On the Relationship Between Bonding Theory and

Youth Gang Resistance in U.S. 8th Graders:

Competing Structural Equation Models with Latent Structure Indirect Effects

Dissertation

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By

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ABSTRACT

In a study of 5285 8th graders from the Gang Resistance and Education Training (G.R.E.A.T.) research, this study applied Travis Hirschi's social bonding theory to examine the curriculum's efficacy in increasing conventional bonding (friends with positive peers, succeeding at education etc.) and decreasing *non-conventional* bonding (drug use, truancy, law violations etc.). The results suggest that across the full models, multiple group models (i.e., receive the G.R.E.A.T. curriculum or not) and models with indirect effects, *attachment* to parent, education and positive peers is the most consistent construct for increasing youth bonding. In the multiple group model, *commitment* (i.e., feelings about joining gangs, being involved with gang behavior etc.) is reduced significantly for those youth who received the G.R.E.A.T. curriculum versus those who did not. In the full model, *belief* about gangs in school, and pressure to join gangs, as well as *involvement* with delinquent peers and drug using peers are significant constructs for increasing bonding in the full models (with and without indirect effects), but are *not* significant in the multiple group model.

Regarding the latent construct G.R.E.A.T. (i.e., gang knowledge and knowledge about gang influence - selling drugs for power, interfering with goals and neighborhood peace) these variables are consistently significant across models regardless if youth received the G.R.E.A.T. curriculum or not. Regarding the manifest variables, youth use drugs because of peer pressure, and youth use drugs because of low self-esteem, youth view these two factors as consistently salient across all models.

Results for bias corrected, resampled confidence intervals for indirect effects on latent constructs suggest that large samples and large resampling (i.e., over 5000) are required for stability of loading estimates.

DEDICATION

This work is dedicated with love to Donna Marie D'Angelo and Marie Brake

for constant support and encouragement. I cherish you.

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PUBLICATIONS

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FIELD OF STUDY

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

Introduction

1.1 Significance of the Study

Gang statistics in the United States are not only alarming and on the rise but they are also

contradictory! This contradiction arises because of the lack of a universally accepted

definition for gangs in the United States. A survey by Egley (2008) from the National

Gang Center found that "32.4 percent of all cities, suburban areas, towns, and rural

counties (more than 3,330 jurisdictions served by city and county law enforcement

agencies) experienced gang problems in 2008. This represented a 15-percent increase

from 2002" (OJJDP fact sheet 2002, p 1). State and federal officials report that the

statistics on the number of gangs and the number of teens involved in gangs and gang

violence is increasing.

More recently the U.S. Government's National Center for Education Statistics

(NCES) report entitled *Crime, Violence, Discipline, and Safety in U.S. Public Schools:*

Findings From the School Survey on Crime and Safety: 2009–10 found that some 10

percent of city schools reported at least one gang-related crime, a higher percentage

than that reported by suburban (5 percent), town (4 percent), or rural schools (2

percent).

Problems exist however when it comes to defining and understanding what a "gang" is. According to research conducted by Dukes, Martinez, and Stein (1997), "little is known about how gang members differ from youth members of the general population… [this] lack of knowledge about youth gangs is due in part to a shift in the research emphasis during the 1970's from etiology to control (p. 140)" (for additional discussion see Klein & Maxson, 1990, Short, 1990).

Also, a Seattle, WA study by Hill, Lui, and Hawkins (2001) found that of 808 participants, 124 (15.3%) reported that they had joined a gang at some point between the ages of 13 and 18 (Hill, 2001). A highly disturbing finding from this study is that the initiation of gang membership started at the age of thirteen. In a study named the Gang Resistance Education and Training (G.R.E.A.T.), a curriculum designed to intervene with middle schools youth and gang resistance and conducted in 11 U.S. states[1], the researchers examined eighth graders perceptions, knowledge, and participation in gangs. While eighth-graders (i.e., in general 13 year olds) are the focus of both this study and the G.R.E.A.T. study, it is/was *not* the intention of either study to determine the primordial age of gang membership nor should it be inferred that younger youth cannot or do not join gangs. The reason eighth graders are examined in this study is simply because the G.R.E.A.T. study collected data on 8th graders and this data is the data source for this study (a full discussion regarding G.R.E.A.T. follows shortly).

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[1] The 11 cites were: Phoenix, Arizona; Torrance, California; Orlando, Florida; Pocatello, Idaho; Will County, Illinois; Kansas City, Missouri; Omaha, Nebraska; Las Cruces, New Mexico; Philadelphia, Pennsylvania; Providence, Rhode Island; and Milwaukee, Wisconsin.

One of the most prominent and tested theories regarding youth delinquency is Social Control/Bonding (SCB) theory. The theory of social bonding was developed by Travis Hirschi (1969) through social control theory. Hirschi's work continued to evolve when he joined Gottfredson in the development of the General Theory of Crime (GTC). Hirschi stated that "delinquency acts result when an individual's bond to society is weak or broken" (p. 16). Hirschi's theory comes as an extension of Reiss (1951), Matza (1957), Nye (1958), and Reckless' (1961) work with social control theory. Social control theory examines how conventional attachments to family, community, peers, etc. keep youth from engaging in delinquent acts and deviant behavior (a complete discussion is presented in Chapter 2), and supporting data will reveal that social control/bonding theory can assist in explaining gang membership.

Hirschi (1969) in *Causes of Delinquency* presented his social bonding theory, which, as stated above, argues that delinquency takes place when a person's bonds to society are weakened or broken, thus reducing personal stakes in conformity. Hirschi argues for conventional connectedness between a youth and their environment.

According to Hirschi (1969), commitment to conventional values, such as striving to get a good education and refusing to drink alcohol and "cruise around" was indicative of conventional behavior. Further, youth who were strongly attached to their parents were less likely to commit criminal acts; youths involved in conventional activity, such as homework, were less likely to engage in criminal behavior. Conversely, youth involved in unconventional behavior, such as smoking and drinking, were more delinquency

3

prone; and youths who maintained weak and distant relationships with people tended toward delinquency. The most controversial finding for Hirschi suggests that those youth who shunned unconventional acts were attached to their peers (for details see http://www.cfkeep.org/html/snapshot.php?id=1065903344253)

According to Karcher (2004), conventional connectedness occurs "when a person is actively involved with another person, object, group or environment, and that involvement promotes a sense of comfort, well being, and anxiety-reduction" (p. 23). Karcher continues by saying that "family neglect, peer rejection, religious intolerance, and racial/ethnic misunderstanding experienced by youth may result in lower connectedness in the forms of less involvement, less positive emotional affect, and less caring about their performance in those social worlds" (Karcher, 2004, p. 24) putting the youth at risk of delinquency

According to Hagan's (2011) discussion of gangs, bonding and conformity, "Individuals maintain conformity for fear that violations will rupture their relationships, (cause them to "lose face") with family, friends, neighbors, jobs, school and the like" (p. 165). These findings arguably, though *not* explicitly, extended Hirschi's theory of bonding.

There are two points from Hirschi's work that are the focus of this research. First, Hirschi's perspective is *not* why people engage in delinquency; rather, why *people don't* engage in delinquency. Second, and related to the first point-and is the crux of Hirschi's work, is that *conventional* attachment leads to conformity, thus *conventional* attachment

is the primary predictor for individuals refraining from delinquency. Hirschi (2004) writes that there are conventional *values*, and conventional *behavior*. Conventional values exist when youth "… strive to get a good education, refuse to drink alcohol and refuse to "cruise around". Additionally, conventional *behaviors* exist when "a youth is involved in activity, such as homework". Conversely, unconventional behaviors are defined as smoking and drinking.

According to Macionis (2009), Hirschi links *conventional* conformity to four different types of social control: 1) Attachment, 2) Opportunity, 3) Involvement, and 4) Belief where by definition:

1. **Attachment.** Strong social attachments encourage conformity. Weak family, peer, and school relationships leave people freer to engage in deviance.
2. **Commitment.** The greater a person's access to legitimate opportunity, the greater the advantages of conformity. By contrast, someone with little confidence in future success is more likely to drift toward deviance.
3. **Involvement.** Extensive involvement in legitimate activities such as holding a job, going to school, or playing sports inhibits deviance (Langbein & Bess, 2002). By contrast, people who simply "hang out" waiting for something to happen have time and energy to engage in deviant activity.
4. **Belief.** Strong belief in conventional morality and respect for authority figures restrain tendencies toward deviance. People who have a weak conscience (and who are left unsupervised) are more open to temptation (Stack, Wasserman, & Kern, 2004)

(Macionis, 2009, p 228)

Research by Klemp-North (2007) argues that social bonding theory not only explains the risk factors contributing to gang membership but also identifies social bonding as one of the most influential theories relating to youth delinquency. A search of the literature reveals that Hirschi's Social Control theory and delinquency have endured

copious testing. However, there is a paucity of research with regard to Hirschi's Social Control theory as applied to gangs and especially with respect to advanced statistical models. To date only one study using structural equation modeling exists that examines the role of Social Control/bonding as it relates to youth gangs and that study is limited in that it used only one Colorado City (See Dukes and Stein, 2009). Thus, this research contributes to the greater understanding of the role of Social Control/bonding as it relates to youth gangs in two ways. First, a structural model can test Hirschi's four aspects in relation to 8th graders' attitudes and knowledge toward and about gangs. Second, a structural model offers a test of indirect effects, something that does *not* exist in any of the social control research. In Chapter Three a discussion regarding the testing of indirect effects though bootstrapping confidence intervals will be provided.

Before progressing we must examine the existing research that attempts to define gangs. As the study of youth gangs, and in particular, gangs in school (i.e., middle school through high school) continues its development as a burgeoning science difficulties arise because defining what a gang "is" remains elusive. Sheldon (2004) writes, "The only agreement about what constitutes a gang is that its (gang) members, and its (gang) activities are in disagreement with society or each other" (p. 36). Sheldon continues by saying that this discord is linked to issues of location (e.g., type of neighborhood), age (e.g., adolescent versus young adult), and purpose (e.g., play group, organized crime, drugs, & turf/protection).

In fact, the National Gang Center at the United States Government's Office of Juvenile Justice and Delinquency Prevention (OJJDP) states, "There is no single, generally accepted definition of a "gang." The term "street gang" is often used interchangeably with "youth gang" as well as "criminal street gang…" (National Gang Center (OJJDP), n.d.).

To confound the issue of making an operational definition of a youth gang, in 1999 the National Youth Gang Survey (NYGS) asked the question 'how many troublesome *youth groups* are in your jurisdiction? According to the NYGS this term differs from *youth gang* in that it is a combination of the term "unsupervised peers, groups" and "unruly youth groups". This question further confounds what a youth gang is by definition. Arguably youth gang is being defined *not* by what constitutes a gang, but by what a youth gang does *not* constitute; thus making research both plentiful yet elusive. The National Youth Gang Survey begs the question, what is a troublesome youth and do troublesome youth become labeled as a gang member? Context will rule the day with this question, because clearly, set and setting will dictate what 'is' an "unruly youth", or "troublesome youth" specifically, making the definition of an "unruly youth" or "troublesome youth" as elusive as the definition of a gang. What is meant by the term "set and setting" is that each state *may* determine a definition of a gang. In some instances states have *not* explicitly defined a gang – as shown below.

Also contributing to the difficulty of finding an operational definition for a *youth gang* are the existence of conflicting definitions among the pundits. Academic scholarship by Huff (1993) explains a distinction between *youth gangs* and *organized*

crime, wherein the *youth gang*s are comprised of adolescents and organized crime is composed of adults. Klein (1989), recognized as a premier gang researcher (see Hagedorn, 1998), and who conducts research on gangs in both America and Europe, developed one of the most accepted definitions of a gang:

> [A gang is] any denotable… group who (a) are generally perceived as a distinct aggregation by others in the neighborhood, (b) recognized themselves as a denotable group, and (c) have been involved in a sufficient number of incidents to call forth a consistent negative response from neighborhood residents and or enforcement agencies
>
> (Klein M., 1989, p. 33)

A shortcoming of this definition is that it does *not* make a distinction between a "gang" and "unruly youth". Moreover, it must be asked, what is the operational definition of an "incident? Herein lays the confusion when trying to define a gang.

In contrast to Kline, Short (1990) defined gangs as "groups whose members meet together with some regularity, over time, on the basis of group-defined criteria of membership and group-defined organization" (p. 3). Short includes additional distinctions between the *youth gang* and *organized crime* suggesting *youth gang*s are involved with both legal and illegal activities and when illegal acts are committed they are typically by an individual or small group within the larger group, in other words, a sub group; whereas *organized crime* is perpetrated by the entire group in the pursuit of economic criminal activity. Short's definition offers a more focused definition of gang behavior; making a distinction between legal and illegal, but one could argue that Short

over generalizes when he claims that illegal acts by gangs are committed by an individual or small group.

Yet Hagedorn, at his website gangresearch.net, offers a more impassioned definition of a gang when he says Gangs are organization of the street composed of either 1) The socially excluded, or 2) alienated, demoralized, or bigoted elements of a dominate racial, ethnic, or religious group.

Strikingly, when Hagedorn's work is included, we see a critical theory perspective wherein a gang is a reaction (usually identified as a backlash) to the status quo; that when people, and in particular youth, are alienated by the power structure, Hagedorns' explicit implication is that the gangs give youth a place of acceptance when alienated, and that these gangs will gather in public, in part, to bond together.

In contrasting Kline, Short, and Hagadorn, what becomes clear is that a gang is *not* organized crime. What is less clear however, is the number of people (youth) that constitute a gang. Two? Three? More? Whether these various definitions of youth gang can be viewed as complementary to each other, or at odds with each other; regardless, a definition of gang eludes us.

Work by Moore (1978, 1993) may offer an insight into why the disparity in defining gangs. Moore suggests that defining a gang remains a problem because of the many stereotypes that exist. The stereotypes or beliefs regarding gang-related-behavior consist of: 1) violent males; 2) are typically African American and/or Hispanic; 3) exist in the inner-city; 4) deal heavily in drugs; 5) that gangs are all alike; 6) that all gangs are

bad; and 7) that gangs engage in criminal behavior among other factors. According to Moore (1993), "stereotypes shape the definitions of gangs and therefore determine policies structured to deal with gangs" (p. 29).

Five years later, Hagadorn (1998) implied that these stereotypes gain traction because "few reliable data are available on the number of gangs in different cities and at different times" (p. 370). To support this position, Hagedorn quotes Miller (1975, 1990) saying (Miller) has long argued that the lack of a centralized database on gangs is one reason why the media can so easily manipulate the definition of a gang. Thus media manipulation, Hagedorn (1998) suggest, "leads to the belief – [Moore (1993) argues stereotype] - that American gangs and their violence were basically the product of the problems of young people acculturating to life in poor urban communities" (p. 370).

Work by Spergel (1995) – another of the most prominent experts on U.S. gangs – suggests two factors involved in defining the term gang. First, gang definitions "evoked intense and emotional discussions in the 1970s and 1980s and have more recently become the basis for a variety of repressive laws and strategies" (p. 17). Second, Spergel suggests that the absence of a gang definition and denial of recognizing a gang problem by a police department when significant gang problem exists is likely to occur in the early stages of the "problem". This occurs when "key city officials and influential's seek to protect the reputation and interest of the city as a 'good place' to live, work, and do business" (p. 17).

Brotherton (2008) suggests a more critical perspective regarding the social construct and social definitions of crime. Examining the work of Thrasher (1929), from

the Chicago school, Brotherton suggests that gangs were once perceived as social clubs - a natural evolution among the youth. Only later with the prison builders' need for construction programs and legislator's desires for reelection by being "tough on crime" - did the social construction of defining gangs as a social "problem" arise?

Both Brotherton (2009) and Spergel (1995) suggest that the U.S. model for dealing with gangs is based on suppression (e.g., directed patrols, crackdowns, investigations, arrests and lockups) which is a dated, post-industrial model that remains archaic. Brotherton suggests that moving to a post-industrial policing technique that co-opts the gang leadership is a superior approach[2].

Building on Brotherton's theory - and fully discussed within the literature section of this work, Sheldon (2001) suggests two incidents that were major turning points in shaping the perception of the social construction of gangs. These two incidents were 1) the Zoot suit riots of the 1940's; and 2) the Watt's riots of the 1960's. Sheldon, among others, argues that these two occurrences began the seismic shift, or evolution of the perception about gangs--from Thrashers interpretation of gangs as youth social clubs into Klein's argument that perceptions of gang are about crime, to Brotherton's and Spergel's definition which incorporates the suppression of delinquency/crime in the definition. Eventually the theory evolved to include Moore's stereotypes, generally based on race. The evolution and etiology of suppression theory was in major part a reaction to the two riots and arguably suppression theory in the U.S. persists today.

The intention of this scholarship is *not* to debate the critical theory or conflict theory, rather the intention is to examine the salient factors that influence America's youth, in particular the G.R.E.A.T. 8th graders, understanding of gangs and gang influence. This discussion will be motivated through social control theory (bonding theory) as discussed by Hirschi (1969), and the General Theory of Crime (GTC) by Hirschi & Gottfredson (1995), containment theory as discussed by Reckless (1932, 1935, 1973), and attachment theory as discussed by Karcher (2004).

The purpose of this study is fivefold:

1. To conduct a positivist evaluation of the G.R.E.A.T. instrument and its efficacy for increasing gang resistance in 8th grade youth.

2. To expand and create a methodological foundation for future inquiry into school gang influence (in particular in 8th grade) in populations beyond the cities that were examined in the G.R.E.A.T. study. This occurs through a comparison of Hirschi's social control/bonding model and a newly developed model within this research called "social-control/bonding indirect effects model".

3. To provide a rationale and foundation for inquiry into the structural model of gang knowledge and to clarify the role of bonding/connectedness in 8th graders' understanding about gangs after receiving the G.R.E.A.T. curriculum.

4. To gain a greater understanding about the role of peer influence on 8th graders knowledge about gang influence and gang behavior after receiving the G.R.E.A.T. curriculum.

5. To examine structural model indirect effects using bootstrap confidence intervals to determine if attachment and commitment are significant mediators between involvement and bonding/connectedness in predicting 8th grade gang knowledge.

Lastly, the theories outlined below provide much debate surrounding and involving peer influence. While Travis Hirschi (1969) argued that peers were a protective factor for deviant behavior, others (e.g., Hindelang, 1977, & Matsueda, 1981) found that peers have exactly the opposite effect. In this research peer influence is measured in two different ways: 1) positive peer influence and delinquent peer influence (robbing, stealing cars etc.). In presenting this peer disaggregation, this research will offer a better understanding about peer influence and shed more light on the debate about the role of peer influence on those 8th graders gang knowledge who received the G.R.E.A.T. curriculum.

By understanding the individual motivation while extending bonding/connectedness theory, this research can impact policy development in order for intervention specialists to have a clearer understanding of the structural relationship between the youth and youth bonding/connectedness with regard to gang resistance.

1.2 Summary of Methodology

A cross-sectional experimental design - namely competing structural equation models - is used to answer the following eight research questions:

1. What similarities and differences exist between Hirschi's Social Control/bonding theory and the new model named "Social Control/Bonding with Indirect Effects model (SCBI) (see Figure 1 below). Review of the research suggests that Hirschi and those that followed analyzed only the direct effects of Attachment, Involvement, Commitment and Belief on bonding/connectedness yet an examination of the indirect effects seems perspicacious. Thus, this research examines indirect effects through a recursive model.

Recursive models meet the following conditions:

   a. Models are hierarchical. All effects in the model are —unidirectional in nature, i.e., no two variables in the model are reciprocally related, either directly or indirectly. Hence, the first endogenous variable is affected only by the exogenous variables. The 2nd endogenous variable is affected only by the exogenous variables and the first endogenous variable; and so on.
   b. All pairs of error (or disturbance) terms in the model are assumed to be uncorrelated.
   c. The error term ε_j will be uncorrelated with all explanatory variables in the equation containing ε_j.
   d. Let L = # of manifest variables in a model (in both models there are 38). For L variables, the number of unique variances and covariances = $(L*[L+1]/2)$. So, in the models in this study, there are 741 unique variances and covariances.

In the SCBI model the following will be examined (see Figure 2):

2. What role does *Involvement* hold for 8th graders understanding about gang influence and gang behavior with respect to the G.R.E.A.T. curriculum?
3. What role does *Attachment* hold for understanding gang influence and gang knowledge for 8th graders with respect to the G.R.E.A.T. curriculum?
4. What role does *Commitment* hold for 8th graders knowledge about gang influence and gang behavior with respect to the G.R.E.A.T. curriculum?
5. What role does *Belief* for 8th graders knowledge about gang influence and gang behavior with respect to the G.R.E.A.T. curriculum?
6. What do youth say are the most salient factors related to why they join gangs?

7. What role do indirect effects hold for 8th grade bonding/connectedness? The specific indirect effect in this study occurs from *involvement* to bonding through *attachment* (I*A) – see Figure 2.

8. Question eight will be analyzed through a multiple-group comparison model and competes with Hirschi's model outlined in Figure 1. This question examines if there a difference between the youth who received the G.R.E.A.T. curriculum versus those who did *not* and 8th graders understandings about gang influence and gang behavior?

This study relied on data from a five year, multi-state, multi-city research program that examined a large sample of U.S. 8th grade students in eleven States to evaluate the efficacy of a gang resistance training curriculum called Gang Resistance, Education and Training (G.R.E.A.T.).

The G.R.E.A.T. Program is a school-based gang prevention curriculum for girls and boys. The curriculum is taught in classrooms of mainly middle school students by uniformed law enforcement officers in a 13-week course. In addition to educating students about the dangers of gang involvement, the lesson content places considerable emphasis on cognitive-behavioral training, social skills development, refusal skills training, and conflict resolution. Thus, the curriculum aims to reduce risk factors and increase protective factors. A more thorough discussion regarding the particulars from the study follows below. Data from the survey are analyzed with descriptive and inferential statistical techniques to answer the eight research questions posited above.
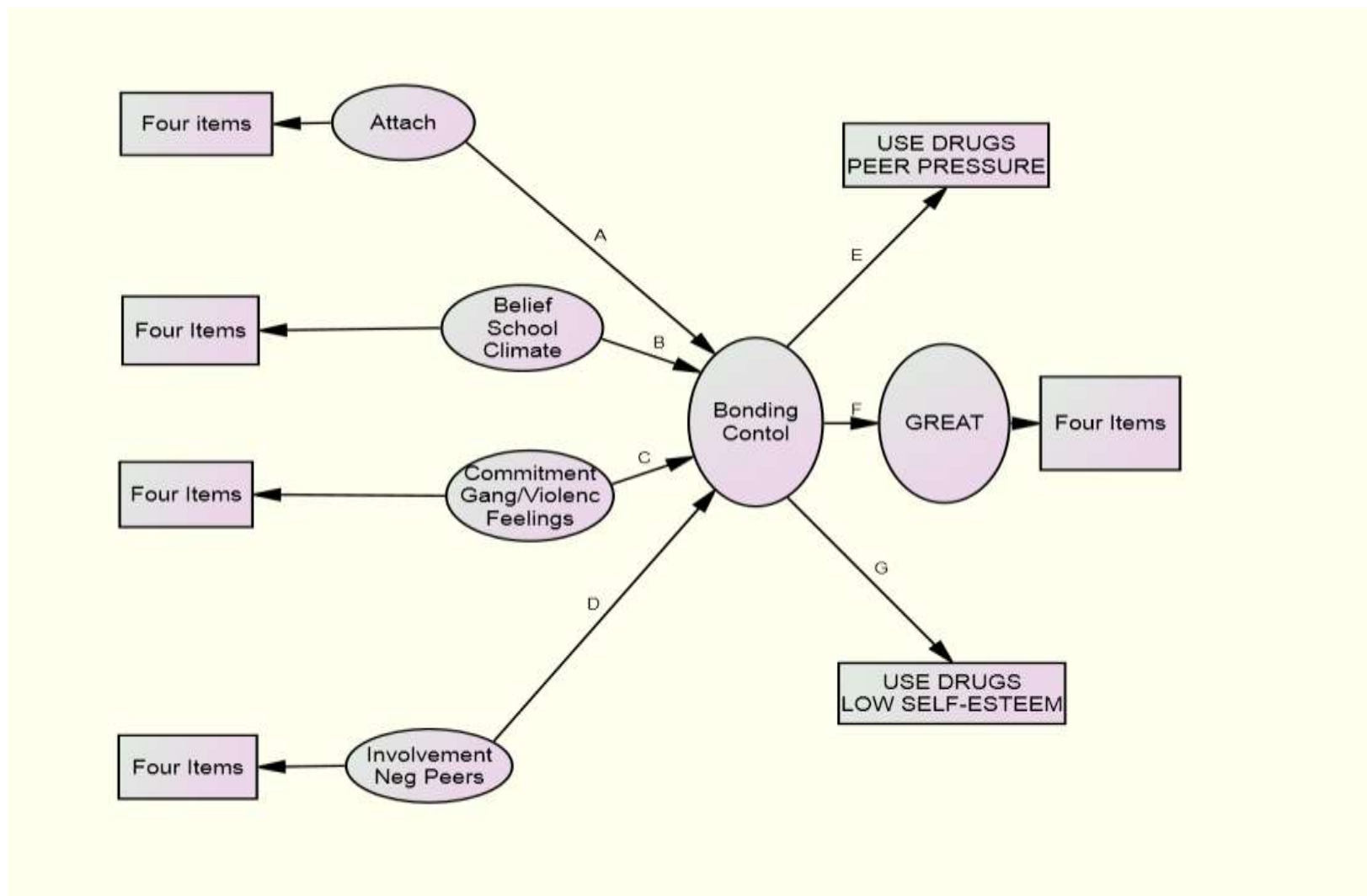
Figure 1: Hirschi's Social Bonding Model (Latent Structure) as related to G.R.E.A.T. Curriculum
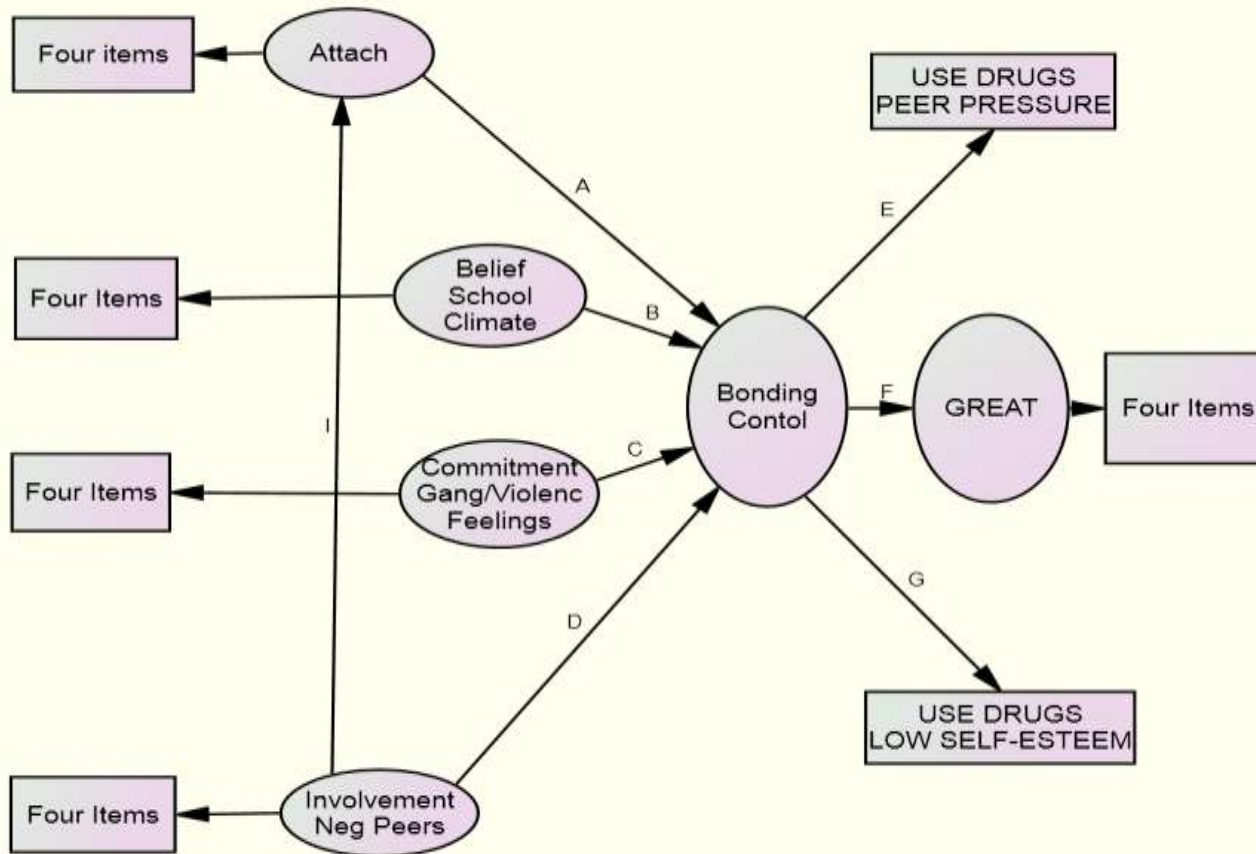
Figure 2: Social Bonding with Indirect Effects Model as related to G.R.E.A.T. Curriculum

Figure 1 and Figure 2 show the latent structural relationship between the exogenous latent predictors and the four elements of Hirschi's theory (i.e., Involvement, attachment, commitment and belief) indicated by their respective letters (i.e., A, B, C, D) and their influence on 8th grade bonding. Also depicted is the direct relationship from bonding by three variables; 1) the youth *use drugs due to peer pressure* (indicated by the letter E); 2) the G.R.E.A.T. endogenous outcome (indicated by the letter F), which is a measure of 8th grade knowledge and understanding about gangs; and 3) the youth *use drugs due to a low self-esteem* (indicated by the letter G).

The major difference between Figure 1 and Figure 2 occurs at the second order factor level (i.e., A, B, C, & D) where Figure 1 shows bonding/connectedness indicated by direct effect, that is arrows pointing toward the indicators (i.e., Education connectedness, feelings about gangs and violence, gang perceptions (i.e., G.R.E.A.T., and reasons for drug use etc.) whereas Figure 2 shows both the direct effect and indirect effects, that is Hirschi's element of involvement is specifically indicated from involvement to bonding through attachment. A full discussion regarding these competing models is provided in Chapter Three section five (i.e., 3.5).

1.3 Assumptions

Several assumptions were made in developing and conducting this project. First, the study is based on the belief that while gang resistance (or involvement) is influenced

18

by contextual factors (i.e., SES, neighborhood safety, school safety etc.) that there

remains individual responsibility for choices and consequences defined as personal

control by the General Theory of Crime (for discussion see Gottfredson and Hirschi,

1998). This statement should *not* be construed as an argument for rational theory wherein

the consequences for "bad" choices result in punishment. On the contrary! The contextual

factors (SES, single parent home, etc) should be, in this author's belief system, addressed

before suppression a.k.a. arresting, adjudicating and locking up youth occurs. However,

this study, as is supported in the literature review, is based on an integrated approach to

theory; that is, a combination of social control theory and connectedness theory. It is not

the purpose of this research to find a general theory of gang resistance/membership; it

would be remiss to believe such a theory exists and such a theory risks the "global

fallacy" – the tendency to attempt to generalize relatively specific explanations for all

types of behaviors (i.e., crime) (for discussion of global fallacy see Hagan, 1987; &

Chambliss and Schutt, 2011).

Second, it is assumed that the Gang Resistance and Education Training

(G.R.E.A.T.) curriculum, as discussed in the methods section, teaches the concept gang

resistance in each state based on the laws and guidelines within each state. Several

attempts to contact officials at G.R.E.A.T. to verify this information have produced zero

contacts. However, because G.R.E.A.T. is endorsed by the U.S. government through the

National Gang Center (see http://www.nationalgangcenter.gov) and implemented

nationwide, this author feels that it is safe to assume that applying G.R.E.A.T. training

19

follows *state* laws for definitions of gangs when implementing the G.R.E.A.T. curriculum.

Third, it is assumed that the findings in this study are based on 8th graders in 11 states and that these findings should *not* be generalized to youth populations outside this school grade or these eleven states without further research. That is to say, protective and/or risk factors for 8th graders cannot be assumed to be salient for lower or higher school grades or for youth in regions outside of the original study.

Fourth, for simplicity throughout this study, the Federal definitions for "gang", "gang membership", and "gang crime" are applied to school gangs. It is stipulated that a definition of youth gang may *not* exist in the States that implemented the G.R.E.A.T. curriculum included in the study. It may also be the case that the definitions may omit portions of the Federal definitions for a youth gang. To date, only one State, Virginia, provides for laws that explicitly state that "gang crimes" occur on school property[2]. Further, the federal government has *not* identified any states that address school gangs through the law. It is also assumed that state laws that exist for gangs are applied uniformly across gang type.

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[2] For more information see http://www.nationalgangcenter.gov/Content/Documents/Definitions.pdf

1.4 Operational Definitions

Gangs

Definitions of Gang, Gang Member, and Gang Crime are disaggregated by Federal and State law. The following definitions are conceptualized and operationalized in this study:

Federal Law

Gang - Currently, federal law defines the term "gang" as "an ongoing group, club, organization, or association of five or more persons: (A) that has as one of its primary purposes the commission of one or more of the criminal offenses described in subsection (c); (B) the members of which engage, or have engaged within the past five years, in a continuing series of offenses described in subsection (c); and (C) the activities of which affect interstate or foreign commerce" within U.S. code18 USC § 521(a).

Gang Crime- Current federal law describes the term "gang crime" as:

> (1) "A federal felony involving a controlled substance (as defined in Section 102 of the Controlled Substances Act (21 USC § 802) for which the maximum penalty is *not* less than five years.
>
> (2) A federal felony crime of violence that has as an element the use or attempted use of physical force against the person of another.
>
> (3) A conspiracy to commit an offense described in paragraph (1) or (2)." 18 USC § (c).

Gang Member - Also, current federal law describes the term "gang member" as "a person who:

(1) Participates in a criminal street gang with knowledge that its members engage in or have engaged in a continuing series of offenses described in subsection (c).

(2) Intends to promote or further the felonious activities of the criminal street gang or maintain or increase his or her position in the gang.

(3) Has been convicted within the past five years for:

> (A) An offense described in subsection (c).
>
> (B) A state offense:
>
>> (i) Involving a controlled substance (as defined in Section 102 of the Controlled Substances Act (21 USC § 802)) for which the maximum penalty is *not* less than five years imprisonment.
>>
>> (ii) That is a felony crime of violence that has as an element the use or attempted use of physical force against the person of another.
>
> (C) Any federal or state felony offense that by its nature involves a substantial risk that physical force against the person of another may be used in the course of committing the offense.
>
> (D) A conspiracy to commit an offense described in subparagraph (A), (B), or "18 USC § 521(d).

State Law[3]

A review of current state laws for various states definitions of the words "gang,"

"gang member" and "gang crime" reveals the following information:

"Gang Member" Definitions

- Fourteen states have legislation that defines a "gang member."
- Six states have a list of criteria, some of which a person must meet to be considered a gang member.
- Of those, five states require that a person must meet at least two criteria to be considered a gang member.
- Kansas requires an admission of gang membership OR three or more of its criteria.

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[3] For complete State information see
http://www.nationalgangcenter.gov/Content/Documents/Definitions.pdf

- Thirty-nine states and Washington, DC, have legislation that defines "gang."
- Thirty states and Washington, DC, define a gang as consisting of three or more persons.
- Twenty-three states include a common name, identifying sign, or symbol as identifiers of gangs in their definitions.
- Twenty-four states refer to a gang as an "organization, association, or group."
- Twenty-two states and Washington, DC, use the term "criminal street gang" to describe a gang.

"Gang Crime" Definitions

- Twenty-two states define "gang crime/activity."
- Twelve states refer to it as a "pattern of criminal gang activity."
- Eighteen states enumerate the exact crimes that are to be considered criminal gang activity

1.5 Statistical Definitions

Bartlett's test of sphericity

Bartlett's test of sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated. A rejection of the null hypothesis (identity matrix exists) suggests that the variables are correlated and factor analysis is appropriate. See also Kaiser-Meyer-Olkin.

(Raftery, 1993)

Confirmatory Factor Analysis (CFA)

Developed by Charles Spearman in 1904, confirmatory factor analysis (CFA) is a special form of factor analysis. It is used to assess the number of factors and the loadings of variables. CFA is used for theory testing/confirmation.

(Schumacker & Lomax, 2010)

Kaiser-Meyer-Olkin (KMO)

The Kaiser-Meyer-Olkin measure of sampling adequacy tests whether the partial correlations among variables are small. The KMO should be greater than 0.5 for a satisfactory factor analysis to proceed. See also Bartlett's test of sphericity.

Mediation

In statistics, a mediation model is one that seeks to identify and explicate the mechanism that underlies an observed relationship between an independent variable and a dependent variable via the inclusion of a third explanatory variable, known as a mediator variable. Rather than hypothesizing a direct causal relationship between the independent variable and the dependent variable, a mediational model hypothesizes that the independent variable causes the mediator variable, which in turn causes the dependent variable. The mediator variable, then, serves to clarify the nature of the relationship between the independent and dependent variables.

(MacKinnon, 2008)

Moderation

A moderator variable M is a variable that alters the strength of the causal relationship. Most moderator analysis measure the causal relationship between X and Y by using a regression coefficient. Although classically, moderation implies a weakening of a causal effect, a moderator can amplify or even reverse that effect.

(Kenny, 2011)

Principal Component Analysis (PCA)

Invented by Karl Pearson in 1901, principal component analysis (PCA) is mathematical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of uncorrelated variables called principal components.

(Schumacker & Lomax, 2010)

Structural Equation Modeling

Structural Equation Modeling (SEM) is a statistical technique for testing and estimating structural relations using a combination of statistical data and assumptions.

1.6 Summary

This study builds upon previous work conducted by Travis Hirschi in which Social Bonding, through the four elements -commitment, involvement, belief, attachment – serve as protective factors that may keep people from engaging in delinquency. The study is informed by the historical development of gangs, current scholarship on the status of gang definitions, and by theoretical understandings of culture, stereotype and of the critical role that policy, police and politicians plays in defining and identifying members of a gang and gang activity.

This study sought to examine associations among social control theory, general theory of crime and attachment, and gangs held by eighth grade students in eleven cities within the United States. A cross-sectional, experimental design relying on paper-and-pencil questionnaire methodology was used to obtain data sufficient to answer the eight research questions posed above. This study's intent is, in part, to provide the foundation for future inquiry into eight grade gang knowledge; to provide empirical support for understanding and intervention into youth gang membership; and with this new information, inform future policy on gangs in the hope that may encourage a movement away from a suppression model in exchange for a re-integrative theoretical model.

The study is presented in the following four Chapters. Chapter Two presents the literature and theoretical rationale for the study. Chapter Three details the methodology used to conduct the study and presents the rational for design selection including model

concept. Results of the study are reported in Chapter Four which include factor analysis, model specification and model identification, and conclusions and implications are presented in Chapter Five.

The dual purpose of the study was to 1) examine the efficacy of the Gang Resistance Education and Training curriculum; and 2) to examine the relationship between 8th graders connectedness to parents (i.e., dad and mom separately) and connectedness to education. Also connectedness to positive peers is examined as well as the influence of 8th graders perceptions of positive self worth/perception on gang knowledge. In addition an examination of 8th graders proclivity for gang involvement and the curriculums influence on gang knowledge and in middle school.

The G.R.E.A.T. instrument was implemented in middle-schools across eleven cities within the United States from 1995 until 1999. Multiple group structural equation models were used to examine the relationships between these variables. In addition, competing structural equation models were used to determine the best model for evaluating the G.R.E.A.T. curriculum.

In particular, this examination focused on several goals: (1) to determine if the G.R.E.A.T. curriculum showed a significant difference between the G.R.E.A.T. treatment group and the non-G.R.E.A.T. control group in youth knowledge regarding gangs, (2) to examine if attachment to Mom and/or Dad through positive interactions (e.g., talking, trusting, understanding, and praising) influence a youths perceptions of gangs, (3) to examine if positive perceptions of the education in the youth community influence a

youth's perceptions of gangs, (4) to examine, how peer relationships influenced a youth's perceptions of gangs, (5) to examine if a positive self perception influenced a youth's perceptions of gangs, and (6) to examine if Hirschi's model of bonding/connectedness is improved by including indirect effects rather than simply direct effects.

CHAPTER 2

Literature Review

The structure of this chapter is as follows: the first sections discuss and define six significant issues, and the seventh section provides a chapter summary. Weaved through Chapter 2 is a substantiation for the variables from the G.R.E.A.T. study that were included in the study and models.

Section one, Gang Definition: 1900 - 2011 provides a background of how gangs became perceived not only as deviant but also as delinquent. This discussion shows a progression of how gang definitions evolved from a somewhat innocuous group of youth as defined by Thrasher (1929) into the more unsavory current perception. This discussion will illuminate how gang theory became operationalized in America into what Brotherton (2011) and others interpret as a mode of suppression.

Section two, Precursors to Social Control/Bonding Theory, provides a discussion about the major contributors who provided the precursors to social control/bonding theory.

Section three, Travis Hirschi – Social Control/Bonding Theory; section four - Social Control/Bonding – Model; and section five – Social Control/Bonding – Model Specification; are interrelated. Section three discusses Travis Hirschi's social control *theory;* section four provides details about the social control *model* that Hirschi

developed. Section four also discusses how Hirschi's (1996) theory and model reacted to subsequent research to both corroborate and challenge the findings within Social Control/Bonding Theory; and section five provides details both about how Hirschi conceptualized his model juxtaposed to how the G.R.E.A.T. variables are conceptualized to test Social Control/Bonding theory.

Section six, Connectedness Theory, offers a discussion about the more contemporary version of control/bonding theory called connectedness theory and provides a discussion concerning connectedness theories contribution to social control/bonding theory.

2.1 Gang Definition: 1900 - 2011

Zoot Suit riots - 1943! Watts Riots - 1965! According to Sheldon (2004), these two disturbances in America elevated the discourse over gangs to the forefront of the American mind and became a turning point in the perceptions of American gangs. Sheldon (2004) suggests that The Zoot-Suit riots were a series of riots in 1943 Los Angeles during WWII. The riots revealed a polarization between two youth groups within wartime society: the gangs of predominantly Mexican youths (and some Blacks), who were at the forefront of the Zoot-suit subculture, versus the predominantly white American servicemen stationed along the Pacific coast. White servicemen were upset because they felt that the Latino military personnel were disrespectful with the clothes they wore – Zuit suits.

Sheldon writes "during the riot, the police [engaging in suppression] arrested 22 gang members for conspiracy to commit murder resulting in 12 convictions (termed the Sleepy Lagoon case). At the same time police began to engage in periodic sweeps within gang areas" (Sheldon, Tracy, & Brown, 2004, p. 9) and began to repatriate Hispanics to Mexico which frustrated the Latin community of Southern California.

The Watts Riots of 1965 refers to a large-scale riot that lasted six days in the Watts neighborhood of Los Angeles, California. By the time the riot subsided, 34 people had been killed, 1,032 injured, and 3,438 arrested. It would stand as the most severe riot in Los Angeles history until the Los Angeles riots of 1992. Sheldon (2004) suggests that the riot is viewed by some as a reaction to the record of police brutality by the LAPD and other racial injustices suffered by Black Americans in Los Angeles, including job and housing discrimination.

Moore (1978) writes "In regard to the Zuit Suit riots, those that fought the marauding sailors in East L.A. were seen by their younger brothers as heroes of a race war" (p. 68). Sheldon then suggests that the Watts riots did for African American gangs roughly what the Zoot Suit riots did for Chicano gangs, in sum, made heroes of the participants against the perceived "race war".

As time progresses, the United States sees a burgeoning 'gang problem' and a growing problem about how gangs are defined. Sociologist Fredrick Milton Thrasher (1892-1962), while in graduate school at the University of Chicago, conducted research on gangs. Thrasher's seminal piece entitled, *The Gang: A Study of 1,313 Gangs in*

Chicago, was published in 1927. According to Brotherton (2008), the definitions that

Thrasher and the Chicago school used for defining gangs "focused on group process and

collective behavior in bounded ecological contexts … and were strikingly open ended" as

seen in Thrasher's definition for a gang:

> [A gang] is an interstitial group originally formed spontaneously and then integrated through conflict… the results of this collective behavior is the development of tradition, unreflective internal structure, esprit de corps, solidarity, moral, group awareness, and attachment to local territory.
>
> (Thrasher, 1927, p. 46)

Brotherton (2008) notes that "the only notion of transgression in this definition is

contained in the vague term 'conflict'; this refers to physical and social conflict with

other gang groups…or tension with the dominant values of the surrounding society" (p.

57). Brotherton further admonishes that 'law violating behavior' that we see in

criminology texts today is missing from Thrasher's definition.

More recently, Kline (1971) developed a definition of a gang that is probably the

most contemporary and influential:

> [a gang is] any identifiable group of youngsters who (a) are generally perceived as a distinct aggregation by others in their neighborhood, (b) recognize themselves as a denotable group (almost invariably with a group name), and (c) have been involved in a sufficient number of delinquent incidents to call forth a consistent negative response from neighborhood resident and/or law enforcement agencies.
>
> (Klein, 1971, p. 13)

So clearly the contrast between Thrasher's definition and Klein's definition is

palpable. Brotherton suggest that that there are three points of contrast between Klein's

definition of a gang versus Thrasher's definition. First is how the outsiders - the audience via the gang - is in keeping with Labeling discourse of the 1970's[4].

Brotherton's second point is how group [gang] members recognize and define themselves. Thrasher implies that gangs are about camaraderie, solidarity and awareness, whereas Kline gives cursory recognition of these gang attributes other than to say that gangs simply recognize each other.

Third, the gang according to Klein, is said to engage in transgressing practices that break our legal codes and inspire social control reaction from the community; whereas Thrasher never explicitly talks about breaking the law.

Brotherton's (2008) final salvo suggests that the gang has become part of a criminological master narrative that feeds societies hegemonic processes. Brotherton's salvo echo's the academic work of Mary Morash (1983).

Morash (1983) raises the possibility that the case for focusing on gangs may be overstated; note that this is not saying there aren't violence and delinquency etc. going on; it's simply that it isn't triggered that often, by gang membership. She questions the amount of crime accounted for by gang activity; she asks whether there may be more important relationships in young people's lives, both to the young people themselves and

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[4] Labeling theory is subsumed under Symbolic Interaction theory and while Labeling theory is an interesting yet controversial topic, a full discussion is outside the scope of this work (for discussion see: Mead, 1934; Becker, 1963, and Goffman 1959, 1963).

to the causal influence on crime; and she raises the possibility that "the gang" is, in reality, a social construct.

Brotherton's conjecture is that this process of conflating gangs, race, and violence is tantamount to a tautology that has "well served the criminal justice industry" (Brotherton, 2008, p. 58). In other words, Brotherton's argument is that the social construction of the gang well serves the political interests for the prison builders and lawyers vis-a-vie the politician.

In a more provocative and nuanced argument Charles Katz and Vincent Webb discuss in their 2004 National Institute of Justice (NIJ) report, *Police Response to Gangs: A Multi-Site Study*, the difference between the internal stakeholders (i.e., gang unit officers, and precinct captains) position on suppression (policing, investigations, arrests, and lockups) versus the external stakeholders:

> Clearly, gang unit officers and some internal stakeholders valued suppression-oriented enforcement activity. Internal stakeholders of the gang units that did *not* spend much time on enforcement were quick to point that out as a failing. Many gang unit officers Police themselves argued that enforcement activities gave the gang unit legitimacy; they also argued that prevention activities had no place in a gang unit and should be the responsibility of community relations or another unit. At the same time, however, few internal or external stakeholders commented upon the value or effectiveness of their gang units' enforcement efforts (e.g., directed patrols, crackdowns, investigations) in reducing the community gang problem or in supporting outside units' or agencies' efforts. Stakeholders seemed to view enforcement as something that gang units ought to do, but almost no one suggested that the gang units' enforcement or suppression strategies were proving effective.
>
> (Katz & Webb, 2004)

Gottfredson and Hirschi (1986) best summed up this argument when they wrote that while it used to be the sociologist that defined and studied gangs, the definition and study of gangs is being controlled by the politicians and their political machinations. What can be gleaned from these arguments is that the controversy about defining a gang and the role of policing is a complex issue with no resolution in the near future.

Clearly the definition of a gang is difficult and, in fact, outside this research. This fact should not get in the way of research though. So, we now turn the discussion toward an exploration of the primordial origins and development of Hirschi's social control theory in its relationship to studying gang knowledge by U.S. 8th graders.

2.2 Precursors to Social Control/Bonding Theory

In one of the early control theories, Lilly (2007) writes, Albert J. Reiss (1951) "proposed that delinquency was behavior consequent to the failure of personal and social controls" (p. 95). *Personal control,* according to Reiss (1951) was defined as "the ability of the individual to refrain from meeting needs in ways which conflict with the norms and rules of the community" while *social control* was "the ability of social groups or institutions to make norms or rules effective" (p. 96). Lilly further writes that one of the problems with Reiss's version of control is that it "did *not* specify the sources of such 'abilities' *nor* did it specify control mechanisms leading to conformity", but he did recognize that the failure of primary groups (e.g., family, schools, religion) to provide reinforcement for non-delinquent roles/values was crucial to the explanation of delinquency.

Toby (1957), writing around the same time as Reiss (1951), argued that the uncommitted adolescent is a candidate for gang socialization…and that the young who had few "stakes" or investments in conformity were more likely to be drawn into gang activity. According to Toby, "gang socialization" was recognized as part of the cause and motivation leading to delinquency. Toby introduced the concept of "stakes in conformity" to explain "candidacy" as learned experience. Toby argued that while delinquency could befall anyone, when there is too much to lose, most refused - a concept (conformity) adopted by Travis Hirschi.

The notion of "stakes in conformity" fits very well with concepts invoked in later versions of social control theory – one of these theories is Karcher's connectedness theory - discussed shortly.

Ivan Nye (1958), in a study of 780 youth from Washington State, contributed to social theory by positing specified ways to operationalize control mechanisms of delinquent behavior. Like Reiss, Nye focused on the family as a source of control. More specifically, Nye contributed three different types of control within social theory: 1) direct control - which included punishments and rewards; 2) indirect control - which included affectionate identification with non-criminals; and 3) internal control - which included a conscience or sense of guilt within youth. Although Nye (1958) acknowledged motivational forces by stating that, "...some delinquent behavior results from a combination of positive learning and weak and ineffective social control" (p. 4), he

adopted a control-theory position when he proposed that, "…most delinquent behavior is the result of insufficient social control..." (p. 4).

Containment theory, developed by Ohio State's professor Walter Reckless (1961) focused on how a youth perceived his or her self. Reckless argued that there are "pushes" and "pulls" that produce delinquent behavior unless they are counteracted by containment -in the words of Hirschi *conventional* attachments. The motivations to deviate (e.g., pushes) may occur when there is: 1) discontent with living conditions and family conflicts; 2) aggressiveness and hostility; and 3) frustration and boredom, say arising from membership of a minority group or through lack of opportunities to advance in school or find employment. Reckless argues that the pull toward delinquent behavior occurs with: 1) delinquent peers; and 2) delinquent subcultures.

Reckless posited that if a youth believes that he or she were/are a good person, this would serve as a protective factor against negative peer influence of those who engage in delinquency. For Reckless there were two aspects of containment that counteracted the 'pushes' and 'pulls'; inner and outer containment. Inner containment posits that a youth has a positive sense of self, and outer containment occurs when there is supervision and/or discipline. Reckless's concept of positive sense of self is a factor that Hirschi never addressed and only until recently – with the work of Karcher – did self worth/perception emerge in any academic research regarding social control/bonding theory. Therefore, this research examines the role of self worth/perception as it relates to social bonding and eighth grade gang resistance/knowledge.

36

For Reckless, inner containment through self-images has intimate ties with family bonding and forms before a youth reaches their teenage years. Conversely, outer containment develops through strong social relationships (i.e., schools, teachers, & religion) and other sources of conventional socialization within the neighborhood (peers). Hamlin (2001) suggest that the aspects that Reckless identified for internal (social) controls include an individual's: favorable image of self in relation to others; being a goal oriented person; having a high level of frustration tolerance; with strong internal morals and ethics; and with a well developed ego and super-ego.

Hamlin (2001) suggests, similarly, the aspect that Reckless identified for external controls include: a set of reasonable limits and responsibilities; an opportunity to achieve status; cohesion among members; identification with the group; identification with one or more persons in the group; and provisions for supplying alternative ways and means of satisfaction.

The influence of Reckless on Travis Hirschi is profound as will be shown. Yet there are aspects about Reckless's work that was/is overlooked and omitted both by Hirschi and Sans Karcher (2011) - current research. The aspects overlooked are the role of self worth/perception and perceptions of self. Thus, self worth/perception is discussed within each structural model within this research.

Because of the work of Reckless, this research will include self worth/perception as both a direct effect and indirect effect within the social-control/bonding indirect effects (SCBI) model. It will be shown below that self worth/perception is a salient variable

when considering G.R.E.A.T. curriculum, but an interesting aspect of self worth/perception is that it is intimately tied to education connectedness.

Based on the work of Reiss, Toby, Nye, and Reckless, Travis Hirschi (1969) developed his specific model for social control. However, Bartollas (1985) writes that Hirschi actively avoided linking his work with his predecessors. In an interview, Hirschi was quoted as saying:

> I was aware at the time I wrote my theory that it was well within the social disorganization tradition. I knew that, but you have to remember the status of social disorganization as a concept in the middle 1960s when I was writing. I felt I was swimming against the current in stating a social control theory at the individual level. Had I tried to sell social disorganization at the same time, I would have been in deep trouble. So I shied away from that tradition. As a result, I did *not* give social disorganization its due. I went back to Durkheim and Hobbes and ignored an entire American tradition that was directly relevant to what I was saying. But I was aware of it and took comfort in it. I said the same things the social disorganization people had said, but since they had fallen into disfavor I had to disassociate myself from them.

(Bartollas, 1985, p. 190).

As time elapsed and the controversy of social disorganization has found a more comfortable footing, the predecessors of social control are now recognized for their contribution both by Hirschi and in other works (for discussion see Chriss, 2007).

According to Costello and Vowell (1999), what set Hirschi apart from the other theorists is his more positivist approach in specifying and testing model. Where other researchers were discussing theoretical implications, Hirschi was testing the model through empirical tests.

Hirschi's theory sparked an enormous level of interest among scholars seeking to test his theory. In fact, Akers & Sellers (2008) suggest that social bond/social control theory is one of the most widely tested theories in criminology, with well over 100 published tests to its credit. And while some reviews of the literature are rather equivocal concerning the theory's empirical status (e.g., Kempf, 1993), others are more firm in concluding that it is, on balance, one of the well-supported criminological perspectives at work in the field today. Andrews and Bonta (1998) argue that even some of Hirschi's competitors concede that the kinds of informal social control mechanisms specified by social bond theory are important to our understanding of criminal behavior.

Clearly gang history is interesting and compellingly and fraught with thoughtful research. The progression of viewing gangs as a rite-of-passage into a suppression model through race riots offers clarity into why gangs are viewed as they are. While Brotherton's perspective deserves further exploration, this research explores how to keep youth out of gangs through increasing their knowledge about gangs and thus mitigating the joining of gangs – at least this is the desire of the G.R.E.A.T. curriculum. To accomplish this goal, we examine the role and influence of social bonding theory. Thus, we now turn to a discussion of the particulars regarding social control theory.

2.3 Travis Hirschi – Social Control/Bonding Theory

Travis Hirschi (1969) collectively refers to the forces controlling criminal behavior as the social bond, which comprises four elements: emotional attachment to parents, peers, and conventional institutions, such as the school; commitment to long-

term educational, occupational, or other conventional goals; involvement in conventional activities, such as work, homework, and hobbies; and belief in the moral validity of the law.

These elements are summarized in Table 2.1 wherein attachment, an affective (emotional component) refers to the relationship that an individual has with other people. The attached individual is reluctant to deviate since deviation would create a negative evaluation from the people whose opinion the person values (as suggested by Reiss (1951), Toby (1957), Nye (1958), and Reckless (1958)). Research on delinquency has clearly indicated that attachment to parents decreases the likelihood and frequency of delinquent behavior (Hirschi, 1969; Gottfredson & Hirschi, 1996; Matsueda 1982; Hindelang 1981). Hirschi stated that attachment to friends may have an inhibiting effect on delinquency – which, as will be shown, became an issue of great contention.

Table 2.1
Elements of the Social Bond[a]

Affective	Attachment	Emotional closeness to family, peers, and schools
Cognitive	Commitment	Rational calculation of the costs of law breaking
Behavioral	Involvement	Time spent in conventional activities (e.g., homework and positive peer relationships)
Evaluative	Belief	Ideas that support a conventional orientation (perceptions about police)

[a]Adapted from Hirschi (1969)

Commitment, a cognitive component, refers to an individual's participation in and evaluation of present and anticipated conventional activities. A committed person feels that it is important to pursue goals that are socially approved and to conform to society.

Research on delinquency has clearly demonstrated that commitment is a key variable in constraining deviance. An individual who has commitment to education or school related activities is less likely to exhibit delinquent behavior (Hirschi, 1969, p. 24).

Hirschi states that there is an overlap of involvement - a behavioral component, and commitment. When an individual is well integrated into the conventional social order they do *not* have time to engage in deviant behavior.

In later work named *The General Theory of Crime* (GTC), Gottfredson and Hirschi (1986) argue that individuals who conform to the expectations, norms and values of society are very unlikely to be involved in deviant behaviors. Hirschi claims that positive definitions of deviance are generally available throughout society but hold little influence over those individuals who have a strong sense of the appropriateness of conventional standards of conduct (Hirschi, 1969, p. 24). Therefore an individual's beliefs, an evaluative component, have control over their ability to commit deviant behaviors.

The four elements of the social bond can independently influence delinquency. Hirschi argued, "The more closely a person is tied to conventional society in any of these ways, the more closely he is likely to be tied in the other ways" (Hirschi, 1969, p. 27). The operative phrase in this sentence is "in any of these ways" which suggest Hirschi believes that each element of bonding was important in a mutually exclusive way, or in the words of structural modeling – a direct effect; a concept challenged in this research.

Hirschi (1969) described a type of control theory for explaining forms of unusual behavior particularly in delinquency of youth, "…the age [eight] when most deviation from the norms generally occurs" (p. 16).

Patricia and Peter Adler (2006) wrote "…control theories have described the elements of the bond in society in many ways" and have therefore helped us to understand the correlation between deviance and an individual's bond to normative society around them" (p. 77).

Hirschi (1969) thoroughly describes his control theory in reference to delinquency in youth. In explaining his theory, Hirschi noted that the process of an individual's becoming alienated from others within society often involves or is harnessed by active interpersonal conflict to the norms defined by that society. Hirschi described that such conflict could "…supply a reservoir of socially derived hostility sufficient to account for the aggressiveness of those whose attachments to others have been weakened" (Hirschi, 1969, p. 19). In this sense it can be understood that violation of norms may be simply a consequence of lack of conventional attachment to society.

Part of Hirschi's social control theory includes involvement or engrossment in conventional activities (sports, groups, hobbies etc.). In essence, Hirschi (1969) and Gottfredson and Hirschi (1986) argue that a person who participates in these types of activities is "…simply too busy doing conventional things to find time to engage in deviant behavior" (Hirschi, 1969, p. 22).

42

In *The General Theory of* Crime, like social control/bonding theory, a person who is occupied with conventional attachments is assumed to be too busy to think about committing deviant acts or, if the thoughts do occur, is too busy to act on those thoughts. Hirschi assumed that a person who commits deviance does so believing they are doing "the wrong thing, in outward defiance of values they have been socialized to believe are the rules of society" (Hirschi, 1969, p. 23). Deviant behavior can be accounted for within social strain, wherein many delinquents believe they are unable to attain what is expected of them by society, and as such are acting out because of it. Hirschi (1969) suggests that this strain is caused by weakened attachment to things within society that are designed to integrate members of society, and therefore causing a sense of alienation in deviant individuals.

As explained previously, in later work called the *General Theory of Crime* (GTC), Gottfredson and Hirschi (1986) argue that social control theory is related to individuals who don't have strong bonds to society's institutions, such as family, school or workplace. Gottfredson and Hirschi hypothesized that a child's level of self-control, being heavily influenced by child-rearing practices, stabilizes by the time he reaches the age of eight. Thus, Hirschi in both social bonding theory and the GTC identified parenting as the most decisive factor in determining the likelihood that a person will commit crimes (Hirschi, 1969, p 83; Hirschi, 2011). This work extrapolates from Hirschi's earlier work wherein he argues that the unit of analysis occurs at the meso level of bonding (e.g., family, religion, school etc.) and was primordial for delinquency. In the GTC the authors argue that the individual should be the unit of analysis because they

argue that self-control (individual), and *not* social bonding (societal level) as the most salient variable for mitigating delinquent behavior.

According to GTC, individuals will likely deviate and behave unconventionally in several ways. On one hand social control theory suggests that problem behaviors of individuals stems from an underlying weakness in the attachment of some adolescents to society and *not* problems that are within the person, such as an inherent problem or biological predisposition and on the other hand, GTC crime attributes problem behaviors stemming from weak internal controls (Reckless's perspective) as well as weak meso controls. The implication is that failure to form meaningful bonds and attachments at an early age will likely create bonding problems for individuals and thus, failure to conventionally bond can present serious abnormal behaviors.

The underlying problems described by social control theory leads to the development of an unconventional perception which may lead to membership in an unconventional peer group, or to involvement in one or several problem behaviors that may set in motion, a chain of problem activities or delinquent behaviors. Social control theory purports to help explain why behavior problems are more prevalent among poor, minority, and inner-city youth.

Gottfredson and Hirschi (1986) argue that adolescents who are poor and live in the city are exposed to more crime and deviant behaviors, although these contentions are in dispute (see Hindelang, 1973). When these adolescents fail to form healthy attachments with their families and schools they tend to look to other sources for support.

Hirschi (1969) and Gottfredson and Hirschi (1986) argue that lack of attachment leads to abnormal behaviors and problems for these individuals, but they never examined the influence of either theory on gang resistance or gang knowledge among U.S. youth – issues addressed within this scholarship.

Social bonding theory, as discussed in the *General Theory of Crime* also deals with the assumption that individual conformity to societal values and expectations is itself a product of social life and is *not* a means of an inherent aspect of nature. Human beings will pursue their own individualistic and sometimes deviant behaviors (p. 89). It is this argument that lends support for this research. That is to say, if youth bonding is absent, and if conventional relationships do *not* emerge, a youth is more likely to engage in delinquent behavior, which may include joining a gang.

Hirschi claims that positive definitions of deviance are generally available throughout society but hold little influence over those individuals who have a strong sense of the appropriateness of "conventional" standards of conduct (Hirschi, 1969). Therefore an individual's *beliefs* have control over his or her ability to commit deviant behaviors.

Unwittingly, the G.R.E.A.T. curriculum evaluates – at some level, conventional connectedness. Moreover, a primary objective of the G.R.E.A.T. curriculum is to create a conventional bond between a youth, their schools and their peers. Thus, it is argued, the G.R.E.A.T. curriculum is a perfect curriculum for testing Hirschi's bonding theory as it relates to gangs in middle-school.

45

2.4 Hirschi's Social Control/Bonding Model

Hirschi's (1969) study used the Richmond Youth Project. The Richmond Youth Project is a self-report survey of 4,075 high school students out of 17,500 junior and senior high school students in Richmond, California, an industrial city in the San Francisco-Oakland metropolitan area. Information was gathered from the youths on their relationships with parents, school adjustment, peer group attachments, recreational activities, occupational and educational aspirations, and their beliefs. Data about the youngsters were also gathered from school and police records. It should be highlighted that Chilton (1971) reports that "a major limitation or shortcoming of Hirschi's study is that the analysis is comprised of primarily white boys" (p. 648).

Table 2.2 provides the variables that Hirschi used in his study. In short, *involvement* in delinquency was measured principally by a six-item self report questionnaire section dealing with "theft of items of varying value, using a car without permission, barlging up something, or beating up someone" (Gibbons, 1970, p. 235). Eighteen items were used to measure *attachment* to parents; nine questions were asked separately about the respondents' mom and dad and two measured virtual parent supervision. Two variables measured *attachment* to friends and four variables measured school bonding. *Belief* was measured using five variables and friends' delinquency was measured with one variable.

Section 2.5 directly below, describes the model specification and discusses differences and similarities between the Richmond Youth survey variables and the G.R.E.A.T variables.

46

Table 2.2

Hirschi Bonding Variables and Latent Constructs

Attachment to Parents	
PARFEEL	Does your (dad, mom) ever explain why (they) feel the way (they) do?
PARFUTUR	How often have you talked over your future plans with your (dad, mom)
PARHELP	When you come across things you don't understand, does your (dad, mom) help you with them?
PARRULE	When you don't know why your (dad, mom) makes a rule, will s(he) explain the reason?
PARTHOUT	Do you share your thoughts and feelings with your (dad, mom)
Virtual Parental Supervision	
PARWHERE	Does your (dad, mom) know where you are when you are away from home?
PARWHO	Does your (dad, mom) know who you are with when you are away from home?
Attachment to Friends	
RSPECTFR	Do you respect your best friend's opinions about the important things in life?
BELIKFR	Would you like to be the kind of person your best friends are?
School Bonds	
LIKESCHL	In general, do you like or dislike school? 1 = dislike (school),
TRHARSCH	I try hard in school.
GRADEIMP	How important is getting good grades to you personally?
HWTIME	On average, how much time do you spend doing homework outside of school?
Belief/Definitions	
DELHURT	Most things that people call "delinquency" don't really hurt anyone.
GETAHEAD	To get ahead, you have to do some things which are not right.
NOBLAME	The man who leaves the keys in his car is about as much to blame for its theft as the man who steals it.
OKLAW	It is alright to get around the law if you can get away with it.
SUCKERS	Suckers deserve to be taken advantage of.
Friends' Delinquency	
FRPICKUP	Have any of your close friends been picked up by the police?

Continued

47

Table 2.2 (continued)
Hirschi Bonding Variables and Latent Constructs

Delinquency	
BATTERY	Not counting fights you may have had with a brother or sister, have you ever hurt anyone on purpose?
CARTHEFT	Have you ever taken a car for a ride without the owner's permission?
THEFT2	Have you ever taken little things (worth less than $2) that did not belong to you?
THEFT250	Have you ever taken things of some value (between $2 and $50) that did no belong to you?
THEFTSO	Have you ever taken things of large value (worth over $50) that did not belong to you?
VANDALSM	Have you ever banged up something that did not belong to you on purpose?

2.5 Social Control/Bonding Model

Items in the G.R.E.A.T. data set that appeared closely related to those in Hirschi's data set were identified. Then factor-analytic and item-analytic procedures were used to identify the measures to be used in the model testing (discussed in Chapter 4). However, there are two models under examination in this project: 1) Social Control/Bonding Model (SCB) and, 2) Hirschi's Social Control/Bonding Indirect Effect Model (SCBI). Each of these models is constructed using the same factor analysis results outlined in Chapter 3. The factor analysis, originally analyzed 73 variables, and finally settled on 41 variables from the G.R.E.A.T. survey. Using factor analysis, these 41 variables were determined to be the most salient in predicting Hirschi's Social Control/Bonding model.

Unlike in Hirschi's 1969 model, the latent constructs (e.g., self worth/perception) was included in the factor analysis, mostly because Reckless' work suggests that self worth/perception is a salient construct and it has never been tested in social control/bonding models. The results in Chapter Three suggest that self worth/perception was vital to understanding not only delinquent behavior but also gang knowledge and gang resistance in this study – as Reckless suggested.

As the test of Hirschi's model developed in this research, self worth/perception, as well as other questions about model specification emerged, thus this project gives birth to the theoretical concept and empirical test of these model specifications as it relates to youth connectedness – formally named the social-control/bonding indirect effects model (SCBI) throughout the remainder of this research. Chapter 3 will provide a detailed outline for each model's *specification*. The discussion immediately below outlines how

49

each of the latent constructs - in both models – are generally *specified*. Chapter 4 will address both model *specification* based on factor analysis, as well as a presentation of the model *identification* used in the analysis.

One of the interesting and unique facets of this study deals with the youth's relationship to peers. As discussed previously, while Hirschi believed that peers could mitigate delinquency behavior, others argued that peers were a negative influence (i.e., Hindelang 1971; and Matsueda, 1982). For this study, peer influence was disaggregated into two parts: positive peer influence; delinquent peers – which exhibit higher delinquent behavior such as hurting other, and threatening others; and negative peers which includes having exhibiting peer pressure to do drugs, and influencing other youth through poor leadership. By disaggregating peers we should get a clearer picture into what influence peers have on youth perceptions of gangs.

Certainly these variables can be considered confounded because feelings of doing illegal gang activity may include delinquent peer behavior. Due to the limitation of the data, it is *not* necessarily the intention of this research to ascertain the differences between negative peers and delinquent peer influence, however this research does rely on the results of the factor loadings which rotated 10 peer variables into two distinct peer factors (negative, positive peer influences). Thus this analysis will give a clearer picture into the mind of the youth because the questions for the negative peer influence ascertains whether the 8th grader is willing to "hang-out" with youth who are in trouble and at the same time it will provide information about the role seriously delinquent peers hold for 8th grade gang perceptions.

50

Attachment. This construct involves the relation of the youth to parents, positive peers, and school. This study represented attachment to parents by two latent variables named mom connectedness and dad connectedness. Both mom and dad connectedness were identified with indices from four manifest variables (i.e., taking advice, talking with the respective parent, trusting the respective parent, and the parent praise the youth); moreover, dad connectedness included two additional manifest variables (i.e. dad knows my friends, and dad understands me). These variables contrast Hirschi's variables in that the G.R.E.A.T. variables are more about the relationship with the child's welfare whereas the Richmond Youth variables deal with rules, feelings and future plans. Overall, the G.R.E.A.T. variables match well with the Richmond Youth study.

Attachment was represented by an additional two latent variables (i.e., positive peers influence, and education). Hirschi (1969) wrote, a youth with close parental attachments is rewarded for conformity by ". . . the approval and esteem of those he admires" (p. 200). This causal sequence in turn leads to a respect for ". . . persons in positions of authority, to belief that the rules of society are binding on one's conduct" (p. 203). Positive peers included four variables: a) Obey school rules, b) Honest, c) Get along with school adults, and d) friends are good students. While Hirschi relied primarily on the relationship between the amount of homework completed and delinquency, this study modified the analysis to include *not only* homework, *but also* trying hard in school, attitudes about good grades, and whether the youth choose friends who study. These four education items were combined into a composite called education connectedness.

These variables are well suited to the Richmond Youth study.

Belief. This construct was difficult to operationalize because the process of developing beliefs is complex. For this study, *belief* was represented by indices from four manifest items related to school culture: 1) Is there gang activity at school, 2) is there pressure to join gangs at school, 3) are there gang fights at school, and 4) the latent construct, self perception. Self-perception had four items: a) I am a useful person, b) I am a person of worth, c) I do a good job as a person, and d) When I do a job I do it well. For Hirschi, belief was developed from the perspective of victimizing others because they deserve it. For example, one question asked "If suckers deserved to be taken advantage of", and another question asked, "Most things that are called delinquency don't really hurt anyone". This sentiment is examined through each of the variables but in particular by the variable; I want to do illegal gang activity.

Commitment. This construct involves the cost of law breaking or cavorting with those who break laws. Commitment was represented by indices from four items: 1) having gang friends; 2) wanting to be in a gang; 3) doing illegal gang activity; and 4) doing what the leader says.

The difference between the negative peer and the delinquent peer is that the negative peer is reported to be skipping school, smoking marijuana, smoking cigarettes, drinking alcohol, stealing less than $50.00; whereas the delinquent peers are doing illegal gang activity, stealing more than $50, and stealing automobiles. Compared to Hirschi's construct, the variables in this study are much more exhaustive and

representative of peer influence. For example, where Hirschi provided one variable for delinquent peers – have your friends been picked up by the police - (synonymous to negative peers in this study), this study included two latent constructs (i.e., positive peers and negative peers) comprised of eight manifest variables. Clearly these added latent dimensions provide a clearer picture into peer influence.

Involvement. Contrasting Hirschi, *involvement* is defined much differently in this study. Whereas Hirschi defined *involvement* in relation to school and work, commitment in this study takes more of the counterfactual wherein negative peers and delinquent peers are used as predictors for commitment. McBride et. al. (2009) found that school environment has a direct influence on ninth grade students' bonding and, in turn, on the likelihood they will engage in risky behavior. Based on this research, a decision was made to evaluate involvement from the counterfactual perspective.

Hirschi (1969) also argued that a committed person feels that it is important to pursue goals that are socially approved and to conform to society. However, due to the limited availability of these types of variables in the G.R.E.A.T. data, a decision was made to examine the counterfactual with relation to these 8th graders. Thus, *commitment* was represented by indices of having gang friends, wanting to be in a gang, doing illegal gang activity, and doing what the leader says. The results of the factor analysis will show that manifest variables are closely tied to the youths feelings about wanting to be involved with gangs and/or gang activity. By examining a youth's commitment to

53

negative behavior, the analysis should still provide rich information regarding Hirschi's concept of *commitment.*

2.6 Connectedness Theory

Gang statistics in the US are startling! A survey by Egley (2008) from the National Gang Center found that "32.4 percent of all cities, suburban areas, towns, and rural counties (more than 3,330 jurisdictions served by city and county law enforcement agencies) experienced gang problems in 2008. This represented a 15-percent increase from the 2002" (OJJDP fact sheet 2002, p 1). State and federal officials know that the statistics on the number of gangs and the number of teens involved in gangs and gang violence is increasing.

Karcher (2004) tells us when youth engage in deviant behavior there is typically a break in conventional connectedness. Conventional connectedness occurs "when a person is actively involved with another person, object, group or environment, and that involvement promotes a sense of comfort, well being, and anxiety-reduction" (Karcher, 2004, p. 23). Karcher continues by saying that "family neglect, peer rejection, religious intolerance, and racial/ethnic misunderstanding experienced by youth may result in lower connectedness in the forms of less involvement, less positive emotional affect, and less caring about their performance in those social worlds" (Karcher, 2004, p. 24) putting the youth at risk of delinquency.

Promoting connectedness, Karcher argues, is "critical to delinquency prevention in many ways" as it increases self-esteem, interpersonal skills, and academic skills, which

all lead to an increase in connectedness thus "directly reducing youths' propensity toward violence" (Karcher, 2004, p. 34).

An excerpt from Karcher's website[5], explains his effort and argument for developing a more precise definition of adolescent connectedness,

> [Karcher]…proposed a theoretical model explaining the antecedents and consequences of adolescent connectedness. In this model, the attachment that develops in response to parental support contributes feelings of relatedness and belonging in later childhood through expectations regarding the degree of support and warmth other people and places will provide. Also contributing to these feelings of relatedness to individual others (such as teachers and peers) and to feelings of belonging within contexts (such as school, one's neighborhood, and religious institutions) are the degree of social support experienced in these contexts and from these other people. … in late childhood and early adolescence youth seek out and demonstrate positive affect towards those places and people from whom they experience social support. These demonstrations of positive feelings and indicators of proximity seeking reflect connectedness to people (e.g., siblings, friends, teachers, and peers) and to places (school, neighborhood, and religious context.
>
> (Karcher, 2010, Theory and Research)

Karcher (2003) hypothesized that connectedness is an ecological form of engagement, engagement that occurs with others and the environment. Drawing on the theories of problem behavior, belongingness, attachment, and ecological development, he conducted exploratory and confirmatory factor analyses to develop a measure of adolescent connectedness (Karcher, 2003).

Similar research suggests that *Connectedness* to Education is a salient factor in reducing youth delinquency and gang membership. Research by Osborn (2004) suggests

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[5] adolescentconnectedness.com

that youth identification with academics (i.e., connectedness) is a crucial factor for an individual "defining the self through a role or performance in a particular domain" (p. 44) suggesting that self esteem increases with success because success in school (i.e., receiving good grades, remaining in school, graduating, attending college, etc.) increases the number of "positive successes" and decreases the number of "negative successes." This suggests a possible decrease in "undesirable behaviors, such as truancy, rebelliousness, acting out in class, and perhaps even violent or aggressive behaviors" (Osborn, 2004, p. 49).

Other research suggests that family factors are linked to adolescent problem behavior (see Leblanc, 1992; Rankin & Kern, 1994; Simons, Wu, Conger & Lorenz, 1994). In particular, work by Gavazzi (2009) found that the family is the "primary micro-system in which adolescent development takes place" (p. 10). In addition, Gavazzi's findings posit that "Peers and school systems are thought to create meso-systems that provide an immediate social ecology for adolescents beyond their family environment" (Gavazzi, 2009, p. 10).

Connectedness theory is *not* the only factor for predicting youth delinquency and initiation into Gang Membership. Findings also suggest that youth who engage in risky behavior are more likely to engage in deviant behavior. For example, research by Sanders (2008) suggests that youth exposure to risk behaviors - alcohol and drug use, violence, and unsafe sexual practices - among gang youth in Los Angeles are salient predictors requiring intervention. Sanders states:

An important point in examining risk behaviors among gang youth is to identify the extent these young people are exposed to health risks. These risks include drug and alcohol addiction, sexually transmitted infections, including HIV – the virus that leads to AIDS – teenage and unplanned pregnancies, injury, disability, and even death. By identifying the extent that young people in gangs are exposed to these health risks and what conditions help explain such exposure, the better informed we will be to intervene and help such youth.

(Sanders, 2008, p. 2)

Regarding contextual level influences, Alvarez (1997) found, "the presence of a violent subculture at the school (e.g., gang presence and attacks on teachers) and availability of drugs/alcohol were related to fear in both contexts" (p. 71). Alvarzes' findings both corroborate the research discussed above and suggest that gang influence in schools as well as risk behaviors are salient issues influencing youth behaviors.

Based on these theories that youth Gang Membership is related to family attachment, identification to education, and a proclivity for risk, this research aims to examine the saliency of these relationships through a structural equation model (SEM).

While academic research suggests that conventional connectedness and academic identification are root factors in healthy relationship and that *un*conventional connectedness is a primary predictor for youth engaging in deviant behavior, research does *not* exist explaining how, or if, Karcher and Osborn's, and Hirschi's models influence youths perceptions and knowledge of gangs. This project explores these

questions and provides answers to whether connectedness to family, peers and education do indeed mitigate a youth's propensity for joining gangs.

2.7 Summary

This Chapter discusses the precursors of social control theory through the works of Nye, Reiss, and Reckless and how their contributions lead to Hirschi's theoretical framework, both in his 1969 work and his 1986 work with Gottfredson and their General Theory of Crime. Where the General Theory of Crime suggests that the individual is as responsible for refraining from delinquency, social bonding theory put the onus on society at large for containing (as Reiss posited) delinquent behavior. Through the four aspects of social bonding/control: Attachment, Commitment, Involvement, and Belief, we found that Hirschi argues that these bonds should be conventional bonds where conventional bonds occur when youth attach themselves to adults who engender behaviors that are deemed social acceptable to the mainstream culture.

We also found that the variables in the G.R.E.A.T. data loaded in many ways the way that Hirschi intended and in some ways a little different. These difference are not uncommon as was found in the work of Matsueda when he concluded, contrary to Hirschi, that peers were a negative influence (1982) among several others contradictions regarding peers (see, e.g., Hindelang 1973; Hagan and Simpson 1977; Wiatrowski, Griswold, and Roberts 1981; Matsueda 1982; Thompson, Mitchell, and Dodder 1984; Greenberg 1985; Friedman and Rosenbaum 1988; LaGrange and Silverman 1999; Geis 2000; Nakhaie, Silverman, and LaGrange. 2000; Marcus 2004).

Connectedness theory suggests that Karcher believed - as did Gavazzi - that the family unit and connectedness are intimately tied to each other. Karcher's most profound contribution to bonding theory is that Self worth/perception and loneliness are salient predictors for a youth to connect. It will be shown in Chapter 3 that Self worth/perception, using this data, does not contribute as much as Karcher had suggested, and in fact Self worth/perception is confounded with Educational bonding.

We discussed the transformation of gang theory from social rites of passage as recognized by Thrasher (1920) to a model of suppression as discussed by Brotherton. This transformation occurred through two major U.S. riots – the Zoot Suit Riots and the Watts riots – whose influence solidified the Hispanic and Black youth respectively against the status quo.

In the final section we began a discussion regarding model conceptualization for the variables in the G.R.E.A.T. data and how they relate to Hirschi's conceptions. We found that *Attachment* included four components (i.e., mom and dad connectedness, positive peer influence, educational connectedness); *Belief* included three school level variables and one individual level variable (i.e., gang activity in school, pressure to join gangs at school, gang fights at school, & self-perception); C*ommitment* included four components (gang friends, being in a gang, doing illegal activity, and doing what the leader says); Involvement included four variables: negative peer influence, peer alcohol use, peer tobacco use, and peers marijuana use. As we move to Chapter 3 a full discussion regarding model conceptualization is provided.

CHAPTER 3

Methods

The structure of this chapter discusses six issues. Section 3.1 is a discussion of

G.R.E.A.T. methods and sample information, Section 3.2 is a discussion regarding

consent and IRB. Section 3.3 provides the variable descriptions included in the

G.R.E.A.T. curriculum. Section 3.4 provides a discussion about variable labels and

coding scheme of the thirty-eight variables used in Chapter 4 to determine their

respective loadings on ten latent variables related to Hirschi's social bonding theory.

Section 3.5 provides a discussion involving the bootstrapping of indirect effects as a

methodological contribution to this study. As an alternative to Kenny and Barron's

(1986) causal steps model, bootstrapping does not require significant direct effects prior

to testing for indirect effect significance.

In the final section (3.6) a discussion regarding missing data analysis and

treatment of missing data is provided. When data were determined to be non-ignorable

through "Pattern Analysis" then treatment of the data for missing data was addressed

using multiple imputation.

3.1 G.R.E.A.T.

The Gang Resistance Education And Training (G.R.E.A.T.) Program is a school-based gang prevention curriculum for girls and boys. The curriculum is taught in classrooms of mainly middle school students by uniformed law enforcement officers in a 13-week course. In addition to educating students about the dangers of gang involvement, the lesson content places considerable emphasis on cognitive-behavioral training, social skills development, refusal skills training, and conflict resolution. Thus, the curriculum aims to reduce risk factors and increase protective factors. The middle school curriculum consists of the following lesson topics and lesson content:

1. Welcome to G.R.E.A.T.—program introduction; the relationship between gangs, violence, drugs, and crime.
2. What's the Real Deal?—message analysis; facts and fiction about gangs and violence.
3. It's About Us—community, roles and responsibilities; what you can do about gangs.
4. Where Do We Go From Here?—setting realistic and achievable goals.
5. Decisions, Decisions, Decisions—G.R.E.A.T. decision-making model; impact of decisions on goals; decision-making practice.
6. Do You Hear What I Am Saying?—effective communication; verbal versus nonverbal communication.
7. Walk in Someone Else's Shoes—active listening; identification of different emotions; empathy for others.
8. Say It Like You Mean It—body language; tone of voice; refusal skills practice.
9. Getting Along Without Going Along—influences; peer pressure; refusal skills practice.
10. Keeping Your Cool—great anger management tips; practice cooling off.
11. Keeping It Together—recognizing anger in others; tips for calming others.
12. Working It Out—consequences for fighting; great tips for conflict resolution; conflict resolution practice; where to go for help.
13. Looking Back—program review; "Making My School a Great Place" project.

A four-year follow-up on randomly selected classrooms that received the original G.R.E.A.T. curriculum found positive long-term effects of the program. Although the reduction in gang membership and delinquency reduction were *not* statistically significant, the differences between treatment and control groups from the program to post-program period were statistically significant and in the direction favorable to G.R.E.A.T. on five of the outcome measures: reduced victimization, more negative views about gangs, more favorable attitudes toward police, more peers involved in pro-social activities, and lower levels of involvement in risk seeking. Interestingly, both high- and low-risk students were equally likely to benefit from the program.

In 1995, questionnaires were administered to all 8th-graders in attendance on the specified day at selected schools from the 11 selected sites. The final sample comprised 3,568 8th-grade students from 315 classrooms in 42 schools. Of the respondents, approximately 45 percent reported they had completed the G.R.E.A.T. program and this group became the treatment group. The remaining respondents who had *not* completed the G.R.E.A.T. program comprised the comparison group. Data were collected from self-enumerated survey questionnaires administered to 8th-grade students in selected schools in the 11 sites.

3.2 Consent and IRB

Because the G.R.E.A.T. data is a public use database, the Ohio State University did not require an application and approval from the Institutional Review Board (IRB). Details regarding previous consent and IRB approval follow.

The University of Nebraska Institutional Review Board approved a component of the research design allowing passive parental consent (students were included unless specifically prohibited by parents) during the pre- and post-test data collection. These surveys were conducted two-weeks-prior-to and two-weeks-following completion of the G.R.E.A.T. program. Active parental consent (students were excluded unless written approval for participation was obtained from parents) was required for the four subsequent annual follow-up surveys. To obtain active parental consent, three direct mailings were made to parents of survey participants.

Included in the mailings were a cover letter, two copies of the parent consent form for student participation, and a business reply envelope. All parents *not* responding after the second mailing were contacted by telephone. School personnel also cooperated by distributing consent forms and cover letters at school. The results of the active consent process led to an overall retention of 67 percent of the initial sample. At the beginning of the academic year, class lists from all participating classrooms were obtained. Each student appearing on these lists was assigned a uniquely identifiable number to be used throughout the longitudinal data collection phase. These lists contained names of individuals who had moved or failed to enroll for some other reason. Students whose names did *not* appear on the lists but who were in attendance were added to the list.

The pre-tests were administered during the spring of 1995 to 6th- and 7th-graders. Follow-up surveys were administered to the same sample of students annually from 1996-1999.

Records provided by ATF, the federal agency with oversight of the G.R.E.A.T. program, were used to identify prospective sites in which two or more officers had been trained to teach G.R.E.A.T. prior to January 1994. Cities were selected based on geographic location, population characteristics, and population size. Eleven cities meeting the selection criteria were chosen. Recall that the cities selected were Phoenix, Arizona; Torrance, California; Orlando, Florida; Pocatello, Idaho; Will County, Illinois; Kansas City, Missouri; Omaha, Nebraska; Las Cruces, New Mexico; Philadelphia, Pennsylvania; Providence, Rhode Island; and Milwaukee, Wisconsin.

Reasons for sample exclusion included: (1) a number of cities had *not* yet implemented the program, (2) *not* all the sites had processed enough students through the program the prior year for the retrospective data collection planned, and (3) in some sites, police officers had instructed all 8th-graders, so there could be no comparison group of students who had *not* received the G.R.E.A.T. training. At the selected sites, schools that had administered the G.R.E.A.T. program during the 1993-1994 school-years were chosen.

The G.R.E.A.T. database was retrieved from the Inter-Consortium for Public and Social Research (ICPSR). ICPSR data undergo a confidentiality review and are altered when necessary to limit the risk of disclosure. ICPSR also routinely creates ready-to-go data files along with setups in the major statistical software formats as well as standard codebooks to accompany the data.

3.3 Variable Labels and Coding Scheme

Internal consistency analyses – prior to imputation - for these ten latent constructs were conducted, and are presented below in Table 3.1. Results for each construct suggest an acceptable internal consistency which are an alpha above 0.70 (for discussion see George and Mallery, 2003) and are presented along with the labels and coding scheme discussion.

Table 3.1 shows the coding scheme for each of the fourty-two manifest variables and Figure 1 show the latent structural models under investigation that use these thirty-six items. The four gang (G.R.E.A.T.) perception items used a five-point scale (1=strongly disagree, 5=strongly agree) which comprised the outcome variable and show a Cronbach's alpha of 0.80. For Parent Bond there were a total of ten items, six items used for "dad connectedness", and four items used for "mom connectedness", both with a seven-point scale (1=none of the time, 7 = all of the time) which show a Cronbach's alpha of 0.87.

The three items used for school culture used a five-point scale (1=strongly disagree, 5=strongly agree) which show a Cronbach's alpha of 0.83.   The three friend drug use items used a five-point scale (1=strongly disagree, 5=strongly agree) and show a Cronbach's alpha of 0.83.   The four delinquent peer items used a five-point scale (1=none of them, 5=all of them) and show a Cronbach's alpha of 0.93. The four feeling about gang/violence items used a five-point scale (1=strongly disagree, 5=strongly agree) and show a Cronbach's alpha of 0.89.

65

The four positive peer items used a five-point scale (1=none of them, 5=all of them) and show a Cronbach's alpha of 0.85. The four education connectedness items used a five point scale (1=strongly disagree, 5=strongly agree) and show a Cronbach's alpha of 0.73. The four self worth/perception items used a five point scale (1=almost never, 5=almost always) and show a Cronbach's alpha of 0.75.

Table 3.1
Variable Labels and Coding Scheme (SD=Strongly Disagree, SA=Strongly Agree, NL=Not Likely, VL=Very Likely)

CONSTRUCT (α)	VARIABLE NAME	VARIABLE CODES (BOLD)/VARIABLE LABEL (Cronbach's Alpha)
G.R.E.A.T.		1=SD, 2=Disagree, 3=Neither Agree/Disagree, 4=Agree, 5=SA
	gangselldrugmoney	GANGS SELL DRUGS FOR MONEY
Dependent	gangselldrugpower	GANGS SELL DRUGS FOR POWER
Variable	ganginterferpeace	GANGS INTERFERE PEACE OF NEIGHBORHOOD
α = (0.803)	ganginterfergoals	GANGS INTERFERE WITH GOALS
Parent Bond		1=None of the time, 7=All of the time
α = (0.871)	dadadvise	ASK DAD'S ADVICE
	dadtalk	CAN TALK TO DAD
	dadtrust	DAD TRUSTS ME
	dadpraise	DAD PRAISES ME
	dadknfr	DAD KNOWS MY FRIENDS
	dadustand	DAD UNDERSTANDS ME
	momadvise	ASK MOM'S ADVICE
	momtalk	CAN TALK TO MOM
	momtrust	MOM TRUSTS ME
	momustand	MOM UNDERSTANDS ME
School Culture		1=SD, 2=Disagree, 3=Neither Agree/Disagree, 4=Agree, 5=SA
α = (0.833)	scggact	SCHOOL HAS GANG ACTIVITY
	scggfigt	MY SCHOOL HAS GANG FIGHTS
	scprjngg	THERE IS PRESSURE AT SCHOOL TO JOIN GANGS
Friend Drug Use		1=None of them, 2=Few, 3=Half, 4=Most, 5=All of them
α = (0.826)	frtob	MY FRIENDS USE TOBACCO
	frmj	MY FRIENDS USE MARIJUANA
	fralc	MY FRIENDS USE ALCOHOL

*Continued

Table 3.1 (Continued)
Variable Labels and Coding Scheme (SD=Strongly Disagree, SA=Strongly Agree, NL=Not Likely, VL=Very Likely)

CONSTRUCT (α)	VARIABLE NAME	VARIABLE CODES (BOLD) (Cronbach's Alpha)/VARIABLE LABEL
Delinquent Peers α = (0.930)		**1=None of them, 2=Few, 3=Half, 4=Most, 5=All of them**
	frsksc	FRIENDS SKIP SCHOOL
	frstll50	FRIENDS STEAL LESS THAN $50
	frstlm50	FRIENDS STEAL MORE THAN $50
	frstlauto	FRIENDS STEAL A MOTOR VEHICLE
Feeling about Gang/Violence α = (0.891)		**1=SD, 2=Disagree, 3=Neither Agree/Disagree, 4=Agree, 5=SA**
	fllkggfr	FEEL LIKE HAVING GANG FRIENDS
	flggself	FEEL LIKE BEING IN A GANG MYSELF
	fldoilact	FEEL LIKE DOING ILLEGAL ACTIVITY
	fldoldrsay	FEEL LIKE DOING WHAT THE LEADER SAYS
Positive Peers α = (0.852)		**1=None of them, 2=Few, 3=Half, 4=Most, 5=All of them**
	posfriendgetalngadult	FRIENDS GET ALONG SCHOOL ADULTS
	posfriendgoodstudent	FRIENDS GOOD STUDENTS
	posfriendhonest	FRIENDS HONEST
	posfriendobeyschlrule	FRIENDS OBEY SCHOOL RULES
Educational Connectedness α = (0.731)		**1=SD, 2=Disagree, 3=Neither Agree/Disagree, 4=Agree, 5=SA**
	schlgradeimp	GRADES IMPORTANT
	schlhwfinish	I FINISH HOMEWORK
	schltryhard	I TRY HARD IN SCHOOL
	eddontlike	I PUT UP WITH WHAT I DON'T LIKE BECAUSE EDU WORTH IT

Continued

68

Table 3.1 (Continued)
Variable Labels and Coding Scheme

CONSTRUCT (α)	VARIABLE NAME	VARIABLE CODES (BOLD)/VARIABLE LABEL (Cronbach's Alpha)
Self worth/perception		1= Never, 2=Not too often, 3=Half time, 4 Often, 5=Always
α = (0.747)	Useful	I AM A USEFUL PERSON
	Idojobwell	WHEN I DO A JOB I DO IT WELL
	Worth	I AM A PERSON OF WORTH
	goodjob	I DO A GOOD JOB AS A PERSON

3.4 Variable Description

In the original study, variables include the level of gang activity, fights, and racial conflict in respondents' schools, whether respondents had ever used illegal drugs and if so, which kind, whether they had carried weapons, attacked or hit someone, lied about their age, destroyed property, or skipped school, and whether they felt guilty for any of their behaviors. Respondents were also asked their opinions of gangs, such as whether they were cool, exciting, or fun, or interfered with the safety in the neighborhood or at school. Students also answered questions designed to assess their attitudes toward the police and their parents. Demographic variables include the sex, race, and age of the respondent.

Table 3.2 presents the summary statistics for the 36 questions and six composites used in both the social control/bonding (SCB) and social control bonding with indirect effects (SCBI) models. Statistics include: the minimum and maximum value for each item, mean, standard error, skew and kurtosis statistics. Note: Questions used together as indicators of latent variables are identified by alternating grey and white highlights and create the variables at the end of Table 3.2 that end in CR where C=Constraint (in imputation) & recoded into composite variables. The constraint is used to truncate the number of response options as required by MPlus. The constraint and recoding syntax is presented in Appendix A.

The most notable feature among these statistics are the skewness statistics for the delinquent peers on the bottom left and top right of Table 3.2. Non-normality in this data

is due to the fact that most youth reporting trying hard in school, and grades being important; while few report positive feelings about gangs, violence, and gang leadership; and reports of friends stealing more than $50, and friends stealing automobiles.

This non-normality will be addressed in Chapter Four which may require treatment of the skew through, among other methods, transformation of the response values (e.g., ln(x) etc.) if the covariance matrix requires addressing the skew of these items. One reason that the covariance matrix will require addressing non-normality is if the matrix becomes non-positive definite (NPD) or in other words, if the matrix contains a zero or negative Eigenvalues. There are many possibilities creating NPD (e.g., linear dependency, sampling variation, negative error variance etc.), and there are different possible solutions addressing each possible cause (e.g., estimating polychoric correlations simultaneously, evaluating fit statistics, or turning admissibility checks off, or estimating covariances between variables).

Table 3.2

Variable - Summary Statistics (n = 5285)   *Dependent Variable

Variable	Min	Max	Mean	S.E.	Skew	Kurtosis	Variable	Min	Max	Mean	S.E.	Skew	Kurtosis
CAN TALK TO MOM	1	7	5.008	0.023	-0.627	-0.371	I'M A USEFUL PERSON	1	5	3.863	0.013	-0.747	0.425
MOM TRUSTS	1	7	5.045	0.024	-0.729	-0.298	I'M A PERSON OF WORTH	1	5	3.993	0.014	-0.966	0.568
ASK MOM'S ADVICE	1	7	4.191	0.027	-0.193	-1.104	GOOD JOB AS A PERSON	1	5	3.969	0.013	-0.823	0.436
MOM PRAISES ME	1	7	5.580	0.024	-1.165	0.434	WHEN I DO A JOB I DO IT WELL	1	5	4.025	0.013	-0.815	0.389
CAN TALK TO DAD	1	7	4.247	0.027	-0.185	-1.105	SCHOOL GANG ACTIVITY	1	5	2.997	0.014	0.020	-0.573
DAD TRUSTS ME	1	7	5.032	0.025	-0.738	-0.423	SCHOOL FIGHTS	1	5	3.243	0.014	-0.202	-0.738
DAD KNOWS FRIENDS	1	7	3.586	0.026	0.215	-1.094	SCHOOL PRESSURE TO JOIN GANGS	1	5	2.174	0.014	0.792	0.347
DAD UNDST ME	1	7	4.399	0.026	-0.326	-0.955	FRIENDS SKIP SCHOOL	1	5	2.453	0.017	0.569	-0.751
ASK DAD'S ADVICE	1	7	3.894	0.028	-0.029	-1.256	FRIENDS STEAL < $50	1	5	2.180	0.017	0.871	-0.270
DAD PRAISES ME	1	7	5.286	0.026	-0.931	-0.290	FRIENDS STEAL > $50	1	5	1.752	0.015	1.489	1.341
I TRY HARD IN SCHOOL	1	5	4.013	0.013	-1.034	0.887	FRIENDS STEAL A MOTOR VEHICLE	1	5	1.571	0.014	1.955	3.102
ED WORTH PUTTING UP W/ WHAT DON'T LIKE	1	5	3.898	0.014	-0.855	0.174	FRIENDS USE TOBACCO	1	5	2.187	0.018	0.850	-0.467
GRADES IMPORTANT	1	5	4.095	0.014	-1.138	0.992	FRIENDS USE ALCOHOL	1	5	2.473	0.019	0.560	-0.969
I FINISH HOMEWORK	1	5	3.556	0.015	-0.567	-0.448	FRIENDS USE MARIJUANA	1	5	2.164	0.019	0.895	-0.562

Continued

Table 3.2 (Continued)

Variable - Summary Statistics (n = 5285)   *Dependent Variable

Variable	Min	Max	Mean	S.E.	Skew	Kurtosis	Variable	Min	Max	Mean	S.E.	Skew	Kurtosis
GANGS SELL DRUGS FOR POWER*	1	5	3.546	0.014	-0.529	-0.080	MomCR	1	7	4.074	0.028	-0.047	-1.244
GANGS INTERFERE PEACE NHOOD*	1	5	3.796	0.015	-0.816	0.138	DadCR	1	7	4.065	0.027	-0.055	-1.226
VIOLENCE INTERFERES RIGHT FEEL SAFE*	1	5	3.963	0.014	-1.033	0.879	SelfWCR	1	5	3.062	0.020	-0.016	-1.316
USE DRUGS BECAUSE PEER PRESSURE*	1	5	3.499	0.016	-0.628	-0.269	EduCR	1	5	3.240	0.020	-0.127	-1.308
FEEL HAVING GANG FRIENDS	1	5	2.680	0.016	0.072	-0.808	PosPCR	1	5	3.182	0.020	-0.223	-1.272
FEEL IN GANG YOURSELF	1	5	2.004	0.016	0.941	-0.063	NegPCR	1	5	3.168	0.019	-0.178	-1.155
FEEL DOING ILLEGAL GANG ACTIVITIES	1	5	1.987	0.015	0.907	-0.103							
FEEL DOING WHAT LEADER SAYS	1	5	1.703	0.013	1.331	1.169							

3.5 Mediation and Bootstrapping Indirect Effects

Lockwood and MacKinnon (1997) report that mediation analysis seeks to go beyond the question of whether an independent variable causes a change in a dependent variable. The goal of mediation is to address the question of how that change occurs. A mediator is a third variable thought to be intermediate in the relationship between two variables and is estimated through a product of the two loadings (i.e., direct effect from X to M, and the direct effect from M to Y; See discussion and Figure 3 below) that can be estimated through bootstrapping.

Bootstrapping is a method that re-samples from an original sample to derive a more accurate estimate than is found through traditional methods. Dixon (n.d.) states that "the empirical distribution of the bootstrap estimated values, estimates the theoretical sampling distribution" (p. 1). Bootstrapping, Dixon argues, offers the advantage of estimation (i.e., mean, or standard error) based on the actual data distribution and *not* based on some inappropriate distribution such as a studentized-t distribution where non-normality (i.e., skew) is likely to exist.

Teknomo (n.d.) discusses bootstrap assumptions for which there are two, (1) the sample is a valid representation of the population, and (2) the bootstrap method will take sampling with replacement from the sample. Each sub sampling is independent and identical distribution (i.i.d.).

Research has found that bootstrapping, and in particular bias-estimated resampling bootstraps (discussed below), are the preferred method for estimating indirect effects (For details see MacKinnon, 2004; Shrout & Bolger, 2002; Lockwood & MacKinnon, 1998; Bollen & Stine, 1990).

Bootstrap analysis will be used to create confidence intervals for tests of significance for indirect effects. Discussions of bootstrapping indirect effects are defended in the literature (e.g., Bollen & Stine, 1990; Lockwood & MacKinnon, 1997). According to Garson (2010), bootstrapping, also known as resampling or Monte Carlo estimation, uses brute computer power to establish confidence intervals for any test statistic, based *not* on assumptions such as multivariate normal distribution, but rather based on repeated samples from the researcher's own data. As such it is a nonparametric method of statistical inference. That is, rather than use generic distribution Tables (eg., normal distribution Tables) to compute approximate probability p-value, resampling generates a unique sampling distribution based on the actual data at hand and uses experimental rather than analytic methods.

There are actually several different bootstrap-based methods that are available for testing hypotheses about intervening variable effects (see MacKinnon, Lockwood, & Williams, 2004). The most common are percentile, bias adjusted, and bias adjusted-accelerated. The percentile confidence interval method uses the $\alpha/2$ and $1 - \alpha/2$ quantiles of an estimated function (e.g., $\hat{F}(x)$) as a $1 - \alpha$ level confidence interval for the parameter (Dixon, (n.d.), p. 1). Dixon continues:

75

The percentile bootstrap is one of the simplest bootstrap confidence interval methods, but it may not be the best method in all applications. In particular, the percentile interval may not have the claimed coverage. Confidence interval coverage is the probability that the confidence interval includes the true parameter, under repeated sampling from the same underlying population.

Dixon (n.d.) discusses several options that are available to improve coverage of the percentile bootstrap. The first method accomplishes this by adjusting the endpoints for bias and non-constant variance termed the accelerated bootstrap (for full discussion see Davison & Hinkley, 1997). Computing the accelerated bootstrap confidence interval requires estimating a bias coefficient Z_0 and an acceleration coefficient. Both coefficients can be estimated non-parametrically from the data (discussed by Efron & Tibsharini 1993, p. 186) or theoretically calculated for a specific distribution (see Davison & Hinkley, 1997, p. 205). Confidence interval endpoints are obtained by inverting percentiles of the bootstrap distribution.

Another option discussed by Dixon (n.d.) is the "adjusting for bias and acceleration" method which alters the percentiles used to find the confidence interval endpoints. Dixon (n.d.) reports "because endpoints of the confidence interval are obtained by inverting the bootstrap distribution, both the percentile and accelerated bootstraps preserve the range of the parameter" (p. 2). For example, if the parameter and statistic are constrained to lie between 0 and 1, then the endpoints of these confidence intervals will satisfy that constraint.

76

Dixon (n.d.) then discusses the quadratic ABC confidence intervals (see DiCicco & Efron, 1992; and DiCicco & Efron, 1996) which are an approximation to the accelerated bootstrap that do not require many bootstrap simulations, which could be helpful when parameter estimation requires considerable computation. There are three required coefficients calculated either from the observations or a model (see Davison & Hinkley, 1997, pp. 214–220). Endpoints of the confidence interval are calculated by a Taylor-series approximation to the function (e.g., $\hat{F}_b(x)$). Because of the approximation, the endpoints may not satisfy constraints on the parameter space, unlike the first three methods.

Dixon (n.d.) discusses several other resampling methods for estimation which are outside the scope of this research. Methods discussed include studentized bootstrap, parametric bootstraps which can occur in a lognormal distribution or multinomial distribution, smoothed bootstrap, and non-parametric bootstrapping of hierarchical data.

For the purposes of this research, bias corrected bootstrap resampling will be employed to test for significant indirect effects.

Hayes (2009) writes that the strength of bootstrapping exists because it "generates an empirical representation of the sampling distribution of the indirect effect by treating the obtained sample size *n* as a representation of the population in miniature, one that is repeatedly re-sampled during analysis as a means of mimicking the original sampling process" (p. 412).

An indirect effect implies a causal relation in which an independent variable generates a mediating variable, which in turn generates a dependent variable (Sobel, 1990).

The indirect-effect model is shown in Figure 3 and is summarized in these three linear models:

$$Y = \beta_{01} + c\,X + \varepsilon_1 \qquad\qquad (1)$$
$$Y = \beta_{02} + c'\,X + b\,M + \varepsilon_2 \qquad\qquad (2)$$
$$M = \beta_{03} + a\,X + \varepsilon_3 \qquad\qquad (3)$$

In these equations, Y is the dependent variable, X is the independent variable, and M is the mediating variable. Continuing, c is the coefficient relating the independent variable and the dependent variable which is also depicted visually in Figure 3(A), and c' is the coefficient relating the independent variable to the dependent variable adjusted for the effects of the mediating variable, which is also depicted visually in Figure 3(B). β_{01}, β_{02}, and β_{03} represent the intercept in Equations 1, 2, and 3, respectively, and ε_1, ε_2, and ε_3 represent residuals. The residuals are assumed to be independent across equations and have an expected mean of zero.

Research suggests that because conventional approaches that test for significant indirect effects either violate the assumption of a normal distribution for a product estimator as does Sobels' (1987) test - a.k.a multivariate delta (for discussion see MacKinnon, Lockwood, and Williams, 2004; and Zhao, Lynch, & Chen, 2010); or a conventional test may overlook significant indirect effects because a significant direct

effect is *not* found; a step the Kenny and Barron's (1986) approach requires in their

causal steps method. Causal steps methods indicate a series of requirements which must

be true for the mediation model to hold.

The causal steps approach as outlined by Baron and Kenny (1986) as well as Judd

and Kenny (1981), is a lengthy discussion that is outside the scope of this research, but in

brief the method requires that: (1) the total effect of the independent variable on the

dependent variable must be significant (*c* in equation 1 above), (2) the path from the

independent variable to the mediator must be significant (*a* in equation 3 above), (3) the

path from the mediator to the dependent variable must be significant (*b* in equation 2

above), and (4) the fourth step is required only for complete mediation. If the

independent variable no longer has any affect on the dependent variable when the

mediator has been controlled, the complete mediation has occurred (nonsignificant *c'*).

Fritz & MacKinnon (2007) found that the causal steps approach is "among the

lowest in power, which is to say, if X's effect on Y is carried in part indirectly through

the intervening variables M, the causal steps approach is least likely of the many

methods available to actually detect the effect.

Hayes (2009) highlights another criticism of the causal steps approach. Causal

steps "is not based on the quantification of the very thing it is attempting to test – the

intervening effect. Rather, the existence of an indirect effect is inferred logically by the

outcome of a set of hypothesis tests. If *a* and *b* are both different from zero by a

79

statistical significance criterion, then so too must be the indirect effect according to the logic of this approach" (p. 410).

Figure 3 shows the path analysis for total, direct and indirect effects for maximum likelihood path estimates in a structural equation model (regression coefficients in an OLS model). Adapted from work by Hayes (professor of Communication at Ohio State University), let a, b, c and c' be quantification of causal effects. Figure 3(A) shows the total effect of X on Y (i.e., c). Figure 3(B) shows both the direct effect of X on Y depicted as c' and an indirect effect of X on Y depicted as the product of the parameter estimates $a*b$ (i.e., the direct effect from X to M = a, and the direct effect from M to Y = b). A total effect in Figure 3(B) equals the sum of the direct effect (c) and the indirect effect ($a*b$) (i.e., $c = c' + a*b$) and the indirect effect equals the direct effect subtracted from the total effect (i.e., $c - c'$).
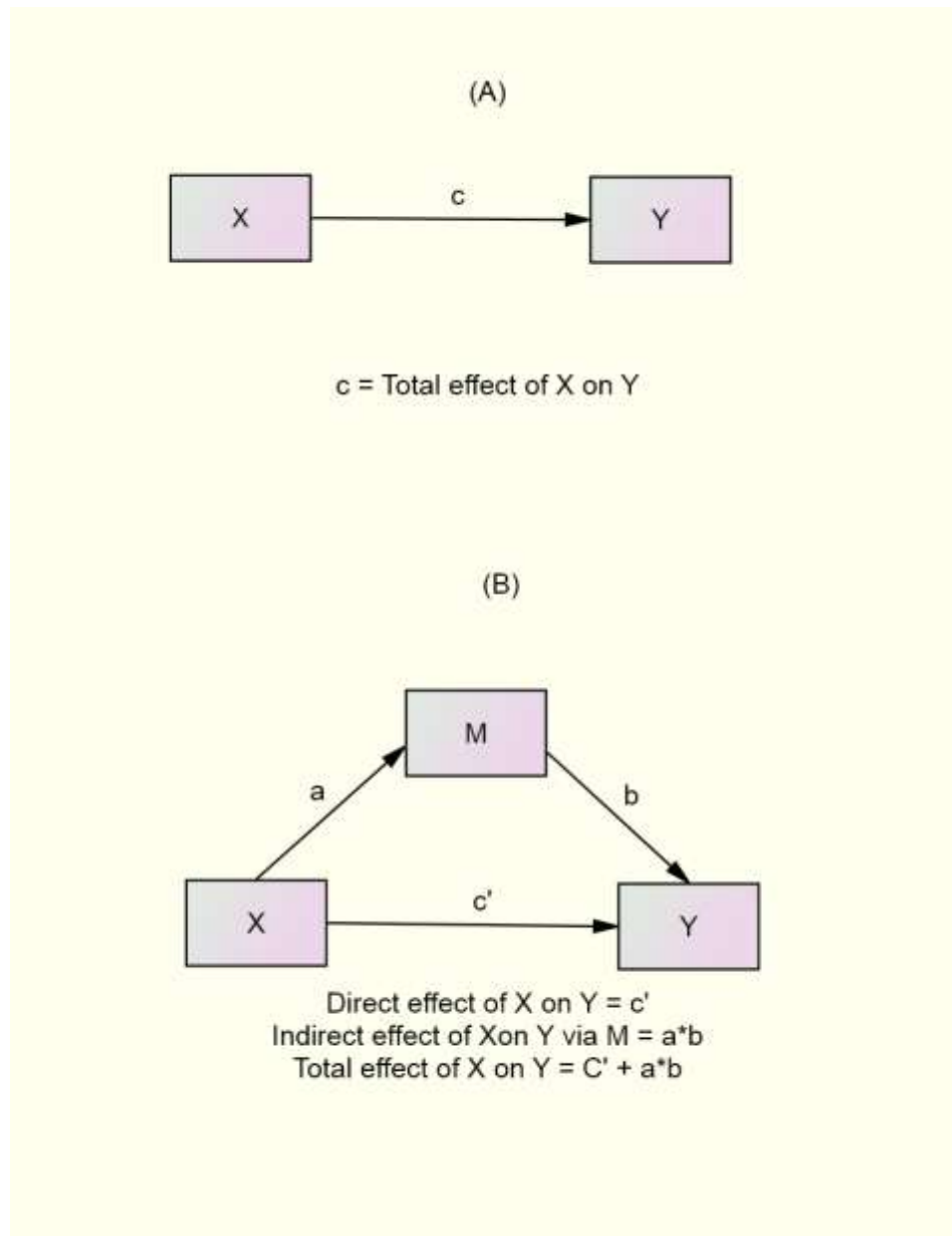
Figure 3: Path analysis – Total, Direct, and Indirect Effects (adapted from Hayes lecture notes: mediation and moderation)

A generic interpretation of these effects states, two people who differ by one unit on X are estimated to differ by *total effect* units on Y on average. They differ by *indirect effect* units on average as a result of the effect of X on M which in turn affects Y. The

remaining difference, the difference of *direct effect* units is due to the effect of X on Y independent of M (A. Hayes, personal communication, October, 26, 2011).

Research suggests that the best tests for determining significant indirect effects are bootstrap techniques. Moreover, one limitation of prior research involves testing simple path analysis with an observed predictor, observed outcome, and a single observed mediating variable. Hayes (2009) suggests that to date, research on intervening models spends little time on latent variable intervening models (p. 417). The paucity of research for testing for significant indirect effects within latent variable models provides a need for research in this area.

Thus this study intends to examine the bootstrap techniques on latent intervening variables models. Because the model in this paper includes latent structures, it is well suited for exploring how robust the findings on bootstrap techniques for indirect effects are for latent intervening variables, a technique *rarely* employed in prior research; especially within educational research.

The methodological contribution portion of this study will test Hirschi's (1969) bonding model by evaluating one specific, latent, indirect effect (see Figure 4). There is one direct effect from *involvement* to *bonding/connectedness.* The specific indirect effect is: from *commitment* to *bonding/connectedness* through *attachment*. Figure 4 shows an isolation of the relationships of the second order factors found in Figure 2 (p. 18). The question asked is: does *attachment* mediate the relationship between *involvement* and *bonding/connectedness?* Matsueda (1982) conducted an examination of social bonding

theory by testing an indirect effect from *attachment* to delinquency through *belief*.

Costello and Vowell (1999) disagreed with this specification when they stated "Hirschi argued that each element of the social bond should have a direct effect on delinquency, and there is no clear reason to hypothesis an indirect effect of *attachment* through *belief*" (p. 820).

For this reason, belief is excluded from an indirect effect. However, because model 1(SCB) (p. 17) tests the direct effects for all four elements of Hirschi's model to youth perceptions of gangs, model 2 (SCBI) (p. 18) examines the indirect effects other than those including belief.

In the end this research will join in the burgeoning intervening variable research (e.g., Bauer, Preacher & Gill, 2006; Kenny, Karchmaros, & Bolger, 2003; Krull and Mackinnon, 2001; Hayes, 2009; Preacher & Hayes, 2008a; and, Preacher & Hayes, 2008b).
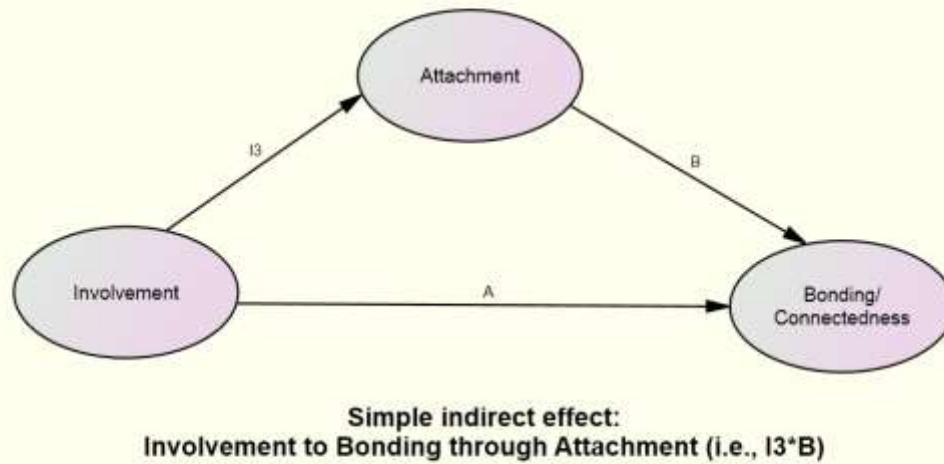
Figure 4: Tesing Hirschi's social bonding theory using indirect effects

3.6 Missing Data

Missing data were addressed using a technique suggested by McKnight and McKnight (2007) called multiple imputation. Missing data treatments were conducted in SPSS 19 and the final model is evaluated using MPlus 6.12 which offers bootstrapping techniques within the software which provides bootstrap confidence intervals to test for significant finding in the indirect effects. Due to the nature of the SCB model there are no indirect effects to examine; therefore, indirect effects will be tested using only the social-control/bonding indirect effects (SCBI) model.

According to McKnight (2007) multiple imputation (MI) "has become the most highly praised method for statistically handling missing data…because according to Rubin (1996), the method provides generalizable estimates and recovers population variance critical to statistical inference" (p. 196).

The question of how to obtain valid inferences from imputed data was addressed by Rubin's (1987), and Little and Rubin (2002, p. 209) books on multiple imputation (MI). MI is a Monte Carlo technique in which the missing values are replaced by $m>1$ simulated versions, where m is typically small (e.g., 3-10). In Rubin's method for `repeated imputation' inference, each of the simulated complete datasets is analyzed by standard methods (i.e., percentile 2.5 and 97.5), and the results are combined to produce estimates and confidence intervals that incorporate missing-data uncertainty.

The missing data analysis method chosen is dependent on whether or not the data is missing completely at random (MCAR) or missing at random (MAR). Figure 5 presents a schematic for MCAR, MNAR and MAR data. Data found to be MCAR suggests the probability that an observation (X_i) is missing is unrelated to the value of X_i or to the value of any other variables (see Rubin & Little, 1987; Heitjan and Baus 1996). Rubin's (1986) missing at random (MAR) mechanism is less restrictive in the sense that missing values on a variable X can be related to other measured variables but still must be unrelated to the underlying values of X. While a full discussion regarding MCAR, MAR, & missing not at random (MNAR) is beyond the scope of this research, Figure 3, adapted from McKnight and McKnight (2007) provides insight into the mechanisms for

missing data. With MCAR data there is no relationship between data that are missing and those that are observed, that is there is no systematic relationship between R^6 and either Y-obs or Y-miss. For MAR missing data there is a relationship between R and Y-miss.

According to McKnight (2007) "this does not mean that missing data do not have a systematic pattern….rather the means to see the pattern does not exist because if it exists it is governed by factors that we do not have data for" (p. 48). Thus, MAR reflects a pattern of missing data (R) related to observed data in the dataset (Y-obs) but *not* the missing data (Y-miss). Data that are MNAR have a relationship between R and Y-miss, yet the relationship is unknown because there is no access to Y-miss.

In the case of MAR and MNAR treatment of the missingness is crucial to maintain randomness and generalizability of the study. Thus missing data within the G.R.E.A.T data were treated using multiple imputation with the results presented in Table 3.3.

Treatment for missing data began by removing all missing data (i.e., 9, 99, or 999) on each G.R.E.A.T. manifest variables (four items) used to construct the dependent latent gang variable presented previously in Table 3.1. The final sample size after removal of the missing values within the four gang variable was 5285 (89%) of the original 5935 youth in year two.

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[6] R – represents a matrix of 0's and 1's (dummy codes) for all observed and missing data in the dataset defined by Little and Rubin (2002).

Missing data was addressed using the multiple imputation tools included in SPSS 19. All manifest *not* related to the outcome (G.R.E.A.T.) were used both as a predictor as well as for imputation. Constraints were set mutually exclusive for each item and were set to the lower and upper bounds for each items response options. With the exception of the parent items (Mom and Dad) the lower bound for every other item was one (1) and the upper bound was five (5). For Mom and Dad the lower bound was one (1) and the upper bound was seven (7). These constraints were set to prevent imputation scores from exceeding the boundaries of the observed response option, that is, an imputed score could not be lower than one (1) or higher than the upper bound for any item.
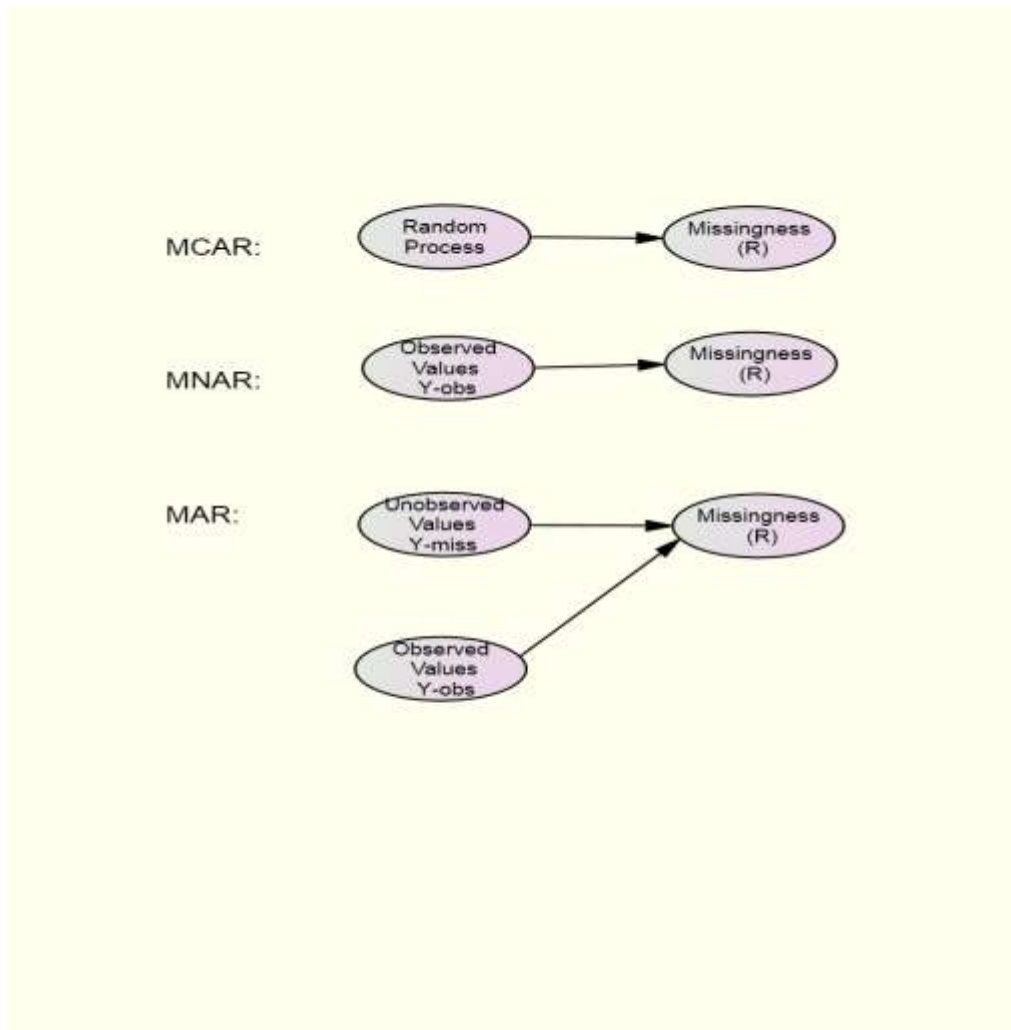
Figure 5: Rubin's Categories of Missing Data (adapted from McKnight and McKnight
    2007).

A overall summary of the missing data from a pattern analysis showed that of the
42 variables, 100% had missing data, of the 82,177 values from the 42 variables there
were a total of 2,116 (2.575%) missing, and of the 5285 cases there were 543 (24.45%)
with missing data.

In Table 3.3 each of the manifest variables were treated for missing data because every variable (100%) included missing data. Results included in Table 3.3 are the item counts prior to imputation, number of imputations, the percent (%) of missing data imputed, the amount of data removed for sex and race which were removed post imputation, and the final sample size for each item after imputation. After imputation the final count for every manifest variable was n=5285.

From Table 3.3, missing data ranged from 0.8 for police are honest, hard working and friendly variables to approximately 10.5% for the items related to Dad. Patterns of missing data suggest a "general pattern" of non-response (for discussion see Little and Rubin (2002), p. 5) which requires imputation for missing data.

The method used for MI was a fully conditional specification. Fully conditional specification is an iterative Markov chain Monte Carlo (MCMC) method within SPSS 19 that can be used when the pattern of missing data is arbitrary (monotone or *non*-monotone) - which in this study, a *non*-monotone data pattern occurred. MCMC occurs in two steps, the Monte Carlo method step and the Marcov Chain. The Monte Carlo step is a technique which obtains a probabilistic approximation to the solution of a problem by using statistical sampling techniques, and the Marcov Chain is a stochastic process which assumes that in a series of random events the probability of an occurrence of each event depends only on the immediately preceding outcome (see Andrieu, De Freitas, Ducet, & Jordan, 2003).

is an algorithm that generates a sample from a distribution used to (1) estimate the

distribution, and (2) For each iteration and for each variable in the order specified in the

variable list, the fully conditional specification (FCS) method fits a uni-variate (single

dependent variable) model using all other available variables in the model as predictors,

then imputes missing values for the variable being fit. The method continues until the

maximum number of iterations is reached, and the imputed values at the maximum

iteration are saved to the imputed dataset (SPSS 19 Guide).

Table 3.3
Missing Data (5 Imputations)

Variable					Removed: Sex, Race and	
		Imputation (count)				
	Pre	Count	Percent	Imputed Total	Dep Var	Final Total
SCHOOL GANG ACTIVITY	5845	90	1.5	5935	650	5285
SCHOOL PRESSURE TO JOIN GANGS	5851	84	1.4	5935	650	5285
SCHOOL GANG FIGHTS	5853	82	1.4	5935	650	5285
CAN TALK TO MOTHER	5808	127	2.1	5935	650	5285
MOTHER TRUSTS	5804	131	2.2	5935	650	5285
ASK MOTHER'S ADVICE	5795	140	2.4	5935	650	5285
MOTHER PRAISES ME	5799	136	2.3	5935	650	5285
CAN TALK TO FATHER	5323	612	10.3	5935	650	5285
FATHER TRUSTS ME	5312	623	10.5	5935	650	5285
FATHER KNOWS FRIENDS	5326	609	10.3	5935	650	5285
FATHER UNDERSTANDS ME	5321	614	10.3	5935	650	5285
ASK FATHER'S ADVICE	5318	617	10.4	5935	650	5285
FATHER PRAISES ME	5323	612	10.3	5935	650	5285
TEST MYSELF BY SOMETHING RISKY	5847	88	1.5	5935	650	5285
TAKE RISK FOR FUN	5858	77	1.3	5935	650	5285
EXCITING TO POSSIBLY GET IN TROUBLE	5853	82	1.4	5935	650	5285
FEEL GUILTY FOR STEALING < $50	5849	86	1.4	5935	650	5285
FEEL GUILTY FOR STEALING > $50	5852	83	1.4	5935	650	5285
I'M A USEFUL PERSON	5849	86	1.4	5935	650	5285
I'M A PERSON OF WORTH	5799	136	2.3	5935	650	5285
GOOD JOB AS A PERSON	5839	96	1.6	5935	650	5285
ABLE TO DO THINGS	5851	84	1.4	5935	650	5285
FEEL GOOD ABOUT SELF	5869	66	1.1	5935	650	5285
WHEN I MY JOB WELL	5863	72	1.2	5935	650	5285

Continued

91

Table 3.3 (Continued)
Missing Data (5 Imputations)

Variable					Removed: Sex, Race and	
			Imputation (count)			
	Pre	Count	Percent	Imputed Total	Dep Var	Final Total
I TRY HARD IN SCHOOL	5876	59	1.0	5935	650	5285
ED WORTH PUTTING UP W/ WHAT DON'T LIKE	5837	98	1.7	5935	650	5285
GRADES IMPORTANT	5880	55	.9	5935	650	5285
I FINISH HOMEWORK	5862	73	1.2	5935	650	5285
FRIENDS GET ALONG SCHOOL ADULTS	5834	101	1.7	5935	650	5285
FRIENDS GOOD STUDENTS	5833	102	1.7	5935	650	5285
FRIENDS HONEST	5817	118	2.0	5935	650	5285
FRIENDS OBEY SCHOOL RULES	5827	108	1.8	5935	650	5285
FRIENDS SKIP SCHOOL	5831	104	1.8	5935	650	5285
FRIENDS STEAL < $50	5781	154	2.6	5935	650	5285
FRIENDS STEAL > $50	5770	165	2.8	5935	650	5285
FRIENDS STEAL A MOTOR VEHICLE	5784	151	2.5	5935	650	5285
FRIENDS USE TOBACCO	5784	151	2.5	5935	650	5285
FRIENDS USE ALCOHOL	5799	136	2.3	5935	650	5285
FRIENDS USE MARIJUANA	5789	146	2.5	5935	650	5285
FEEL HAVING GANG FRIENDS	5770	165	2.8	5935	650	5285
FEEL IN GANG YOURSELF	5759	176	3.0	5935	650	5285
FEEL DOING ILLEGAL GANG ACTIVITIES	5750	185	3.1	5935	650	5285
FEEL DOING WHAT LEADER SAYS	5752	183	3.1	5935	650	5285
USE DRUGS LOW SELF-ESTEEM	5657	278	4.7	5935	650	5285
USE DRUGS PEER PRESSURE	5672	263	4.4	5935	650	5285

Continued

Table 3.3 (Continued)
Missing Data (5 Imputations)

| Variable | Imputation (count) | | | | Removed: Sex, Race and | Final |
	Pre	Count	Percent	Imputed Total	Dep Var	Total
GANGS SELL DRUGS FOR POWER	5646	289	4.9	5935	650	5285
GANGS INTERFERE PEACE OF NEIGHBORHOOD	5657	278	4.7	5935	650	5285
VIOLENCE INTERFERES RIGHT FEEL SAFE	5649	286	4.8	5935	650	5285
GANGS INTERFERE WITH GOALS	5667	268	4.5	5935	650	5285

3.7 Summary

In Chapter 3, section 3.1 explained, in detail, the G.R.E.A.T. data and how the sample was collected. Section 3.2 explained that because the database is deemed public use, consent and IRB review was not required at Ohio State University and a waiver was granted.

In section 3.3 variable descriptions from the original file were explained including the types of questions students were asked and the descriptive statistics for each item including the measures of center and measures of dispersion.

Section 3.4 provided both the labeling and coding schemes for each item. Included in this section was the Cronbach alpha which serves as an internal reliability measure. Each of the ten constructs showed Cronbach alpha's larger than 0.7 which suggests strong internal reliability.

In section 3.5 a detailed description of the advantages of bootstrapping confidence intervals as an alternative to the causal steps approach developed by Kenny and Baron were discussed. It was shown that the bootstrapping does not require the strict assumption of multivariate normality or that an assumption of normality is waived. Another advantage to bootstrapping is that significant direct effects were *not* a precursor to examining indirect effects, a shortcoming of causal steps. A defense of using the bias corrected, MCMC method, was provided. Also, a discussion regarding the general approach of prior research regarding indirect effects suggests that only the path analysis

94

of observed (manifest variables) were examined. Thus, this research extends the current knowledge by (1) examining latent variable indirect effects which include two specific direct effects, and (2) extending Hirschi's bonding theory through the examination of indirect effects for the four bonding elements.

In section 3.6 an explanation about the missing data for each item was provided and the results suggest that 100% of the items had missing data. At most, there was 12% missing data which occurred in the Dad items. Pattern analysis suggested that there was a "general pattern" of missingness described by Little and Rubin (2002) so the decision to impute data using multiple imputation was defended in large part to ensure the integrity of randomness and generalizability. In the final analysis the sample consisted of 5285 students from 11 schools. .

Going forward, Chapter Four will present the confirmatory factor analysis of the ten latent variables using the 42 items. Once the measurement models are constructed, a stepwise approach to constructing the structural model will be employed and discussed including specification, identification and modification.

CHAPTER 4

Results

The structure of this chapter is as follows: the first section revisits the variables in the study, the factor analysis results regarding the variables, the construction of the six composites used in the study, and a discussion regarding the factor correlations.

Section two examines and explains the second order factor analysis used in the study. Section three presents the full model constructed for this study including pre and post modification, identification of the model, the specific factor loadings with coefficients of determination, and lastly a presentation of the model covariances.

Section four discusses the full model that includes the indirect effects from involvement to bonding through attachment. Section five then examines the multiple group analysis including specific indirect effects, measurement variance and covariances related to the multiple group model.

Lastly, section six presents a study regarding the bias corrected confidence intervals related to the G.R.E.A.T. data for the full model with and without indirect effects, and the multiple group model with and without indirect effects. Each of these models are compared to the baseline model.

4.1 Data Structure/Reduction

   Variables. Prior to the data reduction, all manifest variables within year one of the

G.R.E.A.T. data germane to the analysis were coded and input into MPlus 6.12 for

reduction using a geomin rotation solution (geomin is an oblique type of rotation so that

the correlations between latent factors are calculated). Originally 73 items were input for

analysis and communalities below 0.30 were removed from the analysis. Likewise, if a

factor contained more than five items, the largest communalities were retained and the

lower communalities (typically rotated loadings below 0.5) were removed to reduce the

number of indicators for a latent factor to no more than five. In the final analyses there

were 42 manifest variables that were retained in the final rotation and extraction and from

these 42 variables six composite measures were created which are shown at the end of

Table 4.1.

Table 4.1
Variable - Summary Statistics (n = 5285)   *Dependent Variable

Variable	Min	Max	Mean	S.E.	Skew	Kurtosis	Variable	Min	Max	Mean	S.E.	Skew	Kurtosis
CAN TALK TO MOM	1	7	5.008	0.023	-0.627	-0.371	I'M A USEFUL PERSON	1	5	3.863	0.013	-0.747	0.425
MOM TRUSTS	1	7	5.045	0.024	-0.729	-0.298	I'M A PERSON OF WORTH	1	5	3.993	0.014	-0.966	0.568
ASK MOM'S ADVICE	1	7	4.191	0.027	-0.193	-1.104	GOOD JOB AS A PERSON	1	5	3.969	0.013	-0.823	0.436
MOM PRAISES ME	1	7	5.580	0.024	-1.165	0.434	WHEN I DO A JOB I DO IT WELL	1	5	4.025	0.013	-0.815	0.389
CAN TALK TO DAD	1	7	4.247	0.027	-0.185	-1.105	SCHOOL GANG ACTIVITY	1	5	2.997	0.014	0.020	-0.573
DAD TRUSTS ME	1	7	5.032	0.025	-0.738	-0.423	SCHOOL FIGHTS	1	5	3.243	0.014	-0.202	-0.738
DAD KNOWS FRIENDS	1	7	3.586	0.026	0.215	-1.094	SCHOOL PRESSURE TO JOIN GANGS	1	5	2.174	0.014	0.792	0.347
DAD UNDERSTANDS ME	1	7	4.399	0.026	-0.326	-0.955	FRIENDS SKIP SCHOOL	1	5	2.453	0.017	0.569	-0.751
ASK DAD'S ADVICE	1	7	3.894	0.028	-0.029	-1.256	FRIENDS STEAL < $50	1	5	2.180	0.017	0.871	-0.270
DAD PRAISES ME	1	7	5.286	0.026	-0.931	-0.290	FRIENDS STEAL > $50	1	5	1.752	0.015	1.489	1.341
I TRY HARD IN SCHOOL	1	5	4.013	0.013	-1.034	0.887	FRIENDS STEAL A MOTOR VEHICLE	1	5	1.571	0.014	1.955	3.102
ED WORTH PUTTING UP W/ WHAT DON'T LIKE	1	5	3.898	0.014	-0.855	0.174	FRIENDS USE TOBACCO	1	5	2.187	0.018	0.850	-0.467
GRADES IMPORTANT	1	5	4.095	0.014	-1.138	0.992	FRIENDS USE ALCOHOL	1	5	2.473	0.019	0.560	-0.969
I FINISH HOMEWORK	1	5	3.556	0.015	-0.567	-0.448	FRIENDS USE MARIJUANA	1	5	2.164	0.019	0.895	-0.562

Continued

Table 4.1

Variable - Summary Statistics (n = 5285)   *Dependent Variable

Variable	Min	Max	Mean	S.E.	Skew	Kurtosis	Variable	Min	Max	Mean	S.E.	Skew	Kurtosis
GANGS SELL DRUGS FOR POWER	1	5	3.546	0.014	-0.529	-0.080	FRIENDS HONEST	1	5	2.967	0.016	-0.011	-0.944
GANGS INTERFERE PEACE NEIGHBORHOOD	1	5	3.796	0.015	-0.816	0.138	FRIENDS OBEY SCHOOL RULES	1	5	2.813	0.017	0.167	-1.041
VIOLENCE INTERFERES RIGHT FEEL SAFE	1	5	3.963	0.014	-1.033	0.879	MomConn	1	7	4.074	0.028	-0.047	-1.244
GANG INTERFERES WITH GOALS	1	5	3.499	0.016	-0.628	-0.269	DadConn	1	7	4.065	0.027	-0.055	-1.226
FEEL HAVING GANG FRIENDS	1	5	2.680	0.016	0.072	-0.808	SelfPerc	1	5	3.062	0.020	-0.016	-1.316
FEEL IN GANG YOURSELF	1	5	2.004	0.016	0.941	-0.063	EduConn	1	5	3.240	0.020	-0.127	-1.308
FEEL DOING ILLEGAL GANG ACTIVITIES	1	5	1.987	0.015	0.907	-0.103	PosPeer	1	5	3.182	0.020	-0.223	-1.272
FEEL DOING WHAT LEADER SAYS	1	5	1.703	0.013	1.331	1.169	NegPeer	1	5	3.168	0.019	-0.178	-1.155
FRIENDS GET ALONG SCHOOL ADULTS	1	5	3.230	0.015	-0.242	-0.820							
FRIENDS GOOD STUDENTS	1	5	3.268	0.015	-0.220	-0.725							

Factor analysis. Table 4.2 (below) presents the Kaiser-Meyer-Olkin (KMO) statistics which assess one of the assumptions of principal components and principal factor analysis – namely whether there appears to be some underlying (latent) structure in the data - technically referred to as the Factorability of R. This is also referred to as sampling adequacy, which should be greater than 0.5 for a satisfactory factor analysis to proceed (SPSS 19). Examining Table 4.2, the KMO measure is 0.903 which suggests that there is/are latent structure(s) that this data can assess. From the same Table, we can see that the Bartlett's test of sphericity (Chi-Square = 34611.32, df = 820, p<0.001) is significant.

Table 4.2
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.903
Bartlett's Test of Sphericity	Chi-Square	34611.316
	Df	820
	Sig.	.000

The result of the Bartlett's test suggests that the correlation matrix is *not* an identity matrix, thus the factor analysis is the correct analysis to use to assess the model (Foulger, 2010).

In Table 4.1 we revisited the basic summary statistics for each of the forty manifest variables and six composite measures. Recall, Figure 1 and Figure 2 show the structural model under investigation. A factor analysis using a weighted least square with mean and variance adjustment (WLSMV) estimator was conducted. Thirty-six variables

from the G.R.E.A.T. data were input using a geomin (oblique) rotation to minimize the covariance of the squared loadings (for discussion see Costello and Osborn, 2005), and an extraction of eight latent factors were retained based on a combination of the Kaiser (1960) criterion (i.e. Eigenvalues of at least one) and the Cattell (1966) criterion (scree plot). However, of the eight latent factors two, *G.R.E.A.T.* and *Feelings about gangs/violence,* were *not* combined into a composite measure so that each variable could provide a factor loading. Composites are discussed shortly.

There were four items retained for "*mom connectedness*", (i.e., Talk, Trusts, Advises, & Praises) and six items retained for "*dad connectedness*", (i.e., Talk, Trusts, Knows Friends, Understands Me, Advise, and Praises Me) all ten items used a seven-point scale (1=none of the time, 7 = all of the time). These items were used to create the composite measure *MomConn* and *DadConn* respectively. A discussion regarding all six composite measures follows shortly.

The four *education connectedness* items retained (i.e., Try Hard in School, Education is Worth Putting Up with Things I don't Like, Grades Important, & I Finish Homework) used a five-point scale (1=strongly disagree, 5=strongly agree) and were used to construct the composite measure called *EduConn*. The four *self-worth* items retained (i.e., I am Useful, I have Worth, Do Good Job as a Person, & I Do Jobs Well) used a five point scale (1=almost never, 5=almost always) and were used to construct the composite measure called *SelfPerc*.

The three *school perception* items retained (i.e., There is/are: School Gang Activity, School Fights, & School Pressure to Join Gangs) used a five-point scale (1=strongly disagree, 5=strongly agree). The four *negative peer* items retained (i.e., Friends Skip School, Friends Steal Less than $50, Friends Steal More than $50, & Friends Steal an Automobile), used a five-point scale (1=none of them, 5=all of them) and were used to create the composite measure *NegPeer*. The three *drug using peer* items retained (i.e., Friends Use: Tobacco, Alcohol, &Marijuana) used a five-point scale (1=none of them, 5=all of them). The three *gang* items and one *violence* item used a five-point scale (1=strongly disagree, 5=strongly agree). The four *feeling* items (i.e., feel like having gang friends, being in a gang, doing illegal gang activity, & doing what the leader says) used a five-point scale (1=strongly disagree, 5=strongly agree). Finally, the four *positive peer* items used a five point scale (1=none of them, 5=all of them) and were used to create the composite measure *PosPeer*.

Composites. Lastly, six composite measures, presented at the end of Table 4.2, were constructed and the codes used to create the variables are presented in Appendix A.1.

Each of the constructs in Table 4.1 - highlighted in alternating grey and white coloring, were summed and then recoded into either five or seven response options. For example, the four items used for *momconn* - which used a seven point scale, were summed to create a composite measure and the resultant index had a range of 24 (i.e., from 4 to 28). In order to return the response index to the original metric, the composite

measure was recoded into seven response options using cutpoints for seven groups. The recode syntax for each of the six composites is presented in Appendix A.1.

Table 4.3 shows the Eigenvalue matrix for the eight latent factors[7] used to create Hirschi's model. Factor 1 (MomConn) accounted for the largest Eigenvalue (10.474). Factor 2 (DadConn) accounted for the second largest Eigenvalue (3.887). These results seem to support previous finding when evaluating 8th grade gang perceptions, that is to say that mom remains more of a protective factor than dad, especially when considering that mom connectedness shows the highest rotated loadings.

Factor 3 (SelfPerc) accounted for the tertiary Eigenvalue (2.836) which shows support for previous research. Recall, in Chapter 2 we found that research suggests high self perception to be predictive of positive behavior among youth (Reckless, 1958).

The fourth largest Eigenvalue (2.326) occurred for the factor education connectedness. These findings suggest that Osborn's work on educational connectedness may be supported in its importance for reducing youth negative behaviors.

Rotated Loadings. Table 4.4 presents geomin rotated loadings from the analysis. By convention, items retained should have loadings of .3 or higher on the latent factor, but loadings of .7 or higher are preferred (e.g. Schumacker & Lomax, 2004, p. 212).

Recall that eight factors were extracted, but only six composites were created because the feelings about gangs/violence and G.R.E.A.T variables were left disaggregated to estimate the individual factor loadings.

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[7] Only variables with acceptable loadings (i.e. above .3) and used in the analysis are presented.

Table 4.3
Eigenvalues: Hirschi's Sample Correlation Matrix

	Factor	E.V.	Factor	E.V.	Factor	E.V.
MomConn	1	10.474	16	0.511	31	0.253
DadConn	2	3.887	17	0.467	32	0.245
SelfPerc	3	2.836	18	0.431	33	0.220
EduConn	4	2.326	19	0.409	34	0.197
PosPeer	5	1.560	20	0.396	35	0.150
NegPeer	6	1.410	21	0.372	36	0.120
FeelGang	7	1.327	22	0.367		
GangPerc	8	1.174	23	0.345		
	9	0.728	24	0.339		
	10	0.681	25	0.324		
	11	0.663	26	0.321		
	12	0.621	27	0.313		
	13	0.597	28	0.294		
	14	0.574	29	0.268		
	15	0.538	30	0.263		

Each factor extracted between four and six variables as is shown in Table 4.4 –
Geomin Rotated Loadings Matrix (discussed below). There were: four items for mom-
connectedness; six items for connectedness to dad; four items self-perception; four items
for education; four items for positive peers; four items for negative peers; four items for
feelings about gangs and leadership; and four items for the gang (G.R.E.A.T.)
perceptions – the latent outcome variable (DV).

The results suggest that the four retained questions for factor 1 (mom
connectedness) show loadings greater than 0.6 with the highest loading (0.830) occurring
for the question "I can talk to my mom"; the six questions for factor 2 (dad

connectedness) show loadings from .59 (dad knows my friends) to .86 (I can talk to my dad).

For factor 3 (self-worth/perception), four items were retained with loadings ranging from 0.56 to 0.79 with the highest loading occurring for the question, *I am Able*. Factor 4, education connectedness, retained four items with loadings ranging from 0.52 (I finish my homework) to 0.82 (I try hard in school).

The four questions for factor 5 (positive peers) show loadings ranging from 0.66 to 0.76 the highest loading occurring for the question "Friends I choose are good students"

The four questions for factor 6 (negative peers) show high loadings ranging from 0.68 to 0.91 with the highest loading occurring for the question "Friends steal more than $50". The four questions for factor 7, (feelings about gangs/violence) show high loadings ranging from 0.74 to 0.96 with the highest loading occurring for the question "feel like being in a gang myself". Lastly, factor 8 (G.R.E.A.T.) the outcome variable show loadings from 0.58 to 0.83 with the highest loading occurring for the question "Gangs Interfere with Neighborhood Peace".

Table 4.4
Geomin (Oblique) Rotated Loadings (n=5285)

FACTOR	Item	1	2	3	4	6	5	7	8
MomConn*	MTALK	0.83							
	MTRUST	0.64							
	MADVISE	0.71							
	MPRAISE	0.65							
DadConn*	DTALK		0.85						
	DTRUST		0.67						
	DKNFRD		0.58						
	DUSTAND		0.87						
	DADVISE		0.82						
	DPRAISE		0.62						
SelfPerc*	USEFUL			0.65					
	WORTH			0.78					
	GDJBPRSN			0.74					
	ABLE			0.78					
	FLGDSLF			0.60					
	DOJBWELL			0.56					
EduConn*	SCTRYHRD				0.82				
	EDUPUTUP				0.60				
	SCGRDIMP				0.76				
	SCFINHW				0.52				
PosPeer*	FRSCAD					0.76			
	FRGDSTUD					0.76			
	FRHNST					0.66			
	FROBSCRL					0.74			
NegPeer*	FRSTL50						0.84		
	FRSTM50						0.91		
	FRSTLBLD						0.78		
	FRSTLAUT						0.68		
FeelGang	FLHVGGFR							0.74	
	FLGGSLF							0.96	
	FLDOGGAC							0.85	
	FLDOLDSY							0.80	
GangPerc (DV)	GGDRGPWR								0.58
	GGINNHPC								0.83
	VLINSFTY								0.83
	GGITFGL								0.64

*Composite Variable

Factor correlations. Table 4.5 presents the correlations for the latent structures

used, in part, to measure *bonding*. Most notable among the results is that education

showed a moderate, positive relationship with self perception (0.492) suggesting that as

connectedness to education increases the youths self-perception increases. Positive peers

showed a moderate, negative relationship with negative peer relationships (-0.531)

suggesting, as outlined in the literature, that as positive peer relationships increase,

negative peer relationships decrease. Additionally, positive peer relationships suggest a

moderate, positive relationship regarding the youth's feelings for wanting to be involved

in gang activity/membership (0.530). This finding is confounding because one would

expect a decrease in a youth's positive feelings about gangs with an increase in positive

peer relationships. Similarly confounding are the results that suggest a moderate, negative

relationship between negative peers and youth reporting feelings for wanting to be

involved with gang activity/membership (0.49). It is *not* clear why these two factor

correlations show relationships counter to expectations. It should be noted that the

loadings in the full model do *not* show these anomalies, meaning that the factor loadings

and structural loadings occur in the direction expected.

Continuing, there was a moderate, positive relationship between mom

connectedness and dad connectedness (0.483) suggesting, as predicted in the literature,

that an increase in mom connectedness leads to an increase in dad connectedness.

107

Table 4.5
Geomin Latent Factor Correlations

	1	2	3	4	5	6	7	8
MomConn	1							
DadConn	0.483	1						
SelfPerc	0.390	0.291	1					
EduConn	0.404	0.263	0.492	1				
PosPeer	-0.263	-0.194	-0.157	-0.350	1			
NegPeer	0.309	0.247	0.247	0.418	-0.531	1		
Feelings	-0.294	-0.209	-0.228	-0.450	0.530	-0.490	1	
G.R.E.A.T.	0.128	0.104	0.177	0.291	-0.18	0.228	-0.433	1

4.2 Latent Structure Model

Second order factor analysis. Using the results from the Table 4.4 whereby the eight latent factors from which the only six composites were constructed, these six composites, as well as the disaggregated four variables which loaded under the construct, *feelings about gangs,* were included in the analysis. In addition, six additional variables were included in the second order factor analysis to ascertain how many factors existed, and how the composites and variables loaded under these factors. Note: the composites within Table 4.4 are indentified with asterisk.

Table 4.6 shows the results for the geomin rotated, second order factor loadings. The first column in Table 4.6 shows Hirschi's four constructs (*attachment (A), belief (B), commitment (C), & involvement* (I)). Column two presents the six composite latent variables (shown with asterisks) and fourteen additional items as they relate to Hirschi's four-element construct for *bonding*. A weighted least square with mean and variance (WLSMV) estimator using a geomin (oblique) rotation suggest that these items extract four latent factors, as was expected.

108

Table 4.6
Geomin Latent Factor Loadings

Hirschi's Factor	Item	1	2	3	4
Attachment	MOMCONN*	0.684			
	DADCONN*	0.579			
	EDUCONN*	0.505			
	POSPCR	0.272			
Belief	SCGGACT		0.646		
	SCPRJNGG		0.597		
	SCGGFIGT		0.79		
	SELFPERC*	[8]			
Commitment	FLHVGGFR			0.694	
	FLGGSLF			0.969	
	FLDOGGAC			0.856	
	FLDOLDSY			0.814	
Involvement	NEGPEER*				0.636
	PEERTOB				0.858
	PEERALC				0.93
	PEERMJ				0.85

*Composite Measure

It should be noted that the results from the latent factor rotations are merely a statistical guide and that modifications were necessary to fit Hirschi's model with fidelity to his theoretical constructs. Thus, while items loaded statistically under particular factors, there are theoretical considerations that must be addressed so, in one case, these statistical guides were modified and discussed below.

While four items loaded on factor 1 (*attachment)*: mom connectedness (momconn) showed the highest loading (0.684), dad connectedness (dadconn, 0.579), education connectedness (educonn, 0.505), positive peers (pospeer, 0.272), and self worth/perception (selfperc, 0.655); arguing that self perception fits under *attachment* does

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[8] SelfPerc loaded on attachment originally with a loading of 0.655

not follow theoretical expectations. Self-perception, according to Reckless (1958) and Osborn (2001) is a belief about self, thus self perception was moved from factor 1 (*attachment*) to factor 2 (*belief)*.

Factor 2 (*belief*) extracted four items: gang activity in school (scggact, 0.646), school pressure to join gangs (scprjngg, 0.597), gang fights in school showed the highest loading (scggfigt, 0.79), and self perception (selfperc, 0.008). Clearly self-perception showed a very low loading, but this analysis is simply a guide so for theoretical considerations, the movement of self-perception from *attachment* to *belief* is necessary.

Factor 3 extracted four items related to a youth's feelings about both gangs and following leaders. The four items were: feel like having gang friends (flhvggfr, 0.694); feel like being in a gang myself – the highest loading (flggslf, 0.969); feel like doing gang activity (fldoggac, 0.856); and feel like doing what the leader says (fldoldsy, 0.814). These four items comprised factor 3 named *Commitment* under Hirschi's constructs.

Factor 4 extracted the four items related to negative peers and negative peer drug using behavior. The four items were: the composite measure negative peers (negpeer, 0.636), my friends smoke tobacco (peertob, 0.858), smoke marijuana(peermj, 0.850), and drink alcohol showed the highest loading (peeracl, 0.930). These four times comprised Factor 4 named *involvement* under Hirschi's constructs.

4.3 Full Model Pre and Post Modification

Social control measurement. Figure 6 is an extension of Figure 1 from Chapter 1 because it includes the items used in the measurement. Figure 6 depicts the four element

110

measurement structure using the G.R.E.A.T. curriculum and its application to Hirschi's constructs. The analysis presented in Table 4.6 was used to determine model specification for Hirschi's proposed theory. *Attachment* is specified by four variables: mom connectedness (MomConn), dad connectedness (DadConn), education connectedness (EduConn), and Positive Peer influence (PosPeer).

Belief is specified by four variables: school gang activity (ScGgAct), school pressure to join gangs (ScPrJnGg), school gang fights (ScGgFigt), and self perception (SelfPerc).

Commitment is specified by four variables: feel like having gang friends (FlHvGgFr), feel like being in a gang myself (FlGgSlf), feel like doing illegal gang activity (FlDoGgAc), and feel like doing what the leader says (FlDoLdSy).

G.R.E.A.T. is specified by four variables: gang interferes with my goals (GgItfGl), gangs sell drugs for power (GgDrgPwr), gangs interfere with neighborhood peace (GgInNhPc), and violence interferes with my safety (VlInSfty).

Involvement is specified by four variables: the composite *negpeer,* negative peers use tobacco (NPTOB), negative peers use alcohol (NPALC), and negative peers use marijuana (NPMJ).

The latent variable *bonding* is specified in two fashions, with the operands, "BY" and "ON". 'BY' shows arrows pointing from *bonding* to the three observed indicators: 1) use drugs because of peer pressure (UsDgPp), 2) use drugs because of low self-esteem (UsDgLse), and 3) G.R.E.A.T. which is the latent variable discussed previously. 'ON' has arrows pointing from the four exogenous latent variables: *attach, belief, commitment,*

111

and *involvement,* to *bonding.* This specification makes *bonding* an endogenous latent variable.

  Direct Effects. There are four direct effects specified in the model. There are four variables loaded "ON" *bonding:* (1) the latent construct *attach*; (2) by the latent construct *belief*; (3) by the latent construct *commitment*; and (4) by the latent construct *involvement.*

  Social Control Indirect Effects Model. Figure 7 shows the structural relationship between the variables and their effect on the G.R.E.A.T. outcome using the indirect effects model (SCBI). The advantage of this model as compared to Hirschi's model is the possible indirect effect relationship from *involvement* to *bonding* through *attachment* (i.e., I*A). For Hirschi, only direct effects were tested.

  Indirect Effects. There one indirect effect modeled in the structure. *Involvement* to *bonding* is being moderated by *attachment.* It is through this relationship that the indirect effects will be examined using bias corrected bootstrapping techniques as discussed in section 4.6.
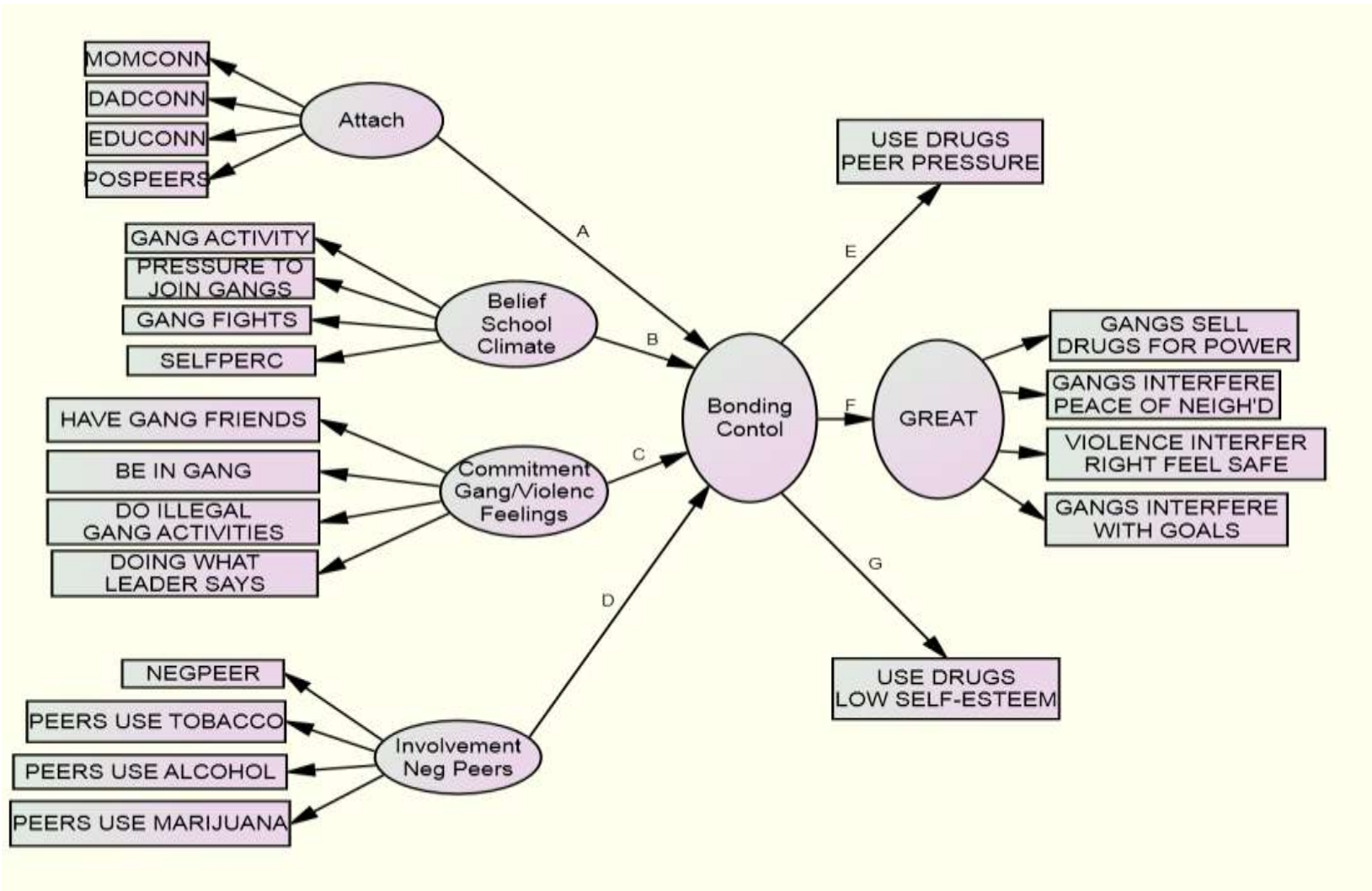
Figure 6: Hirschi's Social Control (SCB)Model for G.R.E.A.T Curriculum
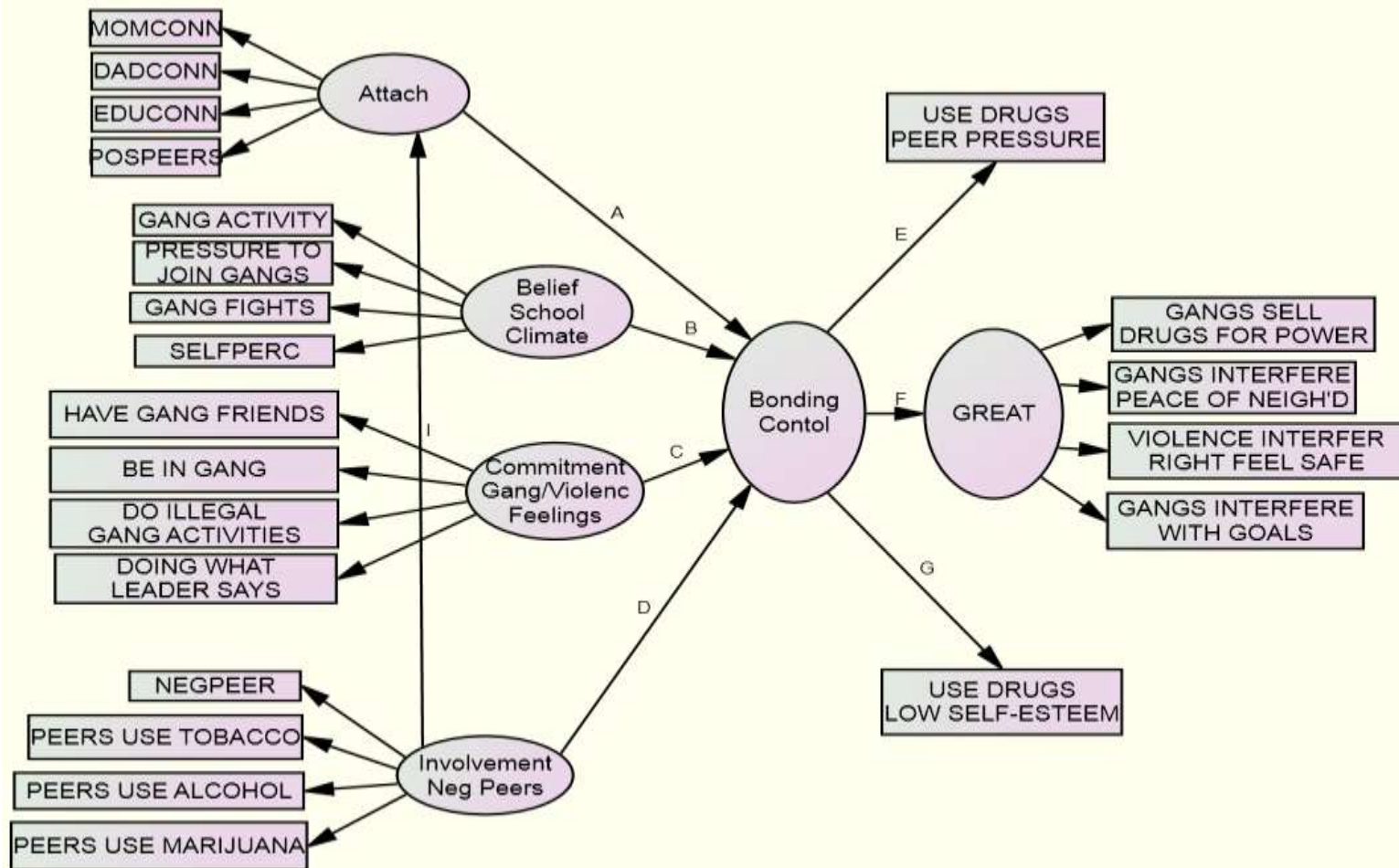
Figure 7: Social Control Indirect Effects (SCBI) Model for G.R.E.A.T Curriculum

Figure 8 and Table 4.7 shows the results for standardized (stdyx), factor loadings (fl), structure coefficients, and coefficient of determination (cd). Both the pre-modified and post-modified models are presented. The global fit for the pre-modified model show a poor fit (RMSEA = .103, CFI = .913, Chi-Square = 11398.08, df=198, p<0.001), but the global fit for the post-modified model shows a good fit (RMSEA = .050; CFI = .981; Chi-Square = 2647.51, df=184, p<0.001). Factor loadings, structure coefficients, and the coefficient of determination (where applicable) for both models are discussed simultaneously and are presented with the pre modification estimates followed by the post modification estimates (e.g., pre fl, cd); (post fl, cd), where 'fl' is the loading and 'cd' is the coefficient of determination.

Identification: To estimate the factor loading for the four elements of Hirschi's construct, that is the exogenous, latent variables; the variance for *attachment, belief, commitment* and *involvement* were each set to one (1) in both the pre-modification and post-modification models. Similarly, to estimate the four factor loadings, the variance was set to one (1) for the exogenous latent variable - G.R.E.A.T..

Hirschi's four constructs were loaded "ON" (i.e., pointing toward) the endogenous latent variable, *bonding*. Additionally, the three variables; 1) G.R.E.A.T., 2) use drugs because of peer pressure, and 3) use drugs because of low self esteem, were loaded "BY" (i.e., pointing from) *bonding*. For the 'BY' loading, the variance of *bonding* was set to one (1) to estimate the factor loadings and as a result each of the 'ON' factor loadings were estimated.

Lastly, a covariance between the item, *I use drugs because of peer pressure*, with the latent variable, *bonding* was estimated to resolve an issue of the psi (latent variable) correlation matrix which was non-positive- definite (npd) because the correlation was greater than one (r >1.0) and this covariance resolved the issue.

Specification, factor loadings, and coefficient of determination. For *attachment*, positive peers in both models (i.e., pre and post) showed the highest loading and lowest coefficient of determination (fl=0.782, cd=0.389); (fl=0.75, cd=0.422) and in both models dad connectedness showed the lowest factor loading and highest coefficient of determination (fl=0.453cd=0.795); (fl=0.381, cd=0.853). The estimates for both models are all positive and significant with p-values less than 0.001. Thus, for the lowest coefficients of determination there was a 39% to 42% explanation of the variance net of all other variables in the model, and for the highest coefficients of determination, there was a 79.5% to 85.3% explanation of the variance net of all other variables in the model.

For *belief,* the pre-modification model estimated gang fights in school as the highest loadings and lowest coefficient of determination. Also, self-perception showed the highest loading and lowest coefficient of determination for the post modification model (fl=0.659, cd=0.566); (fl= -0.798, cd=0.855). In both models, school gang activity showed the lowest loadings and highest coefficient of determination (fl=0.498, cd=0.752); (fl=0.580, cd=0.960). The estimates for school gang fight and school gang activity are positive, but negative for self perception. All estimates are significant with p-values less than 0.001. Thus, for the lowest coefficients of determination there was a 56.6% to 85.5% explanation of the variance net of all other variables in the model, and for the highest coefficients of determination, there was a 75.2% to 96% explanation of the

116

variance net of all other variables in the model. These results suggest that self-perception is an important predictor as Reckless (1958) suggested.

For *commitment*, feel like doing illegal gang activity showed the highest loading and lowest coefficient of determination (fl=0.944 , cd=0.109); (fl=0.942 , cd=0.113) and in both models feel like doing what the leader says showed the lowest factor loading and highest coefficient of determination (fl=0.794, cd=0.370); (fl=0.794, cd=0.370). The estimates for both models are all positive and significant with p-values less than 0.001.

For *involvement*, in both models, friend smoke marijuana showed the highest loading and lowest coefficient of determination (fl=0.901, cd=0.188); (fl=0.849, cd=0.251) and in both models friend smoke cigarettes showed the lowest factor loading and highest coefficient of determination (fl=0.796, cd=0.366); (fl=0.695, cd=0.506). The estimates for both models are all positive and significant with p-values less than 0.001.

In both models, for the outcome exogenous latent variable, *G.R.E.A.T.*, gangs interfere with goals showed the highest loading and lowest coefficient of determination (fl=0.861, cd=0.258), (fl=0.904, cd=0.195) and in both models gang sell drugs for power showed the lowest factor loading and highest coefficient of determination (fl=0.535, cd=0.714), (fl=0.459, cd=0.791). The estimates for both models are all positive and significant with p-values less than 0.001.

For Hirschi's construct of *bonding/control*, the four elements, *attachment, belief, commitment,* and *involvement* were loaded 'ON' *bonding/control* (an endogenous latent construct). Similarly, *bonding/control* was identified 'BY' three variables: two

117

exogenous observed items - I use drugs because of peer pressure, and I use drugs because of a low self-esteem; and one exogenous latent construct – *G.R.E.A.T.* discussed above.

For Hirschi's four constructs, *commitment* showed the highest (negative) loading for the pre-modified model and *attachment* showed the highest (positive) loading for the post-modified model(fl=-0.404), (fl=0.185) and in both models *involvement* showed the lowest factor loading (fl=0.070), (fl= -0.059). The estimates for both models are all significant with p-values less than 0.001. Also noteworthy is that *involvement* was positive in the pre-modified model, but negative in the post-modified model. After examining this phenomenon by making new modification, this change was consistent over several model modifications.

Covariances. Covariances between Hirschi's four latent constructs were estimated by default in both the pre-modification and post-modification models. In addition to these six covariance estimates, there were thirteen additional covariance estimates necessary to adjust the global fit indexes from poor to good. These thirteen estimates are found in Table 4.9 and they are between:

a. Mom connectedness WITH[9] dad connectedness,
b. Friend tobacco use: WITH friend alcohol; and WITH marijuana use,
c. Friend alcohol use WITH marijuana use,
d. Gangs interfere with neighborhood peace WITH gang sell drugs for power,
e. Self perception: WITH mom connectedness; WITH dad connectedness; WITH
    Attachment; and WITH Belief,
f. G.R.E.A.T.: WITH Involvement; WITH Commitment; WITH Attachment; and WITH
    Belief.

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[9] WITH is MPlus nomenclature to estimate covariance's

Note that all covariance's were statistically significant with p values <0.01. Certainly many other modifications were possible, but for parsimony, only the necessary covariance modifications were made to attain good global fit.

4.4 Full Model Indirect Effects

Table 4.7 shows the results for the social control/bonding, indirect effects (SCBI) model and Hirschi's social control/bonding (SCB) model – i.e., post modification from Table 4.7. The results for *attachment, belief, commitment,* and *involvement* factor loadings are nearly identical in the two models. For *attachment* positive peers shows the highest factor loading (r = 0.756 & 0.755 respectively); for *belief* self-worth/perceptions show the highest factor loading (r = -0.757 & -0.798 respectively); for *commitment* feel like doing gang activity shows the highest factor loading (r = 0.941 & 0.942 respectively); and for *involvement*, negative peers shows the highest factor loading (0.815) for the SCBI model, but peer marijuana use shows the highest factor (0.846) loading for the SCB model.

The three most obvious differences between the SCB and SCBI models on page 120 are: (1) the simple direct effect from Involvement to Attachment which shows a significant, negative relationship (-0.88, t=-80.363, p<0.001); (2) the two covariance's between the latent variables; a) commitment with attachment, b) involvement with attachment are not estimated; and (3) a covariance between G.R.E.A.T. and Bonding is estimated to prevent a non-positive-definite (npd) psi matrix (i.e., latent variable matrix).
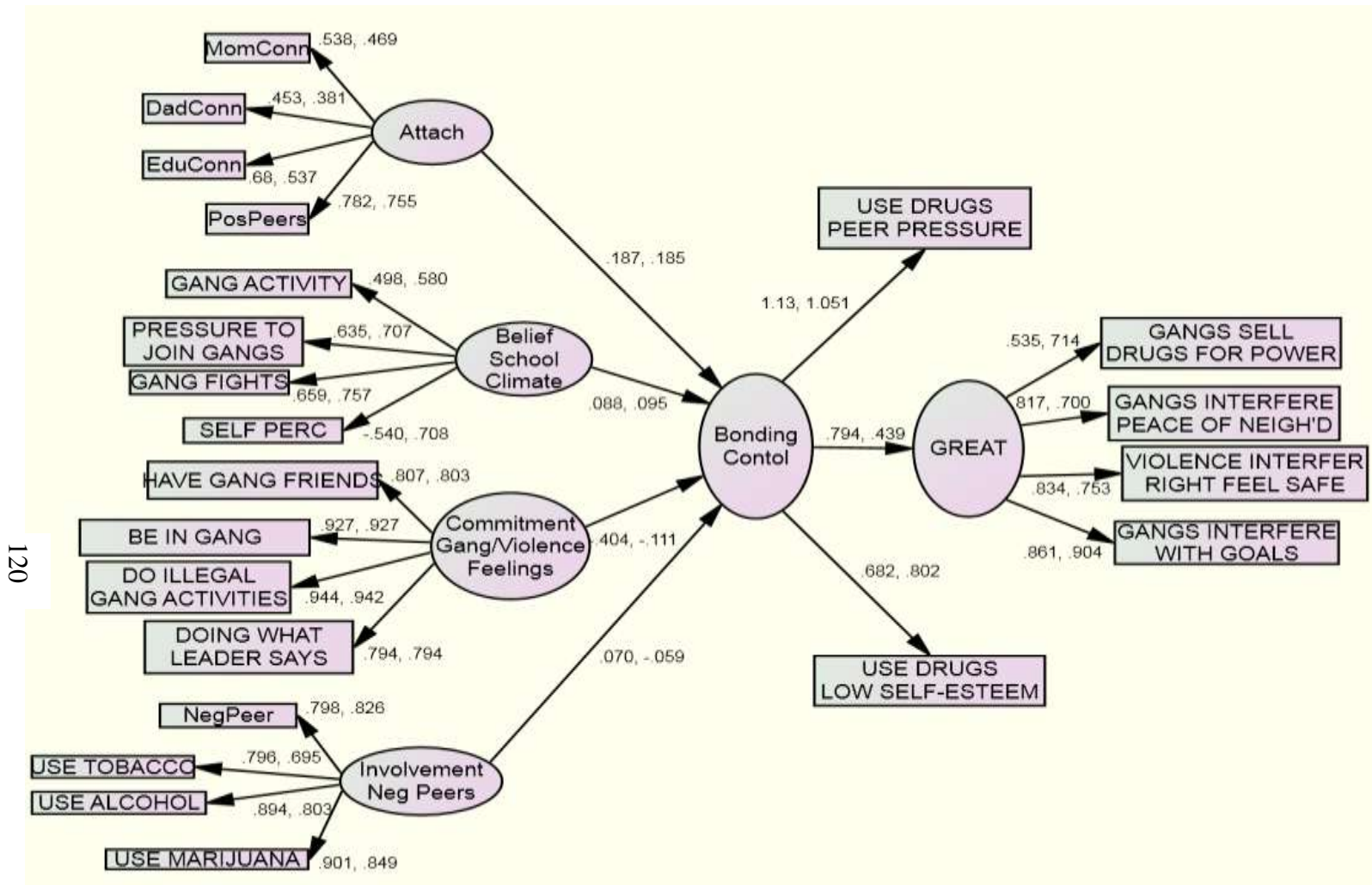
Figure 8: Hirschi's Model (standardized estimates) for G.R.E.A.T Curriculum – (Pre-Modification, Post-Modification)

Table 4.7

Measurement Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (Observed Variables)

		Factor Coefficients									
		Pre Modification					Post Modification				
Factor	Predictor	Indicator	S.E.	Est./S.E.	P-Value	C.D.	Estimate	S.E.	Est./S.E.	P-Value	C.D.
Attachment		BY					BY				
	MOMCR	0.538	0.012	43.458	<0.001	0.711	0.469	0.013	34.933	<0.001	0.778
	DADCR	0.453	0.013	34.139	<0.001	0.795	0.381	0.014	26.372	<0.001	0.853
	EDUCR	0.680	0.011	60.063	<0.001	0.537	0.671	0.011	60.123	<0.001	0.563
	POSPCR	0.782	0.010	76.438	<0.001	0.389	0.755	0.010	73.730	<0.001	0.422
BELIEF		BY					BY				
	SCGGACT	0.498	0.014	34.397	<0.001	0.752	0.580	0.014	40.885	<0.001	0.960
	SCPRJNGG	0.635	0.015	42.856	<0.001	0.597	0.707	0.015	45.821	<0.001	0.877
	SCGGFIGT	0.659	0.014	47.083	<0.001	0.566	0.757	0.015	51.040	<0.001	0.897
	SelfPerc	-0.540	0.020	-27.328	<0.001	0.708	-0.798	0.051	-15.516	<0.001	0.855
COMMITMENT		BY					BY				
	FLHVGGFR	0.807	0.006	132.636	<0.001	0.349	0.803	0.006	131.874	<0.001	0.354
	FLGGSLF	0.927	0.004	262.149	<0.001	0.141	0.927	0.003	265.590	<0.001	0.141
	FLDOGGAC	0.944	0.003	273.500	<0.001	0.109	0.942	0.003	273.480	<0.001	0.113
	FLDOLDSY	0.794	0.007	111.826	<0.001	0.370	0.794	0.007	112.195	<0.001	0.370
INVOLVEMENT		BY					BY				
	NEGPCR	0.798	0.008	105.052	<0.001	0.363	0.826	0.008	98.841	<0.001	0.337
	NPTOB	0.796	0.006	125.797	<0.001	0.366	0.695	0.011	61.962	<0.001	0.506
	NPALC	0.894	0.005	191.962	<0.001	0.201	0.803	0.009	89.340	<0.001	0.340
	NPMJ	0.901	0.005	183.108	<0.001	0.188	0.849	0.009	91.969	<0.001	0.259

49

Table 4.7 (Continued)

Measurement Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (Observed Variables)

| Factor | Predictor | Pre Modification | | | | | Post Modification | | | | |
		Indicator	S.E.	Est./S.E.	P-Value	C.D.	Estimate	S.E.	Est./S.E.	P-Value	C.D.
GREAT		BY					BY				
	GGITFGL	0.861	0.008	113.217	<0.001	0.258	0.904	0.010	92.727	<0.001	0.195
	GGDRGPWR	0.535	0.011	48.922	<0.001	0.714	0.459	0.013	35.331	<0.001	0.791
	GGINNHPC	0.817	0.007	117.086	<0.001	0.332	0.700	0.011	65.658	<0.001	0.518
	VLINSFTY	0.834	0.007	122.575	<0.001	0.304	0.753	0.010	76.891	<0.001	0.444
Structure Coefficients											
BONDING		BY					BY				
	USDGPP	1.130	0.006	180.544	999.000	0.478	1.051	0.004	243.587	<0.001	0.216
	USDGLSE	0.682	0.010	65.660	<0.001	0.535	0.802	0.014	57.872	<0.001	0.438
	GREAT	0.749	0.002	410.979	999.000	*	0.439	0.015	29.714	<0.001	*
BONDING		ON					ON				
	COMMIT	-0.404	0.018	-21.996	<0.001	*	-0.111	0.023	-4.785	<0.001	*
	ATTACH	0.187	0.029	6.564	<0.001	*	0.185	0.034	5.521	<0.001	*
	BELIEF	0.088	0.018	4.920	<0.001	*	0.095	0.016	6.008	0.003	*
	INVOLVE	0.070	0.023	3.112	0.002	*	-0.059	0.030	-1.972	0.049	*
COVARIANCES											
		Pre Modification					Post Modification				
USDGPP		WITH					WITH				
	BONDING	-0.377	0.013	-28.018	<0.001	*	-0.382	0.026	-14.865	<0.001	*
BELIEF		WITH					WITH				
	ATTACH	-0.492	0.016	-31.308	<0.001	*	-0.281	0.019	-14.717	<0.001	*
COMMIT		WITH					WITH				
	ATTACH	-0.672	0.012	-57.640	<0.001	*	-0.706	0.012	-57.946	<0.001	*
	BELIEF	0.420	0.015	28.606	<0.001	*	0.348	0.015	22.964	<0.001	*

Table 4.7 (Continued)

Measurement Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (Observed Variables)

		COVARIANCES									
		Pre Modification					Post Modification				
Factor	Predictor	Estimate	S.E.	Est./S.E.	P-Value	C.D.	Estimate	S.E.	Est./S.E.	P-Value	C.D.
INVOLVE		WITH					WITH				
	ATTACH	-0.698	0.011	-63.582	<0.001	*	-0.790	0.012	-65.683	<0.001	*
	BELIEF	0.300	0.016	18.999	<0.001	*	0.264	0.015	17.140	<0.001	*
	COMMIT	0.631	0.010	63.614	<0.001	*	0.678	0.010	65.756	<0.001	*
		MODIFICATIONS									
MOMCR							WITH				
	DADCR					*	0.361	0.012	29.379	<0.001	*
NPTOB							WITH				
	NPALC					*	0.476	0.017	28.575	<0.001	*
	NPMJ					*	0.338	0.023	14.777	<0.001	*
NPALC							WITH				
	NPMJ					*	0.402	0.023	17.646	<0.001	*
GGINNHPC							WITH				
	GGDRGPWR					*	0.278	0.014	19.900	<0.001	*
	VLINSFTY					*	0.389	0.015	25.136	<0.001	*
SELFWCR							WITH				
	MOMCR					*	0.139	0.013	10.918	<0.001	*
	DADCR					*	0.109	0.013	8.612	<0.001	*

Table 4.7 (Continued)

Measurement Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (Observed variables)

| Factor | Predictor | Pre Modification | | | | | Post Modification | | | | |
		Estimate	S.E.	Est./S.E.	P-Value	C.D.	S.E.	Est./S.E.	P-Value		C.D.
SELFPERC							WITH				
	ATTACH					*	0.240	0.015	16.255	<0.001	*
	BELIEF					*	0.559	0.045	12.555	0.007	*
GREAT							WITH				
	INVOLVE					*	-0.233	0.019	-12.253	<0.001	*
	COMMIT					*	-0.538	0.013	-42.887	<0.001	*
	ATTACH					*	0.407	0.019	21.928	<0.001	*
	BELIEF					*	-0.187	0.016	-11.964	<0.001	*

124

For Hirschi's four constructs, *attachment* showed the highest (negative) loading for the indirect effect model and *attachment* showed the highest (positive) loading for the post-modified model(fl=-0.111), (fl=0.122) and in the indirect model *belief* showed the lowest factor loading (fl=0.094), but *involvement* showed the lowest (negative) loading for the post-modified model (fl= -0.059). The estimates for both models are all significant with p-values less than 0.001. Also noteworthy is that *involvement* was positive in the pre-modified model, but negative in the post-modified model. After examining this phenomenon by making new modification, this change was consistent over several model modifications.

G.R.E.A.T. Lastly, we examine the role of the latent structure G.R.E.A.T. and its two companion indicators, youth do drugs because of a low self-esteem, and youth do drugs because of peer pressure. Beginning with the latent construct, G.R.E.A.T., the results showed a significant, positive relationship with *bonding* (0.439) which suggest that as bonding increased, G.R.E.A.T. knowledge increased. This further suggests that as youth begin to understand the role and influence of gangs – according to the curriculum, then bonding would increase. Recall the role and influence of gangs as defined by the curriculum is that gangs sell drugs for power, interfere with neighborhood peace, interfere with personal goals, and that violence interferes with a person's right to feel safe.

When considering the full model with indirect effects, the results suggest a significant, positive relationship with bonding (0.913) again suggesting that increased knowledge about gangs leads to increased bonding.

Peer pressure and low self esteem. For the two manifest variables, in the full model without indirect effects, the results show a significant positive relationship between bonding and youth who believe that people use drugs because of peer pressure (1.051) and a significant positive result between bonding and youth who believe that people use drugs because of low self esteem (0.802). For the full model with indirect effects, the relationship between bonding and youth who believe that people use drugs because of peer pressure shows a significant, positive relationship (1.051); and a significant positive result for youth who believe that people use drugs because of low self esteem (0.747).

4.5 Multiple Group Model

Specific Direct effects. Figure 9 and Table 4.9 shows the results for a multiple group analysis using the variables from the full model presented previously. This model includes a mean structure with Delta parameterization, thus the thresholds of the factor indicators are held equal across groups default to specify measurement invariance. There are two groups in the analysis; those 8th graders that completed G.R.E.A.T. and those that did *not.* The sample sizes for each group are 2373 and 2912 respectively. The global fit indices suggest a good fit for the model (RMSEA = 0.039, & CFI = 0.987).

The factor loadings for all four of Hirschi's constructs: *attachment, belief, commitment* and *involvement* are significant for both models showing significance for a level of significance of 0.01. Similarly, the factor loadings for the *G.R.E.A.T.* variable indicators are also significant for a level of significance of 0.01 as did the "BY" factor loadings: G.R.E.A.T., use drugs because of peer pressure, and use drugs because of low self-esteem, for Hirschi's *bonding* construct.

126

Table 4.8

Measurement Standardized Factor Indirect Effects Model, Covariance's (WITH), & R^2 (Observed Variables)

Factor	Predictor	Indirect Effect					Post Modification				
		Indicator	S.E.	Est./S.E.	P-Value	C.D.	Estimate	S.E.	Est./S.E.	P-Value	C.D.
ATTACHMENT	BY						BY				
	MOMCR	0.471	0.013	35.028	<0.001	0.222	0.469	0.013	34.933	<0.001	0.778
	DADCR	0.383	0.014	26.473	<0.001	0.147	0.381	0.014	26.372	<0.001	0.853
	EDUCR	0.674	0.011	60.201	<0.001	0.454	0.671	0.011	60.123	<0.001	0.563
	POSPCR	0.756	0.010	74.478	<0.001	0.572	0.755	0.010	73.730	<0.001	0.422
BELIEF	BY						BY				
	SCGGACT	0.581	0.014	41.023	<0.001	0.338	0.580	0.014	40.885	<0.001	0.960
	SCPRJNGG	0.706	0.015	45.919	<0.001	0.499	0.707	0.015	45.821	<0.001	0.877
	SCGGFIGT	0.755	0.015	51.128	<0.001	0.571	0.757	0.015	51.040	<0.001	0.897
	SelfPerc	-0.757	0.049	-15.475	<0.001	undef	-0.798	0.051	-15.516	<0.001	0.855
COMMITMENT	BY						BY				
	FLHVGGFR	0.804	0.006	132.217	<0.001	0.647	0.803	0.006	131.874	<0.001	0.354
	FLGGSLF	0.927	0.003	265.918	<0.001	0.860	0.927	0.003	265.590	<0.001	0.141
	FLDOGGAC	0.941	0.003	273.455	<0.001	0.886	0.942	0.003	273.480	<0.001	0.113
	FLDOLDSY	0.794	0.007	112.100	<0.001	0.630	0.794	0.007	112.195	<0.001	0.370
INVOLVEMENT	BY						BY				
	NEGPCR	0.815	0.008	100.193	<0.001	0.664	0.826	0.008	98.841	<0.001	0.337
	NPTOB	0.652	0.011	59.522	<0.001	0.425	0.695	0.011	61.962	<0.001	0.506
	NPALC	0.756	0.009	86.005	<0.001	0.571	0.803	0.009	89.340	<0.001	0.340
	NPMJ	0.799	0.009	91.133	<0.001	0.639	0.849	0.009	91.969	<0.001	0.259

Table 4.8 (Continued)

Measurement Standardized Factor Indirect Effects Model, Covariance's (WITH), & R^2 (Observed Variables)

Factor	Predictor	Indirect Effect					Post Modification				
		Estimate	S.E.	Est./S.E.	P-Value	C.D.	Estimate	S.E.	Est./S.E.	P-Value	C.D.
GREAT		BY				0.774	BY				
	GGITFGL	0.904	0.010	92.859	<0.001	0.818	0.904	0.010	92.727	<0.001	0.195
	GGDRGPWR	0.459	0.013	35.391	<0.001	0.221	0.459	0.013	35.331	<0.001	0.791
	GGINNHPC	0.698	0.011	65.577	<0.001	0.488	0.700	0.011	65.658	<0.001	0.518
	VLINSFTY	0.753	0.010	76.986	<0.001	0.566	0.753	0.010	76.891	<0.001	0.444
BONDING		BY				0.096	BY				
	USDGPP	1.051	0.004	240.149	<0.001	0.794	1.051	0.004	243.587	<0.001	0.216
	USDGLSE	0.747	0.011	68.568	<0.001	0.558	0.802	0.014	57.872	<0.001	0.438
	GREAT	0.913	0.019	46.918	<0.001	0.246	**0.439**	**0.015**	**29.714**	**<0.001**	*
BONDING		ON					ON				
	COMMIT	-0.122	0.024	-5.155	<0.001	*	-0.111	0.023	-4.785	<0.001	*
	ATTACH	0.138	0.037	3.769	<0.001	*	0.185	0.034	5.521	<0.001	*
	BELIEF	0.094	0.016	5.997	<0.001	*	0.095	0.016	6.008	0.003	*
	INVOLVE	-0.098	0.044	-2.233	0.026	*	-0.059	0.030	-1.972	0.049	*

		COVARIANCES									
		Indirect Effect			P-Value	C.D.	Post Modification				C.D.
ATTACH	**ON**										
	INVOLVE	**-0.880**	**0.011**	**-80.363**	**0.000**	*	*	*	*	*	*
BELIEF		WITH					WITH				
	ATTACH	-0.492	0.016	-31.308	<0.001	*	-0.281	0.019	-14.717	<0.001	*
COMMIT		WITH					WITH				
	ATTACH	*	*	*	*	*	-0.706	0.012	-57.946	<0.001	*
	BELIEF	0.355	0.015	23.432	<0.001	*	0.348	0.015	22.964	<0.001	*

128

Continued

Table 4.8 (Continued)

Measurement Standardized Factor Indirect Effects Model, Covariance's (WITH), & R^2 (Observed Variables)

			COVARIANCES (Cont.)							
Factor	Predictor	Estimate	S.E.	Est./S.E.	P-Value	Coef of Deter	Estimate	S.E.	Est./S.E.	P-Value	Coef of Deter
			Indirect Effects				Post Modification				
USDGPP		WITH					WITH				
	BONDING	-0.343	0.027	-12.880	<0.001	*	-0.382	0.026	-14.865	<0.001	*
			MODIFICATIONS								
Factor	Predictor	Estimate	S.E.	Est./S.E.	P-Value	Coef of Deter	Estimate	S.E.	Est./S.E.	P-Value	Coef of Deter
			Indirect Effects				Post Modification				
INVOLVE		WITH					WITH				
	ATTACH	*	*	*	*	*	-0.790	0.012	-65.683	<0.001	*
	BELIEF	0.292	0.016	18.432	<0.001	*	0.264	0.015	17.14	<0.001	*
	COMMIT	0.737	0.009	80.196	<0.001	*	0.678	0.010	65.756	<0.001	*
MOMCR		WITH					WITH				
	DADCR	0.360	0.012	29.224	<0.001		0.361	0.012	29.379	<0.001	
NPTOB		WITH					WITH				
	NPALC	0.544	0.013	42.283	<0.001		0.476	0.017	28.575	<0.001	
	NPMJ	0.433	0.016	26.268	<0.001		0.338	0.023	14.777	<0.001	
NPALC		WITH					WITH				
	NPMJ	0.520	0.015	35.466	<0.001		0.402	0.023	17.646	<0.001	
GGINNHPC		WITH					WITH				
	GGDRGPWR	0.280	0.014	20.136	<0.001		0.278	0.014	19.9	<0.001	
	VLINSFTY	0.389	0.015	25.299	<0.001		0.389	0.015	25.136	<0.001	

Table 4.8 (Continued)

Measurement Standardized Factor Indirect Effects Model, Covariance's (WITH), & R^2 (Observed Variables)

		Indirect Effect					Post Modification			
Factor	Predictor	Estimate	S.E.	Est./S.E.	P-Value		Estimate	S.E.	Est./S.E.	P-Value
SELFWCR		WITH					WITH			
	MOMCR	0.139	0.013	10.753	<0.001		0.139	0.013	10.918	<0.001
	DADCR	0.109	0.013	8.478	<0.001		0.109	0.013	8.612	<0.001
SELFWCR		WITH					WITH			
	ATTACH	0.576	0.029	19.930	<0.001		0.240	0.015	16.255	<0.001
	BELIEF	0.536	0.043	12.341	<0.001		0.559	0.045	12.555	0.007
GREAT		WITH					WITH			
	INVOLVE	-0.077	0.021	-3.580	<0.001		-0.233	0.019	-12.253	<0.001
	COMMIT	-0.384	0.018	-21.410	<0.001		-0.538	0.013	-42.887	<0.001
	ATTACH	0.368	0.042	8.862	<0.001		0.407	0.019	21.928	<0.001
	BELIEF	-0.157	0.017	-9.264	<0.001		-0.187	0.016	-11.964	<0.001
	BONDING	-0.467	0.025	-18.481	<0.001		*	*	*	*

130

The more interesting aspect of this model involves the direct effects of *attachment, belief, commitment,* and *involvement* on bonding. It is noteworthy that for the group that did *not* complete G.R.E.A.T., only *attachment* shows a significant, positive direct effect (0.264, t=3.131, p=0.002), yet for the group that *did* complete G.R.E.A.T., both *attachment* (0.271, t=4.767, p<0.001) and *commitment* (0.162, t=-2.227, p=0.026) show significant direct effects. In sum, both models suggest that as *attachment* to mom, dad, education, and positive peer relationships increase, bonding also increases. Further, once the youth complete G.R.E.A.T., *commitment* decreases, meaning that 8th graders feelings about wanting to join gangs or engage in gang activity, having gang friends, or following the leader decreases significantly.

Although *belief* and *involvement* were *not* significant in either group, these results merit discussion. Recall that the four indicators of *belief* include issues regarding fights in school, pressure to join gangs at school, gang activity at school, and self-perception. While in the measurement model each of these indicators shows significant effects, the factor *belief* does *not*. This finding suggests that for this multiple group model, 8th graders do not 'believe' that gangs in school, regardless of the issue, are a problem. The more important overall implication is that gangs do *not* seem to pose a large problem in these schools.

Similarly, while *involvement* with negative peers and drug using peers showed significant factor loadings, *involvement* as a factor did *not* show significant for either model. These findings suggest that these 8th graders *involvement* with negative

influencing peers is not a salient issue regarding the G.R.E.A.T. curriculum. If one trusts

the veracity of this model, it seems that the G.R.E.A.T. curriculum may be better served

by directing its focus more on *commitment* (i.e., feelings about gangs and violence) than

on *belief* (school and gang activity) and *involvement* (negative peer influence).

G.R.E.A.T. Next we examine the role of the latent structure G.R.E.A.T. and its

two companion indicators, youth do drugs because of a low self-esteem, and youth do

drugs because of peer pressure. When considering G.R.E.A.T. in the multiple group

model *without* indirect effects, the results are significant and positive (0.987) for the

group that did *not* receive the curriculum, as well as significant for those that did receive

the curriculum (0.815). When considering the multiple group model *with* the indirect

effects, the results are similar in that for both groups, G.R.E.A.T. is significant with

loadings of 0.988 and 0.796 respectively.

Peer pressure and low self esteem. For the two manifest variables, in the multiple

group model *without* the indirect effects, the results for those that did *not* receive the

curriculum shows a significant positive relationship between bonding and youth who

believe that people use drugs because of peer pressure (1.043) and for those that did

receive the curriculum, a significant positive relationship (0.834). For those youth that

did *not* receive the curriculum yet believe people use drugs because of a low self esteem,

the results show a significant, positive relationship (0.747) and for those that did receive

the curriculum, there is a significant positive relationship (0.755).

For the multiple group model *with* indirect effects those youth that did *not* receive the curriculum showed a significant positive relationship between bonding and youth who believe that people use drugs because of peer pressure (1.048) and for those that *did* receive the curriculum, there was a significant, positive relationship (0.833).

Continuing, for the multiple group model with indirect effects, those youth that did *not* receive the curriculum showed a significant positive relationship between bonding and youth who believe that people use drugs because of low self esteem (0.746); and for those that did receive the curriculum, there was a significant, positive relationship (0.753).

In sum, the three bonding indicators are significant across all multiple group models whether indirect effects were used or *not*.

Covariance. For model specification, the modifications that occurred for youth that did *not* receive the G.R.E.A.T. curriculum applied exactly the same to the youth that *did* receive the curriculum.

All covariance's for the youth that did *not* receive the G.R.E.A.T. curriculum were significant. However, for the 8th graders that *did* receive the curriculum, three were *not* significant (in bold): (1) G.R.E.A.T. with *involvement;* (2) use drugs because of peer pressure with *bonding*; and (3) school gang fights with self-perception.

133
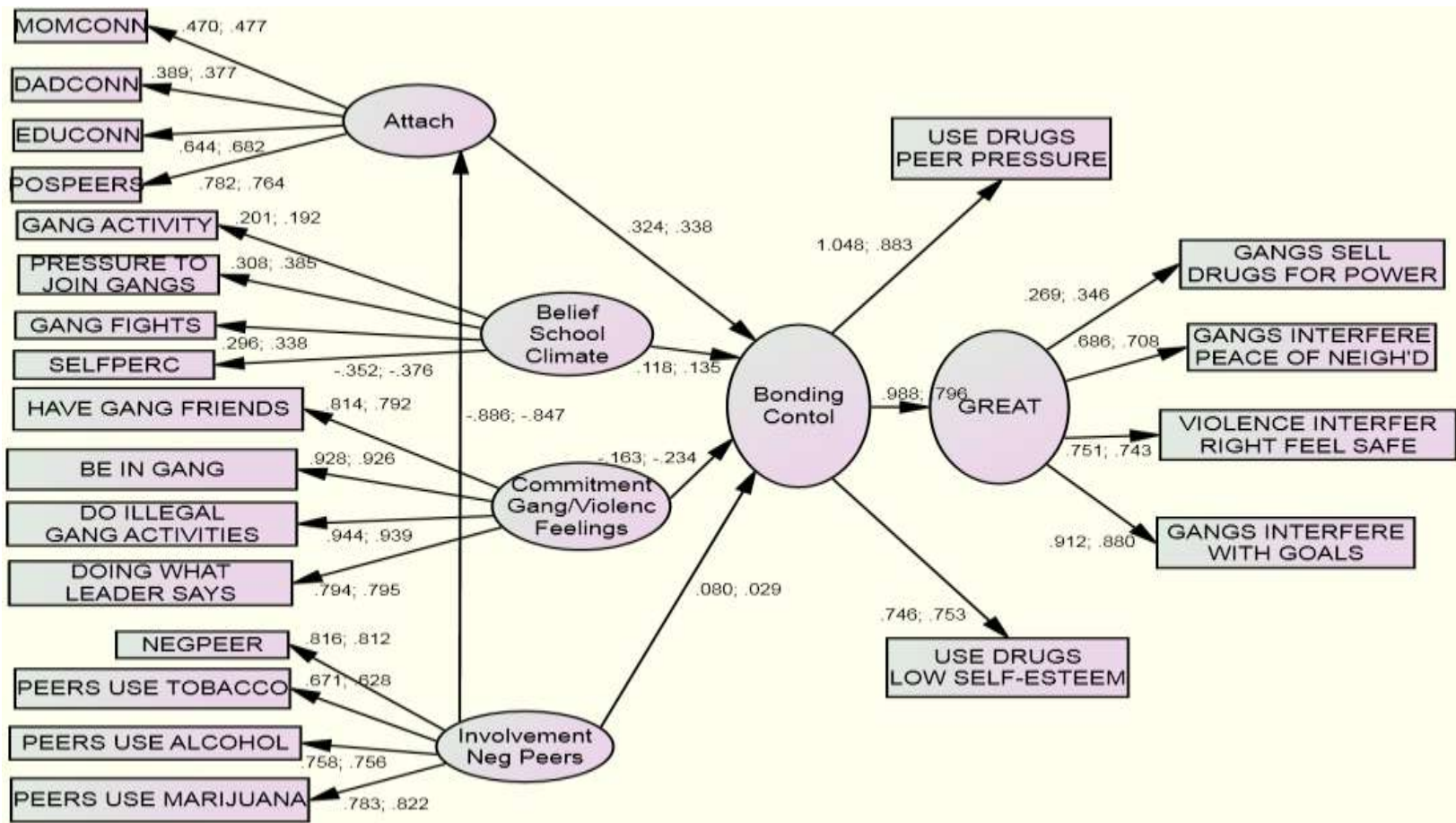
Figure 9: Multiple group Model (standardized estimates) for G.R.E.A.T Curriculum – (G.R.E.A.T. (NO), G.R.E.A.T. (Yes))

Table 4.9

Multiple Group Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (C.D.) for Observed Variables

STDYX   Standardization

				Complete GREAT								
		NO (n=2912)					YES (n=2373)					
Factor	Predictor	Est	S.E.	Est./S.E.	P-Value	C.D.	Predictor	Est	S.E.	Est./S.E.	P-Value	C.D.
ATTACH	BY						BY					
	MOMCONN	0.465	0.018	25.766	<0.001	0.216	MOMCONN	0.478	0.020	23.820	<0.001	0.228
	DADCONN	0.388	0.019	20.518	<0.001	0.150	DADCONN	0.378	0.022	16.887	<0.001	0.143
	EDUCONN	0.640	0.016	41.078	<0.001	0.409	EDUCONN	0.685	0.017	40.444	<0.001	0.469
	POSPEER	0.760	0.014	53.622	<0.001	0.578	POSPEER	0.756	0.016	46.231	<0.001	0.571
BELIEF	BY						BY					
	SCGGACT	0.211	0.027	7.734	<0.001	0.045	SCGGACT	0.200	0.030	6.749	<0.001	0.040
	SCPRJNGG	0.324	0.031	10.617	<0.001	0.105	SCPRJNGG	0.406	0.033	12.221	<0.001	0.165
	SCGGFIGT	0.313	0.032	9.820	<0.001	0.098	SCGGFIGT	0.357	0.034	10.392	<0.001	0.128
	SELFPERC	-0.386	0.033	-11.578	<0.001	0.149	SELFPERC	-0.399	0.033	-11.984	<0.001	0.159
COMMIT	BY						BY					
	FLHVGGFR	0.814	0.008	102.187	<0.001	0.662	FLHVGGFR	0.793	0.009	84.021	<0.001	0.628
	FLGGSLF	0.928	0.005	200.290	<0.001	0.862	FLGGSLF	0.927	0.005	176.557	<0.001	0.860
	FLDOGGAC	0.944	0.005	209.120	<0.001	0.892	FLDOGGAC	0.938	0.005	178.39	<0.001	0.880
	FLDOLDSY	0.793	0.009	84.440	<0.001	0.628	FLDOLDSY	0.793	0.011	74.084	<0.001	0.630
INVOLVE	BY						BY					
	NEGPCR	0.817	0.012	69.953	<0.001	0.667	NEGPEER	0.810	0.014	59.159	<0.001	0.655
	PEERTOB	0.723	0.015	47.692	<0.001	0.522	PEERTOB	0.678	0.018	37.095	<0.001	0.460
	PEERALC	0.814	0.013	62.843	<0.001	0.662	PEERALC	0.811	0.014	57.348	<0.001	0.657
	PEERMJ	0.843	0.014	60.962	<0.001	0.711	PEERMJ	0.885	0.014	63.224	<0.001	0.783

Table 4.9 (Continued)

Multiple Group Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (C.D.) for Observed Variables

STDYX Standardization

<div style="text-align:center">Complete GREAT</div>

		NO (n=2912)					YES (n=2373)				
Factor	Predictor	Est	S.E.	Est./S.E.	P-Value	R^2	Predictor	Est	S.E.	Est./S.E.	P-Value	R^2
GREAT	BY						BY					
	GGITFGL	0.912	0.013	70.726	<0.001	0.832	GGITFGL	0.881	0.014	62.535	<0.001	0.777
	GGDRGPWR	0.270	0.028	9.770	<0.001	0.178	GGDRGPWR	0.344	0.033	10.297	<0.001	0.248
	GGINNHPC	0.686	0.015	46.708	<0.001	0.471	GGINNHPC	0.708	0.016	45.553	<0.001	0.501
	VLINSFTY	0.750	0.013	58.376	<0.001	0.563	VLINSFTY	0.742	0.015	51.188	<0.001	0.551
BONDING	BY						BY					
	USDGPP	1.043	0.007	149.485	<0.001	0.801	USDGPP	0.834	0.039	21.645	<0.001	0.775
	USDGLSE	0.747	0.014	51.586	<0.001	0.558	USDGLSE	0.755	0.015	50.516	<0.001	0.570
	GREAT	0.987	0.031	31.557	<0.001		GREAT	0.815	0.106	7.716	<0.001	
BONDING	ON					0.081	ON					.0157
	ATTACH	0.264	0.084	3.131	0.002	*	ATTACH	0.271	0.057	4.767	<0.001	*
	COMMIT	**-0.099**	**0.066**	**-1.511**	**0.111**	*	COMMIT	-0.162	0.073	-2.227	0.026	*
	BELIEF	**0.122**	**0.110**	**1.109**	**0.268**	*	**BELIEF**	**0.118**	**0.090**	**1.307**	**0.191**	*
	INVOLVE	**-0.033**	**0.053**	**-0.632**	**0.527**	*	**INVOLVE**	**-0.083**	**0.051**	**-1.625**	**0.104**	*

<div style="text-align:center">COVARIANCES</div>

		NO					YES				
GGDRGPWR	WITH						WITH				
	BONDING	0.207	0.019	10.910	<0.001	*	BONDING	0.254	0.024	10.375	<0.001	*
SELFPERC	WITH						WITH				
	ATTACH	0.290	0.023	12.831	<0.001	*	ATTACH	0.346	0.030	11.394	<0.001	*

136

Table 4.9 (Continued)

Multiple Group Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (C.D.) for Observed Variables

STDYX   Standardization

<div align="center">Complete GREAT</div>

		NO (n=2912)					YES (n=2373)				
				COVARIANCES							
GREAT	WITH					0.104*	WITH					0.218
	INVOLVE	-0.088	0.027	-3.281	<0.001	*	INVOLVE	-0.058	0.048	-1.224	0.221	*
	COMMIT	-0.378	0.024	-16.034	<0.001	*	COMMIT	-0.367	0.051	-7.159	<0.001	*
	ATTACH	0.233	0.030	7.667	<0.001	*	ATTACH	0.195	0.056	3.503	<0.001	*
	BELIEF	-0.280	0.049	-5.692	<0.001	*	BELIEF	-0.290	0.058	-4.999	<0.001	*
	BONDING	-0.556	0.030	-18.323	<0.001	*	BONDING	-0.428	0.093	-4.578	<0.001	*
ATTACH	WITH						WITH					
	INVOLVE	-0.782	0.017	-45.195	<0.001	*	INVOLVE	-0.726	0.020	-37.087	<0.001	*
	COMMIT	-0.727	0.017	-42.980	<0.001	*	COMMIT	-0.692	0.018	-38.745	<0.001	*
USDGPP	WITH						WITH					
	BONDING	-0.321	0.035	-9.093	<0.001	*	BONDING	0.110	0.081	1.365	0.172	*
BELIEF	WITH						WITH					
	ATTACH	-0.748	0.056	-13.311	<0.001	*	ATTACH	-0.569	0.046	-12.497	<0.001	*
COMMIT	WITH						WITH					
	ATTACH	-0.724	0.017	-43.086	<0.001	*	ATTACH	-0.689	0.018	-38.563	<0.001	*
	BELIEF	0.756	0.059	12.811	<0.001	*	BELIEF	0.736	0.051	14.463	<0.001	*

Table 4.9 (Continued)

Multiple Group Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (C.D.) for Observed Variables

STDYX   Standardization

<div style="text-align:center">Complete GREAT</div>

		NO (n=2912)					YES (n=2373)				
				COVARIANCES							
INVOLVE	WITH						WITH				
	ATTACH	-0.793	0.017	-46.239	<0.001	*	ATTACH	-0.738	0.019	-37.933	<0.001	*
	BELIEF	0.568	0.052	10.843	<0.001	*	BELIEF	0.565	0.048	11.736	<0.001	*
	COMMIT	0.675	0.014	48.598	<0.001	*	COMMIT	0.671	0.016	42.986	<0.001	*
SELFPERC						*	WITH					*
	MOMCR	0.287	0.021	13.727	<0.001	*	MOMCR	0.370	0.022	16.671	<0.001	*
	DADCR	0.208	0.021	9.967	<0.001	*	DADCR	0.305	0.022	13.818	<0.001	*
MOMCR	WITH						WITH				
	DADCR	0.337	0.016	20.614	<0.001	*	DADCR	0.380	0.019	20.274	<0.001	*
NPTOB	WITH						WITH				
	NPALC	0.432	0.026	16.390	<0.001	*	NPALC	0.496	0.026	18.751	<0.001	*
	NPMJ	0.300	0.035	8.523	<0.001	*	NPMJ	0.342	0.041	8.377	<0.001	*
NPALC	WITH						WITH				
	NPMJ	0.363	0.036	10.080	<0.001	*	NPMJ	0.374	0.045	8.322	<0.001	*
GGINNHPC	WITH						WITH				
	GGDRGPWR	0.265	0.017	15.323	<0.001	*	GGDRGPWR	0.204	0.019	11.010	<0.001	*
	VLINSFTY	0.377	0.020	18.593	<0.001	*	VLINSFTY	0.423	0.023	18.711	<0.001	*

Continued

138

Table 4.9 (Continued)

Multiple Group Standardized Factor Loadings (BY), Covariance's (WITH), & Coef of Determination R^2 (C.D.) for Observed Variables

STDYX   Standardization

				Complete GREAT									
		NO (n=2912)						YES (n=2373)					
					COVARIANCES								
POSPCR	WITH						WITH						
	NEGPCR	-0.192	0.035	-5.442	<0.001	*	NEGPCR	-0.236	0.039	-5.999	<0.001	*	
SCGGFIGT	WITH						WITH						
	SCGGACT	0.485	0.015	31.404	<0.001	*	SCGGACT	0.442	0.018	24.828	<0.001	*	
	SELFPERC	0.071	0.022	3.277	0.001	*	**SELFPERC**	**0.031**	**0.023**	**1.343**	**0.179**	*	
SCPRJNGG	WITH						WITH						
	SCGGACT	0.360	0.018	19.821	<0.001	*	SCGGACT	0.333	0.021	15.644	<0.001	*	
	SCGGFIGT	0.424	0.018	24.002	<0.001	*	SCGGFIGT	0.429	0.022	19.817	<0.001	*	
EDUCR	WITH						WITH						
	SELFPERC	0.347	0.024	14.570	<0.001	*	SELFPERC	0.470	0.028	17.038	<0.001	*	

Multiple Group Specific Indirect effect model. Table 4.10 shows the results for a multiple group analysis using the variables from the indirect effects model. Again, there are two groups in the analysis; those 8th graders that completed G.R.E.A.T. and those that did *not.* The sample sizes for each group are 2373 (Yes) and 2912 respectively (No). The global fit indices, with modification, suggest a good fit for the model (RMSEA = 0.043, & CFI = 0.984); a slightly lower fit than the direct effects model.

Measurement. For both models, the indicator factor loadings for all four of Hirschi's constructs: *attachment, belief, commitment* and *involvement* are significant at a level of significance of 0.01. Similarly, the four indicator factor loadings for the *G.R.E.A.T.* variable are also significant for an alpha 0.01.

A new specific, direct effect from *attachment* to *involvement* appears in both models. Note: this is the first step in creating the indirect effect from *involvement* to *bonding* through *attachment*. These results show a significant, negative, direct effect for those youth that did *not* complete G.R.E.A.T. (0.886; t= -59.812; p<0.001), and a significant, negative, direct effect for those youth that *did* complete G.R.E.A.T. (0.847; t= -51.526; p<0.001) from *attachment* 'ON' *involvement.* This *new* direct effect suggests that as attachment to mom, dad, education, and positive peers increases, involvement with negative peers, and drug using peers (i.e., alcohol, tobacco, marijuana) decreases.

Similar to the direct effects model, the more interesting aspect of this indirect model involves the structural coefficients for *attachment, belief, commitment,* and *involvement* "on" *bonding*. It is noteworthy that for the youth who did *not* complete G.R.E.A.T., only *attachment* shows a strong, significant, positive, direct effect (0.324,

t=3.706, p<0.001), yet for the group that *did* complete G.R.E.A.T., both *attachment* (0.338, t=3.940, p<0.001) and *commitment* (0.234, t=-2.615, p=0.009) show significant direct effects. In sum, both models suggest that as *attachment* to mom, dad, education, and positive peers increase, bonding also increases. Further, once the youth complete G.R.E.A.T., *commitment* decreases, meaning that 8th graders feelings about wanting to join gangs or engage in gang activity, having gang friends, or following the leader decreases significantly.

Just as in the specific, direct effects model, the indirect effects model merits discussion regarding *belief* and *involvement* which also were *non*-significant. Recall that the four indicators for *belief* include issues regarding: fights in school, pressure to join gangs at school, gang activity at school, and self-perception. Just as with the direct effects model, each of these indicators shows a significant statistical effect. But again, the factor *belief* does *not*. This finding suggests that for this multiple group model, 8th graders do *not* 'believe' that gangs in school are a problem. The more important overall implication is that gangs do *not* seem to pose a large problem in these schools whether the G.R.E.A.T. curriculum was administered or *not*.

Similarly, while *involvement* with negative peers and drug using peers (i.e., alcohol, tobacco, and marijuana) showed significant effect, *involvement* as a factor did *not* show significant structural coefficients for either model. These findings suggest that for these 8th graders, *involvement* with negative influencing peers is *not* a salient issue regarding the G.R.E.A.T. curriculum. If one trusts the veracity of this model, it seems that the G.R.E.A.T. curriculum may be better served by directing its focus more on *commitment* (i.e., the youth's feelings about gangs) than on *belief* (i.e., school pressures

141

regarding gangs and violence) and *involvement* (i.e., negative peer influences).

Illuminating the effect of the G.R.E.A.T. curriculum on commitment is a strength of this

multiple group analysis.

Covariance. For the multiple group model specification, the modifications that

occurred for youth that did *not* receive the G.R.E.A.T. curriculum was an exact replica

for the model in which youth *did* receive the curriculum.

Results unique to the indirect effects model occurs with the covariance between

positive peers and negative peers for both groups (i.e., received G.R.E.A.T. or not) which

were *not* significant in this model (p=0.702 and p=0.330 respectively). Otherwise, as with

the direct effects model, all covariance's for the youth that did *not* receive the G.R.E.A.T.

curriculum were significant. Moreover, as with the direct effects model, for the 8th

graders that *did* receive the curriculum, the same three covariance's were *not* significant

(in bold): (1) G.R.E.A.T. with *involvement;* (2) use drugs because of peer pressure with

bonding; and (3) school gang fights with self-perception.

Table 4.10

Multiple Group Indirect Effects Model: Standardized Factor Loadings (BY, ON), Covariance's (WITH), & R^2 (Observed Variables)

STDYX   Standardization

		Complete GREAT									
		NO (n=2912)					YES (n=2373)				
Factor	Predictor	Est	S.E.	Est./S.E.	P-Value	R^2	Predictor	Est	S.E.	Est./S.E.	P-Value	R^2
ATTACH	BY						BY					
	MOMCONN	0.470	0.018	25.956	<0.001	0.784	MOMCR	0.477	0.020	23.879	<0.001	0.802
	DADCONN	0.389	0.019	20.536	<0.001	0.850	DADCR	0.377	0.022	16.959	<0.001	0.914
	EDUCONN	0.644	0.016	41.328	<0.001	0.591	EDUCR	0.682	0.017	40.243	<0.001	0.486
	POSPEER	0.782	0.014	55.086	<0.001	0.422	POSPCR	0.764	0.016	46.661	<0.001	0.403
BELIEF	BY						BY					
	SCGGACT	0.201	0.028	7.311	<0.001	0.955	SCGGACT	0.192	0.029	6.644	<0.001	0.881
	SCPRJNGG	0.308	0.032	9.614	<0.001	0.895	SCPRJNGG	0.385	0.034	11.302	<0.001	0.868
	SCGGFIGT	0.296	0.033	9.028	<0.001	0.902	SCGGFIGT	0.338	0.034	9.858	<0.001	0.877
	SELFWCR	-0.352	0.034	-10.352	<0.001	0.851	SELFWCR	-0.376	0.034	-11.156	<0.001	0.795
COMMIT	BY						BY					
	FLHVGGFR	0.814	0.008	102.289	<0.001	0.338	FLHVGGFR	0.792	0.009	84.093	<0.001	0.362
	FLGGSLF	0.928	0.005	200.393	<0.001	0.138	FLGGSLF	0.926	0.005	176.483	<0.001	0.138
	FLDOGGAC	0.944	0.005	209.127	<0.001	0.108	FLDOGGAC	0.939	0.005	178.571	<0.001	0.133
	FLDOLDSY	0.794	0.009	84.517	<0.001	0.372	FLDOLDSY	0.795	0.011	74.202	<0.001	0.373
INVOLVE	BY						BY					
	NEGPCR	0.816	0.011	71.909	<0.001	0.333	NEGPCR	0.812	0.013	61.506	<0.001	0.355
	NPTOB	0.671	0.014	46.601	<0.001	0.478	NPTOB	0.628	0.017	36.302	<0.001	0.536
	NPALC	0.758	0.012	63.040	<0.001	0.338	NPALC	0.756	0.013	56.438	<0.001	0.353
	NPMJ	0.783	0.013	62.579	<0.001	0.289	NPMJ	0.822	0.013	64.510	<0.001	0.247

Table 4.10 (Continued)

Multiple Group Indirect Effects Model: Standardized Factor Loadings (BY, ON), Covariance's (WITH), & R^2 (Observed Variables)

STDYX   Standardization

		Complete GREAT										
		NO (n=2912)					YES (n=2373)					
Factor	Predictor	Est	S.E.	Est./S.E.	P-Value	R^2	Predictor	Est	S.E.	Est./S.E.	P-Value	R^2
GREAT	BY						BY					
	GGITFGL	0.912	0.013	70.804	<0.001	0.168	GGITFGL	0.880	0.014	62.501	<0.001	0.247
	GGDRGPWR	0.269	0.028	9.749	<0.001	0.822	GGDRGPWR	0.346	0.033	10.357	<0.001	0.757
	GGINNHPC	0.686	0.015	46.707	<0.001	0.529	GGINNHPC	0.708	0.016	45.520	<0.001	0.527
	VLINSFTY	0.751	0.013	58.472	<0.001	0.437	VLINSFTY	0.743	0.015	51.215	<0.001	0.465
BONDING	BY						BY					
	USDGPP	1.048	0.008	137.760	<0.001	0.199	USDGPP	0.833	0.039	21.386	<0.001	0.230
	USDGLSE	0.746	0.015	51.280	<0.001	0.442	USDGLSE	0.753	0.015	50.373	<0.001	0.459
	GREAT	0.988	0.031	31.495	<0.001	*	GREAT	0.796	0.106	7.536	<0.001	*
BONDING	ON						ON					
	ATTACH	0.324	0.087	3.706	<0.001	*	ATTACH	0.338	0.086	3.940	<0.001	*
	COMMIT	**-0.163**	**0.088**	**-1.840**	**0.066**	*	**COMMIT**	**-0.234**	**0.089**	**-2.615**	**0.009**	*
	BELIEF	**0.118**	**0.130**	**0.909**	**0.363**	*	**BELIEF**	**0.135**	**0.118**	**1.143**	**0.253**	*
	INVOLVE	**0.080**	**0.113**	**0.712**	**0.476**	*	**INVOLVE**	**0.029**	**0.108**	**0.266**	**0.790**	*

		COVARIANCES										
		NO (n=2912)					YES (n=2373)					
GGDRGPWR	WITH						WITH					
	BONDING	0.230	0.021	10.974	<0.001	*	BONDING	0.254	0.024	10.375	<0.001	*
SELFWCR	WITH						WITH					
	ATTACH	0.290	0.023	12.831	<0.001	*	ATTACH	0.346	0.030	11.394	<0.001	*

Table 4.10 (Continued)

Multiple Group Indirect Effects Model: Standardized Factor Loadings (BY, ON), Covariance's (WITH), & R^2 (Observed Variables)

STDYX   Standardization

145

		NO (n=2912)					YES (n=2373)				
				COVARIANCES							
ATTACH	**ON**						**ON**				
	INVOLVE	**-0.886**	**0.015**	**-59.812**	**<0.001**	*****	**INVOLVE**	**-0.847**	**0.016**	**-51.526**	**<0.001**	*****
GREAT	WITH						WITH				
	INVOLVE	-0.108	0.028	-3.810	<0.001	*	INVOLVE	-0.073	0.050	-1.446	0.148	*
	COMMIT	-0.380	0.024	-16.037	<0.001	*	COMMIT	-0.376	0.051	-7.386	<0.001	*
	ATTACH	0.246	0.056	4.404	<0.001	*	ATTACH	0.249	0.062	4.044	<0.001	*
	BELIEF	-0.318	0.054	-5.846	<0.001	*	BELIEF	-0.315	0.062	-5.078	<0.001	*
	BONDING	-0.574	0.034	-17.028	<0.001	*	BONDING	-0.438	0.096	-4.561	<0.001	*
USDGPP	WITH						WITH				
	BONDING	-0.334	0.035	-9.432	<0.001	*	**BONDING**	**0.126**	**0.085**	**1.488**	**0.137**	*****
COMMIT	WITH						WITH				
	BELIEF	0.809	0.071	11.396	0.000	*	BELIEF	0.781	0.059	13.308	<0.001	*
INVOLVE	WITH						WITH				
	BELIEF	0.716	0.063	11.330	<0.001	*	BELIEF	0.663	0.053	12.543	<0.001	*
	COMMIT	0.739	0.012	60.429	<0.001	*	COMMIT	0.736	0.014	52.703	<0.001	*
SELFWCR							WITH				
	MOMCR	0.319	0.020	15.783	<0.001	*	MOMCR	0.376	0.021	17.516	<0.001	*
	DADCR	0.233	0.020	11.574	<0.001	*	DADCR	0.307	0.022	14.197	<0.001	*

Continued

Table 4.10 (Continued)

Multiple Group Indirect Effects Model: Standardized Factor Loadings (BY, ON), Covariance's (WITH), & R^2 (Observed Variables)

STDYX   Standardization

<div align="center">Complete GREAT</div>

	NO (n=2912)						YES (n=2373)				
					COVARIANCES						
MOMCR	WITH						WITH				
	DADCR	0.340	0.016	20.702	<0.001	*	DADCR	0.386	0.019	20.656	<0.001
NPTOB	WITH						WITH				
	NPALC	0.524	0.018	29.287	<0.001	*	NPALC	0.569	0.019	29.867	<0.001
	NPMJ	0.424	0.022	19.179	<0.001	*	NPMJ	0.451	0.026	17.416	<0.001
NPALC	WITH						WITH				
	NPMJ	0.507	0.020	25.606	<0.001	*	NPMJ	0.531	0.024	22.576	<0.001
GGINNHPC	WITH						WITH				
	GGDRGPWR	0.267	0.017	15.446	<0.001	*	GGDRGPWR	0.205	0.019	11.073	<0.001
	VLINSFTY	0.378	0.020	18.712	<0.001	*	VLINSFTY	0.422	0.023	18.619	<0.001
POSPCR	**WITH**						**WITH**				
	NEGPCR	**-0.015**	**0.038**	**-0.382**	**0.702**	*	**NEGPCR**	**-0.042**	**0.043**	**-0.973**	**0.330**
SCGGFIGT	WITH						WITH				
	SCGGACT	0.487	0.015	31.951	<0.001	*	SCGGACT	0.447	0.017	25.582	<0.001
	SELFWCR	0.046	0.021	2.209	0.027	*	**SELFWCR**	**0.023**	**0.022**	**1.030**	**0.303**
SCPRJNGG	WITH						WITH				
	SCGGACT	0.368	0.018	20.462	<0.001	*	SCGGACT	0.331	0.021	15.914	<0.001
	SCGGFIGT	0.432	0.017	24.736	<0.001	*	SCGGFIGT	0.438	0.021	20.930	<0.001
EDUCR	WITH						WITH				
	SELFWCR	0.402	0.023	17.615	<0.001	*	SELFWCR	0.480	0.026	18.448	<0.001

4.6 Indirect Effects: Bias Corrected Bootstrap Intervals

Full model, indirect effects model. Table 4.11 presents the results for the full

model with indirect effects. Indirect effect estimates are tested for significance using both

the bias corrected bootstrapped confidence intervals as well as Sobel's test. The left side

of Table 4.11 presents the bootstrap results and the right side presents the Sobel's test

results.

For the bootstrap results, 'N' represents the number of 8th graders in the analysis;

resampling-N represents the number of bias corrected bootstrap resampling used to create

the confidence intervals; the two values (i.e., Attach 'ON' Involve, and Involve 'BY'

bonding) are the structure coefficients, that when multiplied, provide the estimate for the

indirect effect. For example, for sample N=5285 and resampling N=500, the product of

the two structure loadings (i.e., -0.897*0.266) results in the estimate from attachment to

bonding through involvement of -0.238. Continuing, the lower 2.5% and upper 2.5%

represent the cut scores for the indirect effect 95% confidence intervals.

For Sobel's test, S.E. is the standard error, Est./S.E. is the standard score (i.e. Z),

and the p-value is the probability of a Type I error if the null hypothesis is rejected.

Estimates. The determination about significant estimates for the indirect effect is

motivated by using the largest possible sample N; producing changes in both the sample

N, and resampling N size, then examining the behavior of both the bias corrected

bootstrap estimates and Sobels test techniques. For comparison purposes, the full model,

with an N of 5285 provides baseline information.

Baseline. The results for all sizes of resampling N suggest a significant indirect effect (est. = -0.238) because zero (0) is *not* captured in any of the four intervals (see David, 2011). Similarly, Sobel's test provides the same results when considering the p-values. However, while the Sobel test standard error (S.E.) remains relatively stable (i.e., 0.057) across changes in resampling N, the standard scores are moving further away from zero (0) in the negative direction, suggesting that as the resampling N increases, the standard score absolute value increases. This is to be expected as the nature of S.E.'s are sensitive to changes in sample size (for discussion see Kenny, 2011; Preacher and Hayes 2008; & Preacher and Hayes, 2011). Similarly, research suggests that bootstrap resampling should be "large"; Kenny (2011) suggests 2000, and Preacher and Hayes (2008 & 2011) suggest 5000.

Simulation. Continuing, using the estimate results from the baseline (i.e., -0.238), we see that regardless of resampling size, the estimates change as sample-N increases. That is to say, as sample N increases from 200 to 1000, the estimates change, in some cases dramatically, and in every case these estimates are smaller than the baseline estimate. In particular, the estimate for sample N of 500 (i.e., -0.139) is 0.100 smaller which is nearly half as small than the baseline estimate. Similarly, the sample N of 1000 estimate (-0.206) is thirty-two hundredths smaller than the baseline model. In no case is the indirect effects estimate larger than the baseline estimate suggesting an attenuation of the estimate.

Confidence intervals. The bootstrap resampling confidence interval discussion is motivated in the same fashion as the estimates discussion. Using the sample N of 5285 as the baseline, the confidence interval cutpoints change as the resampling increases from 500 to 5000. The baseline estimates show a width of 0.217 (i.e., -0.13--0.347) to 0.240 (i.e., -0.13--0.371) for resample N's of 500 and 5000 respectively.

As expected, not only are the comparison estimates for every sample N *non-significant*, the intervals deviate greatly from the baseline estimates. The most dramatic width occurs for the smallest sample-N. In particular, for a sample of 200 and a resample N of 5000, the width is nearly eight (8) as compared to 0.24 for the baseline. These results suggest for latent structures involving large models, it may be best to avoid a small sample N, regardless of the resampling size, until additional research suggests otherwise.

Similarly, for Sobel's test, the standard errors are most unstable for smaller sample N's. But even as the sample N increases, the S.E. estimates still do *not* approach the baseline results (i.e., 0.057) and in fact the S.E. estimates are nearly four-times larger than the baseline estimate. Regardless, the results of the p-values suggest *non-significance* just as was found for the resampling technique.

Kenny (2011) advises that Sobel's test requires a large sample N and findings in this research seems to suggest that resampled, bias corrected confidence intervals are not a panacea. That is to say, resampling should also have a large sample N. For example, as the sample N increased from 200 to 1000 through 500, the confidence interval estimates

149

approach the baseline width. However, even the sample N of 1000 is *not* significant even when considering the larger sample N=1000 and larger resampling N=5000.

Multiple group. Because it could be argued that a sample N of 1000 is too small and a sample N of 5285 is too large, thus affecting the estimates, the examination continued using sample sizes of 2373 and 2912 in the multiple group model. Table 4.11 presents the results for the multiple group, standardized, bootstrap resampling as well as the Sobel test. The multiple group under examination was whether the youth received (n=2373) the G.R.E.A.T. curriculum or *not* (n=2912). Those students who did *not* receive the curriculum were the control group from professor Esbensen's original study.

*Multiple group e*stimate*.* The indirect effect estimate for both groups is -0.349 which is the product of the structure loadings *attach* 'ON' *involvement* and *involvement* 'BY' *bonding* (i.e., -0.905* 0.385 respectively). This estimate is used for both groups. In both groups the confidence intervals suggest a significant difference because zero (0) is *not* caught within any of the intervals.

For the complete G.R.E.A.T. (No) group (n=2912), the lower 2.5% (-0.474) and upper 2.5% (-0.220) do *not* fully stabilize even at the largest resample N of 5000, yet for the complete G.R.E.A.T. (Yes) group (n=2373) the lower 2.5% (-0.492) and upper 2.5% (-0.205) seem to stabilize at a resample N of 2500. These findings seem contrary to expectation because the smaller of the two sample size N's (i.e., 2373) shows more stability with the confidence intervals than the larger sample size N (i.e., 2912). These

150

findings provide more evidence that sample size N should be large, with a resampling N that is also large.

However, it can be argued that a sample N that is large shows significant indirect effect estimates that are *not* found with the smaller sample N sizes. This is evidence that an *a priori* power analysis for sample size be employed.

Regardless, of the sample N debate, it is clear that for large latent structure models, resampling must remain large as David (2011) and Preacher and Hayes (2008 & 2011) report. Also, based on these results when considering large latent structures models, analysis should use at least 5000 resampling for both the bootstrap, resampling confidence intervals and for Sobel techniques as confirmed in previous research.

As we move to Chapter 5, a full discussion regarding these results is provided as is a summary of the findings.

Table 4.11

Full Model: Standardized Bootstrapped Specific Indirect Effects Confidence Intervals v. Sobels Test

| | | Structure Coefficient | | BIAS CORRECTED BOOTSTRAP Full Model | | | SOBELS TEST | | |
| | | Attach 'ON' Involve | Involve 'BY' Bonding | Lower 2.5% | Estimate | Upper 2.5% | S.E. | Est./S.E. | P-Value |
N	Resample N								
5285	500			-0.347		-0.130	0.055	-4.300	<0.001
5285	1000			-0.350		-0.127	0.057	-4.204	<0.001
5285	2500	-0.897	0.266	-0.351	-0.238	-0.126	0.057	-4.152	<0.001
5285	5000			-0.371		-0.130	0.057	-4.178	<0.001
200	50			-1.643		1.198	0.725	-0.307	0.759
200	100			-3.482		3.037	1.663	-0.134	0.894
200	500			-4.895		4.450	2.384	-0.093	0.926
200	1000	-0.974	0.228	-4.791	-0.222	4.346	2.331	-0.095	0.924
200	2500			-4.389		3.944	2.126	-0.105	0.917
200	5000			-4.226		3.781	2.043	-0.109	0.913
500	100			-0.616		0.338	0.243	-0.570	0.568
500	500			-0.559		0.282	0.214	-0.647	0.518
500	1000	-0.909	0.153	-0.566	-0.139	0.289	0.218	-0.636	0.525
500	2500			-0.574		0.296	0.222	-0.625	0.532
500	5000			-0.628		0.350	0.249	-0.557	0.578
1000	100			-0.597		0.185	0.199	-1.035	0.301
1000	500			-0.586		0.173	0.194	-1.066	0.286
1000	1000	-0.896	0.23	-0.579	-0.206	0.166	0.190	-1.086	0.278
1000	2500			-0.577		0.164	0.189	-1.091	0.275
1000	5000			-0.577		0.164	0.189	-1.092	0.275

Table 4.12

Multiple group: Standardized Bootstrapped Specific Indirect Effects Confidence Intervals v. Sobels Test

| | | Structure Coefficient | | Multiple Group: Complete GREAT (NO) | | | | | |
| | | Attach 'ON' | Involve 'BY' | BIAS CORRECTED BOOTSTRAP | | | SOBELS TEST | | |
N	Resample N	Involve	Bonding	Lower 2.5%	Estimate	Upper 2.5%	S.E.	Est./S.E.	P-Value
2912	50			-0.498		-0.200	0.076	-4.593	<0.001
2912	100			-0.484		-0.213	0.069	-5.050	<0.001
2912	250			-0.480		-0.217	0.067	-5.204	<0.001
2912	500	-0.905	0.385	-0.477	-0.349	-0.221	0.065	-5.336	<0.001
2912	1000			-0.478		-0.220	0.066	-5.309	<0.001
2912	2500			-0.474		-0.223	0.064	-5.443	<0.001
2912	5000			-0.473		-0.225	0.063	-5.510	<0.001
		Structure Coefficient		Multiple Group: Complete GREAT (YES)					
		Attach 'ON'	Involve 'BY'	BIAS CORRECTED BOOTSTRAP			SOBELS TEST		
N	Resample N	Involve	Bonding	Lower 2.5%	Estimate	Upper 2.5%	S.E.	Est./S.E.	P-Value
2373	50			-0.462		-0.236	0.058	-6.064	<0.001
2373	100			-0.471		-0.227	0.062	-5.591	<0.001
2373	250			-0.481		-0.217	0.067	-5.172	<0.001
2373	500	-0.905	0.385	-0.488	-0.349	-0.209	0.071	-4.898	<0.001
2373	1000			-0.492		-0.205	0.073	-4.763	<0.001
2373	2500			-0.493		-0.205	0.073	-4.757	<0.001
2373	5000			-0.493		-0.204	0.074	-4.733	<0.001

Chapter 5

Discussion

The primary aspect of Hirschi's work that served as the motivation of this research was to assess if *conventional* attachment leads to conformity especially in relation to the G.R.E.A.T. curriculum. Recall that Hirschi believes that *conventional* attachment is the primary predictor for individuals refraining from delinquency. Hirschi (2004) wrote that there are both conventional *values*, and conventional *behaviors*. Conventional *values* exist when youth "… strive to get a good education, refuse to drink alcohol and refuse to "cruise around". Additionally, conventional *behaviors* exist when "a youth is involved in activity, such as homework". Conversely, unconventional behaviors are defined as smoking and drinking. Hirschi linked *conventional* conformity to four different types of social control: (1) *Attachment*, (2) *Opportunity*, (3) *Involvement*, and (4) *Beliefs*. From this research we see that there are both conventional values found in the latent construct *attachment*, and *non*-conventional behaviors found in the latent constructs, *belief, commitment,* and *involvement.* Similarly, *non*-conventional attachments are found in the great curriculum in the latent construct G.R.E.A.T which is one of three indicators for *bonding*. The other two manifest indicators for *bonding* are, youth use drugs because of peer pressure, and youth use drugs because of low self esteem.

Before each of these constructs are discussed in full detail, it behooves us to revisit the goals and intentions of this research.

154

Based on Hirschi's theory, the G.R.E.A.T. study was assessed with a fivefold purpose: (1) to conduct a positivist evaluation of the G.R.E.A.T. instrument and its efficacy for increasing gang information in 8th grade youth; (2) to expand and create a methodological foundation for future inquiry into school gang influence (in particular in 8th grade) in populations beyond the cities that were examined in the G.R.E.A.T. study. This occurs through a comparison of Hirschi's social control/bonding model and a newly developed model within this research called "social-control/bonding indirect effects model"; (3) to provide a rationale and foundation for inquiry into the structural model of gang knowledge and to clarify the role of bonding/connectedness in 8th graders' understanding about gangs after receiving the G.R.E.A.T. curriculum.; (4) to gain a greater understanding about the role of peer influence on 8th graders knowledge about gang influence and gang behavior after receiving the G.R.E.A.T. curriculum; and (5) to examine structural model indirect effects using bootstrap confidence intervals to determine if attachment is a significant mediators between involvement and bonding/connectedness in predicting 8th grade gang knowledge.

With regard to purpose one which is to provide a successful positivist evaluation of the G.R.E.A.T. instrument and its efficacy for increasing gang information in 8th grade youth, it is hoped that this research is viewed with providing a substantive positivist analysis, but that determination is left to each individual reader.

With regard to the second purpose of expanding and creating a methodological foundation for future inquiry into school gang influence (in particular in 8th grade) in

populations beyond the cities that were examined in the G.R.E.A.T. study, this author believes in this accomplishment with one caveat. That caveat exists because the principal investigator of the G.R.E.A.T. study advises that generalizations with the data are dubious. A full discussion regarding this issue is contained in the limitations section.

However, by assessing both the theoretical underpinnings of Hirschi's four constructs: *attachment, belief, commitment*, and *involvement,* juxtaposed to the assessment of the indirect effect analysis using bootstrapped confidence intervals, this research provides insight into both Hirschi's theory and the G.R.E.A.T. curriculum which did *not* exist before this research. To this author's knowledge, no attempt at injecting social bonding/attachment theory into the G.R.E.A.T. curriculum has ever occurred. Likewise, little research regarding bootstrapping indirect effects for latent structures exists in the literature to date so both of these milestones provide a strong argument for creating a strong foundation for assessing gang influence as research continues. Did this research expand and create a methodological foundation? This author believes yes. Social control theory is one of the most respected and most tested theories regarding delinquency in general and juvenile delinquency in particular. It has been and will continue to be argued that social control/bonding theory is adept at explaining youth gang involvement and machinations.

It is argued that even when considering the limitations of the data, social control/bonding theory is developed so well that the theory holds merit even in light of the data limitations. Of course acceptance of this statement remains an individual choice.

156

With regard to the third purpose which was to provide a rationale and foundation for inquiry into the structural model of gang knowledge and to clarify the role of bonding/connectedness in 8th graders' understanding about gangs after receiving the G.R.E.A.T. curriculum, again this research stands on its merits. It will be shown below that Hirschi's bonding theory as applied to the G.R.E.A.T. curriculum shows mixed results, but the mixed results occur in part because of the limits created by the variables within the study. That is to say, that the curriculum provided great questions regarding gangs, but the response options limited the amount of analysis that could be employed to assess impact and outcome. More about these issues follows below.

With regard to the fourth goal which was to gain a greater understanding about the role of peer influence on 8th graders knowledge about gang influence and gang behavior after receiving the G.R.E.A.T. curriculum, this research shows support for both Hirschi and his critics. The theories outlined in Chapter 2 provided much debate surrounding and involving peer influence. While Travis Hirschi (1969) argued that peers were a protective factor for deviant behavior, others (e.g., Hindelang, 1977, & Matsueda, 1981) found that peers have exactly the opposite effect. In this research peer influence was measured in three different ways: (1) positive peer influence, (2) negative peer influence (i.e., hurting others), and (3) delinquent peer influence (robbing, stealing cars etc.). This research now offers a better understanding about peer influence and sheds more light on the debate about the role of peer influence on those 8th graders gang knowledge who received the G.R.E.A.T. curriculum. The results suggest that positive

157

peer bonds showed significant results as a predictor across all models, large or small, and *attachment* showed significant loadings for *bonding* when considered across all models. Negative peer bonds showed significant results as a predictor for all models, large or small. However, while the structural coefficients for the large models showed significant results, the multiple group showed *non*-significant results. Clearly the limitation of embedding positive peers as only a predictor for attachment and *not* as a predictor is an issue. Thus, the picture regarding Hirschi's assertion regarding positive peers and his critic's assertions about negative peers, regretfully remains befuddling.

Lastly, with regard to the fifth goal, which was to examine the structural model indirect effects using bootstrap confidence intervals to determine if *attachment* is a significant mediator between involvement and bonding/connectedness in predicting 8th grade gang knowledge, the findings show significant results for all models using indirect effects. This means that *attachment* to schools, positive peers and parents is a salient mediator between *involvement* and *bonding*. Caution with regard to parent bonding must be advised. The questions related to parents did *not* ascertain whether the parents were a positive role model or a not. One of the critiques of Hirschi's model (see Matsueda, 1982 & Matsueda, 1987) is that youth can identify with negative parents as well as positive parents. The questions in the G.R.E.A.T. curriculum do *not* provide insight about this issue. It could be that negative youth highly identified and bonded with negative influencing parents. Because we cannot be clear about this issue, interpreting parent bonding should be approached with caution.

158

Besides these five research goals, this research examined several theoretical and substantive questions to motivate the study. One of these questions examined the similarities and difference between Hirschi's social control/bonding model (SCB) and the model Social control/bonding with indirect effects model (SCBI). Four of these questions involved examining the role of Hirschi's four model construct; *attachment, believe, commitment,* and *involvement* as it relates to the G.R.E.A.T. curriculum. One of the questions examined the effectiveness of including an indirect effect into Hirschi's model. Two questions examined if the indirect effects model held up under the multiple group model, and also the multiple group model examined whether the G.R.E.A.T. curriculum was effective by disaggregating those who completed the curriculum from those who did *not* complete the curriculum. Each of these questions are addressed below.

Full Model SCB and SCBI. The first question asked what similarities and differences exist between Hirschi's Social Control/bonding model (SCB) and the new model named "Social Control/Bonding with Indirect Effects model (SCBI).

The results from Table 4.8 suggest that there are a few fundamental differences between the SCB and SCBI models. The most notable difference was the significant results for the simple direct effect from *involvement* to *attachment*. The results suggest a negative relationship meaning that as *attachment* to positive peers, parents and education increases, *involvement* with negative peers and drug using peers decreases. Yet, there is a significant positive relationship between *attachment* and *bonding*, meaning that as *attachment* increases, *bonding* increases.

159

A second notable difference included factor loadings. With the exception of *involvement*, all other factor loading estimates were nearly identical – and significant at a level of significance of 0.01- in both models. For *involvement* negative peers showed the highest loading for the indirect effects model, but negative peers smoking marijuana use showed the highest loading for the SCB model.

A third notable difference involved covariances. Because of the simple direct effect from *involvement* to *attachment*, in the SCBI model, covariances found in the SCB model could *not* exist in the SCBI model because *attachment* became an endogenous variable and covariances cannot occur with endogenous variables.

Lastly, to prevent an NPD psi matrix, a covariance between G.R.E.A.T. with Bonding was estimated. For all intents and purposes, the factor loadings are statistically the same across both the SCB and SCBI model and similarly the Hirschi's theoretical considerations are the statistically similar across both models.

When considering structural coefficient "ON" *bonding*, it is noteworthy that the highest and lowest factor loadings were similar across both the SCB and SCBI models for *attachment, belief,* and *commitment.* However, for *involvement,* the most influential factor changed across models. For example, in the SCBI full model (post modified), peer marijuana use showed the highest effect but in the SCB full model the composite for negative peers (i.e., skipping school, stealing more or less than $50, and stealing cars) showed the highest effect.

160

Continuing, regarding Hirschi's four theoretical concepts of *attachment, belief, commitment,* and *involvement* in both the SCB and SCBI models, all structural coefficients were significant at a least a level of significant of 0.05. *Commitment* and *involvement* both showed negative effect suggesting that an increase in *bonding* leads to a decrease in *commitment* to gangs, and a decrease in negative drug-using peer influence as well as a decrease in negative peers that skip school and steal. *Attachment* and *belief* both showed positive effect suggesting an increase in *bonding* leads to an increase in *attachments* to parents (again caution must be exercised in interpreting parent), education and positive peers; and an increase in *belief* that that gang problems at school exist. These results for the full SCB model and full SCBI model suggest support for all four of Hirschi's theoretical constructs, meaning that conventional attachments (attachment & belief) increase bonding, and *non* conventional attachments (i.e., commitment and involvement) decrease bonding. In sum, the full models show support for Hirschi's bonding/attachment theory.

Hirschi's theory for SCBI model. The next set of questions examined the role *attachment* (i.e., mom, dad, education, & positive peers), *belief* (i.e., gang and violence influence at school), non-conventional attachment examined through *commitment* (i.e., feelings about joining gangs and following leaders), and non-conventional attachment examined through *involvement* (i.e., negative peer influence) held for 8th graders understanding about gang influence and gang behavior with respect to the G.R.E.A.T. curriculum within the SCBI model. Most notable is that the effects for three out of four of

161

Hirschi's constructs - *attachment*, *commitment*, and *involvement* in every model (i.e., full models, multiple group model, and direct effect & indirect effect models) showed significant, positive value. In the case of *belief*, only self-worth/perceptions showed a significant, negative value while the remaining three factors for *belief* showed significant, positive values. The take home point is that all effects were significant at a level of significance of 0.01 for all SCBI models.

As we move on to the next four questions, each of Hirschi's four constructs are discussed separately so as not to confound the results by discussing the constructs together. However, the discussion will address the full model with and without indirect effects, and the multiple group model with and without indirect effects simultaneously. We begin with the Hirschi's construct called attachment.

Attachment. When considering Hirschi's concept of bonding, *attachment* in the full model, (post modified) showed a significant, positive effect, meaning that an increase in conventional bonding lead to an increase in positive attachments to education, parents and peer influences. The same findings exist for the indirect effects full model, which is to say that the value for *attachment* on *bonding* was also significant and positive. These positive influences included peers, parents explicitly, and getting along with adults, being honest and being a good student as implied by the composite measure *pospeer*.

In the multiple group model (i.e., completed G.R.E.A.T. or not) without the indirect effects, *attachment* as a direct effect for both groups (i.e., complete G.R.E.A.T.

162

or not) showed significant, positive results. Similarly, in the multiple group model with the indirect effects, *attachment* as a direct effect for both groups (i.e., complete G.R.E.A.T. or not) showed significant positive results.

These results suggest that *attachment* as a direct effect perform as expected in the multiple group model and as expected in the full model. These results suggest that attachment shows the strongest loading for every model. These findings corroborate research by Hirschi (1969) and Karcher (2004) suggesting that attachment to peers, education and parents influence greatly (usually mitigate) the relationship youth have with delinquency. Again, it cannot be stressed enough that the bonding these youth report to have with parents does *not* elucidate what the relationship entails. Negative youth bonding with negative parents can confound the results, so caution should be practiced when interpreting these results.

Moreover, the specific indirect effect analysis in both the full model and the multiple group model are interesting. The fact that the specific indirect effects for every model showed significant results, shows support for Preacher and Hayes' (2008a & 2008b) assertion that Kenny and Baron's approach can miss a significant indirect effect and thus is *not* a preferred method for analyzing indirect effects. More will be said about this within the *involvement* discussion below.

Belief. When considering Hirschi's concept of bonding, *belief* in the full model, (post modified) showed a significant, positive value (0.095), meaning that an increase in

conventional bonding lead to an increase in beliefs that gangs activity in school, gang fights in school, pressure to join gangs at school and a decrease in self perception are issues that concern these youth,. The same findings exist for the indirect effects full model, which is to say that the value for *belief* on *bonding* was also significant and positive. These self-perception items included having a sense of usefulness, having worth, doing a good job as a person, and doing a job well and are all contained within the composite measure *selfperc*.

In the multiple group model (i.e., completed G.R.E.A.T. or not) without the indirect effects, *belief* as a direct effect for both groups (i.e., complete G.R.E.A.T. or not) did *not* show significant results. Similarly, in the multiple group model with the indirect effects, *belief* as a direct effect for both groups (i.e., complete G.R.E.A.T. or not) did *not* show significant results.

These results suggest that *belief* as a direct effect did *not* perform as expected in the multiple group model but did perform as expected in the full model. These mixed results suggest two things. First, *belief* may show significance simply as an artifact of the large sample found in the full model. Second, it could be argued that examining *belief* from the counterfactual, which is from the negative school level influences and from the personal perception perspective, may be a misspecification of Hirschi's model for multiple group. We cannot discount the fact however, that *belief* in this research is *not* performing to expectations in the multiple group model.

Commitment. When considering Hirschi's concept of *bonding, commitment* in the full model (post modified) was the most complicated of constructs. The full model showed a significant, negative loading , meaning that an increase in conventional bonding lead to a decrease in feelings about joining gang, having gang friends, and following bad leadership. The same findings exist for the indirect effects full model, which is to say that the loading for *commitment* on *bonding* was also significant and negative. These negative influences were all explicit variables about the youth's feelings about gangs. It should be noted that there were no composite for this latent construct.

In the multiple group model (i.e., completed G.R.E.A.T. or not), *commitment* as a direct effect for those youth that did *not* complete the great curriculum did *not* show a significant, negative finding; but for the youth that did complete the curriculum, there was a significant, negative value. Similarly, in the multiple group model with the indirect effects, *commitment* as a direct effect for those youth that did *not* complete the great curriculum did *not* show a significant, negative finding; but for the youth that did complete the curriculum, there was a significant, negative value. These results suggest that regardless of indirect effect being included in the model (i.e., full model or multiple group), for those youth that received the G.R.E.A.T. curriculum, they were more likely to see a decrease in their feelings about wanting to joining a gang, be involved with gang activity, having gang friends, or follow negative leaders. These results suggest that the curriculum encourages these students toward better choices. Similarly, these results

165

suggest that *commitment* as a direct effect performed as expected in the multiple group model and as expected in the full model.

Involvement. When considering Hirschi's concept of *bonding, involvement* in the full model (post modified) showed a significant, negative estimate, meaning that an increase in conventional bonding leads to a decrease in negative peer influences. The same findings exist for the indirect effects full model, which is to say that the influence for *involvement* on *bonding* was also significant and negative. These negative influences included peer drug-use explicitly and skipping school, and stealing as implied by the composite measure *negpeer.*

In the multiple group model (i.e., completed G.R.E.A.T. or not), *involvement* as a direct effect for both groups (i.e., complete G.R.E.A.T. or not) did *not* show a significant finding. Similarly, in the multiple group model with the indirect effects, *involvement* as a direct effect for both groups (i.e., complete G.R.E.A.T. or not) did *not* show a significant finding.

These results suggest that *involvement* as a direct effect did *not* perform as expected in the multiple group model but did perform as expected in the full model. These mixed results suggest two things. First, *involvement* may show significance simply as an artifact of the large sample found in the full model. Second, it could be argued that examining *involvement* from the counterfactual, which is from the negative peer influences, may be a misspecification of Hirschi's model for multiple group. We cannot

166

discount the fact however, that *involvement* in this research is *not* performing to expectations in the multiple group model.

Conversely, the multiple group, specific indirect effect analysis in Table 4.11 is an interesting finding. While findings for direct effects in the full model and in the multiple group model were mixed, the fact that the specific indirect effects for the multiple group model were significant shows support for Preacher and Hayes' (2008a & 2008b) assertion that Kenny and Baron's approach can miss a significant indirect effect and thus is *not* a preferred method for analyzing indirect effects.

Recall, the causal steps approach as outlined by Baron and Kenny (1986) as well as Judd and Kenny (1981), requires that: (1) the total effect of the independent variable on the dependent variable must be significant, (2) the path from the independent variable to the mediator must be significant, (3) the path from the mediator to the dependent variable must be significant, and (4) if the independent variable no longer has any affect on the dependent variable when the mediator has been controlled, the complete mediation has occurred. Note: the fourth step is required only for complete mediation.

Also, recall that Fritz & MacKinnon (2007) found that the causal steps approach is among the lowest in power, which is to say, if X's effect on Y is carried in part indirectly through the intervening variables M, the causal steps approach is least likely of the many methods available to actually detect the effect.

Based on these facts, if this study had relied on the causal steps approach, the significant indirect effect from *involvement* to *bonding* through *attachment* would have been missed simply because the direct effect from involvement to bonding showed as *non*-significant; thus this research shows further corroboration for the research cited above.

G.R.E.A.T. Lastly, we examine the role of the latent structure G.R.E.A.T. and its two companion indicators, youth do drugs because of a low self-esteem, and youth do drugs because of peer pressure. Beginning with the latent construct, G.R.E.A.T., the results showed a significant, positive relationship with *bonding* which suggest that as bonding increased, G.R.E.A.T. knowledge increased. This further suggests that as youth begin to understand the role and influence of gangs – according to the curriculum, then bonding would increase. Recall the role and influence of gangs as defined by the curriculum is that gangs sell drugs for power, interfere with neighborhood peace, interfere with personal goals, and that violence interferes with a person's right to feel safe.

When considering the full model with indirect effects, the results suggest a significant, positive relationship with bonding again suggesting that increased knowledge about gangs leads to increased bonding.

When considering the multiple group model *without* indirect effects, the results are significant and positive for the group that did *not* receive the curriculum, as well as significant for those that did receive the curriculum. When considering the multiple group

model *with* the indirect effects, the results are similar in that for both groups, G.R.E.A.T. is significant.

Peer pressure and low self esteem. For the two manifest variables, in the full model without indirect effects, the results show a significant positive relationship between bonding and youth who believe that people use drugs because of peer pressure and a significant positive result between bonding and youth who believe that people use drugs because of low self esteem. For the full model with indirect effects, the relationship between bonding and youth who believe that people use drugs because of peer pressure shows a significant, positive relationship; and a significant positive result for youth who believe that people use drugs because of low self esteem.

For the two manifest variables in the multiple group model *without* the indirect effects, the results for those that did *not* receive the curriculum shows a significant positive relationship between bonding and youth who believe that people use drugs because of peer pressure and for those that did receive the curriculum, a significant positive relationship. For those youth that did *not* receive the curriculum yet believe people use drugs because of a low self esteem, the results show a significant, positive relationship and for those that did receive the curriculum, there is a significant positive relationship.

For the multiple group model *with* indirect effects those youth that did *not* receive the curriculum showed a significant positive relationship between bonding and youth

who believe that people use drugs because of peer pressure and for those that *did* receive the curriculum, there was a significant, positive relationship.

Continuing, for the multiple group model with indirect effects, those youth that did *not* receive the curriculum showed a significant positive relationship between bonding and youth who believe that people use drugs because of low self esteem; and for those that did receive the curriculum, there was a significant, positive relationship.

In sum, the three bonding indicators are significant across all models regardless of size (i.e., full or multiple group) or whether indirect effects were used or *not.*

Limitations

Besides the limitation of interpreting attachment to parents, there are two overarching limitations for this study related to two issues, (1) the G.R.E.A.T. curriculum, and (2) the confidence interval bootstrap techniques. We begin with a discussion related to the G.R.E.A.T. curriculum. The most glaring problem related to the curriculum is the failure on the part of the principal investigator or the curriculum developers to clearly define a gang. From Chapter 2 it became clear that defining gangs is difficult if *not* contentious. Providing a gang definition in relation to the curriculum would serve assessment research greatly especially when considering interpretation of curriculum impact and outcomes.

Several contacts to the curriculum developer have gone unanswered. Thus, it is difficult to assess how well the curriculum influences gang information for these 8th graders when the operational definition of a gang does *not* exist. If the contemporary definitions are used there is an implied belief that gangs are inherently bad as Kline (1995) suggests. If gangs are defined with earlier intentions then gangs are seen as an innocuous, rite of passage as Hagedorn (1998) and Brotherton (2008) suggest. Clearly, the interpretation of these findings in contingent on a definition of gangs, thus, the interpretation of a significant finding for *belief* as it relates to Hirschi's *bonding* construct should be interpreted with care.

Care should be taken for two reasons. First, as stated, the definition of gang is *not* clearly defined either through an operational definition or a general definition, and second because many of the important gang related questions provided dichotomous response options (i.e., yes or no) there is no way to assess the amount of variation within these youth understanding of gang information *nor* is there a clear understanding for why youth become involved in gangs.

Moreover, the limitation related to the number of response options for the most important gang questions (i.e. questions 189 – 205 in the year one database) provides severe limitation to interpreting both curriculum impact and curriculum outcome. For example, question 189 asks "it is good to be in a gang to fit in" which provides two substantive responses (i.e., no and yes). Without a more proper scale (e.g., Likert scale)

for the respondents, these very important questions are difficult to use as indicators for

structural modeling due to lack of continuity as required for SEM indicators.

Certainly these questions are well suited to logistic regression or a Bernouli

specification with LaPlace estimation in HLM as these methods require dichotomous

outcomes; but because of limited variation, these questions provide little assistance when

assessing salient issues regarding why youth may choose gang membership or gang

involvement when assessing structural models. This coding scheme for these sixteen

questions is a major limitation for the analysis used in this study.

Another limitation for the curriculum is generalization. The principal investigator

is forthcoming about this issue as he states "The researcher warns that results for Part 1

and Part 3 should *not* be generalized to middle school students and personnel as a whole

because neither sample was randomly selected." This warning is outlined in the study

description at ICPSR – study 3337. Because this study used Part I for analysis, this

advisory is maintained.

Limitations related to the second issue - bootstrapping of confidence intervals,

exist because only one estimation technique was employed in the study. Recall that

Dixon (n.d.) provided several estimation techniques including; accelerated bootstrap

which requires estimating a bias coefficient Z_0 and an acceleration coefficient. Both

coefficients can be estimated non-parametrically from the data (discussed by Efron &

Tibsharini 1993) or theoretically calculated for a specific distribution (see Davison &

Hinkley, 1997).

172

Another option discussed by Dixon (n.d.) is the "adjusting for bias and acceleration" method which alters the percentiles used to find the confidence interval endpoints. Dixon (n.d.) then discusses the quadratic ABC confidence intervals (see DiCicco & Efron, 1992; and DiCicco & Efron, 1996) which are an approximation to the accelerated bootstrap that do not require many bootstrap simulations, which could be helpful when parameter estimation requires considerable computation.

Dixon (n.d.) discusses several other resampling methods including studentized bootstrap, parametric bootstraps which can occur in a lognormal distribution or multinomial distribution, smoothed bootstrap, and non-parametric bootstrapping of hierarchical data.

For the purposes of this research, bias corrected bootstrap resampling was employed to test for significant indirect effects so certainly extrapolation of the findings within this research to these other estimation should be avoided.

Conclusions

By understanding the individual motivation while extending bonding/connectedness theory, this research provides policy development for intervention specialists and provides a clearer understanding of the structural relationship between the youth and youth bonding/connectedness with regard to gang resistance.

While there are clear problems with some of the questions in the database, overall the findings suggest positive aspects regarding the curriculum. The findings in the

173

multiple group model regarding success in decreasing the youths feelings about joining gangs and being involved with gang behavior shows the most promise for the curriculum. Certainly there are issues with some of the important gang questions being dichotomous, but overall, the curriculum seems to have acceptable performance.

While indirect effects show little evidence of being employed with Hirschi's research, these results seem to suggest that indirect effects show promise in elucidating relationships between Hirschi's theoretical constructs and the G.R.E.A.T. data. The promises of this research will certainly illicit substantive debate about Hirschi's intention with indirect effects. This claim is evidenced by the discourse between Matsueda and Costello wherein Matsueda incorporated indirect effects with belief and Costello & Vowell took issue with this methodological approach. While many agree that using belief is a stretch, arguably it makes sense to evaluate *attachment* as a mediator for involvement because how can one conceivably become attached to something (or someone) without being involved, at least at some measureable level. It seems the more involved the more attached one would become. It is for this reason that the indirect effect from involvement to attachment was examined. It proved to be successful.

It cannot be stressed enough that *attachment* to parents is *not* clearly understood in this data, so caution with interpretation should be exercised. Going forward, surveys and research should include questions regarding *attachment* to parents, peers, etc. in a way that captures non-conventional attachments as Hirschi described. Of course these questions are contingent on the parent(s) being in the child's life. One way to accomplish

174

capturing non-conventional attachments is by asking questions about parent behavior with drugs, anger, alcohol, and whether parents support students in "conventional" activities. Conventional activities include things such as, school sports, music, extracurricular neighborhood sports etc.

Questions regarding parents could examine parent employment and parent contact with the law. Many time surveys seem to assume the family is a positive experience for youth. Hopefully this is the case, but there are many youth whose experience is different than academic machinations. Hirschi's theory assumes the best about the parent child relationship, but parenting occurs in a broad spectrum. Hill and Stafford (1980) discovered a decrease of 1/2 as much parental time spent with their children in care-giving, instruction, reading, talking, and playing as when the children were younger.

Santrock (1999) lists four basic parenting styles that have very different impacts on children and explains them in the following ways and should be examined in future social bonding research. These four styles are; (1) authoritarian, (2) authoritative, (3) neglectful, and (4) indulgent. Future research should incorporate more about Santrock's (1999) parenting perspective by asking both indirect and direct questions to the student.

Indirect questions regarding authoritarian parenting would examine if the child believes their parent(s) employ a restrictive, punitive style in which the parents; (1) exhort the child to follow their directions, (2) to respect work and effort, (3) if the parent places firm limits controls on the child, and (4) if they allows little verbal exchange.

175

Indirect questions regarding authoritative parenting would examine if a parent, (1) allows children to be independent but still place limits and controls on their actions, (2) if the parent engages in extensive verbal give-and-take exchanges, and (3) if the parent(s) are warm and nurturant.

Indirect questions regarding neglectful parenting would examine if the parent(s) is/are, (1) uninvolved in the child's life, and (2) if the child feels that other aspects of the parents' lives are more important than the child's life.

Finally indirect questions regarding indulgent parenting can examine if parent(s) are, (1) highly involved with their children placing few demands or controls on the child, and (2) if the child expect to get their own way. These indirect questions would offer a clearer picture into the bonding the child has with their parent(s).

Again from Santrock's (1999) perspective, direct questions to ask a child to determine if they come from an authoritarian parenting home would be (1) if the child feels anxious about social comparison, (2) if the child fails to initiate activity, and (3) if they feel if they have poor communication skills.

Direct questions to ask a child to determine if they come from an authoritative parenting home would be (1) if the child feels they are socially competent (e.g., do you do a job well, are you successful at completing a job), (2) do you feel self-reliant (e.g., can you finish a job or homework without much help), and (3) are you socially

176

responsible (e.g., do you make decision to refrain from drug use, vandalism etc. when adults aren't present).

Direct questions to ask a child to determine if they come from a neglectful parenting home would be examine; (1) if the child feels socially incompetent, (2) does the child show poor self-control, and (3) does the child handle independence well (note that Santrock suggests youth from neglectful parenting homes do not).

Direct questions to ask a child to determine if they come from a neglectful parenting home would be examine, (1) if they or their friend respect others, and (2) does the child have difficulty controlling their behavior. Santrock (1999) suggests that children from neglectful homes do not respect others, and find it difficult to control their behavior.

Including these types of questions from Santrock (1999) will offer great insight into the type of bonding children feel with their parents, resulting in clearer understanding about the type of bonding youth have with their parent(s). Researchers could understand if bonding with negative parenting styles (i.e. Authoritarian, Indulgent, and neglectful) is being interpreted as positive bonding. Sussing out this information in surveys will provide clearer direction for policy initiatives.

Regarding the methodological findings for indirect effects using latent constructs, the results clearly show that indirect effects require both a large sample size in the database as well as a large number of resamplings for estimates to become stable. This research corroborates previous work using bias corrected bootstrap confidence intervals

on manifest variables. One interesting finding is that while the standard errors in Sobels test were unstable at times, the results were consistent with the resampling intervals for every test.

These results suggest for latent structures involving large models, it may be best to avoid a small sample N, regardless of the resampling size, until additional research suggests otherwise. Similarly, for Sobel's test, the standard errors are most unstable for smaller sample N's. But even as the sample N increases, the S.E. estimates still do *not* approach the baseline results and in fact the S.E. estimates are nearly four-times larger than the baseline estimate. Regardless, the results of the p-values suggest *non-*significance just as was found for the resampling technique.

With regard to the simulation of bias corrected confidence interval, caution is advised with regard to resampling of confidence intervals for indirect effects when using latent structures. This means that resampling and raw data should be large. The caution for resampling means resampling should occur at least 5000 times but what a large sample of raw data should be determined on a case by case basis. Of course resampling is computationally laborious, so hopefully researchers will *not* take shortcuts with resampling nor with interpretations of parental influence. Of course, these decisions are the researcher's alone.

In sum, this research seems to show moderate support for the G.R.E.A.T. curriculum especially with regard to the multiple group model and the construct of *attachment.* This research corroborates previous research regarding *attachment* to

positive peers, education and parents which suggest an attenuation of delinquent

behaviors.

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Coding Syntax

Appendix A.1

Composite syntax *Creates Composite and Recodes See pp 71 & 100

DATASET ACTIVATE DataSet1.
COMPUTE MomConn=sum(v20, v21, v24, v25).
COMPUTE DadConn=sum(v26, v27, v28, v29, v30, v31).
COMPUTE SelfW=sum(v98, v99, v100, v101, v102, v103).
COMPUTE EduConn=sum(v105, v106, v108, v109).
COMPUTE PosPeesum(v112, v113, v117, v118).
COMPUTE NegPeesum(v119, v122, v123, v125).

RECODE MomC (1 thru 13=1) (13 thru 16=2) (17 thru 19=3) (20 thru 21=4)
(22 thru 23=5) (24 thru 25=6) (25 thru 50=7) into MomCR.
RECODE DadC (1 thru 15=1) (16 thru 20=2) (21 thru 25=3) (26 thru 28=4)
(29 thru 32=5) (33 thru 36=6) (37 thru 50=7) into DadCR.
RECODE SelfWC (1 thru 20=1) (21 thru 23=2) (24 thru 25=3) (26 thru 27=4)
(28 thru 50=5) into SelfWCR.
RECODE EduC (1 thru 12=1) (13 thru 14=2) (15 thru 16=3) (17=4) (18 thru
35=5) into EduCR.
RECODE PosPC (1 thru 8=1) (9 thru 10=2) (11 thru 12=3) (13 thru 15.99=4)
(16 thru 25=5) into PosPCR.
RECODE NegPC (1 thru 4=1) (5=2) (6 thru 7=3) (8 thru 10=4) (11 thru 25=5)
into NegPCR.
RECODE GREATC(1 thru 17=1) (18 thru 20=2) (21 thru 23=3) (24 thru 25=4)
(26 thru 45=5) into GREATCR.
EXECUTE.

Table A1

Imputation and Composite Syntax

*Impute Missing Data Values with Constraints See page 71 & 100.

MULTIPLE IMPUTATION
v20 v21 v24 v25
v26 v27 v28 v29 v30 v31
v40 v41 v42
v48 v51 v50 v52 v53
v85 v86 v87 v88 v94 v95 v96
v98 v99 v100 v101 v102 v103
v105 v106 v108 v109
v112 v113 v117 v118
v119 v122 v123 v125
v256 v257 v259 v260 v261 v262
v11 v18 v19 v131 v132 v133 v206 v207 v208 v209
 /IMPUTE METHOD=AUTO NIMPUTATIONS=5
MAXPCTMISSING=NONE MAXCASEDRAWS=50 MAXPARAMDRAWS=2
 /CONSTRAINTS v20 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v21 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v24 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v25 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v26 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v27 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v28 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v29 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v30 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v31 (MIN=1 MAX=7 RND=1)
 /CONSTRAINTS v40 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v41 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v42 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v48 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v50 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v51 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v52 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v53 (MIN=1 MAX=5 RND=1)

Continued

Table A1

Imputation and Composite Syntax

*Impute Missing Data Values with Constraints See page 71 & 100.

```
/CONSTRAINTS v61 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v62 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v63 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v66 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v67 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v68 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v73 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v74 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v75 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v79 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v80 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v81 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v85 ( MIN=1 MAX=3 RND=1)
/CONSTRAINTS v86 ( MIN=1 MAX=3 RND=1)
/CONSTRAINTS v87 ( MIN=1 MAX=3 RND=1)
/CONSTRAINTS v88 ( MIN=1 MAX=3 RND=1)
/CONSTRAINTS v94 ( MIN=1 MAX=3 RND=1)
/CONSTRAINTS v95 ( MIN=1 MAX=3 RND=1)
/CONSTRAINTS v96 ( MIN=1 MAX=3 RND=1)
/CONSTRAINTS v98 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v99 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v100 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v101 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v102 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v103 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v105 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v106 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v108 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v109 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v112 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v113 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v117 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v118 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v119 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v122 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v123 ( MIN=1 MAX=5 RND=1)
/CONSTRAINTS v125 ( MIN=1 MAX=5 RND=1)
```

Continued

Table A1

Imputation and Composite Syntax

*Impute Missing Data Values with Constraints See page 71 & 100.

 /CONSTRAINTS v256 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v257 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v259 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v260 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v261 (MIN=1 MAX=5 RND=1)
 /CONSTRAINTS v262 (MIN=1 MAX=5 RND=1)
 /MISSINGSUMMARIES NONE
 /IMPUTATIONSUMMARIES MODELS DESCRIPTIVES
 /OUTFILE IMPUTATIONS='C:\Users\Shag Sanderson\Desktop\Dissertation '+
'Articles\Dissertation\Current Data\Year1NewStartNoImp.sav' .