied in LMICs is stunting. According to the World Health Organization (2021), a child that is stunted has a height for their age that falls two standard deviations below the average height for that age; it is often a

consequence of poor nutrition and affects future neurological development and Boyden et al., (2019) noted that stunting is associated with lower relationships with peers. Stunting can be a result of low birthweight, which is also related to lower Body Mass Index (BMI) (Boyden et al., 2019). This suggests that lower BMI may have a negative effect on relationships with peers.

### **Significant Events**

Significant events refer to changes in the family due to the death of a family member, a serious illness of a family member, divorce, or the birth of a new family member. A significant event could also be related to economic changes or natural disasters. Escueta et al. (2014) determined that traumatic experiences lead to difficulties with social-emotional skills.

The death of a family member or a family member experiencing a serious illness has ramifications past the trauma of loss or concern, especially if the family member is a caregiver. Chuta (2014) discovered that in Ethiopia the loss or illness of a caregiver resulted in the children losing access to basic needs, like food and clothes. The consequent loss of an income also resulted in decreased spending on education and health for the children. The amount that children had to work also rose significantly and more of their focus was turned to working rather than schooling (Heissler & Porter, 2013; Tafere & Chuta, 2016). Hence, the loss of an income has the potential to affect a child's relationships with peers by drawing them away from school. Additionally, the health of a child's caregiver was found to affect the child's well-being (Chuta, 2014). If the child's caregiver was unwell, the child reported to be not well in terms of well-being. Chuta (2014) also noted that situations of divorce, which lead to the absence of a parent and possible loss of income, had many of the same negative outcomes as death or illness: increased work for the child and decreased well-being.

Unfortunately, economic ramifications are not limited to changes in family situations. A common strain on the economy for the countries studied comes from natural disasters, particularly in Ethiopia where drought is common. According to Boyden et al. (2019), all countries experienced extreme weather events affecting households' ability to buy food, which in turn could affect a child's health. As previously mentioned, malnutrition can lead to stunting and in turn relationships with peers. These countries also face economic troubles in times of market stability, as well as when cattle or livestock die (Boyden et al., 2019; Chuta, 2014). Consequently, the necessity of a child working increases during economic crises, reducing a child's focus on school and thereby their relationship with peers (Chuta, 2014).

### **Community Information**

Another component of a child's development is the neighborhood where they are raised. The community where a child resides determines their proximity to health services and educational opportunities, as well as the safety or lack thereof to which they are exposed.

Dornan and Georgiadis found that the availability of health services in a community had an impact on recovery in children's growth (as cited in Boyden et al., 2019, p. 77). A mother's mental health also impacts a child's health, but unfortunately, mental health services are often limited in developing countries and often require significant travel.

Availability of education affects social-emotional skills. Dercon and Krishan (2009) found that participation in school developed a child's certain social-emotional skills, such as self-efficacy, or confidence in school. Similarly, Rolleston and James (2011) noted that school was an important opportunity to foster other social-emotional skills like agency, motivation, and self-esteem through interactions with peers and teachers. Studies have shown that children who started their education later were at a disadvantage compared to those that started earlier,



especially when the early-starter children enrolled in private preschools (Boyden et al., 2019; Rolleston & James, 2011). Hence, communities offering preschool services give children a greater chance of success.

Unfortunately, children can feel unsafe in school environments, leading to absences and in turn affecting their relationships with peers. Common reasons for safety concern can happen both in traveling to school and within school itself. For example, girls face harassment when traveling to school. Then within schools, corporal punishment and lack of gender-segregated bathrooms lead to more harassment (Boyden et al., 2019). Schools, however, are not the only area of concern when it comes to safety. Despite many regulations that have been passed to protect children from evils such as prostitution, slavery, or drug trafficking, children in developing countries are still exposed to these dangers within their communities (Haynes, 2019). Such risky conditions in a community setting were found to negatively impact parental warmth and disciplinary measures toward children (Pinderhughes et al., 2001). Ensuring a safe community for children ensures positive development, greater chances of completing school, and normal growth and health (Boyden et al., 2019).

Lastly, in regard to the timing of each of these predictor variables, the age of the child was found to contribute to social-emotional skills. Older children are more likely to be needed to work, to experience corporal punishment, and to be married before completing school, which as mentioned above affects relationships with peers (Boyden et al., 2019; Ogando Portela & Pells, 2015; Tafere & Chuta, 2016). All of the above-mentioned variables play an important role in the development and educational achievement of children in developing countries. Studying these variables in relation to a child's relationship with peers will determine their ability to predict social-emotional skills.

## CHAPTER 3

### Methods

This section illustrates the dataset used as well as an overview of the variables used, ending with a thorough overview of the analytical strategies used.

#### **Data**

To best understand the dataset I used, I will address how Young Lives collected the data, followed by which variables were independent, and which were dependent. The dependent variables were measured by Young Lives using questionnaires. Thus, I will address consequent psychometric properties.

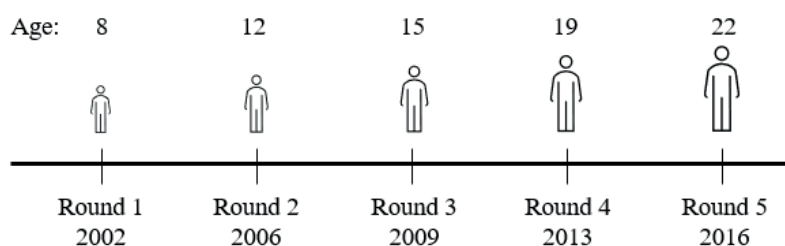
#### ***Data Collection***

The dataset I used in the study includes two cohorts of children, one born in the years 1994-1995 and the other born in the years 2001-2002. However, I used only the older cohort. Data were collected over a period of 15 years in five rounds through surveys given to children, caregivers, community representatives, and schools. Figure 1 provides an illustration of the ages of the children with the years that data were collected.

The countries observed were Ethiopia, India, Peru, and Vietnam. Within India, the specific state that was observed was formerly Andhra Pradesh, which is now split into two states called Andhra Pradesh and Telangana (Boyden et al., 2019). There were a total of 3,723 participants in this study with 1000 from Ethiopia, 1008 from India, 714 from Peru, and 1001 from Vietnam, which is illustrated in Table 1.

**Figure 1**

*Visualization of Older Cohort Ages Throughout Rounds*

**Table 1**

*Sample Size and Frequency From Each Country*

Country	Sample Size	Frequency
Ethiopia	1000	26.9%
India	1008	27.1%
Peru	714	19.2%
Vietnam	1001	26.9%
Total	3723	100.0%

### ***Independent Variables***

Young Lives collected data for researchers to investigate a wide range of themes, namely poverty and inequality; health and nutrition; education; gender and youth; child protection; and skills and work (Young Lives, 2020). While not all variables collected by Young Lives were used here, this study still implements a large number of variables from each of these themes. The Review of the Literature showed the categorization of the independent variables, and an additional thorough variable overview can be seen in Table 2 showing what variables were used for each category and how often they were measured. The first variable is the dependent variable, and all preceding variables are independent.

**Table 2***Variable Overview*

Domain	Construct	Description	Rounds
Outcome	Relationships with peers	Eight-question questionnaire to assess relationships with peers	4,5
Child Demographics	Sex	Biological gender of child	1
	Country	Country where data were collected	1
	Ethnic Advantage	Is the child part of the ethnic majority in their area?	1
	Rural	Does the child live in a rural setting?	1,2,3,4
Child Psychological Aspects	Agency	Assesses locus of control: If I try hard I can improve my situation in life (Strongly Disagree, Disagree, More or Less, Agree, Strongly Disagree)	2,3,4
	Life Satisfaction	Assesses well-being: There are 9 steps on the ladder of life for life satisfaction. Where on the ladder do you feel you personally stand at the moment? (1-worst possible life to 9-best possible life)	2,3,4
Family Demographics	Wealth Index	Measures housing quality, access to services, and ownership of consumer durables	1,2,3,4
	Caregiver Age	Age of caregiver	1
	Caregiver Literacy	Assesses if caregiver is literate: Can caregiver read and understand letter or newspaper in any language?	1,2
	Caregiver Education Level	Education Level of Caregiver	1,2
	Household Size	Number of people living in household	1,2,3,4
Child Health	BMI Z-score	Body mass index (BMI) reported a z-score	1,2,3,4
	Disabilities	Does child have any health difficulties or disabilities?	2
	Long Term Disabilities	Does child have any long term disabilities?	1,2,3
Significant Events	Any family deaths	Have any family deaths happened since last round?	2,3,4
	Sum family deaths	How many family deaths has the household suffered since last round?	2,3,4
	Any family illnesses	Have any family illnesses happened since the last round?	2,3,4
	Sum family illnesses	How many family illnesses have happened since the last round?	2,3,4
	Divorce	Has the household suffered divorce or separation?	2,3,4
	Births	Has the household experienced birth or new household members?	2,3,4

Domain	Construct	Description	Rounds
	Any economic threats	Have any economic threats happened since the last round (taxation, loss of income, land disputes)?	2,3,4
	Sum economic threats	How many economic events have happened since the last round?	2,3,4
	Any natural disasters	Have any natural disasters happened since the last round (drought, flooding, hailstorms, erosion, pests, fire)?	2,3,4
	Sum natural disasters	How many natural disasters have happened since the last round?	2,3,4
Community Information	Community Size	Population of the community	1,2,3
	Social workers	Are social workers available to members of the community?	1,2,3
	Mental health workers	Are mental health workers available to members of the community?	1,2,3
	Any secondary schools	Are there any secondary schools in the community?	2
	Any applicable schools	Are there any schools at the level the child needs?	2
	School Enrollments	Is the child currently enrolled in school?	1,2,3,4
	Sum Safety Threats	How many safety issues are there in this community (robbery, prostitution, juvenile gangs, violent crime)?	1,2,3
	Any Safety Threats	Are there any safety issues in this community (robbery, prostitution, juvenile gangs, violent crime)?	1,2,3

### ***Dependent Variables***

The outcome variable *relationships with peers* was a latent construct. For that reason, it was assessed using a questionnaire. *Relationships with peers* was measured using the relationships with Peers Scale (RPS) which provided statements with four response options for children to choose from: strongly disagree, disagree, agree, strongly agree. The psychometric properties will be discussed subsequently. The statements for relationships with peers were as follows:

1. I make friends easily
2. I am popular with kids of my own age
3. Most other kids like me

4. Other kids want me to be their friend
5. I have more friends than most other kids
6. I have lots of friends
7. I am easy to like
8. I get along with other kids easily

### **Analytical Strategies**

Structural equation modeling (SEM) implements the predictive properties of multiple regression. Hence, this technique was used to answer my research questions. However, psychometric properties such as reliability and measurement invariance of the scale *relationships with peers* were first observed using confirmatory factor analysis (CFA) in order to proceed with SEM for the full model. As well, assumptions related to the predictive properties were examined.

### ***Reliability***

The Relation with Peers Scale (RPS) was a portion of the Self-Description Questionnaire-I. The non-academic portion that RPS belongs to was found to have a coefficient alpha of 0.92, and RPS had an internal coefficient of 0.85 (Marsh, 1990). Thus, RPS has appropriate reliability measures. Additionally, a study using the Young Lives data found that the Cronbach's alpha coefficient was above 0.7 (Pells et al., 2016). Nonetheless, the reliability of the test was measured for this group of participants and reported in the results section.

### ***Measurement Invariance and Model Fit***

The RPS was used across different countries and across time. This means that before using these instruments in this study, I assessed if they were valid measures comparable across countries and time. When an instrument is valid across groups, the instrument is said to be measurement invariant. To test measurement invariance, an instrument must have three types of

invariance: configural invariance, metric invariance, and scalar invariance (Wang & Wang, 2012).

Configural invariance was tested by running Confirmatory Factor Analysis (CFA) on the instrument separated by group, constraining the means of all groups to be zero, and freely estimating the intercepts, or in this case thresholds. The instrument gave respondents four categories for each question, which means the data was treated as categorical rather than continuous, and categorical data has thresholds rather than intercepts. When the CFA is run, the criteria for whether configural invariance was met was that at least three out of four model indices were met. The model indices utilized in this study were Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR). Each comes with its own set of cut-offs, where RMSEA and SRMR are partial to lower values and CFI and TLI are partial to higher values. Specifically, RMSEA and SRMR showed acceptable fit with values of 0.08 and lower, while CFI and TLI showed acceptable fit with values of 0.90 or higher (Wang & Wang, 2012). Hence, those are the cut-offs used in this study.

Metric invariance built off configural invariance by using the same constraints but adding one more additional constraint, which was to constrain the factor loadings to be the same across groups. For example, the factor loading for question one from the RPS was the same factor loading for Ethiopia, India, Peru, and Vietnam. Metric invariance was met if three out of the four model indices were met, but additionally the change in indices from configural to metric invariance needed to be observed. For multigroup, or measurement invariance tested across attributes such as country, Cheung and Rensvold (2002) found that the change in CFI must not exceed 0.01 in order for metric invariance to be met. This cutoff was used in this study when

testing measurement invariance across countries. For multiwave, or measurement invariance tested across time, Clark (2020) found that the change in SRMR between configural and metric must not exceed 0.01.

Scalar invariance added the constraint that thresholds be the same across groups and constrained one group's mean be fixed to zero, while freely estimating the other means. Scalar invariance used the same requirements as metric invariance to determine if it is met. Three out of the four model indices must meet the cut-off, as well as the change in CFI between metric invariance and scale invariance must be below 0.01 for measurement invariance across countries or the change in SRMR must be below 0.01 for measurement invariance across time. If all three types of measurement invariance were met for testing across countries and time, then the instrument was considered measurement invariant and valid to use in this study. The results of testing measurement invariance are given in the results section.

Another type of invariance is strict invariance, where the residual variances are constrained to be the same across groups. Strict invariance is not often used to confirm measurement invariance as it is seen as superfluous. Hence, it will not be measured in this study.

### ***Predictive Relationships With Independent Variables***

Because SEM implements the predictive qualities of multiple regression, the assumptions of regression must be met before analyzing any data. Those assumptions were to have a linear relationship between the independent and dependent variables, equality of variance between the residual errors, independence between observations' residual errors, normality of residual errors, and no multicollinearity issues. These were assessed by residual plots, variance inflation factors, histogram of residuals, and other diagnostic tools. All analyses were done in MPLUS 8.4 using the robust weighted least squares estimator (WLSMV) controlling for the clustering of the



community using the TYPE = COMPLEX option. Missing data was handled through the full information maximum likelihood method (FIML).

## CHAPTER 4

### Results

The results section covers the descriptive statistics of the variables, the instrument's psychometric results, as well as the model results.

#### Descriptive Statistics

This section will go over the descriptive statistics within each domain including bivariate correlations of the predictor variables with *relationships with peers*. A table is provided for each domain. Missing data were examined and found to be minimal (less than 5%).

#### *Child Demographics*

The sample size for the study was 3723. Of that sample size, 49% of adolescents were female (SD = 0.500, where SD refers to standard deviation). For the countries, 27% of adolescents were in Ethiopia (SD = 0.443), 27% in India (SD = 0.444), 19% in Peru (SD = 0.394), and 27% in Vietnam (SD = 0.443). Fifty-two percent of adolescents were of the ethnicity considered to be the majority in their location (SD = 0.499). The proportion of adolescents living in rural settings decreased slightly over time with 64% reported in round 1 (SD<sub>1</sub> = 0.479; note that the subscripts refer to the round), 63% in round 2 (SD<sub>2</sub> = 0.483), 62% in round 3 (SD<sub>3</sub> = 0.485), and 50% in round 4 (SD<sub>4</sub> = 0.500).

The sex of the adolescent was significantly correlated with *relationships with peers* in rounds 4 and 5. See Table 3 for the correlation coefficients. The country adolescents lived in were significantly correlated with *relationships with peers* in rounds 4 and 5, apart from adolescents living in Ethiopia with *relationships with peers* in round 5. Whether the adolescent belonged to the ethnic majority was also significantly correlated with *relationships with peers* in both rounds 4 and round 5. Unexpectedly, the direction of the relationship was negative (round

4:  $-0.212, p < 0.001$ ; round 5:  $-0.188, p < 0.001$ ). The significance between whether adolescents lived in a rural region varied based on the round it was measured in. With round 4 *relationships with peers*, the region was not significant when measured in rounds 1-3, but the region measured in round 4 was significantly correlated with *relationships with peers* round 4. With round 5 *relationships with peers*, the region was significantly correlated as measured in rounds 1 and 2, but the region measured in rounds 3 and 4 was not significantly correlated with *relationships with peers* round 5.

**Table 3**

*Descriptive Statistics for Child Demographics*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Sex	0.490	0.500	0.000	1.000	-0.081***	-0.076***
Ethiopia	0.270	0.443	0.000	1.000	0.065***	0.016
India	0.270	0.444	0.000	1.000	0.266***	0.332***
Peru	0.190	0.394	0.000	1.000	-0.105***	-0.126***
Vietnam	0.270	0.443	0.000	1.000	-0.342***	-0.237***
Ethnic Advantage	0.520	0.499	0.000	1.000	-0.212***	-0.188***
Rural 1	0.640	0.479	0.000	1.000	0.014	0.056**
Rural 2	0.630	0.483	0.000	1.000	0.004	0.037*
Rural 3	0.620	0.485	0.000	1.000	0.002	0.029
Rural 4	0.500	0.500	0.000	1.000	-0.071**	0.010

Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

### ***Child Psychological Aspects***

The descriptive statistics for child psychological aspects can be observed in Table 4. The variable for measuring agency was on a 4-point scale for round 2 and a 5-point scale for rounds 3 and 4, where higher answers indicated higher intrinsic locus of control. For round 2, adolescents averaged a score of 3.65 ( $SD_2 = 0.541$ ). For both rounds 3 and 4, the mean score was 4.33 ( $SD_3 = 0.652$ ;  $SD_4 = 0.635$ ). Life satisfaction was measured on a 9-point scale, where higher scores indicated higher satisfaction. In round 2, the average score was 0.456 ( $SD_2 = 1.936$ ) and increased to 5.16 in round 3 ( $SD_3 = 1.792$ ), then 5.31 in round 4 ( $SD_4 = 1.540$ ).

All rounds of agency were highly correlated with both rounds of *relationships with peers* with a positive direction. Life satisfaction on the other hand was only significantly correlated with both rounds of *relationships with peers* when measured in round 2, and the association is negative. Life satisfaction recorded in round 4 is also significant but with only round 4 of *relationships with peers* and the direction changed to be positive.

### ***Family Demographics***

Table 5 demonstrates the descriptive statistics for the family demographics. The average wealth score increased over time with an average of 0.380 in round 1 ( $SD_1 = 0.224$ ), 0.441 in round 2 ( $SD_2 = 0.208$ ), 0.514 in round 3 ( $SD_3 = 0.206$ ), and 0.548 in round 4 ( $SD_4 = 0.188$ ). Note that wealth was measured as an index with scores between 0 and 1. Wealth was scarcely correlated with *relationships with peers*. For wealth recorded in round 3, a negative relationship with *relationships with peers* in both rounds was significant. Wealth recorded in round 1 was significantly correlated with *relationships with peers* but only as measured in round 5, and the negative direction was maintained.

**Table 4***Descriptive Statistics for Child Psychological Aspects*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Agency 2	3.650	0.541	1.000	4.000	0.111***	0.101***
Agency 3	4.330	0.652	1.000	5.000	0.116***	0.104***
Agency 4	4.330	0.635	1.000	5.000	0.202***	0.094***
Life Satisfaction 2	4.560	1.963	1.000	9.000	-0.099***	-0.108***
Life Satisfaction 3	5.160	1.792	1.000	9.000	-0.012	-0.016
Life Satisfaction 4	5.310	1.540	1.000	9.000	0.072***	0.020

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

The average age of the adolescent's natural born mother was 33.04 years old (SD = 6.449). The mother's illiteracy was measured in both rounds 1 and 2, where high scores represented poor literacy skills. In round 1, the average score for mom illiteracy was 2.060 out of 3 (SD<sub>1</sub> = 0.945) and increased to 2.400 in round 2 (SD<sub>2</sub> = 0.864). The dad's education was measured dichotomously to examine if the dad had finished primary school, where 1 was coded for those that did finish, and 49% of dads were finished primary school (SD = 0.5). All of the variables mentioned here were significantly correlated with *relationships with peers* in rounds 4 and 5. The mom's age was negatively correlated with *relationships with peers* as was the dad's education. The mom's illiteracy showed a positive relationship with *relationships with peers*.

The adolescent's household size decreased over time. In round 1, the average household size was 5.65 people (SD<sub>1</sub> = 2.016), dropped to 5.54 in round 2 (SD<sub>2</sub> = 1.922), then 5.33 in round 3 (SD<sub>3</sub> = 1.961), and 4.74 in round 4 (SD<sub>4</sub> = 2.012). Rounds 1, 3, and 4 of household size had a

significant relationship with both rounds of *relationships with peers* in the positive direction. Round 2 of household size was not significantly correlated with either rounds of *relationships with peers*.

### ***Child Health***

BMI was measured in terms of the z-score. The average BMI z-score for round 1 was -0.906 standard deviations ( $SD_1 = 1.237$ ), then decreased further in round 2 to -1.062 standard deviations ( $SD_2 = 1.32$ ). In round 3, the average BMI z-score increased to -0.986 ( $SD_3 = 1.317$ ) and increased even more to -0.657 in round 4 ( $SD_4 = 1.248$ ). Eighteen percent of the adolescents sampled reported having a long-term ailment ( $SD = 0.381$ ) and 4% reported having a disability ( $SD = 0.202$ ). All of the health variables were correlated with *relationships with peers* for both rounds and they all indicated a negative relationship. See Table 6 to observe the correlation coefficients.

### ***Significant Events***

There were 8% of adolescents that experienced a family loss in round 2 and round 3 ( $SD_2 = 0.276$ ;  $SD_3 = 0.274$ ) followed by 7% in round 4 ( $SD_4 = 0.254$ ). The average number of deaths adolescents experienced in both rounds 2 and 3 was 0.09 deaths ( $SD_2 = 0.297$ ;  $SD_3 = 0.299$ ), and 0.07 deaths were experienced in round 4 ( $SD_4 = 0.269$ ). The relationship between family loss and *relationships with peers* was scarcely significant and inconsistent. Whether an adolescent experienced any family loss in rounds 2 and 4 was significantly associated with *relationships with peers* in round 4. The number of family losses an adolescent experienced in round 4 was significantly associated with *relationships with peers* in round 5.

**Table 5***Descriptive Statistics for Family Demographics*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Wealth 1	0.380	0.224	0.005	0.972	-0.034	-0.035*
Wealth 2	0.441	0.208	0.000	0.926	-0.027	-0.018
Wealth 3	0.514	0.206	0.006	0.963	-0.072***	-0.060**
Wealth 4	0.548	0.188	0.006	0.939	-0.023	-0.024
Mom's Age	33.04	6.449	18.000	67.000	-0.101***	-0.155***
Mom Illiteracy 1	2.060	0.945	1.000	3.000	0.144***	0.130***
Mom Illiteracy 2	2.400	0.864	1.000	3.000	0.054*	0.096***
Dad's Education	0.490	0.500	0.000	1.000	-0.092***	-0.081***
Household Size 1	5.650	2.016	2.000	24.000	0.063***	0.048**
Household Size 2	5.540	1.922	2.000	22.000	0.028	0.027
Household Size 3	5.330	1.961	1.000	26.000	0.040*	0.037*
Household Size 4	4.740	2.012	1.000	26.000	0.077***	0.060**

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

In round 2, 27% ( $SD_2 = 0.442$ ) of adolescents experienced a family member acquiring a serious illness. In round 3, 28% ( $SD_3 = 0.451$ ) experienced a family illness followed by 24% in round 4 ( $SD_4 = 0.429$ ). The average number of family illnesses in round 2 was 0.35, 0.38 in round 3, and 0.28 in round 4 ( $SD_1 = 0.651$ ,  $SD_2 = 0.685$ ,  $SD_3 = 0.536$ ).

To see the actual correlation coefficients, see Table 7. Family illness was significant with both rounds of *relationships with peers* for any illness measured in round 3 and the sum of the illnesses reported in round 2. Whether there was any family illness in round 3 was also significantly correlated with *relationships with peers* but only for round 4. And the number of

illnesses recorded in round 4 was significantly correlated with *relationships with peers* but only for round 5. In all of these correlations, the relationship had a negative direction.

**Table 6**

*Descriptive Statistics for Child Health*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
BMI 1	-0.906	1.237	-5.53	5.080	-0.099***	-0.117***
BMI 2	-1.062	1.320	-6.240	3.740	-0.083***	-0.109***
BMI 3	-0.986	1.317	-5.540	3.860	-0.115***	-0.121***
BMI 4	-0.657	1.248	-4.190	4.430	-0.107***	-0.113***
Long Term Ailments	0.180	0.381	0.000	1.000	-0.070***	-0.063***
Any Disabilities	0.040	0.202	0.000	1.000	-0.060**	-0.052**

*Note.* Body Mass Index (BMI) is measured as a z-score.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

In rounds 2 - 4, 2% of adolescents experienced divorce or separation in their family ( $SD_2 = 0.155$ ,  $SD_3 = 0.126$ ,  $SD_4 = 0.124$ ). In round 2, 9% of adolescents experienced a birth or a new addition in the family ( $SD_2 = 0.280$ ). This was followed by 5% in round 3 ( $SD_3 = 0.215$ ) and 3% in round 4 ( $SD_4 = 0.180$ ). The only instance of a significant correlation with *relationships with peers* was birth as reported in round 4, which was negatively associated with round 5 *relationships with peers*. See Table 8 for the specific correlation coefficients.

The appearance of any economic threats was experienced by 6% of adolescents in round 2 ( $SD_2 = 0.229$ ), 9% in round 3 ( $SD_3 = 0.284$ ), and 7% in round 4 ( $SD_4 = 0.259$ ). The average number of economic threats for round 2 was 0.06 threats ( $SD_2 = 0.247$ ), which increased to 0.09 threats in



round 3 ( $SD_3 = 0.311$ ) and dropped to 0.08 threats in round 4 ( $SD_4 = 0.287$ ). However, none of these variables were significantly correlated with either round of *relationships with peers*.

**Table 7**

*Descriptive Statistics for Family Death and Illness*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Any Deaths 2	0.080	0.276	0.000	1.000	0.035*	0.013
Death Sum 2	0.090	0.297	0.000	2.000	0.032	0.008
Any Deaths 3	0.080	0.274	0.000	1.000	0.010	0.040
Death Sum 3	0.090	0.299	0.000	2.000	0.005	0.040
Any Deaths 4	0.070	0.254	0.000	1.000	0.035*	0.035
Death Sum 4	0.070	0.269	0.000	2.000	0.034	0.037*
Any Illness 2	0.270	0.442	0.000	1.000	0.066***	0.028
Illness Sum 2	0.350	0.651	0.000	3.000	0.077***	0.035*
Any Illness 3	0.280	0.451	0.000	1.000	-0.044*	-0.057**
Illness Sum 3	0.380	0.685	0.000	3.000	-0.009	-0.028
Any Illness 4	0.240	0.429	0.000	1.000	-0.013	-0.030
Illness Sum 4	0.280	0.536	0.000	3.000	-0.034	-0.039*

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

The presence of any natural disasters was experienced by 38% of adolescents in round 2 ( $SD_2 = 0.485$ ). This increased to 39% in round 3 ( $SD_3 = 0.487$ ), then decreased to 24% in round 4 ( $SD_4 = 0.430$ ). The average number of natural disasters experienced in round 2 was 0.66 disasters ( $SD_2 = 1.144$ ). This increased to 0.74 disasters in round 3 ( $SD_3 = 1.167$ ), then decreased to 0.38 disasters in round 4 ( $SD_4 = 0.824$ ). The only instance of significance between these variables and *relationships with peers* was found in the average number of natural disasters

reported in round 2. This variable was positively correlated with round 4 of *relationships with peers*. See Table 9 for more information on the correlation coefficients.

**Table 8**

*Descriptive Statistics for Family Divorce and Birth*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Any Divorce 2	0.020	0.155	0.000	1.000	-0.030	-0.009
Any Birth 2	0.090	0.280	0.000	1.000	-0.020	0.008
Any Divorce 3	0.020	0.126	0.000	1.000	0.013	-0.023
Any Birth 3	0.050	0.215	0.000	1.000	-0.017	-0.015
Any Divorce 4	0.020	0.124	0.000	1.000	-0.031	-0.003
Any Birth 4	0.030	0.180	0.000	1.000	-0.031	-0.038*

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

**Community Information**

The average population size of communities was 0.068 million, or 68,000, in round 1 (SD<sub>1</sub> = 0.062). This increased to 0.094 million in round 2 (SD<sub>2</sub> = 0.133), then dropped to 0.091 million in round 3 (SD<sub>3</sub> = 0.134). The community size for all rounds was negatively correlated with *relationships with peers* for both rounds 4 and 5. See Table 10 for specific correlation coefficients.

In round 1, 46% of adolescents were aware that there were social services in their community (SD<sub>1</sub> = 0.498). This dropped to 36% in round 2 (SD<sub>2</sub> = 0.479), then increased to 57% in round 3 (SD<sub>3</sub> = 0.495). With the exception of social services recorded in round 3, social services were consistently significantly correlated with *relationships with peers* for both rounds 4 and 5, namely in a negative direction. For round 3 of social services, only *relationships with*

*peers* measured in round 4 was significantly correlated. However, the negative relationship persisted as with the other rounds.

**Table 9**

*Descriptive Statistics for Economic Threats and Natural Disasters*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Any Economic Threats 2	0.060	0.229	0.000	1.000	0.024	0.027
Economic Threats Sum 2	0.060	0.247	0.000	2.000	0.026	0.030
Any Economic Threats 3	0.090	0.284	0.000	1.000	-0.009	-0.011
Economic Threats Sum 3	0.090	0.311	0.000	3.000	-0.005	-0.012
Any Economic Threats 4	0.070	0.259	0.000	1.000	0.003	-0.010
Economic Threats Sum 4	0.080	0.287	0.000	3.000	0.007	-0.015
Any Natural Disasters 2	0.380	0.485	0.000	1.000	0.017	0.032
Natural Disasters Sum 2	0.660	1.144	0.000	9.000	0.041*	0.011
Any Natural Disasters 3	0.390	0.487	0.000	1.000	0.001	-0.006
Natural Disasters Sum 3	0.740	1.167	0.000	8.000	-0.014	-0.021
Any Natural Disasters 4	0.240	0.430	0.000	1.000	0.025	0.034
Natural Disaster Sum 4	0.380	0.824	0.000	7.000	0.020	0.001

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

In regard to awareness of mental health services in the community, as seen in Table 11 10% of adolescents reported they were available in round 1 ( $SD_1 = 0.298$ ), which increased to 30% for both rounds 2 and 3 ( $SD_2 = 0.298$ ;  $SD_3 = 0.457$ ). Round 2 of mental health services showed no significant correlation with *relationships with peers* in either round. However, rounds 1 and 2 of mental health services were negatively correlated with *relationships with peers* for both rounds.

**Table 10***Descriptive Statistics for Community Size*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Community Size 1	0.068	0.062	<0.001	0.330	-0.068***	-0.104***
Community Size 2	0.094	0.133	<0.001	1.860	-0.040**	-0.061**
Community Size 3	0.091	0.134	<0.001	0.134	-0.057**	-0.081***

*Note.* Community size was measured in the millions. The minimum population for round 1 was 80 people, 114 people for round 2, and 20 people for round 3.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Adolescents reported that 64% of communities had a secondary school present (SD = 0.480) as shown in Table 12. Having any level of school was reported in 98% of the communities (SD = 0.130). In round 1, 99% of adolescents were enrolled in school (SD<sub>1</sub> = 0.111), which decreased to 96% in round 2 (SD<sub>2</sub> = 0.207), then 83% in round 3 (SD<sub>3</sub> = 0.372), and finally 51% in round 4 (SD<sub>4</sub> = 0.500). Both the presence of a secondary school and any level of school had a significant relationship with *relationships with peers*, namely in the negative direction. Enrollment for rounds 1-3 was not significantly correlated with either round of *relationships with peers*. Only in round 4 of enrollment was the variable significantly correlated with *relationships with peers* in both rounds, and the relationship was positive.

**Table 11***Descriptive Statistics for Social and Mental Services*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Social Worker 1	0.460	0.498	0.000	1.000	-0.119***	-0.115***
Social Worker 2	0.360	0.479	0.000	1.000	-0.071***	-0.074***
Social Worker 3	0.570	0.495	0.000	1.000	-0.037*	0.001
Mental Health Workers 1	0.200	0.401	0.000	1.000	-0.110***	-0.118***
Mental Health Workers 2	0.100	0.298	0.000	1.000	-0.005	-0.005
Mental Health Workers 3	0.300	0.457	0.000	1.000	-0.119***	-0.093***

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

**Table 12***Descriptive Statistics for Community Education*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Any Secondary Schools	0.640	0.480	0.000	1.000	-0.132***	-0.095***
Any School	0.980	0.130	0.000	1.000	-0.077***	-0.047**
Enrollment 1	0.990	0.111	0.000	1.000	-0.017	-0.018
Enrollment 2	0.96	0.207	0.000	1.000	-0.011	-0.020
Enrollment 3	0.830	0.372	0.000	1.000	0.029	-0.001
Enrollment 4	0.510	0.500	0.000	1.000	0.068***	0.043*

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

The average number of safety threats within the community as measured in round 1 was 1.250 threats ( $SD_1 = 1.457$ ), which increased to 2.890 threats in round 2 ( $SD_2 = 2.159$ ), and continued to increase in round 3 to 2.990 threats ( $SD_3 = 1.989$ ). Adolescents in round 1 reported

that in 54% of the communities at least one safety issue was present ( $SD_1 = 0.499$ ). This increased to 93% in round 2 ( $SD_2 = 0.263$ ) and decreased slightly to 90% in round 3 ( $SD_3 = 0.294$ ). See Table 13.

**Table 13**

*Descriptive Statistics for Community Safety Issues*

Variable	Mean	Standard Deviation	Minimum	Maximum	Correlation Coefficient	
					RPS Round 4	RPS Round 5
Sum Safety Threats 1	1.250	1.457	0.000	4.000	-0.074***	-0.116***
Any Safety Threats 1	0.540	0.499	0.000	1.000	-0.054**	-0.090***
Sum Safety Threats 2	2.890	2.159	0.000	8.000	-0.079***	-0.095***
Any Safety Threats 2	0.930	0.263	0.000	1.000	-0.076***	-0.015
Sum Safety Threats 3	2.990	1.989	0.000	8.000	-0.140***	-0.168***
Any Safety Threats 3	0.900	0.294	0.000	1.000	-0.094***	-0.097***

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

### Psychometric Results

In this section, I discuss the results from the CFAs, along with the reliability measures for RPS, the measurement invariance across countries, as well as the measurement invariance across time, and of course the results from the final SEM. For a review of the cut-offs used for appropriate fit see the Analytical Strategies section in the Methods section.

### ***Confirmatory Factor Analysis***

We assume one construct for RPS with no correlated errors. The fit indices of all rounds met the cut-offs, which confirmed the model was unidimensional. The fit indices for the CFA on RPS in round 4 were satisfactory for RMSEA (0.079), CFI (0.957), TLI (0.940), and SRMR (0.035). Likewise, the fit indices in round 5 were also satisfactory for RMSEA (0.073), CFI (0.947), TLI (0.926), and SRMR (0.035). This indicates that the instrument fits the data well in both rounds 4 and 5. These results can be seen in the last row of Table 14 and Table 16.

The CFAs mentioned above were performed combining all countries. However, the CFAs were also performed individually for each country. For round 4, both Ethiopia and India had satisfactory fit indices for all four fit indices observed (Ethiopia - RMSEA: 0.075, CFI: 0.95, TLI: 0.93, SRMR: 0.041; Vietnam - RMSEA: 0.077, CFI: 0.951, TLI: 0.931, SRMR: 0.046). India and Peru both had an RMSEA index higher than the cut-off, but the other three fit indices were satisfactory (India - RMSEA: 0.105, CFI: 0.932, TLI: 0.905, SRMR: 0.057; Peru - RMSEA: 0.091, CFI: 0.932, TLI: 0.936, SRMR: 0.043). Thus, the instrument fits each country's data well and multigroup across countries is appropriate to perform. These fit statistics can be seen in Table 14. Table 15 shows the factor loadings for round 4. A visual inspection of the factor loadings indicated Tau Equivalence was met.

**Table 14**

#### *Confirmatory Factor Analysis for RPS Round 4 by Country*

Country	RMSEA	CFI	TLI	SRMR
Ethiopia	0.075	0.950	0.930	0.041
India	0.105	0.932	0.905	0.057
Peru	0.091	0.954	0.936	0.043
Vietnam	0.077	0.951	0.931	0.046
All Countries	0.079	0.957	0.940	0.035

**Table 15***Factor Loadings From CFA for RPS Round 4*

Items	Ethiopia	India	Peru	Vietnam	All Countries
Item 1	0.447	0.501	0.611	0.506	0.524
Item 2	0.502	0.607	0.615	0.625	0.621
Item 3	0.646	0.722	0.615	0.575	0.661
Item 4	0.700	0.736	0.702	0.626	0.713
Item 5	0.773	0.717	0.693	0.654	0.739
Item 6	0.780	0.777	0.770	0.721	0.753
Item 7	0.586	0.670	0.767	0.583	0.657
Item 8	0.606	0.652	0.652	0.623	0.635

For round 5 CFAs in each country, Peru had four satisfactory fit indices (RMSEA: 0.062, CFI: 0.98, TLI: 0.972, SRMR: 0.033). Both Ethiopia and Vietnam had three satisfactory fit indices with TLI lower than the cut-off (Ethiopia - RMSEA: 0.077, CFI: 0.904, TLI: 0.866, SRMR: 0.046; Vietnam - RMSEA: 0.06, CFI: 0.927, TLI: 0.898, SRMR: 0.049). India as well had three satisfactory fit indices with RMSEA above the cut-off (RMSEA: 0.088, TLI: 0.953, TLI: 0.934, SRMR: 0.051). Since all countries had at least three satisfactory fit indices, I concluded that the instrument fit the data well in round 5, so performing a multigroup across countries was appropriate. Table 16 shows the above-mentioned fit statistics. Similar to round 4, visually inspecting the factor loadings for round 5 indicated Tau Equivalence was met, which can be seen in Table 17.

**Table 16***Confirmatory Factor Analysis for RPS Round 5 by Country*

Country	RMSEA	CFI	TLI	SRMR
Ethiopia	0.077	0.904	0.866	0.046
India	0.088	0.953	0.934	0.051
Peru	0.062	0.980	0.972	0.033
Vietnam	0.060	0.927	0.898	0.049
All Countries	0.073	0.947	0.926	0.035



**Table 17***Factor Loadings From CFA for RPS Round 5*

Items	Ethiopia	India	Peru	Vietnam	All Countries
Item 1	0.52	0.582	0.614	0.505	0.576
Item 2	0.617	0.584	0.637	0.463	0.618
Item 3	0.533	0.546	0.75	0.513	0.617
Item 4	0.679	0.505	0.634	0.651	0.642
Item 5	0.72	0.777	0.747	0.655	0.757
Item 6	0.764	0.794	0.791	0.642	0.777
Item 7	0.554	0.636	0.763	0.49	0.632
Item 8	0.582	0.618	0.715	0.382	0.601

***Cronbach's Alpha***

Cronbach's alpha was calculated in SPSS. Cronbach's alpha was selected to correspond with past literature measures of reliability. As well, Cronbach's alpha was appropriate because none of the residual errors in the scale were correlated and the scale is unidimensional. For round 4 of RPS, the Cronbach's alpha coefficient was 0.797. For round 5, the coefficient was 0.783. These coefficients suggest that the reliability of RPS on the dataset used for this study is sufficient.

***Multigroup***

For both rounds, the RPS was tested for measurement invariance across countries. The fit statistics for round 4 and round 5 can be seen in Table 18 and Table 19, respectively. For round 4, three out of four fit indices had appropriate fit for the configural invariance (RMSEA: 0.086, CFI: 0.946, TLI: 0.925, SRMR: 0.047). Thus, configural invariance was met and I tested metric invariance. All model indices had appropriate fit for metric invariance (RMSEA: 0.07, CFI: 0.956, TLI: 0.951, SRMR: 0.048). As well, the change in CFI from configural to metric invariance was 0.01 and the change in SRMR was 0.001. Thus, by Cheung and Rensvold (2002) criteria the RPS met metric invariance and this is well confirmed by Clark's (2020) criteria.

Finally, the fit indices for scalar invariance all fit properly (RMSEA: 0.066, CFI: 0.945, TLI: 0.956, SRMR: 0.053). The change in CFI from metric to scalar invariance exceeds 0.01 ( $\Delta\text{CFI}=0.011$ ), which missed the cut-off for Cheung and Rensvold criteria. However, the change in SRMR was 0.005, which concluded by Clark's criteria that the RPS has scalar invariance. Thus, the RPS in round 4 was measurement invariant across Ethiopia, India, Peru, and Vietnam.

**Table 18**

*Measurement Invariance Across Country for Relationships With Peers Round 4*

	RMSEA	CFI	TLI	SRMR	CFI Change	SRMR Change
Configural	0.086	0.946	0.925	0.047	-	-
Metric	0.07	0.956	0.951	0.048	0.01	0.001
Scalar	0.066	0.945	0.956	0.053	0.011	0.005

Similarly, in round 5 the RPS had configural invariance (RMSEA: 0.072, CFI: 0.949, TLI: 0.929, SRMR: 0.046). The RPS also had metric invariance with a change in CFI less than 0.001 and a change in SRMR of 0.002, as well the fit indices all indicated appropriate fit (RMSEA: 0.064, CFI: 0.949, TLI: 0.944, SRMR: 0.048). Scalar invariance was met despite a change in CFI greater than 0.001 ( $\Delta\text{CFI}=0.013$ ) because the change in SRMR was 0.005 which meets Clark's criteria for scalar invariance. Therefore, the RPS in both rounds was measurement invariant across all four countries.

***Multiwave***

Finally, measurement invariance of RPS across rounds 4 and 5 was also investigated and can be seen in Table 20. The fit indices for the configural invariance indicated that configural invariance was met (RMSEA: 0.038, CFI: 0.964, TLI: 0.958, SRMR: 0.035). The change in CFI from configural to metric invariance, as well as the fit indices indicated that metric invariance

was met ( $\Delta CFI < 0.001$ ; RMSEA: 0.037, CFI: 0.964, TLI: 0.961, SRMR: 0.037). Scalar invariance was met as well as indicated by the change in CFI as well as the fit indices ( $\Delta CFI = 0.001$ ; RMSEA: 0.034, CFI: 0.963, TLI: 0.966, SRMR: 0.037). Because these three types of invariance were met, I concluded that RPS was measurement invariant across time for rounds 4 and 5.

**Table 19**

*Measurement Invariance Across Country for Relationships With Peers Round 5*

	RMSEA	CFI	TLI	SRMR	CFI Change	SRMR Change
Configural	0.072	0.949	0.929	0.046	-	-
Metric	0.064	0.949	0.944	0.048	<0.001	0.002
Scalar	0.061	0.936	0.949	0.053	0.013	0.005

**Table 20**

*Measurement Invariance Across Time for Relationships With Peers*

	RMSEA	CFI	TLI	SRMR	CFI Change	SRMR Change
Configural	0.038	0.964	0.958	0.035	-	-
Metric	0.037	0.964	0.961	0.037	0.000	0.002
Scalar	0.034	0.963	0.966	0.037	0.001	0.000

**Model Results**

The results are outlined in their respective domains. For a visualization of the SEM, see Figures 2 and 3.

***Child Demographic***

For both round 4 and round 5 of *relationships with peers*, females had lower *relationships with peers* than males (round 4:  $\beta = -0.089$ ,  $p < 0.001$ ; round 5:  $\beta = -0.081$ ,  $p <$

0.001). Beta is standardized, so females have 0.089 standard deviations of RPS less than males. The countries that had the highest *relationships with peers* in both rounds 4 and 5 were India (round 4:  $\beta = 0.288, p < 0.001$ ; round 5:  $\beta = 0.367, p < 0.001$ ) followed by Ethiopia (used as the reference category), Peru (round 4:  $\beta = -0.108, p < 0.001$ ; round 5:  $\beta = -0.142, p < 0.001$ ), then Vietnam (round 4:  $\beta = -0.233, p < 0.001$ ; round 5:  $\beta = -0.246, p < 0.001$ ). While the country an adolescent lived in was significantly associated with *relationships with peers*, living in a rural region was not significant for round 5 *relationships with peers* and was only significant for *relationships with peers* round 4 when region was measured in round 4. That association showed that rural adolescents have lower *relationships with peers* ( $\beta = -0.073, p = 0.018$ ). Additionally, belonging to the ethnic majority for that region was negatively associated with *relationships with peers* in rounds 4 and 5 (round 4:  $\beta = -0.233, p < 0.001$ ; round 5:  $\beta = -0.210, p < 0.001$ ).

### ***Child Psychological Aspects***

For both rounds 4 and 5 of *relationships with peers*, a child's perception of agency had a positive relationship with *relationships with peers* and the magnitude of the effect does not change over time (round 4:  $\beta_2 = 0.130, \beta_3 = 0.136, \beta_4 = 0.233$ , all  $p < 0.001$ ; round 5:  $\beta_2 = 0.119, \beta_3 = 0.116, \beta_4 = 0.111$ , all  $p < 0.001$ ). Unexpectedly, for both rounds 4 and 5 of *relationships with peers*, a child's life satisfaction measured in round 2 had a negative relationship with *relationships with peers* (round 4:  $\beta = -0.111, p < 0.001$ ; round 5:  $\beta = -0.124, p < 0.001$ ). For round 4 of *relationships with peers*, a child's life satisfaction was also significantly associated with life satisfaction in round 4, but the association was positive ( $\beta = 0.081, p < 0.001$ ). Round 3 of life satisfaction was not significantly associated with *relationships with peers* in rounds 4 or 5 ( $p > 0.05$ ).

### ***Family Demographics***

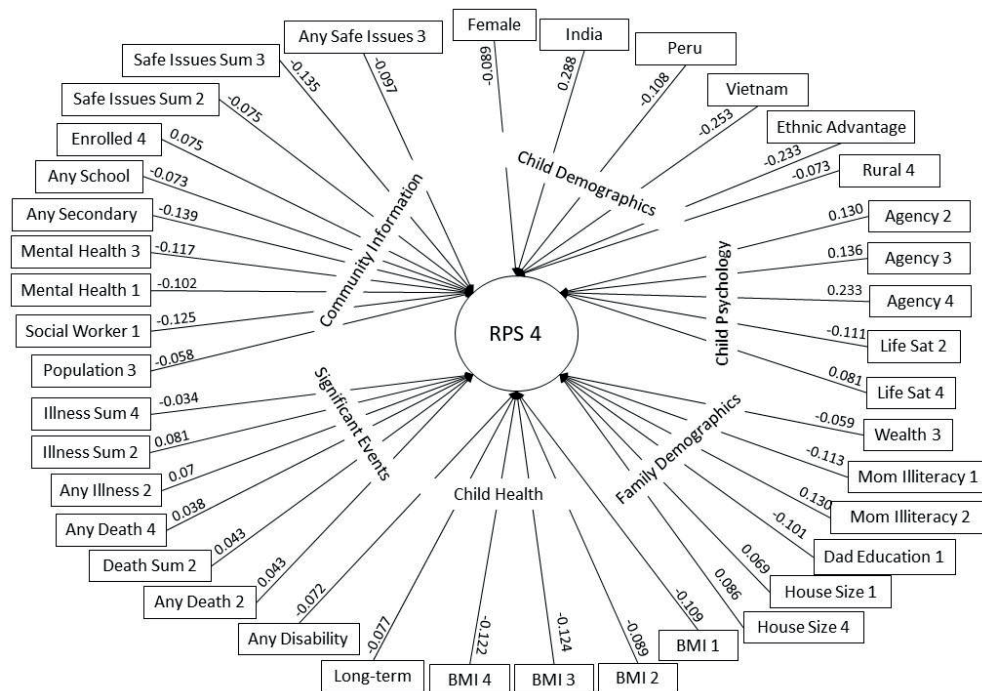
*Relationships with peers* in round 4 was significantly associated with wealth only in round 3 ( $\beta = -0.059, p = 0.038$ ) but wealth was not significant in any other rounds or with round 5 *relationships with peers* ( $p > 0.05$ ). The age of the mother had a negative association with both rounds 4 and 5 for *relationships with peers* (round 4:  $\beta = -0.113, p < 0.001$ ; round 5:  $\beta = -0.177, p < 0.001$ ). Having an illiterate mother measured in round 1 was positively associated with *relationships with peers* in rounds 4 and 5 (round 4:  $\beta = 0.130, p < 0.001$ ; round 5:  $\beta = 0.116, p = 0.001$ ). In round 5 for *relationships with peers*, having an illiterate mother measured in round 2 was also positively associated but in a smaller magnitude ( $\beta = 0.092, p = 0.009$ ). Having a dad that had attended primary school measured in round 1 had a negative association with *relationships with peers* for both rounds 4 and 5 (round 4:  $\beta = -0.101, p = 0.001$ ; round 5:  $\beta = -0.086, p = 0.007$ ). The size of the child's household measured in rounds 1 and 4 had a positive association with both rounds 4 and 5 *relationships with peers*, where the magnitude was greater for the household size in round 4 (round 4:  $\beta_1 = 0.069, \beta_4 = 0.086, \text{all } p < 0.001$ ; round 5:  $\beta_1 = 0.052, \beta_4 = 0.07, \text{all } p < 0.05$ ).

### ***Child Health***

For BMI measured in rounds 1 through 4, both rounds 4 and 5 of *relationships with peers* had a negative relationship. The magnitude of the effect did not change over time (round 4:  $\beta_1 = -0.109, \beta_2 = -0.089, \beta_3 = -0.124, \beta_4 = -0.073, \text{all } p < 0.001$ ; round 5:  $\beta_1 = -0.129, \beta_2 = -0.124, \beta_3 = -0.14, \beta_4 = -0.128, \text{all } p < 0.001$ ). For both rounds 4 and 5 of *relationships with peers*, having any long-term ailments had a negative relationship (round 4:  $\beta = -0.077, p < 0.001$ ; round 5:  $\beta = -0.069, p = 0.001$ ). The same was true for whether the adolescent had any disabilities (round 4:  $\beta = -0.072, p = 0.002$ ; round 5:  $\beta = -0.055, p = 0.013$ ).

Figure 2

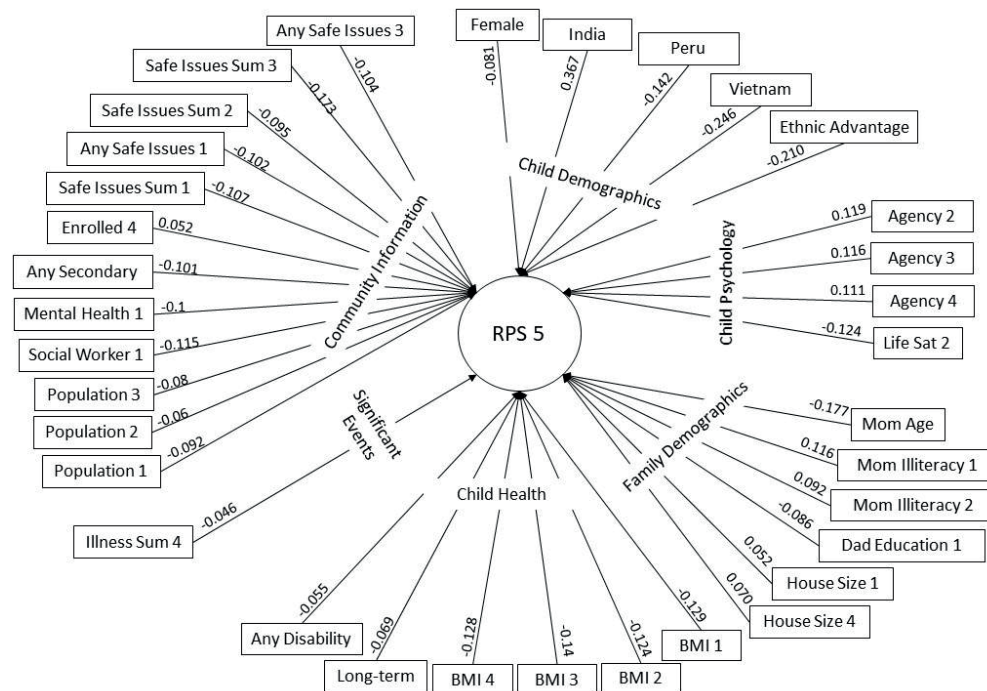
SEM Diagram of RPS Round 4 Regressed on All Covariates



*Note.* The beta values shown are standardized betas. Only variables with a significant relationship ( $p < 0.05$ ) with RPS were included in the diagram. Non-significant variables were Rural rounds 1-3, Life Satisfaction round 3, Wealth rounds 1,2 and 4, Household Size rounds 2,3, Any Death round 3, Death Sum rounds 3 and 4, Any Illness round 3 and 4, Illness Sum round 3, Social Worker rounds 2 and 3, Mental Health round 2, Enrollment rounds 1-3, Any Safe Issues rounds 1 and 2, and Safe Issues Sum round 1.

Figure 3

SEM Diagram of RPS Round 5 Regressed on All Covariates



*Note.* The beta values shown are standardized betas. Only variables with a significant relationship ( $p < 0.05$ ) with RPS were included in the diagram. Non-significant variables were Rural rounds 1-4, Life Satisfaction rounds 3 and 4, Wealth rounds 1-4, Household Size rounds 2,3, Any Death rounds 2-4, Death Sum rounds 2-4, Any Illness rounds 2-4, Illness Sum rounds 2 and 3, Social Worker rounds 2 and 3, Mental Health rounds 2 and 3, Enrollment rounds 1-3, Any Secondary School, and Any Safe Issues round 2.

### ***Significant Events***

Death in the family did not have any significant associations with *relationships with peers* for round 5 ( $p > 0.05$ ). However, for *relationships with peers* in round 4, children that experienced any family deaths in rounds 2 or 4 had a positive association with *relationships with peers* ( $\beta_2 = 0.043$ ,  $\beta_4 = 0.038$ , all  $p < 0.05$ ). Additionally, the number of deaths the adolescent experienced as measured in round 2 had a positive association with *relationships with peers* round 4 ( $\beta = 0.043$ ,  $p = 0.037$ ). The number of illnesses in the family measured in round 4 had a negative relationship with *relationships with peers* for both rounds 4 and 5 (round 4:  $\beta = -0.034$ ,  $p = 0.046$ ; round 5:  $\beta = -0.046$ ,  $p = 0.019$ ). For round 4 *relationships with peers*, both the number of illnesses in the family measured in round 2 ( $\beta = 0.081$ ,  $p = 0.001$ ) and whether there were any illnesses in the family ( $\beta = 0.070$ ,  $p = 0.005$ ) had a positive relationship with *relationships with peers*. The other instances of the number of illnesses and whether there were any illnesses in the family were not significant. As well, family divorce or births in the family had no significant association with *relationships with peers* and neither did whether any natural disasters or economic disasters occurred ( $p > 0.05$ ).

### ***Community Information***

For *relationships with peers* in rounds 4 and 5, population size measured in round 3 had a negative relationship with *relationships with peers* (round 4:  $\beta = -0.058$ ,  $p < 0.001$ ; round 5:  $\beta = -0.080$ ,  $p < 0.001$ ). For round 5 *relationships with peers*, population size measured in rounds 2 and 3 was also negatively associated, where the magnitude of the effect remains consistent over time ( $\beta_1 = -0.092$ ,  $\beta_2 = -0.060$ , all  $p < 0.05$ ).

For rounds 4 and 5 of *relationships with peers*, the adolescent knowing a social worker was available in the community as measured in round 1 was negatively associated (round 4:  $\beta = -$



0.125,  $p = 0.001$ ; round 5:  $\beta = -0.115$ ,  $p = 0.010$ ). The same is true for mental health workers as measured in round 1 (round 4:  $\beta = -0.102$ ,  $p = 0.002$ ; round 5:  $\beta = -0.1$ ,  $p = 0.010$ ). However, knowing a mental health worker was available in round 3 was also negatively associated with round 4 *relationships with peers* ( $\beta = -0.117$ ,  $p = 0.004$ ) but not significantly associated with *relationships with peers* round 5.

The presence of a secondary school in the community was negatively associated with *relationships with peers* in rounds 4 and 5 (round 4:  $\beta = -0.139$ ,  $p < 0.001$ ; round 5:  $\beta = -0.101$ ,  $p = 0.011$ ). The presence of the age-appropriate school in the community was also negatively associated with *relationships with peers* but only in round 4 ( $\beta = -0.073$ ,  $p < 0.001$ ). Being enrolled in school in rounds 1-3 was not significantly associated with *relationships with peers* for rounds 4 and 5. However, being enrolled in round 4 was positively related to both rounds 4 and 5 *relationships with peers* (round 4:  $\beta = 0.075$ ,  $p = 0.001$ ; round 5:  $\beta = 0.052$ ,  $p = 0.036$ ).

The number of safety issues in the community measured in rounds 2,3 were negatively associated with *relationships with peers* in rounds 4 and 5 with not much change in magnitude of the effect over time (round 4:  $\beta_2 = -0.075$ ,  $\beta_3 = -0.135$ , all  $p < 0.05$ ; round 5:  $\beta_2 = -0.095$ ,  $\beta_3 = -0.173$ , all  $p < 0.05$ ). For round 5 *relationships with peers*, the number of safety issues measured in round 1 were also negatively associated ( $\beta = -0.107$ ,  $p = 0.007$ ). Having any safety issues as measured in round 3 was also negatively associated with *relationships with peers* in rounds 4 and 5 (round 4:  $\beta = -0.097$ ,  $p = 0.005$ ; round 5:  $\beta = -0.104$ ,  $p = 0.005$ ). Additionally, having any safety issues in round 1 was negatively associated with *relationships with peers* in round 5 ( $\beta = -0.104$ ,  $p = 0.019$ ). All other instances of the number of safety issues and whether any safety issues existed were non-significant ( $p > 0.05$ ).

## CHAPTER 5

### Discussion

Here I will discuss how LMICs may use these results to leverage the outcomes of interest for their adolescents. As way of reminder, the research questions inquired which variables were significant predictors of *relationships with peers*, as well as how the timing of the variables affects *relationships with peers*. Measurement invariance was tested across time (multiwave) to ensure that RPS was appropriate to use for both rounds 4 and 5, which was met as mentioned in the Results section. Measurement invariance was also tested across countries to make sure RPS was appropriate to use across countries, which once again was met as mentioned above.

### Findings

In this section, I interpret how the findings answered the research questions. Because the research questions were categorized into domains, this section likewise is categorized by those same domains.

#### *Child Demographics*

For an optimal *relationships with peers* score, an adolescent would be an ethnic minority male living in an urban area of India. That males have higher *relationships with peers* than females is not surprising given that females are likely to spend more of their time in the household (Boyden et al., 2019; Tafere & Chuta, 2016). It is also expected that adolescents living in urban regions would have higher *relationships with peers* than rural regions. Rural regions are more sparsely populated leaving less opportunity to socialize. However, it is unclear why adolescents in India would have higher *relationships with peers* than other countries. Future research might benefit from examining those differences. Additionally, another surprising result was the relationship between an adolescent's ethnicity and *relationships with peers*, namely that

adolescents in the ethnic majority had lower *relationships with peers* than those in the minority. Possible reasons for this might be that adolescents in the ethnic majority might marry younger giving them less opportunity to socialize or that those in the minority feel a need to compensate for their culturally lower ethnic standing.

### ***Child Psychological Aspects***

Agency was used to observe an adolescent's internal locus of control. In line with the literature, higher agency was associated with higher *relationships with peers*, which is most likely due to the connection that higher locus of control has been seen to be linked with longer school retention (Barón, 2009; Singh et al., 2018). Unexpectedly, the life satisfaction results did not quite match the story from the literature. Singh et al. (2018) noted that life satisfaction, similar to agency, led to longer school retention and thus, higher *relationships with peers*. These results showed that an adolescent's life satisfaction at age 12 negatively impacted their *relationships with peers*. However, for *relationships with peers* as measured in round 4, an adolescent's life satisfaction at age 19 positively impacted their *relationships with peers*. Further studies would do well to investigate why life satisfaction at a younger age might negatively impact future *relationships with peers*.

### ***Family Demographics***

Despite literature that indicated social bias towards poverty, wealth was mostly not significantly associated with *relationships with peers* (Boyden et al., 2019). The one exception is the adolescent's family wealth reported in round 3, which was negatively associated with *relationships with peers* as measured in round 4. The negative association (i.e., more wealth is associated with lower *relationships with peers*) was contrary to the literature. One potential

reason is that those with higher wealth are afforded different academic opportunities that isolate them from peers within their community.

Unexpectedly, the literacy or education of the parents had an effect opposite of the literature, which illustrated higher parental education was associated with more investment in their child's education and thus, more opportunities for socialization in school. The results seen here indicated that the more literate the adolescent's mother was, the lower the *relationships with peers* was, which held true for the father's education, as well. Children that cannot rely on their parents for help with homework or other educational tasks may need to rely on their peers allowing them to increase their social skills.

The adolescent's household size had a positive association with *relationships with peers* meaning that the more that lived in the household, the higher the adolescent's *relationships with peers* was. This was expected as noted in the literature. The more people living in the household, the less responsibilities the adolescent must shoulder (Helmers & Patnam, 2010; Heissler & Porter, 2013; Tafere & Chuta, 2016). Thus, they were able to focus more on school and their peers.

### ***Child Health***

An adolescent's BMI was shown to affect social relationships negatively, meaning a higher BMI was associated with lower *relationships with peers*. This is likely due to a lack of a healthy diet and malnutrition. Similarly, both adolescents with a long-term ailment or any disability had lower *relationships with peers*. This result was expected given that a common ailment in LMICs is stunting which has been shown to be associated with lower *relationships with peers* (Boyden et al., 2019).

### ***Significant Events***

Unexpectedly, death in the family seemed to positively impact *relationships with peers* contrary to Escueta et al. (2014) and Chuta (2014) showing that loss led to issues with social-emotional skills and more responsibilities. Another perspective that might explain why an adolescent's family losses improve their *relationships with peers* is that the adolescent has less family to interact with or rely on and must turn outward to their peers or community. However, this relationship was only seen with *relationships with peers* measured in round 4. Specifically, instances of death that happened when the adolescent was 12 (round 2) affected their 19-year old (round 4) *relationships with peers* score but that effect lost significance for their 22-year old (round 5) *relationships with peers* score. This may show that as adolescents mature, experiences from their younger years have less impact.

The observed family illness results performed as expected in that experiencing an ill family member decreased an adolescent's *relationships with peers*. Perhaps adolescents had an increase of responsibilities only when the family member is temporarily ill as opposed to dead. Again though, the illness of a family member was measured in rounds 2-4 but was only significant for both rounds 4 and 5 of *relationships with peers* for illness measured in round 4. Similar to experiencing death, experiencing an ill family member when the adolescent was 12 (round 2) impacted their 19-year old (round 4) *relationships with peers* score but not their 22-year old (round 5) *relationships with peers* score. Once more, we see potentially that as time passes from trauma, the trauma has less impact on the adolescent.

As noted in the literature review, instances of divorce could increase the responsibilities of the adolescent in turn decreasing their *relationships with peers* (Chuta, 2014). This was not observed in the results. Neither divorce nor birth had a significant association with *relationships*

*with peers*. Similarly, economic struggles and natural disasters were predicted to negatively impact *relationships with peers* (Boyden et al., 2019; Chuta, 2014). Again, this was not observed in the results. There was no significant association with *relationships with peers*.

### ***Community Information***

The population as reported in round 3 was negatively associated with *relationships with peers* in both rounds 4 and 5. For *relationships with peers* in round 5, this pattern continued with population measured in rounds 1 and 2. This result is expected given that smaller communities have the opportunity to know more of the members of their community.

It was noted in the literature that availability of health services, even mental health services, positively impacted health and well-being and in turn *relationships with peers* (Boyden et al., 2019). This pattern was not observed in these results. However, this may be due to lack of awareness of social worker services and mental health services. It is possible that those that answered that social worker and mental health services were available were mostly those that used those services and thus, had an existing health or family issue that lowered their *relationships with peers*.

Also noted in the literature was the positive effect of availability of schools on *relationships with peers* (Dercon & Krishan, 2009; Rolleston & James, 2011). Once again, the results observed here were somewhat contrary to past literature. For communities where secondary schools or any schools were present, *relationships with peers* was lower than if the schools were not present. However, if adolescents were enrolled in school as measured in round 4, this did positively influence their *relationships with peers*. These two results indicate that the presence of schools does not inform whether those schools allow equal opportunities for all to

attend. In fact, these results point to the likelihood these schools do not provide equal opportunities.

Additionally, enrollment in school was measured in rounds 1-4 but was not significantly associated with *relationships with peers* for rounds 1-3. This is likely because in earlier years, most adolescents are enrolled in school. Only when adolescents are older does retention in school have more variance, where enrollment in school is associated with higher *relationships with peers*.

Finally, safety issues in the community were seen to negatively impact *relationships with peers*. This was expected based on the literature. When adolescents feel unsafe, they are less inclined to travel to school, especially when safety issues can exist within the school themselves (Boyden et al., 2019). As mentioned in the literature review, regulations have been passed to improve safety (Haynes, 2019). Unfortunately, these results show that those regulations were not sufficient and more needs to be done to increase safety.

### **Limitations**

Some issues with the data analysis arose on the part of how Young Lives collected the data. For example, a myriad of variables needed to be manipulated in order to answer the questions of interest or to match categorical options with corresponding variables. This was especially the case in variables measured across countries and other differences between countries were found. Generalization of these results to other LMICs requires caution.

Additionally, as this study was not a randomized controlled trial, there may exist other important covariates that could change the story. Finally, all results hinge on the appropriateness of the RPS. If another scale exists to better measure relationships with peers, namely in LMICs, the story could again shift.

### **Implications for Future Research**

Future research would benefit from thorough and consistent data collection. As mentioned in the Limitations section, certain data had to be manipulated to match corresponding variables which at times truncated the data. As noted in the Findings section, future research further investigating the differences between relationships with peers between Ethiopia, India, Peru, and Vietnam could be beneficial to model the positive aspects of the higher performing countries. Outside the scope of this study was comparison between the countries. Future research should examine interactions of the covariates between countries. As well, further investigation of the impact of ethnic advantage on relationships with peers could be conducted to see if they confirm that minority groups would have higher relationships with peers and/or explain why such a relationship exists. It was also mentioned that more research on life satisfaction at younger ages in adolescence would be beneficial to confirm if lower life satisfaction at a younger age positively impacts relationships with peers.

### **Implications for Practitioners**

From the child psychological aspect domain, this study showed that encouraging agency or intrinsic locus of control benefits adolescents. Academic settings would do well to implement more of this sort of encouragement. Additionally, schools need to provide equal access to community members. Females should also be given equal opportunities to educational opportunities. Regulations should be placed to allow females to finish school before marriage. Equal opportunities will increase enrollment which in turn may allow adolescents more opportunity to develop socially. In general, any means to increase enrollment, especially in the later teenage years, should be sought after. As mentioned above, safety issues within the school, such as non-segregated bathrooms must be addressed. As well, safety issues within LMICs in



general need to be attended to through passing more regulations, as well as raising community awareness of these issues through education.

Within communities with larger populations, steps should be taken to eliminate the competition for resources (e.g., food, education, health services) or potentially break down larger cities into smaller sections. As well, more awareness should be presented for the social worker services, mental health services, or general health services. These services are especially needed when adolescents experience loss when social support is necessary. Along with health services, education on nutrition and basic health should be provided with increased healthy resources.

### **Conclusions**

Using structural equation modeling, the RPS was fit to the data provided by Young Lives. The ability to validate the instrument for this dataset and the instrument behaving in its intended fashion are indicators that the instrument has predictive validity. As such, this study has confirmed the instrument is appropriate to use in future studies.

Experiences in childhood were seen to affect *relationships with peers*. Namely, child and parental demographics, psychological aspects, health, important life events, educational opportunities, and community safety. Further studies are needed to hone in on each of these domains.

This study sought to find means to improve social-emotional skills among adolescents in LMICs, which in turn aids the United Nations' SDGs (2021). I found that more equal opportunities are needed in education, social services, mental health services, and general health services, and as well, regulations are needed to increase safety especially for younger adolescents. Additionally, adolescents should be encouraged in their intrinsic locus of control continuously. Competition for resources should also be eliminated.

## REFERENCES

- Barblett, L., & Maloney, C. (2010). Complexities of assessing social and emotional competence and wellbeing in young children. *Australasian Journal of Early Childhood*, 35(2), 13-18.
- Barón, J. (2009). *Exploring the factors associated with youths' educational outcomes: The role of locus of control and parental socio-economic background* (No. 598). Centre for Economic Policy Research, Research School of Economics, Australian National University.
- Bowen, G. L., Roderick A. Rose, R. A., Joelle D. Powers, J. D., & Glennie, E. J. (2008). The joint effects of neighborhoods, schools, peers, and families on changes in the school success of middle school students. *Family Relations*, 57(4), 504-516. doi:10.1111/j.1741-3729.2008.00518.x
- Boyden, J., Dawes, A., Dornan, P., & Tredoux, C. (2019). *Tracing the consequences of child poverty: Evidence from the Young Lives study in Ethiopia, India, Peru and Vietnam*. Policy Press.
- Cheung, G.W. and Rensvold, R.B. (2002) Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233–255.
- Chuta, N. (2014). *Children's agency in responding to shocks and adverse events in Ethiopia*. Young Lives.
- Clark, J. C. (2020). *Evaluating model fit for longitudinal measurement invariance with ordered categorical indicators* (Publication No. 8725) [Doctoral Dissertation, Brigham Young University]. BYU ScholarsArchive.
- Denham, S. A. (2005). Assessing social-emotional development in children from a longitudinal

- perspective for the National Children’s Study: Social-emotional compendium of measures. *Columbus, OH: Battelle Memorial Institute.*
- Dercon, S., & Krishan, P. (2009). Poverty and the psychosocial competencies of children: Evidence from the Young Lives sample in four developing countries. *Children, Youth and Environments, 19*(2), 138-163.
- Escueta, M., Whetten, K., Ostermann, J., O’Donnell, K., & Positive Outcomes for Orphans (POFO) Research Team. (2014). Adverse childhood experiences, psychosocial well-being and cognitive development among orphans and abandoned children in five low income countries. *BMC international health and human rights, 14*(1), 6.
- Harpham, T. (2002). Measuring child poverty and health: A new international study. *Journal of Tropical Pediatrics, 48*(3), 128–131. doi:10.1093/tropej/48.3.128
- Haynes, S. (2019, December 2). Slavery still exists all around the world. Here's how some countries are trying to change that. *Time*. <https://time.com/5741714/end-modern-slavery-initiatives/>
- Heissler, K., & Porter, C. (2013). Know your place: Ethiopian children’s contributions to the household economy. *European Journal of Development Research, 25*(4), 600–620. <https://doi.org/10.1057/ejdr.2013.22>
- Helmets, C. & Patnam, M. (2010). The formation and evolution of childhood skill acquisition: Evidence from India. *Journal of Development Economics, 95*(2), 252-266.
- Marsh, H. W. (1990). *Self Description Questionnaire-I (SDQI)*. APA PsycTests. <https://doi.org/10.1037/t01843-000>

- Miyamoto, K., Huerta, M. C., & Kubacka, K. (2015). Fostering social and emotional skills for well-being and social progress. *European Journal of Education, 50*(2), 147-159.
- Morley, C. A., & Kohrt, B. A. (2013). Impact of peer support on PTSD, hope, and functional impairment: a mixed-methods study of child soldiers in Nepal. *Journal of Aggression, Maltreatment & Trauma, 22*(7), 714-734.
- Ogando Portela, M., & Pells, K. (2015). *Corporal punishment in schools: Longitudinal evidence from Ethiopia, India, Peru and Vietnam* (Innocenti Discussion Paper 2015-02). UNICEF Office of Research.
- Pells, K., Portela, M. O., & Revollo, P. E. (2016). Experiences of Peer Bullying among Adolescents and Associated Effects on Young Adult Outcomes: Longitudinal Evidence from Ethiopia, India, Peru and Viet Nam. India, Peru and Viet Nam Florence: UNICEF Office of Research-Innocenti. doi:10.18356/c2e90aee-en
- Pinderhughes, E. E., Nix, R., Foster, E. M., Jones, D., & Conduct Problems Prevention Research Group. (2001). Parenting in context: Impact of neighborhood poverty, residential stability, public services, social networks, and danger on parental behaviors. *Journal of marriage and family, 63*(4), 941-953.
- Rolleston, C., & James, Z. (2011). The Role of Schooling in Skill Development : evidence from Young Lives in Ethiopia, India, Peru and Vietnam. Background paper prepared for the Education for All Global Monitoring Report 2012. (pp. 1–52).
- Sawyer, S. M., Afifi, R. A., Bearinger, L. H., Blakemore, S.-J., Dick, B., Ezeh, A. C., & Patton, G. C. (2012). Adolescence: A foundation for future health. *The Lancet, 379*(9826), 1630-1640. doi:10.1016/s0140-6736(12)60072-5

Singh, R., Kesarwani, R., & Mukherjee, P. (2018). *'I will achieve everything on my own': The association between early psychosocial skills and educational progression through adolescence in India*. (Working Paper No. 175). Young Lives.

<https://www.younglives.org.uk/sites/www.younglives.org.uk/files/YL-WP175-Singh.pdf> Tafere,

Y., & Chuta, N. (2016). *Gendered trajectories of young people through school, work and marriage in Ethiopia*. (Working Paper No. 155). Young Lives.

<https://www.younglives.org.uk/sites/www.younglives.org.uk/files/YL-WP155-Gendered-Trajectories-in-Ethiopia.pdf>

United Nations. (2021, May 31). *Sustainable development goals*.

<https://www.un.org/sustainabledevelopment/>

Walters, K., & Bowen, G. L. (1997). Peer group acceptance and academic performance among adolescents participating in a dropout prevention program. *Child and Adolescent Social Work Journal*, 14(6), 413-425. <https://doi.org/10.1023/A:1024566930164>

Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using mplus*. Wiley.

World Health Organization. (2021, June 1). *Stunting in a nutshell*.

[https://www.who.int/nutrition/healthygrowthproj\\_stunted\\_videos/en/](https://www.who.int/nutrition/healthygrowthproj_stunted_videos/en/)

Young Lives. (2021, June 1). *A longitudinal study into children and youth around the world*.

<https://www.younglives.org.uk/>