In this study, I use Group-Based Trajectory Modeling and Multinominal Logit Regression Modeling to test and extend Gottfredson and Hirschi’s (1990) self-control theory. Specifically, I examine the following: 1) the stability of self-control up to early adulthood, 2) social factors that improve self-control up to early adulthood, and 3) the new extension of self-control theory concerning criminal opportunity.

Using data from an African American sample, I examine the developmental trajectories of self-control from age 10 to 22. Arguing that family routines about children are the structural aspect of effective parenting and authoritative parenting its content aspect, I examine the impact of effective parenting and other socialization processes in the school, conventional peer groups, and religion on youth’s self-control trajectories. In addition, using the structural aspects of effective parenting and other socialization processes as criminal opportunity measures, I examine the role of criminal opportunity in the relationship between self-control and delinquency.

My research produced a number of important findings. First, the results indicate that there is heterogeneity in terms of the developmental trajectories of self-control. The
majority of the sample shows an increase in self-control by the age of 22. The ranking of self-control among the sample reshuffles substantially over time. Second, authoritative parenting during childhood and during adolescence significantly impacts youth’s self-control trajectories. This impact holds for both boys and girls. Finally, authoritative parenting during childhood and during adolescence significantly impacts youth’s delinquency trajectories. This impact holds for both boys and girls. In addition, family routines about the children significantly interact with self-control during childhood in predicting youth’s delinquency trajectories. The theoretical and practical implications of these important findings are discussed.

INDEX WORDS: Effective parenting, Family Routines, Self-Control, Delinquency, Gender, African American
STABILITY OF SELF-CONTROL AND THE ROLE OF PARENTING IN EXPLAINING DELINQUENCY: AN AFRICAN AMERICAN SAMPLE

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DEDICATION

To my family. Thank you for your love and support.
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CHAPTER 1
INTRODUCTION

Since its publication in 1990, *A General Theory of Crime* (Gottfredson and Hirschi 1990) has attracted enormous attention in criminology. This theory assumes that human beings are self-interested creatures who relentlessly pursue pleasure and avoid pain. Crime providing the pleasure of immediate gratification and requiring the least pain of planning, preparation, and skills is naturally the normative way of human behavior. According to this theory, it is self-control that keeps human beings’ “here and now” tendency in check and prevents individuals from committing crime. Gottfredson and Hirschi (1990) argue that self-control results primarily from effective parenting that individuals experience during early childhood. Once self-control/low self-control is formed by the age of 10, it tends to remain stable over time. In addition, the ranking of self-control in similar-aged population tends to remain stable as well. Relative to individuals who have higher self-control, individuals who fail to develop adequate self-control are more likely to commit crime and behaviors analogous to crime throughout the life-course stages subsequent to the formation of self-control.

A number of studies have been devoted to test the stability of self-control or Gottfredson and Hirschi’s stability postulate. The majority of these studies have shown that, although a portion of individuals do not experience changes in self-control, self-control is not as stable as suggested by Gottfredson and Hirschi (1990). A sound portion of individuals experience changes in both the absolute levels and the rankings of self-
control. These changes follow a number of patterns – it increases, decreases, or show curvilinear changes over time. Negating Gottfredson and Hirschi’s (1990) stability postulate, the prior studies have limitations. They only examine self-control up to early and/or mid-adolescence. Without looking beyond mid-adolescence, it is uncertain whether the found changeability of self-control is a reflection of a life-course trend of self-control or just a reflection of misidentification of the age when self-control should become stable. In addition, it is unanswered that, if self-control is changeable beyond mid-adolescence, will parenting and other socialization processes, e.g., socialization processes in schools, peer groups, and religion, still play a role in inducing changes in self-control.

Gottfredson and Hirschi (1990; 2003) have also asserted that self-control is the cause of all crime and analogous behavior. According to them, effective parenting as the primary source of self-control is only a distal precursor of crime and analogous behaviors. Although empirical research generally shows that self-control is a stronger predictor of crime, it is not negligible that the same body of research also shows that self-control does not fully mediate the impact of effective parenting on crime. The efforts to explain the unmediated effect of effective parenting on crime has rekindled interests in the construct criminal opportunity.

Recently Hay and Forrest (2008) have extended self-control theory to incorporate criminal opportunity. Drawing from routine activity theory and its individual-level applications, Hay and Forrest (2008) have argued that variation in individuals' criminal opportunity lies in their routine activities. Since their extension of self-control theory,
only two studies explicitly test the extension. Further systematic test of this extension is greatly needed.

**Purpose of the Present Study**

The purpose of the present study is to test and extend self-control theory (Gottfredson and Hirschi, 1990). Utilizing data from a longitudinal study, the Family and Community Health Study (FACHS), where an African American sample aged 10 to 12 were followed up to age 20 to 22, the present study tests the stability of self-control up to early adulthood when self-control should be highly stable according to self-control theory (Gottfredson and Hirschi, 1990). Expanding the concept of effective parenting to include family routines about children, the present study also tests the role of effective parenting and other socialization processes in the school, peer groups, and religion in inducing self-control up to early adulthood. In addition, using routine activities shown in effective parenting and other socialization processes as measures of criminal opportunity, the present study tests the role of criminal opportunity in the expression of self-control into delinquency.

**Research Questions**

In the present study, I ask and seek to answer three closely-related research questions. The first research question is: Is self-control stable up to early adulthood? To answer this question, I use Group-Based Trajectory Modeling to describe the developmental trajectories of self-control of an African American sample from age 10 to age 22. The second question is: if self-control is changeable up to early adulthood, will effective parenting and other socialization processes during adolescence induce the changes in self-control up to early adulthood. To answer the second research question, I
use Multinomial Logit Regression Modeling to test the impact of effect parenting and other socialization processes during individuals’ adolescence on their self-control trajectories up to early adulthood. The third research question is: Does criminal opportunity interact with self-control in predicting delinquency. To answer this question, I first describe the developmental trajectories of delinquency of an African American sample from age 10 to age 20. Then, I use individuals’ trajectories of delinquency as the outcome variable and use Multinomial Logit Regression Modeling to examine if individuals’ criminal opportunity interacts with their levels of self-control in predicting their delinquency trajectories.

**Contributions of the Present Study**

The present study contributes to criminological research in a number of ways. One notable contribution of the present study is that it clears out the remaining uncertainty concerning the stability of self-control in self-control theory. Since the publication of Gottfredson and Hirsch's (1990) self-control theory, a number of studies have been devoted to test the stability postulates of this theory. Although almost all of the studies have shown that self-control is changeable, these studies only focus on time periods ranging from childhood to early- or mid-adolescence. The evidence is strong enough to negate Gottfredson and Hirschi’s assertion that the age of 10 is the cutoff point before which self-control is malleable. However, it is not enough to infer a life-course trend of changeability of self-control. That is, it is uncertain if the changeability of self-control found in these studies is a reflection of a life-course trend of self-control or just a reflection of a misidentification of the age when self-control becomes stable. This poses an impediment in extending self-control theory. Examining the stability of self-control
up to early adulthood when self-control should by no means be changeable according to self-control theory, the present study clears out this remaining uncertainty suggesting the changeability of self-control as a life-course trend of self-control.

Another notable contribution of the present study is the expanded model of effective parenting. Building on prior research, I expended the definition of effective parenting to include family routines about children as the structural aspect of parenting. With the three aspects, i.e., responsiveness, demandingness, and regularity, the expanded definition of effective parenting can work as a general model of socialization in social institutions such as the school, army, correction and rehabilitation facilities, and prison. In addition, the expanded model of effective parenting provides a potentially more efficient model for programs on the improvement of parenting skills. Assisting parents in setting up regular family routines about children could be the starting point of improving parenting skills. Since family routines are easy to record, it is easy for parents to monitor and track their improvement. Then, parenting skills can be linked to family routines about children. Since parenting behaviors often occur during family routines about children, parents can roughly predict what kinds of tough situations are likely to occur during certain family routines. With this predictability, parents are able to be emotionally prepared for the occurrence of these situations and are more likely to find the right parenting skills to handle these situations.

The present study also makes notable contributions by identifying continued socialization processes that are effective in terms of improving self-control and preventing crime up to early adulthood. It examines the effectiveness of socialization in social institutions such as the family, the school, peer groups, and religion in inducing
self-control. It identifies criminal opportunities shown in the socialization processes that facilitate or decrease the expression of self-control into delinquency. Through doing this, the present study provides valuable information as to the effectiveness of different social institutions in improving self-control and in preventing crime. This information can be used as guiding information for the prevention of delinquency and for the allocation of crime-prevention resources among social institutions.

Showing the changeability of self-control over time and identifying socialization processes that are able to improve self-control, the present study can rekindle both individuals' and society's faith in correction and rehabilitation of delinquent youth and criminals. On one hand, the present study conveys the message that delinquent youth and criminals are changeable. With this faith, delinquent youth and criminals may cherish the hope of being able to desist and be accepted by society again, and start to cooperate with their family and other institutions in getting their life back on track. With this faith, parents may be able to make more efforts in helping their children desist from delinquency and crime, rather than lamenting on their lost battle as parents and giving up on their children. With this faith, society may treat delinquent youth and criminals as members experiencing tardy maturation needing more time and attention, rather than as deviants. On the other hand, the present study conveys the message that "Nothing works" is no longer an acceptable excuse for parents and the society to eschew their responsibilities of socializing individuals into conventional members of the society. All these will eventually contribute to shifts in the policies and practices concerning individuals' socialization and delinquent youth's and criminals' punishment, correction, and rehabilitation.
Furthermore, the present study extends self-control theory and bridges two bodies of literature on self-control. The "self-control" concept has its origin in psychology. However, it had long been disconnected with its origin once it took roots in criminology. Because of this disconnection, psychological research findings on self-control have been largely ignored. The present study is an effort to use these two bodies of literature to inform the revision of self-control theory. Specifically, the present study borrows from the psychological model of self-control in two ways. First, it expands the effective parenting to include family routines about children as the structural aspect of parenting and examines its role in inducing changes in self-control. Second, it expands the causal model of self-control to include other socialization processes in the school, peer groups, and the religion as well as effective parenting as the causal factors of self-control. Through these practices, the present study bridges the two bodies of literature on self-control together and exemplifies the vast space where research findings in other disciplines can be used to inform the optimization of criminological theories.

In the following chapters, I discuss the present research project in detail. Chapter 2 to chapter 4 are the literature review for the present research project. In chapter 2, I discuss the stability postulate of self-control theory and the psychological perspective of self-control, review prior research findings on the stability of self-control and limitations of the prior research, and highlight the significance of testing the stability of self-control up to early adulthood. In chapter 3, I discuss the implications of the psychological perspective on self-control for revising the causal model of self-control, review the evolution of effective parenting, which is the primary cause of self-control according to Gottfredson and Hirschi, (1990), and expand the concept to include family routines about
children. In this chapter, I also discuss socialization processes in the school, peer groups, and religion, review literature on the relationship between these socialization processes and self-control, and highlight the limitations of prior research and the significance of testing the role of these socialization processes in inducing self-control up to adulthood. In chapter 4, I review the possible role of criminal opportunities in the relationship between self-control and delinquency, the recent extension to self-control theory that incorporated routine activities as criminal opportunity, and the empirical research on this extension. I further highlight the significance of testing the role of criminal opportunities in the relationship between self-control and delinquency.

Next, in chapter 5, I describe the present study and present several hypotheses regarding the stability of self-control, the role of socialization processes in inducing self-control, and the role of criminal opportunity in the relationship between self-control and delinquency based on literature review. In chapter 6, I discuss the methods I use for the present project including the data, measures, and analytic strategies.

Then, in chapter 7 and 8, I present the analysis results from the present study. Specifically, I present the results from analyses designed to answer the first and the second research questions concerning the stability of self-control and socialization processes that may enhance self-control in chapter 7. In chapter 8, I present the results from the analysis designed to examine the moderating effect of criminal opportunity in the relationship between self-control and delinquency. At last, in chapter 9, I discuss the results from the present study and draw conclusion based on the findings.
CHAPTER 2

STABILITY OF SELF-CONTROL

As mentioned in the introduction, I devote chapter 2 to the stability postulate of self-control theory. First, I discuss broad background, basic assumptions, and the stability postulate of self-control theory. I proceed to argue against this postulate and introduce a psychological perspective on self-control that suggests changeability of self-control over time. I then review and summarize the prior research testing the stability postulate and highlight the significance of testing the stability of self-control up to early adulthood.

In criminology, there has been a long-lasting controversy between the latent-trait/ontogenetic theories and sociogenic theories (Dannefer 1984). This controversy centers on the role of social factors (i.e., parenting, school, peer groups, and other social institutions) in explaining individuals’ criminality and crime beyond early childhood. Generally, latent-trait theories treat early childhood as the shaper of all that follow. They hypothesize that crime is caused by individuals’ time-invariant latent trait formed early in life, e.g., low IQ and hyperactivity (Wilson and Herrnstein 1985), neuropsychological deficit (Moffitt 1993; Moffitt, Caspi, Dickson, Silva, and Stanton 1996), or low self-control (Gottfredson and Hirschi 1990). According to them, once the latent-trait is formed in early childhood, social factors subsequent to its formation will be largely irrelevant in accounting for the latent-trait and crime. To the best, these social factors are
simply “the stage on which life patterns are played out – one that has no real bearing on the structure of development” (Sampson and Laub 1997).

In contrast, sociogenic theories, e.g., social bonding theory (Hirschi 1969) and a life-course theory (Laub and Sampson 2003; Sampson and Laub 1993), treat individuals’ later life-course stages such as adolescence and adulthood as periods of formative development as well. According to them, rather than being simply a stage where preprogrammed trends are played out, social factors in individuals’ later life-course stages such as social environment of individuals and social processes continue to impact individuals’ development. As a result, these social factors in individuals’ later-life stages play a significant role in accounting for individuals’ criminality and crime.

**A General Theory of Crime**

Since its publication, *A General Theory of Crime* (Gottfredson and Hirschi 1990), also called self-control theory, has been caught up in controversy. Following classical criminologists’ description of human nature as being governed by “two sovereign masters, pain and pleasure” (Bentham 1970[1989]:11), this theory assumes that individuals are self-interested creatures who relentlessly pursue pleasure and avoid pain. Crime providing the pleasure of immediate gratification of needs and requiring least pain of planning, preparations, and skills is naturally the normative way of human behavior (Gottfredson and Hirschi 1990:7). In other words, all human beings are born with the tendency to use crime to pursue self-interest.

According to self-control theory, it is the latent trait self-control, “the tendency to avoid acts whose long-term costs exceed their immediate or short-term benefits” (Hirschi and Gottfredson 2001:88), that keeps human beings’ “here-and-now” tendency in check.
and constrains individuals from taking the normative way of action. Hirschi and Gottfredson (2001) have suggested that self-control is a construct that is the reverse of low self-control. They describe people with low self-control as being impulsive, risk-seeking, incapable of deferring immediate gratification, prefer physical activities over mental or cognitive ones, and is self-centered and insensitive to others’ sufferings and needs (Gottfredson and Hirschi 1990:89-90). In general, people with low self-control have problems in taking into consideration long-term consequences of their behavior; and they tend to be “children of the moment” (Hirschi and Gottfredson 2001:90).

According to Gottfredson and Hirschi (1990), self-control is built through effective parenting during the first 6 to 8 years of age. The process of building self-control is just like this: beginning with the natural needs (or natural drives), children pursue the immediate gratification and tend to use the short-cut way to satisfy their needs. Parents consistently monitor children’s behaviors, recognize improper behaviors, and correct these behaviors. Parents also discipline children in correcting their behaviors. Through parents’ consistent monitoring, correction, and disciplining, children connect those short-cut ways of behavior with prohibition or punishment. As a result, when they seek gratification of needs, they learn to keep their “here-and-now” tendency in check, avoid using short-cut ways of gratification, and behave in approved ways.

Unfortunately, the process of fostering self-control is missing in ineffective parenting. Ineffective parents often fail to monitor children’s behavior. When they are able to monitor children’s behavior, they often cannot recognize and correct inappropriate behavior. Prohibiting children’s inappropriate behavior, they often fail to show children the socially sanctioned way of behavior. Although parents can be evaluated as effective
or ineffective generally, their effectiveness or ineffectiveness exists on a continuum. In other words, the extent to which they have the self-control-fostering processes differ. As a result of these varied parenting practices, individuals’ levels of self-control exist on a continuum. According to Gottfredson and Hirsch (1990), individuals ranking of self-control (or low self-control) among similar-aged cohort foretells the probability that they will commit crime relative to others in the same cohort. Relative to individuals who develop adequate self-control, individuals who rank low in self-control are more likely to be subject to the domination of their own impulses. When opportunities are available, they are more likely to commit crime.

The Stability of Self-Control

Acknowledging parenting as the primary source of self-control, self-control theory (Gottfredson and Hirschi 1990) gives a rather narrow time-window for (effective) parenting to exert its impact on individuals’ self-control. Gottfredson and Hirschi (1990) have argued that self-control is formed during the child’s first 6 to 8 years as a consequence of effective parenting. By the age of 8 to 10, individuals’ self-control basically is formed. They have asserted that, once the child’s self-control is formed, differences in self-control among similar-aged children tend to persist over time. It is “difficult for subsequent institutions to make up for the deficiencies in self-control” (Gottfredson and Hirschi 1990:107). In other words, once it is formed, the ranking of self-control among similar-aged individuals tends to remain stable throughout the life-course stages subsequent to early childhood.

Hirschi and Gottfredson (2001) have depicted a rather rigid picture of the stability of the ranking of self-control among individuals over the life-course. They have
described that those who are able to develop adequate self-control before 10 years old will maintain well-behaved during adolescence and adulthood, and become conventional adolescents and adults over time. In contrast, “children in trouble with teachers in the 2nd and 3rd grades are more likely to be in trouble with juvenile authorities at 15 and 16; they are more likely to serve prison terms in their 20’s; they are more likely to have trouble with their families and jobs at all ages” (Hirschi and Gottfredson 2001:87). For individuals who rank low in self-control, it is destiny that they will remain low in their ranking of self-control and be more likely to fail to control their impulse and get into trouble at each single stage of the life course.

Gottfredson and Hirschi (1990) have acknowledged the possibility of slight increase in absolute level of self-control over time beyond age of 10. They have suggested that, since socialization by family, school, and other social institutions subsequent to age 10 is intrinsically the same as socialization before age 10, theoretically subsequent socialization is able to install self-control in individuals. As a result, the absolute levels of self-control within individuals may change slightly over time as “socialization continues to occur throughout life” (Gottfredson and Hirschi 1990:107). In addition, they have asserted that, once socialization is accomplished successfully, its effect is largely irreversible (Gottfredson and Hirschi 1990:107). In other words, once self-control is formed, few efforts will be able to undo it or undermine it. Therefore, Gottfredson and Hirschi (1990) have proposed a continuing increase in the absolute level of self-control beyond age of 10 and throughout their lifetime.

Acknowledging the possibility of increases in individuals’ self-control but denying the possibility of reshuffling in the ranking of self-control beyond age of 10,
self-control theory (Gottfredson and Hirschi 1990) seems self-contradictive. To reconcile this self-contradiction, Gottfredson and Hirschi (1990) have elaborated on their underlying logic. They have argued that theoretically low-self-control individuals will be able to change their ranking in self-control if they can accomplish continuing socialization by sticking to rules and social norms valued by social institutions. Gottfredson and Hirschi (1990) have further argued that, unfortunately, the ranking of self-control formed by the age 10 seems to set the basic tone for individuals’ developmental trajectories. Although responding to continued socialization by institutions such as family and school, individuals with low self-control, relative to their high-self-control counterpart, are less likely to keep up with expectation of these social institutions. They are also less likely to stick to the socialization processes of these institutions and are more likely to quit or give up on these social institutions. As a result, individuals with low self-control are both less involved in and less benefited from these continuing socialization processes. In other words, given the same efforts on the part of social institutions, high self-control individuals gain more in terms of building self-control, relative to low self-control individuals. Thus, it logically follows that, though both of them increase their absolute levels of self-control, individuals low in self-control will retain their low rank in self-control, relative to those high in self-control.

Truly, it is reasonable to assume that low self-control individuals, relative to high self-control individuals, are more likely to drop out of continued socialization processes due to their low self-control and to gain less in self-control. Evidence from some clinical reports on treatments of unrestrained behaviors analogous to deviance (Strayhorn 2002) lends support to this assumption. These treatments are to cure obsessive-compulsive
disorder, phobias, delayed sleep phase problems, and disruptive disorders through improving self-control. The results have shown that following whole therapy can improve self-control. However, 20 percent to 47 percent of individuals drop out the therapy and fail to improve their self-control. Controlling for other factors that might contribute to drop out, the results have shown that, relative to individuals who complete the therapy, drop-out individuals have lower levels of self-control (Strayhorn 2002).

Given the plausibility of the assumption, there is a loose chain in Gottfredson and Hirschi’s (1990) logic. Gottfredson and Hirschi (1990) have assumed that decision on whether or not to keep up with socialization processes is made unilaterally by individuals. In other words, they assumed that, whenever low self-control individuals decide to give up on certain socialization processes, they are able to do so. Socialization institutions are treated as rather passive – they do not have influence on individuals’ decision as to quit or continue the socialization processes. However, this is often not the case in reality. If this is the case, all human beings, born with no self-control whatsoever, would never be able to develop any self-control. Naturally, we will all choose to quit the socialization processes due to our zero self-control at the beginning of our life. The reality is that few of us are able to do so.

Certain socialization processes (e.g., socialization in family through parenting and socialization processes in school) are not optional and are not up to individuals’ choice. Parents, school and other socializing institutions often play a rather active role in socialization processes. They have active impacts (though not necessarily a coercive one) on whether or not individuals are able to keep up with the socialization processes. For example, parents make persistent efforts to improve their parenting skills and never
give up on socializing their children; schools go out their way to address low self-control individuals’ need and improvement. The extra efforts from these institutions may be able to keep low self-control individuals from dropping out of continued socialization processes. The sustained engagement in the socializing process may, in turn, both increase individuals’ absolute level of self-control and improve their ranking of self-control among cohorts.

Thus theoretically, changes in the absolute levels and the ranking of self-control should be life-course processes, rather than only existing in early childhood. Continued socialization by social institutions (e.g., family, school, conventional peer groups, and religion) subsequent to age of 10 should be able both to increase individuals’ absolute levels of self-control and reshuffle the relative ranking of self-control among similar-aged cohort.

**Self-Control as Muscles**

A number of psychologists (e.g., Baumeister and Exline 1999; Baumeister, Vohs, and Tice 2007; Muraven and Baumeister 2000) have suggested a life-course change in both the absolute levels and the ranking of self-control. They argue that self-control operates like muscles. Reviewing multiple research literatures, Baumeister et al. (1994) have proposed that self-control depends on a single, limited source of energy which resembles the strength of muscles. Supporting for this proposition, researchers (e.g., Baumeister, Bratslavsky, Muraven, and Tice 1998; Muraven, Tice, and Baumeister 1998) have found that, resembling a muscle getting tired, participants suffer temporary deterioration of self-control when they have to complete two or more consecutive tasks of self-control. For example, Muraven et al.’s (1998) research has shown that trying to alter
one’s emotional state, which is a self-control-demanding task, results in a subsequent drop in tenacity in tasks (e.g., squeezing a handgrip).

In addition, Baumeister et al. (2007) have proposed that, just like muscles can become stronger through repeated exercise, the strength of self-control can be improved through regular exertions of self-control. Since self-control is the single resource all self-control tasks draw on, performing exercises of self-control (i.e., specific self-control-demanding tasks) over a period of time can improve the strength of self-control in general. Researchers (e.g., Muraven 2010; Muraven, Baumeister, and Tice 1999; Oaten and Cheng 2006b) have found evidence supporting this proposition. For example, Muraven (2010) has found that the strength of self-control can be improved through regular exercises of self-control (e.g., doing handgrip muscle exercises or avoiding sweet foods) over a period of time.

Thus, according to this group of researchers, individuals would be able to improve their absolute level of self-control over the life course. Given the diversified self-control exercises individuals will go through during their life course, it is followed that individuals will be able to reshuffle their ranking of self-control among similar-aged cohort throughout their life-course.

**Summary of Prior Research**

A number of studies have been devoted to testing Gottfredson and Hirschi’s (1990) stability postulate (Arneklev, Cochran, and Gainey 1998; Burt, Simons, and Simons 2006; Hay and Forrest 2006; Raffaelli, Crockett, and Shen 2005; Turner and Piquero 2002). The majority of these studies have shown that, although a portion of
individuals do not experience changes in self-control, both the absolute levels and the ranking of self-control are not as stable as suggested by Gottfredson and Hirschi (1990).

Using a sample aged 4 or 5 and followed up to ages 12 or 13, Raffaelli et al. (2005) have found that the correlations between self-control measures at 8 or 9 years and 12 or 13 years is .50, suggesting some extent of reshuffling in the ranking of self-control. Similarly, using a large random sample tracked longitudinally from an average age of 6.91 to 19.05, Turner and Piquero (2002) have found that both offenders and non-offenders experience increases in their absolute levels of self-control over time. They have also found that the magnitude of within-group correlations of self-control (i.e. offender and non-offender group) is moderate ranging from .33 to .68 (p<.05) suggesting reshuffling in the ranking of self-control beyond the age of 10. In addition, their findings that offenders seem to experience a more precipitous increase in self-control, relative to non-offenders, suggest possible reshuffling in the ranking of self-control.

Burt, Simons, & Simons (2006) have shown that there are substantial changes in both the absolute levels and the ranking of self-control. Using an African American sample aged 10-12 years old and followed up to 12-14 years old, Burt et al. (2006) have compared both individuals membership in quartile groups and individuals’ percentile in low self-control across the two-year time span. Comparing individuals’ membership in quartile groups across time, the result has shown that less than half of the adolescents in the sample remain in the same quartile group across the two waves. Comparing individuals’ percentile in low self-control across two waves, the result has shown that youth, on average, moved 175 positions in either increasing or decreasing directions. Of the whole sample, 52% have moved more than one standard deviation (142 ranks);
slightly more than 21% moved more than two standard deviations; and only 31% of the sample (about 231) individuals remained within 75 positions of their wave 1 rank in low self-control at wave 2.

Using a group-based trajectory model, Hay and Forrest (2006) examined the stability of self-control across five time points that span a 9-year period from roughly age 7 to age 15. They found that there is heterogeneity in terms of the stability of self-control -- individuals follow 8 different self-control trajectories up to mid-adolescence. Individuals’ absolute levels of self-control were significantly higher after age 10 relative to age 7-9, suggesting that children’s absolute levels of self-control are still responsive to socialization processes beyond age 10. They also found that, from 7 to 15 years old, the percentages of the sample that change in absolute level of self-control and in their ranking of low self-control are 16% and 46%, respectively. In addition, the changes of self-control take different directions- it increases, decreases, or is in a curvilinear shape.

In summary, prior findings generally negate Gottfredson and Hirschi’s (1990) stability postulate. There are substantial changes in the absolute levels of self-control. In addition, there is heterogeneity in terms of the change of self-control over time. The changes in the absolute levels of self-control take different directions - self-control may increase, decrease, be curvilinear, or remain stable over time. In addition, prior findings show that the ranking of self-control reshuffles substantially over time.

The prior studies testing the stability postulate have limitations. Most of these studies assess the stability of self-control by relying on the magnitude of correlation coefficients between self-control measures at different time points. Reflecting the overall level of stability in self-control across an entire sample, magnitude of these correlation
coefficients may not be an accurate measure of the stability of ranking in self-control over time. Magnitude of correlation coefficients between two measures is more a statistic that points to magnitude of change (i.e. how much do values of a variable change correspondingly to values of another variable), rather than that of scale of change (i.e. the number of values of a variable that change accordingly to values of another variable). This is clearly illustrated by Burt et al.’s (2006) findings that, despite of moderate magnitude of correlations between self-control measures across waves ($r=.48$, $p<.05$), the ranking of self-control is actually changing substantially over time.

Studies done by Hey and Forrest (2006) and Burt et al. (2006) overcome this methodological limitation. However, they only cover a relatively short time-span beyond the age of 10. For example, covering a rather long period of time (from age 7 to age 15), only five years beyond age of 10 (two waves) have been covered. Similarly, Burt et al.’s (2006) research covers up to age of 12-14. Due to the short time-span beyond age 10 covered in these studies, it is uncertain whether the identified changeability in both absolute levels and ranking of low self-control reflects a long-term trend of self-control that extends throughout the life-course or a slight mis-calibration of the age when self-control becomes stable.

To better evaluate the stability postulate and clarify this uncertainty, it demands research that is able to test this postulate over a long period of time beyond age of 10. In addition, it demands research that is able to describe the long-term developmental trends of self-control. Building on prior research, the present study takes a step forward to answer the research question: Is self-control stable up to early adulthood when self-control should be highly stable according to Gottfredson and Hirschi (1990). In addition,
the present study seeks to describe the trajectories of changes or stability of self-control up to early adulthood.
CHAPTER 3

PARENTING, OTHER SOCIALIZATION PROCESSES, AND SELF-CONTROL

In the previous chapter, I focused on the theme that self-control theoretically should be changeable throughout the life-course. In this chapter, I focus on social factors that may enhance self-control over time. First, I discuss research findings in psychology on self-control improvement. Treating effective parenting and other socialization processes as self-control-enhancing exercises, I proceed to argue that effective parenting and other socialization processes should be able to improve self-control over time. Then, I review empirical research on effective parenting and other socialization processes in enhancing self-control and highlight the significance of the present study.

Self-Control Exercises and Socialization Processes

A growing body of research has shown that the strength of self-control, just like muscles, can be improved through doing regular self-control exercises (e.g., monitoring and improving posture, regulating mood, writing diary and physical exercises) over a period of time. For example, Oaten and Cheng (2006a) have found that regular physical exercises can improve individuals’ levels of self-control. In their experiment, participants were asked to go through two phases -- the control and the treatment phases. In the control phase, individuals’ life was kept as it was for two months. In the treatment phase, participants entered a program of regular physical exercise designed to improve the strength of self-control. Within each month, participants’ self-control and general regulatory behavior were assessed. Comparing individuals’ self-control measured after
the control and treatment phases, respectively, the results have shown that participants who exercised regularly have significant improvement in their self-control. Similarly, researchers have found that regular exercises of self-control including regulating mood, monitoring and improving posture, recording eating behavior (Muraven, Baumeister, and Tice 1999), cutting back on sweets or squeezing a handgrip (Muraven 2010) for two weeks all significantly improve participants’ self-control.

These findings have been echoed by a number of other studies (Oaten and Cheng 2006a; Oaten and Cheng 2007). Oaten and Cheng (2006b) have found that students receiving a study intervention program, which requires a regular practice of self-control, show significant increase in self-control. In another study, Oaten and Cheng (2007) have found that participants who entered a four-month self-control exercise drill, a financial monitoring program, show significant improvement in self-control; while the participants in control group fail to show improvement in self-control. All the above studies have shown that the strength or the absolute levels of self-control can be improved through regular exercises of self-control.

These self-control exercises have two common features. First, these exercises, be it physical exercises or monitoring posture, are all self-control-demanding. In other words, it requires individuals’ exertion of self-control to engage and complete the exercises. Using physical exercises as an example, it requires individuals’ exertion of self-control to complete each session of physical exercises and to keep regular engagement in physical exercises. Without self-control, individuals won’t be able to finish a single session of exercises or keep regular physical exercises. Second, these exercises need to be done regularly or repeatedly. To strengthen muscles, it requires
regular physical exercises. Analogously, to improve self-control, it requires regular self-control-demanding exercises. Through regular exercise of self-control, the strength of self-control can be improved.

The self-control exercises can be easily identified in major socialization institutions/groups such as the family, school, religion, and peer groups. It has long been recognized in the study of child and adolescent development that these social institutions/groups are significant spheres of influence that explain key outcomes of child and adolescents (Meldrum and Hay, 2012). These institutions/groups assume significant responsibility of socializing individuals into conventional members of the society through teaching and reinforcing social norms. They use social norms to regulate individuals’ behavior and punish individuals when they violate social norms. To avoid being punished by these social institutions/groups, individuals need to exert their self-control to make sure that they abide by the norms. Thus, in essence, socialization processes in these institutions/groups are self-control exercises. In addition, as individuals’ important arenas of social life, these socialization processes often go on repeatedly and regularly. For example, parenting, attending school, playing with peer, and attending religious activities or worship all take place repeatedly which, in the long run, show certain regularity.

**The Family: Effective Parenting**

Among the self-control exercises in these social institutions/groups, Gottfredson and Hirschi (1990; Hirschi and Gottfredson 2001) regard effective parenting as the primary source of self-control. According to them, effective parents monitor/track children’s behavior, recognize inappropriate behavior, and discipline children when they
show inappropriate behavior. Through these parenting behaviors, parents instill self-control in their children. They have suggested that parents’ “affection for or investment in the child” is required to activate this “system” of parenting (Gottfredson and Hirschi 1990). Hirschi and Gottfredson (2001) further clarify effective parenting as having four elements: care, monitor, recognize (deviant behavior), and correct. They have described effective parents as: parents who have affection or care for their children and watch their children as best they can; whenever they see their children doing something deviant, they correct, admonish, or punish them for such deviant behavior.

**Effective Parenting and Authoritative Parenting.** Gottfredson and Hirschi’s conceptualization of effective parenting bears a lot of resemblance to Baumrind’s (1966; 1991; 1996) conceptualization of authoritative parenting, which has been recognized as the most efficacious parenting style (Magnusson and Stattin 2006; Parke and Buriel 2006; Simons, Simons, and Wallace 2004). According to Baumrind (1966; 1991; 1996), parenting can be evaluated on two dimensions – responsiveness and demandingness. Responsiveness refers to the extent to which parents are warm, supportive, and attuned to children’s needs and demands; while demandingness refers to the level of parents’ control over the child through supervision, monitoring and disciplinary efforts.

Evaluating parenting on the two dimensions, Baumrind (1966; 1991; 1996) has classified four parenting styles – permissive, authoritarian, authoritative, and neglectful parenting – through combining high versus low levels on the two dimensions.

Among the four styles, authoritative parenting is high on both responsiveness and demandingness. Authoritative parents are open to the child’s view and demands. They show warmth and nurturance to the child; help the child solve problems; engage in clear
communication and provide reasoning for their rules and decisions concerning the child. Yet, they are firm in guiding the child’s actions. They warmly encourage the child’s actions that are socially acceptable; they use firm control that is contingently applied and justified by consistently-enforced rules; and they make sure that their use of firm control is in the context of a warm, engaged parent-child relationship. Comparatively, authoritative parenting’s high responsiveness closely resembles effective parenting’s “care” element; while its high demandingness closely resembles the “monitor, recognize, and correct” elements of effective parenting.

**Authoritative Parenting as Effective Parenting.** Given Gottfredson and Hirschi’s inclusion of care as one element of effective parenting, most researchers testing their theory focus exclusively on the “monitor, recognize, and correct” element of effective parenting (Cochran, Wood, Sellers, Wilkerson, and Chamlin 1998; Pratt, Turner, and Piquero 2004; Unnever, Cullen, and Pratt 2003). For example, Unnever, Cullen and Pratt (2003) interpret Gottfredson and Hirschi’s effective parenting as “hinges upon monitoring their children, recognizing deviant behavior when it occurs, and then consistently punishing misconduct” (Gottfredson and Hirschi 1990:483). They measure monitoring and consistent punishment as effective parenting in their study. Similarly, Pratt, Turner, Piquero (2004) focused only on the effect of monitoring and discipline/punishment upon individuals’ levels of self-control without taking into consideration of the “care” element of effective parenting.

The narrow version of effective parenting has recently been questioned (Hay 2001). Using an adolescent sample, Hay (2001) compared the explanatory powers of authoritative parenting versus the narrow version of effective parenting for self-control.
Hay (2001) found that, though discipline-monitor parenting practices has a significant effect upon levels of self-control as predicted by self-control theory, its explanatory power is less than impressive. The model including monitoring-disciplinary parenting practices only explains 7% of the total variance in self-control. In contrast, using authoritative parenting, the expanded version of effective parenting, the model explains 23% of the total variance in low self-control. The explanatory power of authoritative parenting is more than three times stronger than that of monitoring-disciplinary parenting. Hay’s research (2001) has clearly called for attention on the “care” element of effective parenting.

Significance of including “care” element in effective parenting has also been noted by a number of other studies. Studies have suggested that children are more receptive to parents’ monitoring and discipline that is coupled with love and care (Lay, Waters, and Parke 1989; Londerville and Main 1981). Given the same level of monitoring and discipline, parenting with love and care induces better results in children. In addition, studies (Pratt, Turner, and Piquero 2004; Turner, Piquero, and Pratt 2005) have consistently shown that, instead of enhancing levels of self-control, parenting with only discipline/punishment negatively affects adolescents’ levels of self-control. In contrast, research including the “care” element in effective parenting has shown consistent support for Gottfredson and Hirschi’s proposition that effective parenting increases levels of self-control (Hope and Chapple 2005; Vazsonyi and Belliston 2007).

Recently, effective parenting has been conceptualized as authoritative parenting (Burt, Simons, and Simons 2006). Burt, Simons, and Simons (2006) incorporated parents’ warmth, support, inductive reasoning, and avoidance of harshness with parents’
monitoring and discipline. This conceptualization is both a revisit to and an extension of Gottfredson and Hirschi’s (1990) original conceptualization of effective parenting. On one hand, Burt et al.’s (2006) conceptualization of effective parenting is consistent with Gottfredson and Hirschi’s original conceptualization as including care, monitoring, recognizing deviance, and correcting the child. On the other hand, Burt et al.’s (2006) explicit adoption of authoritative parenting has gone one step beyond the original conceptualization of effective parenting, unifying two constructs that bridge two large bodies of literature in criminology and child development.

**Family Routines about Children as the Structural Aspect of Effective Parenting.** Authoritative parenting is analogous to self-control exercises for children in that it demands self-control from children. For example, under parents’ supervision, children need to use their self-control to pay attention to their behavior, to follow parents’ rules, and to avoid prohibition and punishment from parents. In this sense, authoritative parenting is self-control-demanding exercises for children that can improve their strength of self-control. Unlike the self-control exercises in the experiments (e.g., physical exercises), parenting is a self-control exercise where children are involved passively. It is initiated by parents, and children do not have much freedom to quit these exercises.

Treating parenting as self-control exercises, there is still one necessary condition missing to build self-control – the regularity of these exercises. Authoritative parenting provides general information as to how parents parent children. However, it does not provide information as to the regularity of parenting practices. That is, how regularly is parenting administered to children is not shown. For example, all having authoritative parents, some children may have more regular parenting time relative to others. Using
the self-control as muscles model, we would expect that, given an authoritative parenting style, children receiving more regular parenting would practice their “self-control” more regularly and, thus, would gain more strength of self-control, relative to those receiving less regular parenting.

**Family routines about children.** Family routines about children have been found to provide information as to the regularity of parenting time. Family routines is defined broadly as specific, repeated practices that involve two or more family members (Spagnola and Fiese 2007). It entails communications among family members and time commitment of family members that are repeated in a regular manner (Fiese, Tomcho, Douglas, Josephs, Poltrock, and Baker 2002). Research on family routines (Sytsma, Kelley, and Wymer 2001) identifies four types of child routines that are inseparable from parenting practice including daily living routines (e.g., mealtime, bedtime, and getting ready in the morning), household responsibilities, discipline routines, and homework routines. Using mealtime routines as an example, research (Fiese 2006) has found that, regardless types of families, parents invest more than about 10 percent of meal time in monitoring or disciplining children’s meal-related behavior, about 20 percent of time in family issues including those concerning children, and half of the mealtime in general positive exchanges including those with children. Mealtime provides an opportunity for parents to monitor children’s behavior, solve problem with children, and resolve conflict. Similarly, researchers (Serpell, Sonnenschein, Baker, and Ganapathy 2002) have found that homework routines provide an opportunity for parents to monitor their child’s development, learn about what was going on at school, and communicate with teacher. Through these observable family routines about children, how parenting is administered
in children’s daily life can be identified. Thus, regular family routines about children can be used to show the regularity of parenting behavior.

**Family routines about children as the structural aspect of effective parenting.**

Family routines about children can be regarded as an aspect of parenting. Family routines about children, be it bedtime routines, homework routines, or mealtime routines, are inevitably oriented toward children’s needs and development. They occur in accordance with the natural rhythm of a daily cycle. For example, bedtime routines tend to occur at night and mealtime tends to occur in the morning, at noon, and in the evening. However, family routines about children do not occur naturally. It requires parents’ efforts in creating the routines and sticking to them over time. These efforts on parents’ part can be clearly shown by the challenges that new parents face in creating caregiving routines to fold children’s care into the stream of daily activities (Lubeck and Chandler 1990). Coping with children’s needs and development, created by parents, and administered on children, family routines about children can be regarded as an aspect of parenting.

Being an aspect of parenting and showing the regular repetitiveness of parenting, family routines about children can be regarded as an integrative aspect of effective parenting. Different from authoritative parenting which can be regarded as the content of parenting, family routines about children can be regarded as the structural aspect of effective parenting. It shows how regularly authoritative parenting is administered to children over time or the regularity of the dose of parenting practices delivered to children.
Socialization Processes in the School, Conventional Peer Groups, and Religion

The School. Self-control exercises can also be easily found in schools. It is quite obvious that schools are designed to promote conventional behaviors. Gottfredson and Hirschi (1990:107) have acknowledged that social institutions including schools “do not allow unfettered pursuit of self-interest.” For students, school life is self-control-demanding. At school, students need to be on time and sit in classes following teachers’ instructions. In addition, students need to follow school rules such as dress codes, zero tolerance of violence, and no unexcused absences. When students break the rules, they will face the consequences of their behavior. To meet these rules and instructions and eschew punishment, students need to exert their self-control to keep their behavior in check and to avoid violation of the rules.

Beside its self-control-demanding aspect, school life is highly structured. Its structure is shown in the strict day-to-day routines of school life. Students are required to attend school 5 days a week, except on holidays and special occasions. On each typical school day, classes start and end at a specific time, students take recess and have lunch at specific times. With its self-control-demanding aspect and its regularity, school should be able to instill self-control in individuals as well.

Conventional Peer Groups. The conventional peer group is a social institution that may enhance self-control. During adolescence, individuals’ major life arena shifts from home to peer groups (Thornberry 1987). Like it or not, adolescents are gradually pulled out from home to peer groups since peer groups become a normative part of life for adolescents. Relative to that of children, the pressure for adolescents to fit in a peer
group is much stronger since turning back to the arms of parents is not longer a desirable way of solving problems in peer groups. Conventional peer groups endorse group rules such as listening to parents, being nice to each other, being fair, etc. These group rules are often consistent with social norms. It is possible that children/adolescents may pursue their self-interest without taking into consideration the peers’ needs or may break rules at the beginning of joining a conventional peer group. However, when they do so, they often face the consequences of their behaviors - being reprimanded, punished, or ostracized by peers. To fit in conventional peer groups, adolescents need to watch their behavior, follow the group rules, take into consideration of peers’ needs and demands, get along with others, and solve problems in socially-approved way. In this sense, fitting in conventional peer groups is self-control demanding. The more conventional the peers are, the more self-control-demanding the fitting processes are. In addition, adolescents spend a sound amount of time playing with peers. Thus, theoretically, conventional peer groups should be able to enhance individuals’ self-control.

**Religion.** Religion is yet another social institution that may enhance individuals’ self-control. There is much overlap between religious principles and social norms. All religions have moral guidelines that regulate disciples’ behavior and thinking. The moral guidelines, e.g., do not kill, do not steal etc. are also the basis of social norms. Adhering to religious principles, e.g., resisting temptations and controlling hostile attitudes, are all self-control demanding. Religious practices and religious rituals, e.g., attending Sunday school and praying regularly, also require self-control to resist the temptation to engage in some other fun but hedonistic activities. In addition, religious practices and rituals
require regular attendance and regular practices. Thus, religion should be able to improve individuals’ self-control.

**Summary of Prior Research**

Supporting Gottfredson and Hirschi’s proposition, a number of studies have shown that effective parenting that individuals experience is a source of self-control (e.g., Gibbs, Giever, and Martin 1998; Hay 2001; Hope, Grasmick, and Pointon 2003; Unnever, Cullen, and Pratt 2003). Using a sample of children age 10 at the time of data collection, Turner et al. (2005) have found that, controlling for competing socialization processes, parenting socialization (i.e., parental supervision and monitoring/discipline) significantly predict children’s levels of self-control.

Research also shows that effective parenting during late childhood or early/mid adolescence impacts individuals’ self-control as well (Hay and Forrest, 2006; Burt et al., 2006). Using a sample of adolescents aged 10-14 and 12-16 and using parental monitoring as a measure of effective parenting, Meldrum (2008) has found that parental monitoring significantly increases adolescents self-control. Burt et al. (2006) also found that authoritative parenting beyond the age of 10 up to mid-adolescence significantly increased adolescents’ levels of self-control. Similar research findings have been reported by Pratt et al. (2004) that parental efficacy (measured using parents’ attachment to their child and their effectiveness in recognizing problematic behavior and responding to the behavior) significant predicts levels of self-control of adolescents from 7 to 12 grades.

In addition, research suggests that the impact of parenting on individuals’ self-control may go throughout the life-course. Although not their major argument, Sampson
and Laub (1993; 2003) have suggested that reconnection with family of origin that is nurturing and caring can play an active role in keeping low self-control individuals in or drawing/attracting them back to continued socialization processes. Sampson and Laub (1993; 2003; Sampson, Laub, and Wimer 2006) have noted that even those with a high tendency toward criminal behavior (those can be classified as of the lowest in self-control) are able to be drawn or attracted back into continued socialization processes. As a result, they are able to desist from crime while similar others are still deep in crime. In other words, they are able both to increase successfully their absolute levels of self-control and change their rankings of self-control among their cohort. Thus, effective parenting including authoritative parenting and regular family routines about children will be able to enhance self-control throughout the life-course.

The school has been shown to play a significant role in increasing individuals’ self-control. Research by Burt et al. (2006) has found that, controlling for authoritative parenting and conventionality of peer groups, attachment to school has significant impact on adolescents’ self-control. Using school monitoring as a measure of school socialization, Meldrum (2008) has found that, after controlling for parenting practices, school monitoring significantly increases adolescents’ self-control. In addition, using a sample of children age 10 at the time of data collection, Turner et al. (2005) have found that, controlling parenting socialization (i.e., parental supervision and discipline), school socialization measured by school’s ability to teach right and wrong and school’s ability to maintain discipline significantly predict children’s levels of self-control.

Similarly, Sampson and Laub (1993; 2003) have noted that enrollment in Lyman School, which can be understood as an endeavor to keep low-self-control individuals in
socialization processes, can play an active role in helping individuals desist from crime. Sampson and Laub (1993; 2003) have found that even those with the highest levels of crime (those can be regarded as with the lowest self-control) are able to benefit from this endeavor. They are drawn or attracted back into continued socialization processes and are able to desist from crime which can be interpreted as improving their absolute levels and ranking of self-control. Evaluating 34 studies on correctional programs which are predominantly school-based programs (79.4%), Piquero et al. (2010) have found that these programs improved a child/adolescent’s self-control. All of this research suggests that school may be another social institution that can enhance individuals’ self-control.

The role of conventional peer groups in fostering self-control has been highlighted in a number of studies. Burt et al.’s (2006) research has shown that, controlling for authoritative parenting and school attachment, peer’s level of deviance significant decreases adolescents’ levels of self-control. Similarly, using peer pressure to try marijuana/drug, cigarettes, drink alcohol, skip school, and commit crime or doing something violent as measures of peer socialization, Meldrum (2008) has found that peer socialization significantly predicts adolescents’ levels of self-control. Lower levels of peer pressure to have these unconventional behaviors predicts higher levels of individuals’ self-control, after controlling for parenting practices and school monitoring.

In addition, an increasing number of studies has shown that religious activities may enhance self-control. Baumeister, Bauer, and Lloyd (2010) have proposed that religion may work as self-control-enhancing exercises. Reviewing empirical evidence on the relationship between religion and self-control, McCoullough and Willoughby (2009) have concluded that religion is a self-control exercise. In addition, Simons et al.’s (2004)
research on religion and delinquency shows that adolescents’ religiosity including regularity of attending religious activities and religious commitment significantly decreases adolescents’ levels of delinquency. This finding suggests that adolescents’ religiosity may enhance their self-control which may contribute to the decrease of delinquency. In addition, Landor et al. (2011) have found that adolescents’ religiosity, measured by the regularity of attending religious activities and religious commitment, significantly decreases adolescents’ risky sexual behavior. This finding also suggests that religiosity may enhance self-control which in turn decreases adolescents’ risky sexual behavior.

Although self-control-enhancing effects of all these social institutions/groups have received some support from empirical research, this body of research primarily focuses on early or mid-adolescence. In addition, these studies often do not take into consideration all four social institutions. If self-control is changeable up to early adulthood, it is important to know which socialization processes during adolescence work in terms of enhancing self-control. Hence, the present study seeks to answer the research question – Do continued socialization processes identified in the family, school, conventional peer groups, and religions during adolescence enhance individuals’ self-control?
CHAPTER 4

PARENTING, CRIMINAL OPPORTUNITY, SELF-CONTROL, AND DELINQUENCY

In the previous chapter, I focused on the effect of effective parenting as well as other socialization processes on self-control. In this chapter, I will discuss the role of effective parenting, criminal opportunities shown in parenting, and other socialization processes, and self-control in explaining delinquency. First, I discuss self-control theory's postulate concerning the role of effective parenting in explaining delinquency and empirical findings on this postulate. I proceed to discuss how the empirical findings inspired efforts to extend self-control theory by incorporating criminal opportunities in this theoretical model. I then discuss this theoretical extension to self-control theory, review the studies testing the theoretical extension, and highlight the significance of the present study.

Effective Parenting as a Distal Precursor of Delinquency

Gottfredson and Hirschi (1990) have argued that self-control is the cause of crime and behaviors analogous to crime. According to them (Gottfredson and Hirschi, 1990:97-105), effective parenting is a distal precursor of delinquency. As the primary source of self-control, effective parenting is hypothesized to contribute to delinquency through its effects on a child's self-control. Empirical studies generally show that self-control does mediate the relationship between effective parenting and delinquency. For example, Polakowski (1994) has found that parental monitoring of children at ages 8 to
10 significantly contributes to their self-control at ages 12 to 14, which, in turn, significantly contributes to their later criminal conviction. Similarly, Gibbs et al. (1998) have found that youth's self-control mediates much of the impact of parental monitoring and discipline on deviance in college including alcohol consumption and academic cheating. In the same line, Hay (2001) has found that parental monitoring-discipline has significant effects on both predatory delinquency and substance abuse. He has also found that adding self-control into regression equations, the variations in both predatory delinquency and substance abuse explained by the equations increase substantially, and the effects of self-control on both predatory delinquency and substance use are statistically significant. Further, adding self-control into regression equations, the effects of parental monitoring-discipline on both delinquency and substance use decreases substantially. All these studies show that self-control does mediate the relationship between effective parenting and delinquency.

However, inconsistent with Gottfredson and Hirschi's (1990) postulate, empirical research also shows that self-control does not fully mediate the effect of effective parenting and delinquency. Effective parenting also shows direct impact on delinquency. In his research on predatory delinquency and substance use, Hay (2001) has found that, although adding self-control in regression equations decreases the effects of parental monitoring-discipline on predatory delinquency and substance use, the effects of parental monitoring-discipline on the two types of delinquency or deviance are still statistically significant and substantively large in magnitude. Similarly, Finkenauer et al. (2005) have found that self-control only partially mediates the relationship between effective parenting (including high parental acceptance, strict control and monitoring, and little use
of manipulative psychological control) and behavioral problems (delinquency and aggression) among youths (aged 10 to 14 years). Using a nationally representative sample of adolescents, Perrone et al. (2004) have found that, although parental efficacy significantly predicts adolescents levels of self-control, self-control only partially mediates the relationship between parental efficacy (measured by parents' effectiveness in recognizing problematic behavior and responding to this behavior) and delinquency. In the same line, Simons et al. (2007) found that children's self-control partially mediates the relationship between both parental monitoring-discipline and hostility/rejection and children's conduct problems. This growing body of evidence consistently shows that, beyond impacting delinquency through self-control, effective parenting has a direct impact on delinquency.

Studies of effective parenting and behaviors analogous to delinquency/crime also report similar findings that effective parenting directly affects behaviors analogous to delinquency/crime. Testing Gottfredson and Hirschi's mediating postulate using substance use, Chapple et al. (2005) found that self-control partially mediates the relationship between parenting variables (e.g., parental bonds which is measured using parental monitoring and parental attachment) and substance use. In addition, using a nationally representative sample of adolescents, Hope and Chapple (2005) found that self-control is a significant precursor of adolescents' engagement in sexual activity and the number of sex partners. In addition, they found that the impact of certain parental behaviors (monitoring and attachment) on adolescents’ sexual behavior is partially mediated by adolescents' self-control. Similarly, Unnever et al. (2006) found that ineffective parenting (including dimensions of monitoring, caring and parental
reinforcement of aggression) is negatively related to adolescents' self-control, and that the relationship between ineffective parenting and delinquent involvement is mediated by self-control.

**Rekindled Interests in Criminal Opportunity**

Efforts to explain the residual effect of parenting on delinquency and analogous behavior unmediated by self-control have rekindled interests in criminal opportunity. One reasonable explanation for the direct effect of parenting on delinquency and analogous behavior is that variation in parenting practices may be one of the sources of criminal opportunity. For children whose parents monitor their behavior closely may have less criminal opportunity to externalize their low self-control into delinquency, relative to those whose parents do not. This explanation inevitably pulls back the construct – criminal opportunity – into criminologists’ sight.

There is much uncertainty about the role of criminal opportunity in self-control theory itself. Earlier, Gottfredson and Hirschi (1990) seemed to give some space for criminal opportunities in explaining crime. They describe low self-control as inclination to crime or criminality that will express as crime or analogous behavior whenever individuals’ with low self-control have opportunity to express or externalize this inclination. They mention that parenting may also contribute to delinquency as providing or deprive of individuals’ opportunity of crime (Gottfredson and Hirschi, 1990: 22-44). However, they later flatly deny the possibility that criminal opportunities might play a role in the relationship between self-control and crime. According to them (Gottfredson and Hirschi, 2003), crime is simplistic in nature and does not require much time. In this sense, everyone has limitless criminal opportunities. Thus, they conclude that criminal
opportunity can be regarded as a constant for individuals and does not play any role in the relationship between self-control and crime.

Despite the uncertainty, empirical evidence has accumulated showing that criminal opportunity plays a significant role in explaining delinquency (e.g., Grasmick, Tittle, Bursik, and Arneklev 1993; LaGrange and Silverman 1999; Longshore 1998; Longshore and Turner 1998). For example, using the time adolescents spend in unstructured socializing with friends, Haynie and Osgood (2005) found that time spent with peers in unstructured situations, as criminal opportunity, significantly increases the level of adolescents' delinquency. In addition, empirical research also shows that criminal opportunity interacts with self-control in explaining crime and delinquency. For example, Grasmick et al. (1993) have found that criminal opportunity has both a significant main effect and a significant interaction with self-control on self-reported crime including fraud and force. In addition, the relationship between self-control and acts of force and fraud is especially strong for those who perceive more criminal opportunities, relative to those who perceive less. Using parental/adult supervision as a measure of criminal opportunity, LaGrange and Silverman (1999) have found that crime opportunity moderates the relationship between self-control and delinquency, partially explaining the gender difference in delinquency. Using different measures of criminal opportunities, i.e., gender and crime-involved friends, Longshore (1998) and Longshore and Turner (1998) reported similar findings. This body of empirical evidence demands the incorporation of criminal opportunity to self-control theory for a more comprehensive and accurate explanation of crime.
Routine Activity as Criminal Opportunity

Inspired by empirical findings on criminal opportunity, Hay and Forrest (2008) have recently extended self-control theory by incorporating criminal opportunity into the theoretical model. They hypothesize that criminal opportunity amplifies the effects of self-control on crime. In other words, given the same level of self-control, individuals with more criminal opportunities are much more likely to commit crime relative to those with less criminal opportunities. According to Hay and Forrest (2008), incorporating criminal opportunity into self-control theory shows respect not only to the empirical findings but also to the logical consistency of self-control theory. This extension of self-control theory does not change its basic assumptions about crime, human nature, and social order. For example, this new extension of self-control theory also assumes that human being are self-interested creatures who pursue pleasures and avoid pain. It also holds the assumption of crime as providing immediate pleasure and requiring least pain of planning, preparation, and skills.

Hay and Forrest (2008) have conceptualized criminal opportunity as "a situation that makes crime possible or more easily accomplished" (p. 1046). Drawing on routine activity theory and its individual-level application, they have argued that the key source of variation in criminal opportunity is routine activities involving unstructured or unsupervised socializing. They have suggested that criminal opportunity can be measured using the frequency of unstructured or unsupervised socializing. Although prior research often measure criminal opportunities using items on routine activities, Hay and Forrest (2008) are the first one who explicitly conceptualize criminal opportunities as shown in individuals' routine activities.
Routine Activities in Effective Parenting and Other Socialization Processes

Effective parenting and other socialization processes, e.g., in the school, conventional peer groups, and religion, all have an element of routine activities in them. For example, parenting takes place on daily basis. The structural aspect of effective parenting, family routines about children, captures the routines of parenting, e.g., having meals with the child, helping the child with homework, assigning the child to do house chores, and making sure the child go to bed early. All family routines of children reflect parents’ administering or structuring of the child’s family life. Similarly, the school life has an element of routine activities. The school routines structures school life, e.g., from going to school, class starts, class ends, having recess, having lunch, class starts, class ends, and going back home. For the socialization among peer groups, its routines show in the regular time they play and spend together. While for the socialization in religion, its routines are shown in individuals’ repeated attendance of religious activities, e.g., worship, Sunday school, bible class, and other religious activities.

Routine activities in structured socialization processes, i.e., effective parenting, and those in the school and religion may present as deprivation of criminal opportunity. Hirschi (1969) noted that individuals involved in conventional activities are deprived of criminal opportunities. With the conventional activities, often structured, individuals just do not have the time to commit crime. Thus, the element of routine activities in the socialization processes in the family, school, and religion, which are structured activities, may be regarded as a deprivation of criminal opportunity. Since peer play-time is often unstructured, the lack of structure or supervision poses as criminal opportunity. Thus, the
element of routine activities in the socialization of peer groups may pose as peers may be regarded as criminal opportunity, rather than the deprivation of criminal opportunity.

**Summary of Prior Research**

Research on criminal opportunity prior to Hay and Forrest’s (2008) extension has consistently shown that the criminal opportunity significantly interacts with self-control in explaining crime. Since the extension to self-control theory, only two studies have explicitly examined the role of criminal opportunity in the relationship between self-control and delinquency/crime using Hay and Forrest (2008) extension. Using four measures of criminal opportunity including unsupervised time away from home (child report and parents’ report), time with peers, and adult absence, Hay and Forrest (2008) found that the availability of criminal opportunities significantly moderated the effects of self-control on delinquency. The availability of criminal opportunity significantly amplified the effect of low self-control on delinquency. Using availability of substances in the home and friends’ substance use as the measure of opportunity, the research done by Desmond, Bruce, and Stacer (2012) showed that availability of substance use does not significantly condition the relationship between self-control and adolescents’ smoking, drinking, and marijuana use, but friends’ substance use does.

A sound number of studies examine the impact of unstructured time spent with peers (e.g., Maimon and Browning 2010) and regular religious attendance (e.g., Pickering and Vazsonyi 2010; Simons, Burt, and Peterson 2009) on delinquency. However, there is no study that uses Hay and Forrest’s (2008) new extension to examine the role of criminal opportunity shown in the socialization processes in school, peer groups, and
religion as well as in parenting. In addition, Hay and Forrest’s (2008) research only
looks at a time point at age 12-14. Further study testing this extension is needed.

Following Hay and Forrest's (2008) example, I seek to examine the role of
criminal opportunities, measured as individuals' routine activities, in the relationship
between self-control and delinquency. Specifically, I examine how criminal
opportunities interact with self-control in predicting the developmental trajectories of
adolescents' delinquency.
CHAPTER 5
THE PRESENT STUDY AND HYPOTHESES

The Present Study

Prior research testing the stability of self-control generally shows negative evidence for Gottfredson and Hirschi’s (1990) stability postulate. It has shown that there are different patterns in population in terms of the changeability or stability in self-control. There are groups whose self-control remains stable over time. For those whose self-control changes over time, the changes of self-control show different directions -- it can be increasing, decreasing, or curvilinear. In addition, prior research has shown that there is substantial reshuffling in the ranking of self-control in similar-aged population over time.

Given its strong negation of Gottfredson and Hirschi’ (1990) stability postulate, the prior research has limitations. The prior studies only examined a short time period beyond the age of 10. Most of them limit their examination to the period from early childhood to the early or mid-adolescence. Few studies examine the changing patterns of self-control beyond mid-adolescence or up to adulthood, when self-control should be highly stable according to Gottfredson and Hirschi (1990). Due to this limitation, it is uncertain if prior evidence reflects a life-course trend of self-control or just a slight misidentification of the age when self-control should become stable. To optimize self-control theory, this uncertainty needs to be cleared.
In addition, the causal factors of self-control need to be identified. Earlier research testing the source of self-control primarily focused on parenting, without looking at other socialization processes. Recently, researchers have started to examine the role of other socialization processes (e.g., those at the school and religion) in instilling self-control in individuals. However, these studies often examine socialization processes in one or two types of the social institution and limit to early and mid-adolescence. It is still unanswered if the continued socialization processes in social institutions such as family, school, conventional peer groups, and religion during adolescence play a role in inducing changes in self-control over time. Answering this question is important in terms of optimizing self-control theory.

Further, there is still uncertainty about the role of criminal opportunity in the expression of low self-control into delinquency. It has long been suggested by empirical research that criminal opportunity may moderate the relationship between self-control and delinquency. However, Gottfredson and Hirschi (1990, 2003), after a time of uncertainty, have denied that criminal opportunity can play a role in the relationship between self-control and delinquency. Conceptualizing criminal opportunity as embedded in individuals' routine activities, Hay and Forrest (2008) have extended self-control theory and reconsidered the role of criminal opportunity in this theory. Since their extension of self-control theory, there is only very limited amount of research testing their extension. Further research is needed to test and evaluate this new extension.

The present study seeks to address the three issues concerning self-control theory. Specifically, the present study answers three closely-related research questions: 1) Is self-control stable up to early adulthood when self-control should be highly stable according
to Gottfredson and Hirschi (1990)? 2) Do socialization processes in family, school, religions, and conventional peer groups during adolescence induce changes in self-control? 3) Does criminal opportunity shown in socialization processes in the family, the school, peer groups, and religion interact with self-control in predicting delinquency.

Using a data set with an African American sample that covers the time range from age of 10 to 22, I test the stability of both the absolute level and the rankings of self-control over this age span and describe the trajectories of self-control up to early adulthood. Building on prior research, I also test the role of parenting, school, conventional peer groups, and religion during adolescence in predicting the trajectories of self-control up to early adulthood. In addition, using the same data set that covers the time range from age of 10 to age of 20\(^1\) and using the routine activities in socialization processes as measures of criminal opportunities, I examine the role of parenting, criminal opportunity in the relationship between self-control and delinquency.

**Hypotheses**

Following my argument against self-control theory, the "self-control as muscles" model, and based on prior empirical evidence on self-control theory, I expect that both the absolute levels and the rankings of self-control are changeable throughout the life course. Based on prior research findings on the heterogeneity in the population in terms of the changeability or stability of self-control up to mid-adolescence, I tested the following hypothesis about self-control up to early adulthood.

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\(^1\) Wave 5 data do not have delinquency items in the Wave 5 data since by the wave 5 data collection time, all the respondents are young adults. Instead of the delinquency items, the questionnaire includes crime items. Since the crime items at wave 5 are different from the delinquency items in prior waves, this wave of data is not used for the analysis of criminal opportunity and delinquency.
Hypothesis 1. There will be heterogeneity in the sample in terms of the stability of self-control from age 10 to 22.

Hypothesis 1a. Given the extensiveness of socialization processes, the majority of the sample will show increases in self-control from age 10 to 22.

Hypothesis 1b. There will be at least one group whose absolute levels of self-control remain stable from age 10 to 22.

Hypothesis 1c. There will be at least one group whose absolute levels of self-control decrease from age 10 to 22.

With different social circumstances, individuals may have very different experiences of continued socialization processes in the family, the school, peer groups, and religion etc. With the variation in their socialization, individuals may gain/lose self-control to different degrees. Thus, I expect that:

Hypothesis 2. Due to varied socialization individuals experience, there will be substantial reshuffling in the ranking of self-control over time.

Following the "self-control as muscles" model, I expect that parenting, conventional peer groups, religion, and the school play a significant role in predicting the trajectory of self-control over time. Specifically, analogous to the self-control-demanding exercises, effective parenting, conventionality of peer groups, religious commitment, and school commitment will all significantly increase individuals' self-control over time. Analogous to the regularity of self-control-enhancing exercises, I
expect that family routines about children, regular peer playtime, and regular religious attendance all significantly increase individuals’ self-control. In terms of self-control trajectory over time, these socialization processes will increase individuals' likelihood to follow trajectories that either remain high self-control across time or gain high self-control eventually. Thus, I expect that:

For parenting:

**Hypothesis 3a.** Authoritative parenting during adolescence increases the likelihood that individuals will have high self-control across time or will gain high self-control by age of 22.

**Hypothesis 3b.** Regular family routines during adolescence increase the likelihood that individuals will have high self-control across time or will gain high self-control by age of 22.

For peer groups:

**Hypothesis 4a.** Conventionality of peer groups during adolescence increases the likelihood that individuals will have high self-control across time or will gain high self-control by age of 22.

**Hypothesis 4b.** Regular play time with peers during adolescence increases the likelihood that individuals will have high self-control across time or will gain high self-control by age of 22.
For religion:

Hypothesis 5a: Religious commitment during adolescence increases the likelihood that individuals will have high self-control across time or will gain high self-control eventually by age of 22.

Hypothesis 5b. Regular attendance of religious activities during adolescence increases the likelihood that individuals will have high self-control across time or will gain high self-control by age of 22.

For school:

Hypothesis 6a. School commitment during adolescence increases the likelihood that individuals will have high self-control across time or will gain high self-control by age of 22.

Here in the present study, I did not examine the regularity of school attendance. My assumption is that the regularity of school attendance as the regularity of “self-control-enhancing exercises” does not have much variation among the population. It is true that some students may be suspended or truant. However, the days of suspension or truancy, compared to the length of mandatory education, is negligible. In other words, those disruptions do not alter the major theme of school life which is regular school-attendance.

Following Hay and Forrest's (2005) extension to self-control theory and based on research findings testing the role of criminal opportunity in the relationship between
self-control and delinquency, I expect that criminal opportunity facilitates the expression of low self-control into delinquency. In terms of the impact of criminal opportunity on the long-term trajectory of delinquency, I expect that the criminal opportunity interacts with self-control in prone individuals to promote delinquency trajectories that either have high delinquency over time or eventually report high delinquency by the age of 20. Specifically, I expect that:

**Hypothesis 7.** Individuals with higher levels of self-control, relative to their lower self-control counterparts, will be more likely demonstrate delinquency trajectories with either the lowest delinquency across time or the lowest level of delinquency by age of 20.

**Hypothesis 8.** Authoritative parenting will decrease individuals' likelihood of showing delinquency trajectories with either the highest delinquency across time or the highest levels of delinquency by age of 20.

**Hypothesis 9.** Individuals' self-control mediates the impact of authoritative parenting on individuals' delinquency trajectories.

**Hypothesis 10.** Given the same level of self-control, individuals with more regular family routines will be more likely to follow delinquency trajectories with either the lowest levels of delinquency across time or the lowest levels of delinquency by age of 20.
Hypothesis 11. Given the same level of self-control, individuals with more regular peer playtime will be more likely to follow delinquency trajectories with either the highest levels of delinquency across time or the highest levels of delinquency by age of 20.

Hypothesis 12. Given the same level of self-control, individuals with more regular religious attendance will be more likely to follow delinquency trajectories with either the lowest levels of delinquency across time or the lowest levels of delinquency by age of 20.

Hypothesis 13. Given the same level of self-control, individuals who continue school throughout adolescence will more likely to follow delinquency trajectories with either the lowest levels of delinquency across time or the lowest levels of delinquency by age of 20.

Here I include school continuity during adolescence. My assumption is that, in terms of criminal opportunity, the major variation does not come from differences in regularity of attending school (e.g., attending school every day vs. truancy). The major variation in terms of criminal opportunity that is related to school comes from the dichotomy of school status, i.e., attending school vs. dropping out of school.

Hypothesis 14. Given the same level of self-control, individuals who have higher level of criminal opportunity (composite measures) will be more likely to follow delinquency trajectories with either the highest levels of delinquency across time or the highest levels of delinquency by age of 20.
CHAPTER 6

METHODS

In this chapter, I discuss the data, measures, and analytic strategies I use to answer my three research questions. In the first section, I describe the data I used and the appropriateness of the data set for my analyses. Next, I describe the measures that I used in the analysis. In the last section, I discuss the strategies for the analyses and the models I used in the analyses.

Data

The present study utilized five waves of data from the Family and Community Health Study (FACHS), which were collected in 1998 (wave 1), 2000 (wave 2), 2004 (wave 3), 2006 (wave 4), and 2008 (wave 5). FACHS is a project to examine the risks and resources that may impact African American family and child development in social contexts other than inner city cores. Its sample consists of 889 African American families recruited from two states, Iowa and Georgia. Each family had a 5th grader at the time of recruitment. Both the target children and their primary caregivers were interviewed at each wave of data collection. At wave one, 889 African American children and their primary caregivers participated in this study. All of the participated children were 10 to 12 years old at wave 1 with a 10.5 year-old mean age. Among the target children, there were 411 boys and 478 girls; and 467 of them were in Iowa and 422 in Georgia. At wave 2, 779 families participated, and 767, 714 and 689 families participated at wave 3, 4 and 5, respectively.
This data set suits the current research very well. Based on a longitudinal design, this data set covers a long period of time ranging from targets children’s late childhood to early adulthood, i.e., from age 10-12 years old to 20-22 years old. It makes the examination of long-term developmental trajectories of both self-control and delinquency possible. Furthermore, it provides a large array of detailed developmental information on the target children, including children’s personal information and interaction with their immediate social environment, i.e., family, school, peer groups, and churches. It also provides information on both children and their immediate social environment from multi-sources (e.g. reported by target children and their primary caregivers). In addition, Gottfredson and Hirschi (1990) have argued that self-control theory is a general theory and it is applicable regardless of race and ethnicity. According to self-control theory, the African American population should reflect fully the patterns shown in the general population. Thus, using such a sample does not impair the validity and generalization of research findings.

Data from wave 1, wave 2, wave 4, and wave 5 were utilized in the analysis for the first two research questions. Selection of the four waves of data was based on the availability of measures for self-control. Data from wave 1, wave 2, wave 3, and wave 4 were utilized in the analysis for the third research question. Wave 5 data were not utilized in the analysis for criminal opportunity and delinquency since, by the time of wave 5 data collection, target children were all adults and the delinquency items were replaced by items of crime in the data set.
Measures

**Self-Control at Wave 1, Wave 2, Wave 4, and Wave 5.** Self-control at the four waves was the outcome variables in the analysis to test the stability of self-control. According to Gottfredson and Hirschi (1990:89-90), individuals low in self-control are impulsive, incapable of deterring gratification, risk-seeking, lack diligence and tenacity in tasks, prefer physical activities over mental or cognitive ones, and are self-centered and insensitive to the sufferings and needs of others. This construct was measured using a 15-item scale. Children were asked to answer 15 questions which assess the extent to which the respondents are risk-seeking, desire immediate gratification, show tenacity in tasks, be impatient, physical versus contemplative, are easily frustrated, etc. The response format is 1 (Not at all true), 2 (Somewhat true), and 3 (Very true). The reliability alpha of the scale for the wave 1, wave 2, wave 4, and wave 5 is .668, .718, .696, and .744, respectively. Following Hay and Forrest’s (2006) research, the scores of self-control were averaged over the 15 items and ranged from 1 to 3.

In the analysis to test the role of criminal opportunities in the relationship between self-control and delinquency, the self-control measures were used as the predictive variables. When self-control was used as the predictive variable, self-control at wave 1 was treated as self-control during childhood. Self-control at wave 2 and wave 4 were summed and averaged as measure of self-control during adolescence, following other

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2 This scale is a modified version of the self-control scale used by Burt, Simons, and Simons (2006). A number of items concerning target children’s behaviors in school were taken out because some of the respondents were out of school at wave 4 and wave 5. To make sure that the fluctuation in low self-control is not simply due to the attrition of items, only items applicable throughout the four waves were used to measure self-control in the current research. Using principal components analysis with the four waves of self-control data, the results show support for a one-factor solution. For each wave of data, four factors with eigenvalues of greater than 1.00 were extracted. However, the difference in eigenvalues between the first and the second factor (a difference of 1.43, 1.85, 1.30, and 2.40 for wave 1, 2, 4, and 5, respectively) is the most pronounced. Going from the second through the fourth factors, the breaks in eigenvalues between adjacent factors are substantially lower (ranging from 0.09 to 0.56). This suggests a one-factor solution (Hay, 2001).
researchers' recommendation (e.g., Wiesner and Silbereisen 2003). Original scores on self-control, rather than averaged scores over the 15 items, were used when self-control was treated as a predictive variable.

**Delinquency at Wave 1, Wave 2, Wave 3, and Wave 4.** Delinquency of the four waves was the outcome variable in the analysis to test the role of criminal opportunity in the relationship between self-control and delinquency. They were measured using a 26-item scale based on child's self-report data. Children were asked to report on the conduct disorder section of the Diagnostic Interview Schedule for Children, Version 4 (DISC-IV), which covers diagnoses criteria defined in Diagnostic Statistical Manual-IV (American Psychiatric Association, 1994). Developed over about 15 years of research on children and parents, the DISC has shown high reliability and validity (Shaffer et al., 1993). The fourth version of DISC has been in use since 1995 and it is a revision of the DISC-III informed by the findings from the Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) project (Shaffer et al., 1993). It includes an array of questions about the respondents' behavior in the conduct disorder section. Specifically, the respondents were asked about how often during the previous years they engaged in 26 delinquent behaviors including shoplifting, vandalism, burglary, physical assault, setting fires and lying, etc. This section can be used to construct symptom counts as well diagnose. In the current study, I used symptom counts. The reliability alpha for this scale is .810, .808, .835, and .851 for wave 1, wave 2, wave 3, and wave 4, respectively.

**Age at Wave 1, Wave 2, Wave 3, Wave 4, and Wave 5.** Target children’s age was included as a predictive variable in the trajectory analysis. The trajectory analysis is
to describe the changes of self-control (both absolute level and relative rankings) beyond age of 10 and up to early adulthood. Target children’s primary caregivers were asked to indicate children’s date of birth. Target children’s age is calculated using the date of data collection at each wave minus children’s date of birth. Since self-control may be very sensitive to changes in age and there can be 11 months difference within in the same year of age, target children’s age in current research was measured in month and centered at 120 months (or 10 years old).

**Authoritative Parenting during Childhood and Adolescence.** Authoritative parenting at wave 1 was treated as authoritative parenting during childhood since the target children's age is about 10-12 years old at wave 1 data collection. Following other researchers’ example (e.g., Wiesner and Silbereisen 2003), the average of authoritative parenting at wave 2 and wave 4 were treated as authoritative parenting during adolescence since, from wave 2 to wave 4, the time covers the whole adolescence (On average, from 13-19 years old). Other socialization variables were also treated using the same method.

Authoritative parenting at wave 1, wave 2, and wave 4 were measured using target children’s report. Responsiveness was measured using a 21-item scale. Target children were asked about their primary caregivers’ warmth (7 items), eschew of hostility (8 items), positive reinforcement (1 item), and inductive reasoning (5 items). Target children were asked to indicate, during the past year, how often their parents showed warmth to them (e.g., helping them do something that was important to them, let them know he/she really cares about them, and acted loving and affectionate toward them), avoided being hostile to them (e.g., shouting or yelling at them, criticizing them or
ideas, and getting angry at them), positively reinforced their good behavior, and engaged in inductive reasoning (e.g., asking them what they think before making a decision about them, and explaining the reason when they don’t understand a rule). Response format is 1 always, 2 often, 3 sometimes, and 4 never. Target children’s responses were coded and summed across items so that higher scores mean higher levels of responsiveness. The reliability alpha for responsiveness is .796, .853, and .888 for wave 1, wave 2, and wave 4, respectively.

Parents’ demandingness was measured using an 11-item scale. Target children were asked about their parents’ supervision and monitoring of their behavior (5 items) and parents’ consistent discipline (6 items). Target children were asked to indicate how often their parents knew what they did after school, where they were and what they were doing, how well they were doing in school, and if they did something wrong. They were also asked to indicate how often they would be disciplined at home if their parents knew they broke a school rule, how often their parents gave up when they did not listen to their parents or did something wrong, and how often their parents disciplined them depending on parents’ moods, etc. Response format is 1 always, 2 often, 3 sometimes, and 4 never. Target children’s responses were coded and summed across items so that higher scores mean higher levels of parents’ demandingness. The reliability alpha of the scale is .506, .629, and .701 for wave 1, 2, and 4, respectively.

The scores of responsiveness and demandingness are then summed for each wave as the scores on authoritative parenting. Authoritative parenting at wave 2 and wave 4 were summed and averaged as a measure of authoritative parenting during adolescence.
Family Routines about Children during Childhood and Adolescence. Family routines about children during childhood and adolescence was measured using a 6-item scale. Targets’ primary caregivers were asked to indicate how often the target children went to bed at the same time each night, their family eats a meal together each day, and do regular house chores, do homework at the same time each day or night during the week, etc. Response format is 1 every day, 2 almost every day, 3 1-2 times a week, or 4 never. Responses were coded and summed so that higher scores mean higher regularity of family routines. The reliability alpha of this scale is .555, .527, and .560 at wave 1, 2, and 4, respectively. Family routines about children at wave 1 were treated as family routines during childhood. Family routines about children at wave 2 and wave 4 were summed and averaged as family routines during adolescence.

Conventionality of Peer Group during Childhood and Adolescence.

Conventionality of peer group at wave 1, wave 2, and wave 4 was measured using a 5-item scale. Target children’s primary caregivers were asked to indicate how they agree with the statement about target children’s friends getting into trouble, going to church, sometimes smoking or drinking (drinking too much), listening to their parents, sometimes breaking the law. Response format was 1 strongly agree, 2 agree, 3 disagree, or 4 strongly disagree. Responses were coded and summed so that higher scores mean more conventional peer group. The reliability alpha of this scale is .659, .727, and .792 at wave 1, 2, and 4, respectively. Conventionality of peer group at wave 1 was treated as conventionality of peer group during childhood. Conventionality of peer group at wave 2

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3 There are two items from the scale of family routines about children included in wave 4 data. The wave 4 measure of the family routines about children is weighted using a factor (6/2).
and wave 4 were summed and averaged as conventionality of peer group during adolescence.

**Regularity of Peer Playtime during Childhood and Adolescence.** Regularity of peer playtime at wave 1, wave 2, and wave 3 was measured using a single item. Target children’s primary caregivers were asked to indicate about how many times in a week target does things with friends outside of school. Response format was 1 less than once a week, 2 1 to 2 times a week, 3 3 or 4 times a week, or 4 5 or more times a week. Responses were coded for wave 1, wave 2, and wave 3 so that higher scores mean higher regularity of peer playtime. Regularity of peer playtime at wave 1 was treated as regularity of peer playtime during childhood; the scores on wave 2 and wave 3 were summed and averaged as the regularity of peer playtime during adolescence.

**Religious Commitment during Childhood and Adolescence.** Religious commitment at wave 1, wave 2, and wave 4 was measured using a single item. Target children were asked to indicate how important religious or spiritual beliefs are in their day-to-day life. Response format is 1 very important, 2 fairly important, 3 not too important, or 4 not at all important. Responses at wave 1, wave 2, and wave 4 were coded so that higher scores mean stronger religious commitment. Religious commitment at wave 1 was treated as religious commitment during childhood. The scores of religious commitment at wave 2 and wave 4 were summed and averaged as the score of religious commitment during adolescence.

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4 Wave 3 data were used to compute the regularity of peer playtime since no data on this variable from wave 4. Since there is only 2 year-gap between wave 3 and wave 4 data collection, wave 3 measures would be the best approximation of the wave 4 measures.
Regularity of Religious Attendance during Childhood and Adolescence.

Regularity of religious attendance at wave 1, wave 2, and wave 4 was measured using 4 items. Target children were asked to indicate how often in the past month they attended church services and social events at their church, went places or did things with friends from their church, and attended Sunday school, a class, or discussion group on religion. Response format is 1 never, 2 once or twice, 3 three to four times, 4 more than once a week, and 5 daily. Responses were coded and summed so that higher scores mean higher regularity of church or religious activity attendance. The reliability alpha of this scale is .755, .772, and .837 at wave 1, wave 2, and wave 4, respectively. Regularity of religious attendance at wave 2 and wave 4 were summed and averaged as regularity of religious attendance during adolescence; while wave 1 measure was treated as regularity of religious attendance during childhood.

School Commitment during Childhood and Adolescence. School commitment at wave 1, wave 2, and wave 4 was measured using a 7-item scale. Target children were asked to indicate how true were the statements (e.g., they like school a lot, grades are very important to them, they don’t do well at school, and they do not feel like they really belong at school), and how often they have been in trouble for skipping or not attending school. Response format is 1 strongly agree, 2 agree, 3 disagree, and 4 strongly disagree. Responses were coded and summed so that higher scores mean higher level of school commitment. For target children that are out of school, the scores are treated as an absolute 0. The reliability alpha of this scale is .673, .686, and .696 at wave 1, wave 2, and wave 4, respectively. School commitment at wave 2 and wave 4 were summed and
averaged as school commitment during adolescence; school commitment at wave 1 was treated as school commitment during childhood.

**School Continuity during Adolescence.** School continuity during adolescence measures whether target children remain at school or dropped out of school. This variable is a dummy-coded variable based on three items. At wave 2, children are asked to indicate the type of school they attended at the time of data collection. All of the children gave a valid answer to this question suggesting that all the children were at school at the time of data collection. At wave 4, target children were asked to indicate whether or not they were at school or were going to attend school the following year. By the time of wave 4, 241 children dropped out of school. To distinguish those who were currently at school and who were planning to attend school the following year, the item asking target children to indicate their current grade was used. At wave 4, target children who both indicated that they were at school or were going to attend school the following year and reported a current grade were treated as being at school. Based on target children's school status at the two waves, for children who stayed at school at both waves school continuity during adolescence was coded as 1 (continuity of school attending throughout of adolescence); while for those who stayed in school at wave 2 but dropped out of school at wave 4 were coded as 0 (discontinuity of school during adolescence).

**Criminal Opportunity during Childhood and Adolescence.** Criminal opportunity during childhood and adolescence was measured using a composite measure. Family routines about children, regular religious attendance, and regular peer play time are standardized. The family routines about children and religious attendance are reversely coded so that more regular family routines and more regular religious
attendance means less criminal opportunity. Then, the reversely-coded standardized family routines about children and regularity of religious attendance are summed with standardized regularity of peer play times for both childhood and adolescence as the composite measure of criminal opportunity during childhood and adolescence, respectively. Thus, for the criminal opportunity, higher score means more criminal opportunity.

**Analytic Strategy**

Since the first two research questions are more closely-related, the first section of analyses were done to address the first two research questions, while the second section of analyses were devoted to the third research question. The first section of analyses was conducted in two steps. First, I used Group-Based Trajectory Modeling (GBTM) available in SAS Proc Traj to test the stability of self-control across the four time points (wave 1, wave 2, wave 4, and wave 5) ranging from 10-12 years old to 20-22 years old. The use of GBTM is based on prior research findings on self-control. Hay and Forrest (2006) found that a single trajectory is not sufficient to describe the changes or stability of self-control over time among population. There are several trajectories of self-control and each of them is shared by a cluster of individuals. Thus, to capture different trajectories of self-control among the population, GBTM was utilized in the first step of analysis following Hay and Forrest’s (2006) example.

GBTM (Jones, Nagin, and Roeder 2001; Nagin 1999; Nagin and Land 1993; Nagin 2005) is a model developed specifically to capture unobserved heterogeneity within the population. It can identify clusters of individuals who are relative homogeneous and share similar developmental trajectories over time. It uses a
multinomial modeling approach treating each individual’s developmental trajectory as a multinomial function of age and his/her membership in one of a set number of latent groups that can best approximate a continuous population distribution (i.e., censored normal distribution, Poisson, or logistic distribution) (Nagin, 1999). The GBTM used in the first section of analysis can be expressed as:

\[ y_{it}^* = \beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + e_u, \]

where \( y_{it}^* \) refers to a latent variable, i.e., self-control in this study, for a given individual \( i \) at time \( t \) given membership in group \( j \) (Nagin 2005). Age is the individual’s age at time \( t \) and \( Age^2 \) stands for the quadratic term of his/her age at time \( t \). This model specifically examines the change in the level of self-control overtime as a function of age. Usually, a quadratic relationship is utilized to model the relationship between measured behavior (self-control) and age. Since self-control is measured using psychometric scale (ranging from 1 to 3) and follows a censored normal distribution\(^5\) (Jones, Nagin, and Roeder 2001), a GBTM for censored-normally distributed data were used to fit current data. Thus, the relationship between the latent variable \( y_{it}^* \) and the observable indicator of self-control shows the following pattern (Hay and Forrest, 2006):

\[ y_{it} = 1 \text{ if } y_{it}^* < 1; \]
\[ y_{it} = y_{it}^* \text{ if } 1 \leq y_{it}^* < 3; \]
\[ y_{it} = 3 \text{ if } y_{it}^* \geq 3. \]

Since the SAS Proc Traj program can handle data with missing values using a full-information maximum likelihood (FIML), cases with missing data can be included in

\(^5\) Data measured using a psychometric scale follow a censored normal distribution (Jones, Nagin, and Roeder, 2001). In this type of distribution, there are data clustering on both the minimum and maximum scores of the scale. In addition, the clustering on the minimum score is relatively larger relative to that of the maximum score.
the analysis (Nagin 2005). However, it cannot handle data with missing values on the independent variable (i.e., age in our analysis). Thus, in our first step, only individuals with valid data on self-control at three or four waves of data collection and with valid data on age at four waves of data collection were included in the analysis. Our selection of cases with self-control data on at least 3 time points is to ensure that the cases have enough information to reasonably infer a developmental trajectory over time. This resulted in a total sample of 755 (335 boys and 420 girls).

Second, I use Multinomial Logit Regression (MNLR) to examine the role of socialization processes in the family, the school, conventional peer groups, and religion during adolescence in predicting the developmental trajectory of self-control up to early adulthood. Specifically, group membership in the different self-control trajectories up to early adulthood were regressed on the socialization processes (i.e., authoritative parenting, conventionality of peer group, school commitment, and religious commitment) and the structural aspects of the socialization processes (i.e., family routines about children, regularity of peer playtime, regularity of religious attendance) during adolescence. Variables of socialization processes and the structural aspect of these socialization processes during childhood were controlled in the model. Using individuals’ group membership in different self-control trajectories up to early adulthood as the outcome variable and socialization processes during childhood and adolescence as predicting variables is to make sure the temporal order of the outcome variable and predicting variable is in right direction.

The MNLR can be understood as simultaneously estimating binary logits for all comparisons among categories of the dependent variable. For each comparison pair of
the dependent categories, the probability of the dependent variable falling in one group relative to the reference group is:

\[ Pr(y=1|x) = \frac{\exp(\alpha + \beta x)}{1 + \exp(\alpha + \beta x)} \]

where \( \alpha \) and \( \beta \) vary with different comparison pairs and comparison group (Long and Freese 2003). In the second step of the first section of analyses, only individuals with valid data on all study constructs were included. This resulted in a sample of 675 (300 boys and 375 girls).

The use of the MNLR model, rather than GBTM, to do the second step of this section of analyses was based on a consideration of the limitations of the GBTM. To my knowledge, GBTM is by far the most advanced method identifying heterogeneity of developmental trajectories of a study construct among population and in describing its developmental trajectories. However, it is limited in that, once trajectories are identified and individuals’ developmental trajectory is determined, this model only allows other factors to inflate or flatten his/her trajectory. It does not allow other factors to switch an individual from one trajectory group to another totally different trajectory group. Thus, in a sense, this model inherently imposes a boundary to the effect of other factors on individuals’ developmental trajectories. This limitation of the GBTM is clearly shown in the debate between Nagin and Tremblay (2005) and Sampson and Laub (2005). In contrast, the MNLR allow social factors to impact individuals’ membership in different developmental trajectories, rather than only minor revision of a determined trajectory. Therefore, the MNLR is used in the second step of the first section of analysis.

The second section of the analyses was devoted to answering the third research question concerning the role of criminal opportunity in the relationship between self-
control and delinquency. The second section of analysis is basically the same as the first section of analysis. For this section, I conducted the analysis in two steps as well. Using wave 1, wave 2, wave 3, and wave 4 data, I first use GBTM to describe the long-term trajectories of delinquency ranging from age 10-12 to age 18-20 for boys and girls (Jones, Nagin, and Roeder, 2001). Since boys’ and girls’ delinquency is measured using count variables, the GBTM designed for count variables were utilized (Blokland, Nagin, and Nieuwbeerta, 2005). In this model, delinquency is treated as a multinomial function of age and individuals’ membership in a finite number of trajectories. The model\(^6\) can be expressed as the following:

\[
\log(\lambda_{it}^k) = \beta_0^k + \beta_1^k \text{Age}_{it} + \beta_2^k \text{Age}_{it}^2
\]

Where \(\lambda_{it}^k\) refers to the predicted rate of delinquent behavior for individual \(i\) at age \(t\) given his/her membership in group \(k\) (Blokland, Nagin, and Nieuwbeerta, 2005). \(\text{Age}_{it}\) is the individual’s age at time \(t\); \(\text{Age}_{it}^2\) is the quadratic term of the individuals’ age at time \(t\). The \(\beta_0^k, \beta_1^k,\) and \(\beta_2^k\) are estimated using the method of maximum likelihood under the assumption that the number of delinquency of the sample within trajectories groups followed a Poisson process with rate \(\lambda_{it}^k\). Since these \(\beta\)-parameters superscripted by \(k\) describe trajectories of different groups, these parameters can vary freely across the \(k\) groups. As I did with the self-control trajectory analysis, cases with valid data on delinquency for at least three time points were selected for the delinquency analysis. This resulted in a sample of 782 (427 girls and 355 boys).

In the second step of the second section of analysis, I used MNLR modeling to examine the moderating effects of criminal opportunities in the relationship between self-

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\(^6\) Prior research only identifies quadratic relationship between delinquency and age. Based on the prior research findings, I hypothesize a quadratic relationship between age and delinquency.
control and the trajectories of delinquency. Individuals’ group memberships of delinquency trajectories from age 10 to 20 were regressed on socialization processes, criminal opportunity, and self-control during childhood and adolescence. In doing this analysis, I assume that criminal opportunity and self-control impact delinquency contemporarily in that criminal opportunity are likely to facilitate the contemporary expression of self-control. Allowing a time-lag between the predictors and delinquency would assume a time-lag between predictors and delinquency. Cases with valid data on all the study variables were included in the analysis. This resulted in a sample of 686 (376 girls and 310 boys).

For both sections of the analysis, I did the analysis separately for boys and girls. This is out of a consideration of possible gender difference in the trajectories of self-control and delinquency and in the mechanisms whereby social factors may impact these trajectories. Gottfredson and Hirschi (1990) have suggested that the well-supported gender difference in offending may be partly due to gender difference in self-control. A number of empirical studies have reported significant difference in boys’ and girls’ levels of self-control (e.g., Burton, Cullen, Evans, Alarid, and Dunaway 1998; Gibbs, Giever, and Martin 1998; LaGrange and Silverman 1999). With the gender difference in the levels of self-control, it is reasonable to expect that boys and girls may follow different trajectories in the change of self-control. In addition, given the well-shown gender difference in both offending and criminality, it has been a common practice analyzing boys’ and girls’ data separately (e.g., Landor et al. 2011; Simons et al. 2007). Thus, to avoid overshadowing distinct developmental trajectories of boys’ and girls’ resulting
from analyzing data of the whole sample, I did the analysis for boys first, and then repeated the procedure for girls.
CHAPTER 7

RESULTS: THE STABILITY OF SELF-CONTROL

In chapter 6, I described the data I used for the present study and discussed the methods I utilized for the analysis. In this chapter, I focus on the results for the first two research questions. First, I present the descriptive statistics on self-control and age across waves. I proceed to present results from the trajectory analysis for self-control from age 10 to 22. I then present the results for the impact of socialization processes on self-control trajectories. At the end of this chapter, I summarize findings for the first two research questions.

Descriptive Statistics on Self-Control and Age across Waves

Descriptive statistics for self-control and age at four time points for boys and girls are presented in Table 1. For boys, the average absolute levels of self-control are 2.34, 2.35, 2.47, and 2.49 for wave 1, 2, 4, and 5, respectively. There is a slight increase in the average absolute levels of self-control from wave 1 to wave 2 and from wave 3 to wave 4, each with a 2-year gap. There is a big leap in the average absolute levels of self-control from wave 2 to wave 3 with a 6-year gap. Age is measured in months and is centered at 120 months. On average, the age of target boys aged about 11 years old (or 132 months), 13 years old (or 157 months), 19 years old (or 231 months), and 22 years old (or 264 months) at the four wave points, respectively.

Girls’ data show a pattern of change in self-control very similar to that of boys. For girls, the average absolute levels of self-control are 2.35, 2.36, 2.45, and 2.50 for
wave 1, 2, 3, and 4, respectively. There is a slight increase in the average absolute levels of self-control from wave 1 to wave 2 and from wave 3 to wave 4, each with a 2-year gap. There is a big increase in the average absolute levels of self-control from wave 2 to wave 3 with a 6-year gap. The only difference between boys and girls in terms of the changes in self-control seems to be that, between wave 3 and wave 4, girls’ absolute levels of self-control experience more increase, relative to those of boys. On average, the ages of girls at the four wave points are the same as that of boys, about 11 years old (or 132 months), 13 years old (or 157 months), 19 years (or 231 months), and 22 years old (or 264 months) at the four wave points, respectively.

The correlation coefficients among self-control measures at four time points for boys and girls are presented in Table 2. Correlation coefficients for boys are below the diagonal and girls’ above the diagonal. The correlation coefficients of self-control measures between wave 1 and wave 2 for boys and girls are .40 and .42 ($p<.01$), respectively; between wave 2 and wave 4 for boys and girls are .37 and .42 ($p<.01$), respectively. The correlation coefficients between wave 4 and wave 5 for boys and girls are .45 and .62 ($p<.01$), respectively. The correlation coefficients of self-control measures between wave 1 and wave 4 for boys and girls are .20 ($p<.01$) and .35 ($p<.01$), respectively; between wave 2 and wave 5 for boys and girls are .33 and .38 ($p<.01$), respectively. The correlation coefficients of self-control measures between wave 1 and wave 4 and between wave 2 and wave 5 are relatively smaller than those of between adjacent time points. In addition, the correlation coefficients of self-control measures between wave 1 and wave 5 for boys and girls, .16 and .27, respectively, are the smallest in terms of magnitude. This suggests that, over a long-term period, self-control shows
higher instability relative to that over a short-term period. In addition, the magnitude of correlation coefficients of self-control ranging from .16 to .62 suggests substantial reshuffling in the ranking of self-control over time.

**Results for the Trajectory Analysis of Self-Control**

To better describe the long-term developmental trajectories of self-control for boys and girls and to capture subgroups in the population that may share similar developmental trajectories of self-control, I fit Group-Based Trajectory Models (GBTM) to boys’ and girls’ data, separately. To fit Group-Based Trajectory Models, the first step is to test if there are multiple clusters of individuals that share similar trajectories of self-control and to specify the optimal number of these clusters. In other words, it is to determine the number of groups that have the highest homogeneity within groups and the highest differences among groups. I used an iterative process recommended by other researchers (Jones, Nagin, and Roeder, 2001; Nagin, 2005) to do this. I started fitting boys’ and girls’ data using a single group approach and added more groups to the model one at a time. I repeated the iterative process up to 8 groups that are suggested by Hay and Forrest (2006). For each group, I included a quadratic term, a linear term, and an intercept. When the coefficient for quadratic term was not statistically significant, the quadratic term was dropped from the model. Since linear coefficients are usually retained in the model regardless their significance (Andruff, Carraro, Thompson, Gaudreau, and Louvet 2009), I retained linear coefficients for all the groups.

The Bayesian Information Criteria (BIC) recommended by other researchers (Jones, Nagin, and Roeder, 2001; Nagin, 2005) were used to help identify the optimal number of groups that best describe patterns of self-control shown in data. BIC (Jones,
Nagin, and Roeder 2001; Schwarz 1978) is a statistic testing the null hypothesis that the (k+1) group approach is not significantly better than the k group approach in terms of explaining variations in data. Usually, Likelihood Ratio test is used for this type of hypothesis test. However, this test has its limitation – it can only test less than four clusters, i.e., three groups versus four groups (Ghosh and Sen 1985). To overcome this limitation, researchers use the log of the Bayes factor, which is valid for testing the number of groups in a population. Due to the computation complexity of the Bayes factor, researchers (D'Unger, Land, McCall, and Nagin 1998; Jones, Nagin, and Roeder 2001; Kass and Raftery 1995) have recommended the use of the change in BIC between models as an approximation to log Bayes factor, $2\log_e(B_{10})=2(\Delta BIC)$. $\Delta BIC$ results from the BIC of the alternative (i.e., model with k+1 groups) minuses the BIC of the null model (i.e., model with k groups). Following other researchers’ recommendation, I use the BIC approximation of log Bayes factor to test the optimal number of groups that can best describe the data. Value of the statistic is interpreted as the extent to which the alternative is favored over the null model. The cutoff point values in interpreting the statistics were shown in appendices A.

Results from the iterative process for boys’ and girls’ data are presented in Table 3. The results for boys show that BIC for a single-model approach is -227.94. Adding the second group, the BIC increases significantly ($2\Delta BIC=126.16; p<.05$) suggesting that there is significant heterogeneity among population and the two-group approach can fit the data significantly better than a single-group approach. Adding the third group to the model, BIC increases significantly ($2\Delta BIC=2.66; p<.05$) suggesting that three-group approach improves the model fit. Adding the fourth groups, BIC again increases
significantly ($\Delta$BIC 3.86; $p<.05$). After adding the fifth group, the BIC starts to decrease ($\Delta$BIC=-11.7; $p<0.5$) suggesting a deterioration in model fit. I run the process up to 8 groups suggested by Hay and Forrest (2006), the BIC keep decreasing. The results suggest that four-group approach fit boys’ data the best.

I repeated the iterative process for girls’ data. The results for girls show that BIC for a single-group approach is -295.3. Adding the second group, the BIC increases significantly ($\Delta$BIC=255.06; $p<.05$) suggesting that there is significant heterogeneity among girls and the two-group approach can fit the data significantly better than a single-group approach. Adding the third group to the model, BIC increases significantly ($\Delta$BIC=17; $p<.05$) suggesting that three-group approach improves the model fit. Adding the fourth groups, BIC again increases significantly ($\Delta$BIC=19.06; $p<.05$). Adding the fifth groups, BIC again increases significantly ($\Delta$BIC=2.84; $p<.05$). After adding the sixth group, the BIC starts to decrease ($\Delta$BIC=-11.06, $p<0.5$) suggesting a deterioration in model fit. I run the process up to 8 groups recommended by Hay and Forrest (2006), the BIC keep decreasing. The results suggest that five-group approach yields the best model fit for girls.

Average posterior probabilities for the selected approaches are then examined. Posterior probabilities are statistics to show the probabilities that each individual falls into the identified groups or patterns (Nagin, 1999). It is calculated based on the model coefficient estimates. For each individual, the probability of falling in each of the identified groups is calculated on the basis of the individual’s longitudinal pattern of outcome behavior. Individuals are assigned the membership of the group for which they have the highest posterior probability. Then, for each group, the posterior probabilities of
all the assigned members for that group are averaged. The average posterior probabilities for identified groups reflect how well these groups group individuals sharing similar patterns of change and distinguish individuals with different patterns. Generally, average posterior probabilities of group membership greater than .70 to .80 are regarded as a sign that the identified groups significantly well in term of describing the data (Andruff, Carraro, Thompson, Gaudreau, and Louvet, 2009; Nagin, 2005:88).

The average posterior probabilities of the four groups for boys are 0.68, 0.74, 0.73, and 0.84. Three of the posterior probabilities exceed the recommended value of 0.70 (Nagin, 2005:88). The average posterior probability for the first group is slightly lower than the cutoff point. To make sure if this group captures a meaningful feature of the data, I compare the intercepts and the slopes of this group with that of the other three groups, respectively. The result shows that the group trajectory is significantly different from the other three groups. This suggests that this group is significantly different from other groups and stands for a unique pattern of change in self-control. So I accept the four-group approach as the optimal model for boys’ data. The average posterior probabilities for girls range from 0.77 to 0.85, suggesting that the five-group approach captures well the heterogeneity among groups and the homogeneity within groups.

Having identified the number of groups that fits the data best, it is time to look at the trajectories of self-control for these groups presented in Table 4. For boys, the trajectories of self-control for the four identified groups can be described as median self-control increasing group (M.I. group, 22% of boys), low self-control increasing group (L.I. group, 8% of boys), median self-control stable group (M.S. group, 21% of boys), and high self-control increasing group (H.I. group, 48% of boys). Among the four
groups, the M.I. group starts with median level of self-control (2.1) and increases over time (0.0032; $p<0.01$); the L.I. group starts with low self-control (1.84) and increases over time (0.0029; $p<0.01$); the M.S. group starts with median self-control (2.32) and remains relatively stable (-0.0007, $p=0.31$); the H.I. group starts with high self-control (2.5; $p<0.01$) and increases over time (0.0008; $p<0.01$). Among the three increasing groups, the group with median self-control experiences the steepest increase over time, followed by low self-control groups. Although it is increasing over time, the group with the highest starting-level of self-control gains less over time, relative to the other groups with increasing trajectories. The amount of variance in self-control accounted for by the model is given by Sigma, which is equivalent to R-squared in OLS model (Andruff, Carraro, Thompson, Gaudreau, Louvet, 2009). It suggests that overall the model explains 22% of the variance in self-control over time.

Figure 1 shows the visual display of the four groups of boys. Among the four groups, the H.I. group has high self-control throughout the time and remains the highest ranking in self-control. The M. I. group, although starting with median self-control, gains high self-control eventually and ranks second high in self-control by the time of early adulthood. In contrast, although the L.I. group gains substantial strength in self-control, it only has median levels of self-control by the time of early adulthood and ranks much lower in self-control relative to the H.I. and M.I. groups. By the early adulthood, the M.S. and L.I. groups are about the same in terms of their levels and both of their rankings are low, with the L.I. group’s ranking slightly higher relative to the M.S. group.

Among the four groups, three groups (79% of the boys in the M.I., the L.I., and the H.I. groups) experience increases in the absolute levels of self-control up to early
adulthood. One group (21% of the boys in the M.S. group) remains relatively stable in the absolute levels of self-control. In terms of ranking of self-control, three groups (52% of boys) transpose their ranking of self-control – the M.I. and L.I. groups transpose with the M.S. group. The M.I. group experiences the steepest increase in self-control and the steepest increases in the ranking of self-control.

The five groups of girls (presented in Table 4) can be defined as median self-control increasing group (M.I. group, 10% of girls), low self-control increasing group (L.I. group, 3% of girls), high self-control stable group (H.S. group, 17% of girls), median self-control stable group (M.S. group, 14% of girls), and high self-control curvilinear group (H.C. group, 56% of girls). The M.I. group starts with median self-control (1.91) and increases over time (0.0046; \( p < .01 \)); The L.I. group starts with low self-control (1.67) and increases over time (0.0028; \( p < .01 \)); The H.S. group starts with high self-control (2.63) and remains stable over time (0.0005; \( p = 0.17 \)); The M.S. group starts with median self-control (2.15) and remains stable over time (-0.0003; \( p = 0.37 \)); The H.C. group starts with high self-control and shows curvilinear change over time (quadratic term 0.00001, \( p < 0.05 \); linear term -0.0008, \( p = 0.31 \)).

Figure 2 is a visual display of the five trajectories of self-control for girls. Among the five groups, the H.S. group has the highest self-control throughout the time and it ranks the highest in self-control over time. The H.C. group has high self-control throughout the time as well. It experiences a slight decrease in self-control during the early adolescence and a gradual increase thereafter. The M.I. group, though starting with median self-control, gains high self-control by the early adulthood and catches up with the H.C. group in the levels of self-control and ranks even slightly higher than the H.C.
group. Although the L.I. group gains self-control over time, its self-control is still much lower than the H.C., H.S., and M.I. groups. By the early adulthood, the M.S. group and L.I. group show only median self-control and their rankings are the lowest among the five groups.

Among the five groups, three groups (69% of girls in the H.C., M.I., and L.I. groups) experience increase in their absolute levels of self-control up to early adulthood. Two groups (31% of girls in the H.S. and M.S. groups) remain stable in their self-control. Three groups (80% of girls) experience transpose in their ranking of self-control – the M.I. group transpose with both H.C. and M.S. group. The M.I. group experiences the steepest increase in self-control and the steepest increases in their ranking of self-control.

Results for the Impact of Socialization Processes on Self-Control Trajectories

After describing the trajectories of self-control, I proceeded to test the role of socialization processes in family (i.e., parenting), school, conventional peer groups, and religiosity in inducing the changes in self-control. To do the analysis, I first did group profiling for each of these groups. Table 5 shows the group profiling for the four groups of boys. For boys, authoritative parenting and school commitment during childhood are significantly different across the four groups. The mean scores on authoritative parenting during childhood is 98, 93, 102, and 104, respectively for the M.I., L.I., M.S., and H.I. groups. Among them, the H.I. group has the highest score on authoritative parenting during childhood; while L.I. has the lowest score on authoritative parenting during childhood. H.I. group also has the highest score on school commitment during childhood; while L.I. has the lowest score on it. During adolescence, authoritative parenting, religious commitment, conventionality of peers, and school commitment are
all significantly different across the four groups. Similarly, the H.I. group has the highest scores on all these variables; while the L.I. group has the lowest scores on these variables. For the M.I. group, the authoritative parenting during childhood is the second lowest among the four groups, while the authoritative parenting during adolescence for this group rises to the second highest among the four groups.

In the second step of my analysis, I treated target children’s membership of self-control trajectories as outcome variables and fitted Multinomial Logit Regression models to examine if socialization processes in families, school, peer groups, and religion during their adolescence impact their trajectories of self-control up to early adulthood. In the analysis for boys’ data, the H.I. group is treated as the reference group. The results for boys are presented in Table 6 and Table 7. In Model 1 for boys, family routines, regularity of peer playtime, and religion attendance during childhood were entered into the equation. None of them significantly impacts boys’ self-control trajectories. In model 2 for boys, authoritative parenting, conventionality of peers, religious commitment, and school commitment during childhood were entered into the equation. Authoritative parenting and school commitment during childhood show significant impact on boys’ self-control trajectories. In model 3, family routines, regularity of peer playtime, and religion attendance during adolescence were entered into the equation. Entering these variables does not change the impact of authoritative parenting and school commitment during childhood on boys’ self-control trajectories. Family routines during adolescence show only marginal impact on boys’ self-control trajectories.

In model 4, authoritative parenting, peer conventionality, religious commitment and school commitment during adolescence were entered into the equation. The results
show that authoritative parenting during childhood, school commitment during childhood, authoritative parenting during adolescence, and conventionality of peers during adolescence all significantly impact boys’ trajectories of self-control up to early adulthood. Other variables do not show significant impact upon boys’ self-control trajectories. For boys, every standard deviation increase in authoritative parenting during childhood decreases the odds of boys’ having the M.I. and L.I. trajectories relative to the H.I. trajectory by a factor 0.65 and 0.39, respectively. Every standard deviation increase in authoritative parenting during adolescence for boys decrease their odds of having the M.I., L.I. and M.S. trajectories relative to the H.I. trajectory by a factor 0.67, 0.49, and 0.52, respectively. Supporting the hypothesis, authoritative parenting during adolescence significantly increases the likelihood that boys follow a trajectory with high self-control throughout of time. In addition, every standard deviation increase in boys’ school commitment during childhood decreases the odds of boys’ having a M.I. trajectory relative to H.I. trajectory by a factor 0.64. School commitment during adolescence does not significantly impact boys’ trajectories of self-control up to early adulthood.

Every standard deviation increase in conventionality of peers during adolescence decreases boys’ odds of having the M.I. trajectory, relative to the H.I. trajectory by a factor 0.68. Conventionality of peers during adolescence also marginally decreases the odds of having a L.I. trajectory relative to H.I. trajectory for boys. This result supports the hypothesis that higher conventionality of peers increases the likelihood that boys follow trajectories with high self-control. The impact of regularity of peer playtime on boys’ trajectories of self-control seems counter-intuitive. Supporting the hypothesis, regularity of peer playtime during adolescence marginally decreases the odds of having
L.I. and M.S. trajectories relative to H.I. trajectory for boys. However, the regularity of peer playtime during childhood marginally increases the odds of having L.I. trajectory relative to H.I. trajectory for boys. Spending more time playing with conventional peers during childhood does not seem to be a good thing for boys in terms of instilling self-control.

For boys, authoritative parenting during childhood and adolescence are similar in terms of their impact on self-control trajectory. Authoritative parenting increases the likelihood that boys following a H.I. trajectory which both starts with highest level of self-control, even gains more in the strength of self-control, and consistently ranks the highest in self-control among the sample. School commitment during childhood seems to be a salient factor in terms of self-control development. It increases boys’ likelihood of following a H.I. self-control trajectory. However, school commitment during adolescence does not seem to be a salient factor in instilling self-control. During adolescence, conventionality of peers significant impacts boys’ trajectories of self-control. It increases boys’ likelihood of following a H.I. self-control trajectory. Religion does not seem to be a salient factor that impacts boys’ self-control. Both religious commitment and regular attendance of religious activities fail to show significant impact upon boys’ self-control development. This holds for both childhood and adolescence.

I repeated the same analysis for girls’ data. For girls, during childhood, scores on authoritative parenting, family routines about children, religion attendance, and school commitment are all significantly different across the five groups (presented in Table 5). Among them, the H.S. group has the highest scores on all these variables; while the L.I. group has the lowest scores on all these variables. During adolescence, authoritative
parenting, religious commitment, religion attendance, conventionality of peer, and school commitment are all significantly different across groups. Among the five groups, the H.S. group has the highest scores on all these variables; often followed by either the H.C. group or M.I. group; while the L.I. group has the lowest scores on nearly all these variables, except school commitment. In addition, authoritative parenting during childhood for the M.I. group is the second lowest among the five groups; while authoritative parenting for the M.I. group during adolescence rises to the second highest among the five groups.

I then fitted Multinomial Logit Regression models to girls’ data, with the H.C. trajectory as the reference group. The results are presented in Table 8 and Table 9. In Model 1 for girls, family routines, regularity of peer play time, and religion attendance during childhood were first entered to the equation. All of the three variables significantly impact girls’ membership of self-control trajectories. In model 2 for girls, authoritative parenting, peer conventionality, religious commitment, and school commitment during childhood were entered into the equation. Authoritative parenting and school commitment during childhood show significant impact on girls’ self-control trajectories. Entering of the four variables, the impact of family routines and religion attendance during childhood is no longer significant. In model 3, family routines, regularity of peer playtime, and religion attendance during adolescence were entered into the equation. Entering these variables does not change the impact of authoritative parenting and school commitment during childhood on girls’ self-control trajectories. Girls’ religious attendance during adolescence shows significant impact on girls’ self-control trajectories.
In model 4 for girls, authoritative parenting, peer conventionality, religious commitment and school commitment during adolescence were entered into the equation. The results show that authoritative parenting and school commitment during childhood and authoritative parenting and religious commitment during adolescence significant impact girls’ self-control trajectories. For girls, every standard deviation increase in authoritative parenting during childhood decreases their odds of following the M.I. trajectory relative to the H.C. trajectory by a factor of 0.53, and marginally increases their odds of following a H.S. trajectory relative to H.C. trajectory by a factor 1.56. Every standard deviation increase in authoritative parenting during adolescence for girls increases their odds of following the M.I., and H.S. trajectories relative to the H.C. trajectory by a factor 1.77 and 1.83, respectively, and decreases girls’ odds of following a L.I. trajectory relative to H.C. trajectory by a factor 0.29.

In addition, every standard deviation increase in girls’ school commitment during childhood decreases their odds of having the M.I. and L.I. trajectories relative to H.C. trajectory by a factor 0.60 and 0.38, respectively. School commitment during adolescence only shows marginal impacts on girls’ self-control trajectories. Every standard deviation increases in girls’ school commitment during adolescence marginally decreases their odds of following a M.I. trajectory relative to H.C. trajectory by a factor 0.68. Peer groups variables do not show significant impact on girls’ self-control. The impact of religion on girls’ self-control shows very interesting patterns. Every standard deviation increase in girls’ religious commitment increases their odds of following a H.S. trajectory relative to a H.C. trajectory by a factor 2.12 and decreases their odds of following L.I. and M.S. trajectories relative to a H.C. trajectory by a factor of 0.31 and
0.65, respectively. In contrast with positive impact of religious commitment during adolescence on girls’ self-control, regular religious attendance during adolescence shows negative impact. Every standard deviation increase in girls’ religious attendance during adolescence increases their odds of following L.I. and M.S. trajectories relative to H.C. trajectories by a factor 4.06 and 1.78, respectively.

For girls, authoritative parenting during childhood and adolescence are similar in terms of their impact on self-control trajectory. Authoritative parenting increases the likelihood that girls following a H.S. or M.I. trajectory which either have the highest self-control throughout the time or gained high self-control by early adulthood. School commitment during childhood is a salient factor in girls’ self-control development. Like it is in boys’ case, school commitment during adolescence does not seem to be a salient factor in instilling self-control for girls. During adolescence, religious commitment significantly impacts girls’ trajectories of self-control. It increases girls’ likelihood of following a trajectory either with high self-control across time or gained high self-control by early adulthood. Peer groups do not seem to be a salient factor that impacts girls’ self-control. Both the peer playtime and the conventionality of peers fail to show significant impact on girls’ self-control. This holds for both childhood and adolescence.

**Summary of Findings**

As a summary, the present study finds heterogeneity in the sample in terms of the trajectories of self-control from age 10 to 22. Four trajectories of self-control, i.e., median self-control increasing group, low self-control increasing group, median self-control stable group, and high self-control increasing group are identified for boys. The percentage of boys fall in the four groups is 22%, 8%, 21%, and 48%, respectively. For
girls, five trajectories of self-control, i.e., median self-control increasing group, low self-control increasing group, high self-control stable group, median self-control stable group, and high self-control curvilinear group are identified. The percentage of girls fall in the five groups is 10%, 3%, 17%, 14%, and 56%, respectively.

The present study also shows that both the absolute level of self-control and the ranking of self-control in similar-aged cohort are changeable up to early adulthood. For boys, 79% experience increases in their absolute levels of self-control; while only 21% of boys remain stable in their absolute levels of self-control. For girls, 69% of them experience increases in their absolute levels of self-control, and 31% remain stable. Increase in the absolute levels of self-control is the general trend of self-control for both boys and girls from age 10 to 22. In addition, both boys and girls experience substantial reshuffling in their ranking of self-control from age 10 to 22. Fifty two percent of boys and 80% of girls experience changes in the ranking of self-control.

Among the socialization processes, both authoritative parenting and school commitment during childhood significantly impact boys’ trajectories of self-control. During adolescence, both authoritative parenting and conventionality of peers significantly impact boys’ trajectories of self-control. Regularity of peer playtime during childhood and regularity of peer playtime during adolescence only have marginal impacts on boys’ trajectories of self-control. There is no significant impact found for other variables.

For girls, both authoritative parenting and school commitment during childhood significantly impact girls’ trajectories of self-control. During adolescence, both authoritative parenting and religious commitment significantly impact girls’ trajectories
of self-control. Religious attendance during adolescence also significantly impacts girls’
trajectories of self-control; however, the direction of the impact is opposite to the
expected direction. There is no significant impact found for other variables.
Table 1: Descriptive Statistics of Self-Control and Age for Girls and Boys.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>Range</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Girls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-control at W1</td>
<td>2.35</td>
<td>0.31</td>
<td>1.47-3</td>
<td>420</td>
</tr>
<tr>
<td>Self-control at W2</td>
<td>2.36</td>
<td>0.30</td>
<td>1.2-3</td>
<td>391</td>
</tr>
<tr>
<td>Self-control at W4</td>
<td>2.45</td>
<td>0.26</td>
<td>1.4-2.93</td>
<td>398</td>
</tr>
<tr>
<td>Self-control at W5</td>
<td>2.50</td>
<td>0.27</td>
<td>1.6-3</td>
<td>390</td>
</tr>
<tr>
<td>Age in months at W1</td>
<td>12.08</td>
<td>6.99</td>
<td>-3-35</td>
<td>420</td>
</tr>
<tr>
<td>Age in months at W2</td>
<td>37.07</td>
<td>7.82</td>
<td>18-70</td>
<td>420</td>
</tr>
<tr>
<td>Age in months at W4</td>
<td>111.84</td>
<td>9.87</td>
<td>89-142</td>
<td>420</td>
</tr>
<tr>
<td>Age in months at W5</td>
<td>144.20</td>
<td>9.17</td>
<td>122-170</td>
<td>420</td>
</tr>
<tr>
<td><strong>Boys</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-control at W1</td>
<td>2.34</td>
<td>0.29</td>
<td>1.47-2.93</td>
<td>335</td>
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<tr>
<td>Self-control at W2</td>
<td>2.35</td>
<td>0.30</td>
<td>1.47-3</td>
<td>319</td>
</tr>
<tr>
<td>Self-control at W4</td>
<td>2.47</td>
<td>0.27</td>
<td>1.67-3</td>
<td>309</td>
</tr>
<tr>
<td>Self-control at W5</td>
<td>2.49</td>
<td>0.28</td>
<td>1.2-3</td>
<td>290</td>
</tr>
<tr>
<td>Age in months at W1</td>
<td>11.83</td>
<td>7.09</td>
<td>-9-39</td>
<td>335</td>
</tr>
<tr>
<td>Age in months at W2</td>
<td>36.87</td>
<td>8.08</td>
<td>18-65</td>
<td>335</td>
</tr>
<tr>
<td>Age in months at W4</td>
<td>111.19</td>
<td>9.45</td>
<td>82-137</td>
<td>335</td>
</tr>
<tr>
<td>Age in months at W5</td>
<td>143.91</td>
<td>9.05</td>
<td>116-180</td>
<td>335</td>
</tr>
</tbody>
</table>

Note: Using list-wise deletion, N=339 and 248 for self-control analysis for girls and boys, respectively. Age in months is centered at 120 months.
<table>
<thead>
<tr>
<th></th>
<th>Self-Control W1</th>
<th>Self-Control W2</th>
<th>Self-Control W4</th>
<th>Self-Control W5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Control W1</td>
<td>1</td>
<td>0.42**</td>
<td>0.35**</td>
<td>0.27**</td>
</tr>
<tr>
<td>Self-Control W2</td>
<td>0.40**</td>
<td>1</td>
<td>0.42**</td>
<td>0.38**</td>
</tr>
<tr>
<td>Self-Control W5</td>
<td>0.20**</td>
<td>0.37**</td>
<td>1</td>
<td>0.62**</td>
</tr>
<tr>
<td>Self-Control W5</td>
<td>0.16*</td>
<td>0.33**</td>
<td>0.45**</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: 1. For self-control matrix using listwise deletion, N=339 and 248 for girls and boys, respectively.
2. Correlation coefficients above diagonal are for girls, and below the diagonal are for boys.
3. ** p<.01; * p<.05; † p<.10; 2-tailed test.
Table 3: Tests of Population Heterogeneity in the Change of Self-control Using GBTM (Boys and Girls).

<table>
<thead>
<tr>
<th>Models</th>
<th>Boys</th>
<th></th>
<th></th>
<th>Girls</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BIC</td>
<td>Comp.</td>
<td>2ΔBIC</td>
<td>BIC</td>
<td>Comp.</td>
<td>2ΔBIC</td>
</tr>
<tr>
<td>1-group</td>
<td>-227.94</td>
<td></td>
<td></td>
<td>-295.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-group</td>
<td>-164.86</td>
<td>1-grp</td>
<td>126.16*</td>
<td>-167.77</td>
<td>1-grp</td>
<td>255.06*</td>
</tr>
<tr>
<td>3-group</td>
<td>-163.53</td>
<td>2-grp</td>
<td>2.66*</td>
<td>-159.27</td>
<td>2-grp</td>
<td>17*</td>
</tr>
<tr>
<td>4-group</td>
<td>-161.6</td>
<td>3-grp</td>
<td>3.86*</td>
<td>-149.64</td>
<td>3-grp</td>
<td>19.06*</td>
</tr>
<tr>
<td>5-group</td>
<td>-167.45</td>
<td>4-grp</td>
<td>-11.7</td>
<td>-148.22</td>
<td>4-grp</td>
<td>2.84*</td>
</tr>
<tr>
<td>6-group</td>
<td>-172.05</td>
<td>5-grp</td>
<td>-9.2</td>
<td>-154.75</td>
<td>5-grp</td>
<td>-11.06</td>
</tr>
<tr>
<td>7-group</td>
<td>-180.12</td>
<td>6-grp</td>
<td>-16.14</td>
<td>-160.79</td>
<td>6-grp</td>
<td>-12.08</td>
</tr>
<tr>
<td>8-group</td>
<td>-188.84</td>
<td>7-grp</td>
<td>-1724</td>
<td>-167.45</td>
<td>7-grp</td>
<td>-13.32</td>
</tr>
</tbody>
</table>

Note: 1. For self-control, N=335 and 420 for boys and girls, respectively.
Table 4: Trajectories of Self-Control for Boys and Girls.

<table>
<thead>
<tr>
<th>Group #</th>
<th>Coefficients Name</th>
<th>Boys</th>
<th>Girls</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coefficients</td>
<td>Std. E.</td>
<td>P-value</td>
</tr>
<tr>
<td>1</td>
<td>Intercept</td>
<td>2.1**</td>
<td>0.08</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>0.0032**</td>
<td>0.008</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Intercept</td>
<td>1.84**</td>
<td>0.07</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>0.0029**</td>
<td>0.0006</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Intercept</td>
<td>2.32*</td>
<td>0.05</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>-0.0007</td>
<td>0.0007</td>
<td>0.31</td>
</tr>
<tr>
<td>4</td>
<td>Intercept</td>
<td>2.5*</td>
<td>0.03</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>0.0008**</td>
<td>0.0003</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Quadratic</td>
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<td></td>
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</tr>
<tr>
<td>BIC</td>
<td></td>
<td>-161.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sigma</td>
<td></td>
<td>0.22**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 1. N=335 and 420 for boys and girls, respectively.
2. The sum of percentages may not equal to 100% due to rounding.
3. Age is measured in months and centered at 120 months.
4. ** p<.01; * p<.05; † p<.10; 2-tailed test.
Figure 1. Self-Control Trajectories of Boys (10-22 yrs old).
Figure 2. Self-Control Trajectories of Girls (10-22 yrs old).
Table 5: Group Profiling for Boys and Girls Following Different Self-Control Trajectories.

|-----|-----|-----|-----|-------|------
| M.I. | L.I. | M.S. | H.I. | Range | Mean | Mean | Mean | Mean | Mean | Mean | Range | Sign.

**Childhood Variables**

| Authoritative Parenting | 97.97 | 93.29 | 101.80 | 103.68 | 73-121 | .00 | 94.13 | 89.70 | 107.70 | 95.96 | 102.21 | 49-126 | .00
| Family Routines | 18.52 | 18.00 | 18.87 | 18.57 | 11-24 | .63 | 17.75 | 17.50 | 19.58 | 18.27 | 18.92 | 10-24 | .02
| Religious Commitment | 3.32 | 3.17 | 3.44 | 3.48 | 1-4 | .33 | 3.34 | 3.50 | 3.68 | 3.40 | 3.54 | 1-4 | .22
| Religion Attendance | 10.30 | 9.67 | 10.20 | 10.04 | 4-20 | .90 | 9.78 | 9.60 | 12.30 | 10.50 | 11.29 | 4-20 | .01
| Peer Conventionality | 15.72 | 15.50 | 16.11 | 15.90 | 8-20 | .54 | 15.84 | 16.50 | 16.58 | 16.00 | 16.46 | 10-20 | .28
| Peer Playtime | 2.42 | 2.71 | 2.21 | 2.32 | 1-4 | .29 | 2.06 | 2.00 | 2.25 | 1.79 | 2.10 | 1-4 | .23

**Adolescence Variables**

| Authoritative Parenting | 98.32 | 93.32 | 96.43 | 102.36 | 71-124 | .00 | 101.40 | 88.93 | 108.22 | 89.54 | 100.40 | 74-108 | .00
| Religious Commitment | 3.23 | 3.02 | 3.20 | 3.37 | 2-4 | .02 | 3.44 | 2.75 | 3.76 | 3.15 | 3.40 | 1.5-4 | .00
| Religion Attendance | 7.82 | 7.35 | 7.89 | 8.19 | 4-16 | .38 | 8.48 | 8.35 | 10.28 | 8.41 | 8.67 | 4-17 | .00
| Peer Conventionality | 15.18 | 14.72 | 15.62 | 15.85 | 9-20 | .01 | 15.46 | 14.65 | 16.16 | 15.16 | 15.81 | 10-20 | .01
| Peer Play | 2.42 | 2.25 | 2.11 | 2.31 | 1-4 | .24 | 1.91 | 2.05 | 2.08 | 2.02 | 2.01 | 1-4 | .87
| School Commitment | 18.72 | 15.40 | 17.75 | 18.79 | 8-28 | .05 | 17.21 | 17.33 | 22.57 | 17.45 | 20.09 | 7-28 | .00

| N | 60 | 24 | 61 | 155 | 300 | 32 | 10 | 53 | 52 | 228 | 375

Note: 1. Variables with italic numbers are significantly different across groups.
2. M.I. stands for Medium-Increasing group; L.I. for Low-Increasing trajectory; M.S. for Medium-Stable trajectory; H.S. for High-Stable trajectory; M.S. for Medium-Stable trajectory; H.C. for High-Curvilinear trajectory.
Table 6. Self-Control Trajectories Regressed on Socialization Processes using MNLR Model (Boys).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>e^b</td>
<td>e^b</td>
</tr>
<tr>
<td></td>
<td>Std X</td>
<td>Std X</td>
</tr>
<tr>
<td>Childhood Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Routines</td>
<td>1.00 0.940.950.861.041.111.021.06</td>
<td>0.990.971.041.12</td>
</tr>
<tr>
<td>Peer Playtime</td>
<td>1.111.111.341.380.930.921.121.131.381.43</td>
<td>0.940.931.061.13</td>
</tr>
<tr>
<td>Religion Attendance</td>
<td>1.021.090.990.951.011.031.041.151.031.10</td>
<td>1.021.06</td>
</tr>
<tr>
<td>Authoritative Parenting</td>
<td></td>
<td>0.94<strong>0.56</strong>0.89<strong>0.33</strong></td>
</tr>
<tr>
<td>Peer Conventionality</td>
<td></td>
<td>0.970.930.910.831.061.13</td>
</tr>
<tr>
<td>Religious Commitment</td>
<td></td>
<td>0.960.960.960.960.960.980.98</td>
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<tr>
<td>School Commitment</td>
<td></td>
<td>0.89<em>0.72</em>0.910.750.990.97</td>
</tr>
<tr>
<td>Adolescence Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Routines</td>
<td></td>
<td></td>
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<tr>
<td>Peer Playtime</td>
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<tr>
<td>Religion Attendance</td>
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<tr>
<td>Authoritative Parenting</td>
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<td></td>
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<tr>
<td>Peer Conventionality</td>
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<tr>
<td>Religious Commitment</td>
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<td></td>
</tr>
<tr>
<td>School Commitment</td>
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<td></td>
</tr>
<tr>
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Note: 1. H.I. stands for High-Increasing trajectory; M.I. for Medium-Increasing trajectory; L.I. for Low-Increasing trajectory; M.S. for Medium-Stable trajectory. H.I. trajectory is the reference trajectory.
2. ** p<.01, * p<.05, † p<.10.
Table 7. Self-Control Trajectories Regressed on Socialization Processes using MNLR Model (Boys)-Contd.

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LR $\chi^2(d.f.)$ 56.46** (30) 91.6** (42)
Pseudo R$^2$ 0.08 0.13
N 300 300

Note: 1. H.I. stands for High-Increasing trajectory; M.I. for Medium-Increasing trajectory; L.I. for Low-Increasing trajectory; M.S. for Medium-Stable trajectory. The H.I. trajectory is the reference trajectory.
2. ** p<.01, * p<.05, † p<.10.
Table 8: Self-Control Trajectories Regressed on Socialization Processes using MNLR Model (Girls).

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Note: 1. H.C. stands for High-Curvilinear trajectory; M.I. for Medium-Increasing trajectory; L.I. for Low-Increasing trajectory; M.S. for Medium-Stable trajectory; M.I. for Medium-Increasing trajectory. The H.C. trajectory is the reference trajectory. 2. ** p<.01, * p<.05, † p<.10.
Table 9: Self-Control Trajectories Regressed on Socialization Processes using MNLR Model (Girls)-Contd.

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<td>1.18**</td>
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<td>1.07</td>
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<td>.95</td>
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<td>1.27</td>
<td>.96</td>
<td>.77</td>
</tr>
</tbody>
</table>

LR $\chi^2(d.f.)$: 106.61** (40)  190.7** (56)
Pseudo R²: 0.12  0.22
N: 375  375

Note: 1. H.C. stands for High-Curvilinear trajectory; M.I. for Medium-Increasing trajectory; L.I. for Low-Increasing trajectory; M.S. for Medium-Stable trajectory; M.I. for Medium-Increasing trajectory.
The H.C. trajectory is the reference trajectory. 2. To save space, for coefficients with only a 0 before decimal, 0 is omitted; e.g., 0.93 is recorded as .93. 3. ** p<.01, * p<.05, † p<.10.
CHAPTER 8
RESULTS: PARENTING, CRIMINAL OPPORTUNITY, SELF-CONTROL, AND DELINQUENCY

In the previous chapter, I presented the results for the first two research questions. In this chapter, I present the results for the third research question. First, I present the descriptive statistics on delinquency and age across waves. I proceed to present results from the trajectory analysis for delinquency from age 10 to 20. I then present the results for the role of criminal opportunities in the relationship between self-control and delinquency trajectories. At the end of this chapter, I summarize the findings for the third research question.

Descriptive Statistics on Delinquency and Age across Waves

Descriptive statistics of delinquency and age at wave 1, 2, 3, and 4 of data collection for boys and girls are presented in Table 10. The average count of delinquency for boys at waves 1, 2, 3, and 4 is 2.11, 3.27, 3.70, and 3.36, respectively. For girls, the average count of delinquency for the four waves is 1.22, 2.58, 3.08, and 2.42, respectively. Throughout the four waves of data collection, boys generally reported higher counts of delinquency behavior relative to girls did (p<0.01). For both boys and girls, the average count of delinquent behavior increases from wave 1 to wave 3, and decreases from wave 3 to wave 4. Age here is measured in months. On average, the age of target boys was 11 years old (or 132 months), 13 years old (or 157 months), 16 years old (or 194 months), and 19 years old (or 231 months) at w1, w2, w3, and w4,
respectively. The average age of girls at the four time points are basically the same as that of boys – 132 months, 157 months, 194 months, and 232 months for w1, w2, w3, and w4, respectively. The average changing patterns of delinquency against age for boys and girls shown in Figure 3 are very similar. The counts of delinquency peak at age around 16 years old. This pattern echoes the classical age-crime curve described by Gottfredson and Hirschi (1990) and other researchers (e.g., Blokland, Nagine, and Nieuwbeert, 2005).

The correlation coefficients among the measures of delinquency at the four time points are shown in Table 11. The correlation coefficients among the measures of delinquency at the four time points are all statistically significant for both boys and girls. They range from 0.12 to 0.54. Generally, measures of delinquency at adjacent time-points have stronger correlation coefficients relative to those at non-adjacent time points. However, the correlation coefficients between wave1 and wave4 are still statistically significant for both boys and girls (0.21 and 0.12, respectively).

**Results for the Trajectory Analysis of Delinquency**

To answer my third research question, I first described the developmental trajectories of delinquency using Group-Based Trajectory Modeling for count data. The analyses were conducted separately for boys and girls. Prior research on crime and delinquency generally identifies four or five trajectories among population (Blokland, Nagin, Nieuwbeerta, 2005; Nagin and Land, 1993; Shaw, Lacourse, and Nagin, 2005). I tested from a one-group model up to a seven-group model of delinquency trajectories. The results are presented in Table 12. For boys, the BIC yielding from 1-group model is -3396.19. Adding one more group, the BIC (-3996.45) does not show significant improvement. Adding the third group, the BIC (-3272.6) increases significantly; Adding
the fourth group, the BIC (-3172.92) again increases significantly. The BIC keeps increasing as more groups were added into the model.

Blokland, Nagin, and Nieuwbeert (2005) have noted that, although BIC is recommended for the selection of the optimal model, it does not work well in some cases, especially for the count variables. They have noted in their research that, while BIC scores continue to increase as more groups are added into their model, the added groups are redundant in that the added groups do not add much in terms of capturing important features of the data. In these cases, they recommend to make decision based on parsimony, comprehensiveness, and prior information.

In the analysis for boys, the three-group model distinguishes among groups with very low- (nearly zero) and low- levels of delinquency and with high level of delinquency. The three groups resemble sporadic-offender group, high-chronic or the life-course-persistent group, and late-starter group (Nagin and Land, 1993; Shaw, Lacourse, and Nagin, 2005). The four-group model adds a group that shows a steep decrease in the level of delinquency. This group mirrors the moderate-desister group (Blokland, Nagin, Nieuwbeerta, 2005). Similar trajectories are reproduced by the five- and six-group models, however, these two approaches further distinguish between those showing very low delinquency (sporadic-offender group) and low level of delinquency (late-starter group). In consideration of the parsimony and comprehensiveness of the model and the prior findings of four groups, the four-group model is selected for boys. The average posterior probability for the four groups ranges from 0.86 to 0.95.

The trajectory parameters for the four groups of boys are shown in Table 13. Three of the four groups show curvilinear relationship between age and delinquency.
The first group (the sporadic-offender trajectory group) starts with relatively low count of delinquency (between 0 and 1) at the age of 11 years and remains low throughout of the adolescence. 38.05% of the boys follow this delinquency trajectory. The second group (the late-starter trajectory group) starts with a count of delinquency slightly higher than 1 at around 11 years old, however, the count of delinquency increases and reached 5 at the end of adolescence. 25.6% of the boys follow this delinquency trajectory. The third group (the life-course-persistent trajectory group) starts with 5 counts of delinquency around 11 years old, increases in the level of delinquency till 16 years old and then gradually decreases. Even it is decreasing after 16 years old, the count of delinquency for this group by the end of adolescence still remain the highest among the four groups and is higher than its starting levels. 12.73% of the boys follow this delinquency trajectory. The fourth group (Moderate-desister trajectory group) starts with about 4 counts of delinquency at age 11 years old, and decreases into nearly zero count of delinquency by the end of adolescence. 23.57% of the boys fall in this group. Among the four groups, the life-course-persistent trajectory group shows the highest levels of delinquency across time; and the sporadic-offender group shows the lowest level of delinquency across time. Although the late-starter groups have low starting points, their levels of delinquency increase over time and it exceeds the delinquent levels of the moderate-desister group by the end of adolescence. In contrast, by the end of adolescence, the delinquency level of the moderate-desister group is almost as low as that of the sporadic-offender group. The visual display of the four trajectories is shown in Figure 4.

I repeated the analysis for girls’ data. For girls, the BIC yielding from 1-group model is -4054.05. Adding one more group, the BIC (-3419.15) show significant
improvement. Adding the third group, the BIC (-3340.4) increases significantly; Adding the fourth group, the BIC (-3224.93) again increases significantly. Like the case in boys’ data, the value of BIC keeps increasing when more groups are added to the mode, although the increase is small in magnitude. The three-group model distinguishes among groups with very low- (nearly zero) and low- level of delinquency and those with high level of delinquency by the end of adolescence. The three groups resemble the sporadic-offender, moderate-desister, and late-starter trajectory group, respectively. The four-group model adds a group that shows high level of delinquency across time, though the shape of the trajectory is curvilinear. This group shows some similarity with the life-course-persistent group. However, it has much lower level of delinquency relative to boys’ life-course-persistent group. I labeled it as an early-starter group. Like the case of fitting boys data, the five- and six-group models replicate similar trajectories shown by the four-group model but further distinguishes between the early-starter group, and late-starter group and do not capture the important aspect of the data. For example, the five-group approach even captures a group with only two cases in it. Following Blokland, Nagin, and Nieuwbeert (2005) recommendation, I accepted the four-group approach. The posterior probability for the four groups ranges from 0.86 to 0.92, suggesting a high homogeneity within groups and heterogeneity among groups.

The trajectory parameters for the four groups of girls are shown in Table 13. All of the four groups show curvilinear relationship between age and delinquency. Generally the four groups are similar with that of boys. The first group (the sporadic-offender trajectory group) starts with very low count of delinquency (basically zero) and remains very low in delinquency throughout the adolescence. 37.40% of the girls follow this
delinquency trajectory. The second group (the late-starter trajectory group) starts with a low count of delinquency which is under 1 and increases over time. By the end of adolescence, this group has the highest level of delinquency among girls. 21.14% of the girls fall in this group. The third group (the moderate-desister trajectory) is like the fourth group of boys’ data (the moderate-desister trajectory), only with lower counts of delinquency at the starting point. This group starts with 2 counts of delinquent behavior, and increases first and then decreases over time. By the end of adolescence, this group shows basically zero count of delinquency. Twenty eight percent of girls fall in this group. The fourth group of girls (the early-starter trajectory) only shows some similarity with the third\(^7\) group of boys (the life-course-persistent trajectory), but with lower starting and ending levels of delinquency. This group starts with the highest count of delinquency among girls, increases and then decreases over time. However, by the end of adolescence, this group still has the second highest count of delinquency among girls. 13.36% of girls fall in this group. The visual display of the four trajectories is shown in Figure 5.

**Results for the Impact of Criminal Opportunity on Delinquency Trajectories**

The following step of analysis uses the final sample of cases with valid data on all the study variables. It includes 686 cases with 310 boys and 376 girls. Although the general patterns of the trajectories show some similarity between boys and girls, the levels of girls' delinquency is generally lower relative to boys. The early-starter group of girls starts with a delinquent count around 4, rather than boys' 5 of the life-course-persistent group. In addition, after a peak in delinquent behavior around 16 years old, the

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\(^7\) The third group of boys is labeled as the fourth group and the fourth group of boys is labeled as the third group in the table 11 to table 17. This makes the presentation of groups with similar features easier.
delinquent levels of girls' early-starter group decreases to almost the same as their starting level. This is very different from the life-course-persistent boys whose delinquent level (an average 9 count of delinquent behavior) at the end of adolescence is much higher than their starting levels. So, I did the following analysis for boys and girls, separately.

First, I did the group profiling for boys' data to see if there are significant difference in the study constructs across the four groups of boys. As shown in Table 14, authoritative parenting, conventionality of peer groups, school commitment during childhood all significantly different among the four groups of boys. The difference in self-control during childhood among the four groups is only marginally significant (p=0.072). During adolescence, authoritative parenting, regularity of family routines, conventionality of peers, religious commitment, school commitment, and self-control are all significantly different across the four groups. The composite measure of opportunity during adolescence is significantly different among the four groups. Generally, the sporadic-offender group has the highest scores on these variables (except self-control during childhood). The life-course-persistent group generally has the lowest scores on these variables (except school commitment during childhood). The late-starter group generally has higher scores on these variables relative to the moderate-desister group (except family routines during adolescence). In addition, the life-course-persistent group has the highest scores on the composite opportunity measure during adolescence; while the sporadic-offender group has the lowest scores.

Using boys’ group membership as the outcome variable, I then fitted the MNLR model to boys’ data. The sporadic-offender group was treated as the reference group. First, I entered childhood variables including socialization and opportunity variables
during childhood. Authoritative parenting, conventionality of peers, and school
commitment during childhood all significantly impact boys' group membership of
delinquent trajectories. However, the model is only marginally significant in explaining
the variation in boys' group membership. Then, self-control during childhood was
entered into the model. Entering self-control during childhood, the significance of other
variables does not show substantive change. Self-control during childhood does not
significantly impact upon boys' odds of following into the other three trajectories relative
to the sporadic-offender trajectories. It only marginally (p=0.09) decreases the odds of
following into a life-course persistent trajectory relative to the late-starter trajectory.

In the following step, the socialization and opportunity variables during
adolescence were entered into the model. Entering these variables significantly improves
the models' explanatory power. Authoritative parenting, conventionality of peers, and
religious commitment during adolescence significantly impact boys’ group membership.
Family routines during adolescence marginally significantly impact boys’ group
membership. Entering these variables, the effect of conventionality of peers during
childhood on boys’ group membership is no longer significant. Family routines during
adolescence marginally decrease boys' odds of following the life-course-persistent and
the late-starter trajectories relative to the sporadic-offender trajectory by a factor 0.64
(p=0.054) and 0.73 (p=0.075), respectively. In addition, religious commitment
significantly decreases boys' odds of following the moderate-desister trajectory relative to
the sporadic-offending trajectory by a factor 0.69 (p<0.05). Interestingly, school
commitment during adolescence significantly increases boys' odds of following the late-
starter trajectory relative to the sporadic-offender trajectory by a factor 1.42.
In model 1 shown in Table 15, boys’ self-control during adolescence was entered into the model. Boys' self-control during adolescence significantly impact boys' trajectories of delinquency. It significantly decreases boys' odds of falling in the late-starter, the moderate-desister, and the life-course-persistent groups relative to the sporadic-offender group by a factor 0.56, 0.88, and 0.29, respectively. After entering boys' self-control during adolescence, the impact of authoritative parenting and religious commitment during adolescence upon boys' trajectories of delinquency decreases substantially, although the effect of authoritative parenting during adolescence on boys’ group membership is still significant. From model 3 to model 4, the factor change for boys’ odds of falling into the moderate-desister and the life-course-persistent trajectories relative to the sporadic-offender group attributed to authoritative parenting during adolescence increased from 0.66 \,(p<0.05)\) to 0.72 \,(p<10)\) and from 0.45 \,(p<0.01)\) to 0.60 \,(p<0.05)\), respectively. The factor change for boys’ odds of falling in the moderate-desister group relative to the sporadic-offender group attributed to religious commitment during adolescence increases from 0.69 \,(p<0.05)\) to 0.73 \,(p<0.10)\). Conventionality of peers during adolescence significantly decreases boys odds of falling into the moderate-desister \,(0.46, p<0.05)\) and the life-course-persistent groups \,(0.45, p<0.05)\) relative to the sporadic-offender group. Entering boys’ self-control during adolescence into the model, the effect of family routines during adolescence on boys’ group membership becomes statistically significant. It significantly decreases boys’ odds of falling in the late-starter group \,(0.72, p<0.07)\) and the life-course-persistent group \,(0.62, p<0.05)\) relative to the sporadic-offender group.
Authoritative parenting and school commitment during childhood also significantly impact boys’ group membership. Authoritative parenting during childhood significantly decreases boys’ odds of falling in the life-course-group relative to the sporadic-offender group (0.56, p<0.05). School commitment during childhood significantly decrease boys’ odds of falling into the moderate-desister group relative to the sporadic-offender group (0.65, p<0.05). One interesting finding is that, after controlling other variables, self-control during childhood become significant, and it significantly increases boys' odds of following the late-starter trajectory relative to the sporadic-offender trajectory by a factor 1.53 (p<0.05). In addition, school commitment during adolescence also increases boys’ odds of falling into the late-starter group relative to sporadic-offender group (1.44, p<0.05).

In model 2 to 5, the interaction terms of the opportunity measures (i.e., family routines, peer play-time, religious attendance, and school continuity) and self-control during childhood and adolescence were entered into the model one pair (the interaction term for childhood variables and for adolescence variables) at a time. In model 2, the interaction terms of family routines and self-control during childhood and adolescence were entered into the model. Entering the interaction terms does not change the effects of other variables on boys’ group membership. The interaction term of family routines during childhood and self-control during childhood shows significant effect on boys’ group membership. Given the same level of self-control during childhood, boys with more regular family routines during childhood have decreased odds of following the life-course-persistent trajectory relative to the sporadic-offending trajectory (by a factor of 8

8 A pair of the interaction terms refer to interaction terms for childhood variables and adolescence variables, e.g., conventionality of peers during childhood * self-control during childhood and conventionality of peers during adolescence * self-control during adolescence are called a pair here.
0.60, p<0.05). No significant effect is found for the interaction terms of family routines and self-control during adolescence.

The model 3 and model 5 show that no significant effect for the interaction terms of self-control and peer playtime during childhood and adolescence and interaction terms of self-control and school continuity during adolescence (shown in Tables 16 and 17). Results from model 4 show that religious attendance during adolescence significantly interacts with boys' self-control in predicting their trajectories of delinquency. Interestingly, the direction of this effect is countering the expected direction. Given the same level of self-control during adolescence, boys with higher level of religious attendance show increased odds of following the life-course-persistent trajectory relative to the sporadic-offending trajectory, comparing to those with lower level of religious attendance.

In model 6, the composite measures of criminal opportunity during childhood and adolescence, instead of the individual criminal opportunity measures, were used to examine the interactive effect. The results from fitting model 6 are comparable to that of model 2. Authoritative parenting during childhood and authoritative parenting during adolescence both show significant impact on boys’ group membership. Both of them significantly decrease boys’ odds of falling into the life-course-persistent group relative to the sporadic-offender group. Self-control during adolescence significantly decreases boys’ odds of falling in the late-starter and the life-course-persistent group relative to the sporadic-offender group. In contrast, self-control during childhood significantly increases boys’ odds of falling in the late-starter group relative to the sporadic-offender group. School commitment during childhood significant decreases boys’ likelihood of
falling into the moderate-desister group; while school commitment during adolescence significantly increases boys’ odds of falling into the late-starter group. Peer conventionality decreases boys’ odds of falling into the moderate-desister group and the life-course-persistent group relative to the sporadic-offender group.

Composite delinquent opportunity measures during childhood do not have significant impact on boys’ group membership. Composite delinquent opportunity measure during adolescence shows significant impact on boys’ group membership. Delinquent opportunity during adolescence significant increases boys’ odds of falling into the life-course-persistent group relative to the sporadic-offender group. Composite delinquent opportunity during childhood marginally significantly interacts with boys' self-control during childhood in predicting boys' trajectories of delinquency. Given the same level of self-control during childhood, the composite delinquent opportunities increases boys’ odds of following a life-course-persistent trajectory relative to the sporadic-offending trajectory (1.51, p=0.070). The composite measure of delinquent opportunity during adolescence does not significantly interact with self-control during adolescence in predicting boys' trajectories of delinquency. School continuity during adolescence does not significantly interact with boys' self-control during adolescence in predicting boys' trajectories of delinquency.

I repeated the same procedures for girls. Results from group profiling the four groups of girls show that there are significant differences in authoritative parenting, family routines, school commitment, and self-control during childhood among the four groups of girls. Among adolescence variables, authoritative parenting, family routines, conventionality of peers, religious commitment, religious attendance, school commitment
and self-control show significant difference among the four groups of girls. Similar as that of boys’ data, girls in the sporadic-offender group generally have the highest values on these variables (except school commitment during childhood); while the early-starter group generally has the lowest scores on these variables (except school commitment during childhood). The late-starter group has higher scores on childhood variables relative to the moderate-desister group; while it has lower scores on adolescence variables including authoritative parenting, family routines, and conventionality of peers, relative to the late-starter group. In addition, comparing to the sporadic-offender group, the early-starter group has significantly higher scores on the composite measure of opportunity during adolescence.

Using girls’ group membership as the outcome variable, I then fitted the MNLR model to girls’ data. The sporadic-offender group was treated as the reference group. First, socialization and opportunity variables during childhood were entered into the model. The results show that family routines about children, authoritative parenting, and conventionality of peers during childhood all have significant impact upon girls’ delinquency trajectories. School commitment during childhood marginally impacts girls’ group membership. The model is statistically significant in terms of explaining variation in girls’ group membership. Then, self-control during childhood was entered into the model. Self-control during childhood significantly impacts girls’ group membership. Entering self-control during childhood into the model, the effect of peer conventionality during childhood becomes only marginally significant and its coefficients increases slightly. Although the effects of family routines and authoritative parenting during childhood are still significant, their coefficients slightly increase.
In the following step, I entered the socialization variables and opportunity variables during adolescence. The results show that, entering these variables during adolescence, the effect of family routines during adolescence is no longer significant. There is no change in the effects of other variables on girls’ group membership. Family routines during adolescence marginally impact girls’ group membership. Authoritative parenting and peer conventionality during adolescence significantly impact girls’ group membership.

In model 1 shown in Table 18, girls’ self-control during adolescence was entered into the model. Girls’ self-control during adolescence significantly impacts girls’ group membership. One standard deviation increase in girls' self-control during adolescence significantly decreases girls' odds of following the late-starter, the moderate-desister, and the early-starter trajectories relative to the sporadic-offending trajectory by a factor 0.50, 0.45, and 0.39 (p<0.01), respectively. Entering girls' self-control into the model, self-control during childhood and family routines during adolescence is no longer significant. In addition, the effect of authoritative parenting during adolescence decreases significantly. For example, entering girls' self-control during adolescence, authoritative parenting during adolescence decreases girls' odds of following the late-starter, the moderate-desister, and the early-starter trajectories relative to the sporadic-offending trajectory by a factor 0.53 (p<0.01), 0.67 (p<0.05), and 0.63 (p<0.063) (authoritative parenting standardized), respectively, instead of a factor 0.45 (p<0.01), 0.55 (p<0.01), and 0.49 (p<0.01), respectively, in the prior model (not shown in the Tables). Peer conventionality during adolescence significantly decreases girls’ odds of falling in the late-starter, moderate-desister, and early-starter group relative to the sporadic-offender.
group by a factor 0.50 (p<0.01), 0.45 (p<0.01), and 0.39 (p<0.01), respectively. School commitment during childhood is no longer significant.

In model 2 to 5 (shown in Tables 18, 19 and 20), the interaction terms of the opportunity measures (i.e., family routines, peer play-time, religious attendance, and school continuity) and self-control during childhood and adolescence were entered into the model one pair at a time. Model 2 to model 4, no significant effect is found for the interaction terms. In model 5, the interaction terms of school continuity during adolescence and self-control during adolescence was entered. Entering the interaction terms does not impact the effects of authoritative parenting during children and during adolescence on girls’ group membership. There is also no substantive change in the effect of peers’ conventionality on girls’ group membership. School commitment during childhood becomes statistically significant. It significantly increases girls’ odds of falling in the late-starter group relative to the sporadic-offender group (1.44; p<0.05). In addition, school continuity during adolescence significantly interacts with self-control during adolescence in impacting girls’ group membership. Comparing to those who do not continue school during adolescence, those staying in school are less likely to fall in the late-starter group.

In model 6, I used the composite opportunity measure to test the interactive effect between delinquent opportunity and self-control in predicting girls' trajectories of delinquency. The result is comparable to that of model 5. Both authoritative parenting during childhood and authoritative parenting during adolescence significantly impact girls’ group membership. Authoritative parenting during childhood significantly decreases girls’ odds of falling in the early-starter group relative to the sporadic-offender
group (0.51, p<0.01). Authoritative parenting during adolescence significantly decreases girls’ odds of falling in the late-starter, the moderate-desister, the early-starter group relative to the sporadic-offender group by a factor 0.52 (p<0.01), 0.63 (p<0.01), and 0.66 (p<0.10), respectively. School commitment during childhood significantly increases girls’ odds of falling in the late-starter group relative to the sporadic-offender group (1.49, p<0.05). Conventionality of peers significantly decreases girls’ odds of falling in the late-starter, moderate-desister, and the early-starter group relative to the sporadic-offender group. School continuity during adolescence significantly decreases girls’ odds of falling into the late-starter group relative to the sporadic-offender group.

Summary of Findings

As a summary, the present study finds that, in general, boys have significantly higher level of delinquency relative to girls. Four trajectories of delinquency are identified for boys and girls, respectively. For boys, the four trajectories are sporadic-offender group, moderate-desister group, late-starter group, and life-course-persistent group. The percentage of boys in the four groups is 38%, 26%, 24%, and 13%, respectively. For girls, the four trajectories are sporadic-offender group, moderate-desister group, late-starter group, and early-starter group. The percentage of girls in the four groups is 37%, 21%, 28%, and 13%, respectively. Although groups for boys and girls with the same name share some similarity, they generally differ in terms of the starting levels of delinquency at age of 10 and their changing parameters from age 10 to 20.

The present study also finds that authoritative parenting, school commitment, and self-control during childhood all significantly impact boys’ trajectories of delinquency.
During adolescence, criminal opportunity (composite measure), authoritative parenting, and conventionality of peers, school commitment, and self-control all significantly impact boys’ trajectories of delinquency. School commitment during adolescence and self-control during childhood impacts boys’ trajectories of delinquency in a direction opposite to what I expected. In addition, criminal opportunity (composite measure) during childhood marginally significantly interacts with self-control during childhood in impacting boys’ trajectories of delinquency (p<0.07).

Among the four types of criminal opportunity measures (e.g., family routines about children, regularity of peer playtime, regularity of religious attendance, and school continuity), the present study finds that family routines about children during childhood significantly interacts with self-control during childhood in impacting boys’ trajectories of delinquency. Regularity of religious attendance during adolescence is also found to significantly interact with self-control during adolescence in impacting boys’ trajectories of delinquency.

For girls, the present study finds that authoritative parenting and school commitment during childhood significantly impact girls’ trajectories of delinquency. During adolescence, authoritative parenting and conventionality of peers significantly impact girls’ trajectories of delinquency. However, school commitment during childhood impact girls’ trajectories of delinquency in a direction opposite to what I expected. In addition, school continuity during adolescence significantly interacts with self-control during adolescence in impacting girls’ trajectories of delinquency. There is no significant impact (either direct or interactive) on girls’ trajectories of delinquency found for composite criminal opportunity measure and for the other three types of criminal
opportunity measures (i.e., family routines about children, regularity of peer playtime, and regularity of religious attendance).
Table 10: Descriptive Statistics of Delinquency and Age for Girls and Boys.

<table>
<thead>
<tr>
<th></th>
<th><strong>Girls</strong></th>
<th></th>
<th><strong>Boys</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Range</td>
<td>N</td>
</tr>
<tr>
<td>Delinquency W1</td>
<td>1.22</td>
<td>2.02</td>
<td>0-15</td>
<td>425</td>
</tr>
<tr>
<td>Delinquency W2</td>
<td>2.53</td>
<td>2.87</td>
<td>0-16</td>
<td>399</td>
</tr>
<tr>
<td>Delinquency W3</td>
<td>3.08</td>
<td>3.25</td>
<td>0-18</td>
<td>411</td>
</tr>
<tr>
<td>Delinquency W4</td>
<td>2.42</td>
<td>3.02</td>
<td>0-14</td>
<td>395</td>
</tr>
<tr>
<td>Age in months W1</td>
<td>12.07</td>
<td>6.96</td>
<td>-3-35</td>
<td>427</td>
</tr>
<tr>
<td>Age in months W2</td>
<td>37.08</td>
<td>7.75</td>
<td>18-70</td>
<td>427</td>
</tr>
<tr>
<td>Age in months W3</td>
<td>74.35</td>
<td>8.27</td>
<td>53-104</td>
<td>427</td>
</tr>
<tr>
<td>Age in months W4</td>
<td>111.69</td>
<td>9.66</td>
<td>89-142</td>
<td>427</td>
</tr>
</tbody>
</table>

Note: Using list-wise deletion, N =349 and 276 for delinquency analysis for boys and girls, respectively; Age in months is centered at 120 months.
**Table 11: Correlation Matrix for Delinquency Measures Across Waves.**

<table>
<thead>
<tr>
<th></th>
<th>Delinquency W1</th>
<th>Delinquency W2</th>
<th>Delinquency W3</th>
<th>Delinquency W4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delinquency W1</td>
<td>1</td>
<td>0.51**</td>
<td>0.40**</td>
<td>0.12*</td>
</tr>
<tr>
<td>Delinquency W2</td>
<td>0.38**</td>
<td>1</td>
<td>0.54**</td>
<td>0.26**</td>
</tr>
<tr>
<td>Delinquency W3</td>
<td>0.26**</td>
<td>0.46**</td>
<td>1</td>
<td>0.34**</td>
</tr>
<tr>
<td>Delinquency W4</td>
<td>0.21**</td>
<td>0.29**</td>
<td>0.39**</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: 1. For delinquency matrix using listwise deletion, N= 349 and 276 for girls and boys, respectively.  
2. Correlation coefficients above diagonal are for girls, and below the diagonal are for boys.  
3. ** p<.01; * p<.05; † p<.10; 2-tailed test.
Table 12: Tests of Population Heterogeneity in the Change of Delinquency Using GBTM (Boys and Girls).

<table>
<thead>
<tr>
<th>Models</th>
<th>Boys</th>
<th></th>
<th></th>
<th>Girls</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BIC</td>
<td>Comp</td>
<td>2ΔBIC</td>
<td>BIC</td>
<td>Comp</td>
<td>2ΔBIC</td>
</tr>
<tr>
<td>1-group</td>
<td>-3996.19</td>
<td></td>
<td></td>
<td>-4054.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-group</td>
<td>-3996.45</td>
<td>1-grp</td>
<td>-0.52</td>
<td>-3419.15</td>
<td>1-grp</td>
<td>1271.8*</td>
</tr>
<tr>
<td>3-group</td>
<td>-3272.6</td>
<td>2-grp</td>
<td>1427.7*</td>
<td>-3340.4</td>
<td>2-grp</td>
<td>157.50*</td>
</tr>
<tr>
<td>4-group</td>
<td>-3172.92</td>
<td>3-grp</td>
<td>199.36*</td>
<td>-3224.93</td>
<td>3-grp</td>
<td>230.94*</td>
</tr>
<tr>
<td>5-group</td>
<td>-3123.09</td>
<td>4-grp</td>
<td>99.66*</td>
<td>-3213.66</td>
<td>4-grp</td>
<td>22.54*</td>
</tr>
<tr>
<td>6-group</td>
<td>-3115.25</td>
<td>5-grp</td>
<td>15.68*</td>
<td>-3201.96</td>
<td>5-grp</td>
<td>23.4*</td>
</tr>
<tr>
<td>7-group</td>
<td>-3113.67</td>
<td>6-grp</td>
<td>3.16*</td>
<td>-3197.58</td>
<td>6-grp</td>
<td>8.76*</td>
</tr>
</tbody>
</table>

Note: 1. For delinquency, N=355 and 427 for boys and girls, respectively.
Figure 3. Average Delinquency-Age Curve of Boys and Girls (10-20 yrs old).
<table>
<thead>
<tr>
<th>Group #</th>
<th>Coefficients' Name</th>
<th>Coefficients</th>
<th>Std. E.</th>
<th>p-value</th>
<th>Percentage of Sample</th>
<th>Coefficients</th>
<th>Std. E.</th>
<th>p-value</th>
<th>Percentage of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intercept</td>
<td>-0.876**</td>
<td>0.212</td>
<td>0</td>
<td>38%</td>
<td>-2.149**</td>
<td>0.272</td>
<td>0</td>
<td>37%</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>0.038**</td>
<td>0.004</td>
<td>0</td>
<td></td>
<td>0.051**</td>
<td>0.008</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quadratic</td>
<td>-0.00029**</td>
<td>0.00006</td>
<td>0</td>
<td></td>
<td>-0.0003**</td>
<td>0.00006</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Intercept</td>
<td>0.024</td>
<td>0.194</td>
<td>0.90</td>
<td>26%</td>
<td>-1.073**</td>
<td>0.232</td>
<td>0</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>0.019**</td>
<td>0.006</td>
<td>0</td>
<td></td>
<td>0.049**</td>
<td>0.006</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quadratic</td>
<td>-0.00003</td>
<td>0.00004</td>
<td>0.49</td>
<td></td>
<td>-0.0002**</td>
<td>0.00004</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Intercept</td>
<td>1.001**</td>
<td>0.134</td>
<td>0</td>
<td>24%</td>
<td>0.172</td>
<td>0.127</td>
<td>0.18</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>0.031**</td>
<td>0.006</td>
<td>0</td>
<td></td>
<td>0.043**</td>
<td>0.005</td>
<td>0</td>
<td></td>
</tr>
<tr>
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<td>Quadratic</td>
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<td>0.958**</td>
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</tbody>
</table>

Note: 1. Groups 1, 2, and 3 stand for the sporadic-offender, late-starter, and moderate-desister trajectories. Group 4 stands for the life-course-persistent group for boys and the early-starter group for girls; 2. N=355 and 427 for boys and girls, respectively; 3. The sum of percentages may not equal to 100% due to rounding; 4. Age is measured in months and centered at 120 months; 5. ** p<.01; * p<.05; † p<.10; 2-tailed test.
Figure 4. Trajectories of Delinquency of Boys (10-20 yrs old).

Delinquency vs. Age for Boys

- Sporadic-offender
- Late-starter
- Moderate-desister
- Life-course-persistent

Age in Months (centered at 120 months)

Delinquency
Figure 5. Trajectories of Delinquency of Girls (10-20 yrs old).
### Table 14. Group Profiling of Boys and Girls Following Different Delinquency Trajectories.

<table>
<thead>
<tr>
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<th><strong>Girls</strong></th>
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<td></td>
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<td><strong>M-D</strong></td>
<td><strong>LC-P</strong></td>
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<td>101.82</td>
<td>99.39</td>
<td>98.58</td>
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<td>18.38</td>
<td>18.31</td>
<td>18.78</td>
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<td>3.41</td>
<td>3.49</td>
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<td>10.12</td>
<td>10.11</td>
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<td>15.84</td>
<td>15.61</td>
<td>15.28</td>
</tr>
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<td>2.15</td>
<td>2.46</td>
<td>2.53</td>
</tr>
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<td>-0.11</td>
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<td>3.39</td>
<td>3.11</td>
<td>3.04</td>
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<td>7.61</td>
<td>7.03</td>
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<td>14.71</td>
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<tr>
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<td>2.14</td>
<td>2.43</td>
<td>2.43</td>
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<td>77%</td>
<td>75%</td>
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</table>

Note: 1. Variables with Italic numbers are significantly different across groups; 2. Difference in school continuity among groups are tested using Pearson’s Chi-square test; 3. S-O stands for sporadic-offending trajectory; L-S late-starter trajectory.; M-D moderate-desister trajectory.; LC-P life-course-persistent trajectory; E-S early-starter trajectory.
### Table 15. Delinquency Trajectories Regressed on Socialization Processes and Opportunity Measures using MNLR Model (Boys).

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<td>e^b</td>
<td>e^b</td>
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<tr>
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<td>Std.X</td>
<td>Std.X</td>
<td>Std.X</td>
<td>Std.X</td>
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<td><strong>Childhood Variables</strong></td>
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<td></td>
</tr>
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<td>1</td>
<td>1.02</td>
<td>1.07</td>
</tr>
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<td>1.13</td>
<td>1.14</td>
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<td>0.97</td>
<td>0.76</td>
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<tr>
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<td>1.17</td>
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<tr>
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<td>0.93</td>
<td>0.8</td>
<td>0.86*</td>
<td>0.65*</td>
</tr>
<tr>
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<td>1.10*</td>
<td>1.53*</td>
<td>1.07</td>
<td>1.33</td>
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<td><strong>Adolescence Variables</strong></td>
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<td>0.72**</td>
<td>0.95</td>
<td>0.84</td>
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<tr>
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<td>0.98†</td>
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<td>0.99</td>
<td>0.97</td>
<td>0.93</td>
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<td>0.67**</td>
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</table>

LR $\chi^2(d.f.)$: 134.04**(51) 143.56**(57)
Pseudo R$^2$: 0.16 0.18
N: 310 310

**Note:** 1. S-O stands for sporadic-offender trajectory; L-S for late-starter trajectory; M-D for moderate-desister trajectory; LC-P for life-course-persistent trajectory. S-O trajectory is the reference trajectory. 2. ** p<.01, * p<.05, *- p<=.06, † p<=.10.
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<td>0.82</td>
<td>0.86*</td>
<td>0.65*</td>
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<td>1.06*</td>
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<td>0.90**</td>
<td>0.72**</td>
<td>0.95</td>
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**LR \chi^2(df)\:** 137.56**(57)  \hspace{1cm} 143.19**(57)

**Pseudo R^2:** 0.17  \hspace{1cm} 0.18

**N:** 310  \hspace{1cm} 310

Note: 1. S-O, L-S, M-D, and LC-P stand for sporadic-offender, late-starter, moderate-desister, and life-course-persistent trajectories, respectively. S-O trajectory is the reference trajectory. 2. ** p<.01, * p<.05, * p<=.06, † p<=.10.
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<td>0.95**</td>
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<td>0.64*</td>
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<td>0.66**</td>
<td>0.46**</td>
<td>0.66*</td>
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<tr>
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<td>130.43**(48)</td>
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</tbody>
</table>

Note: 1. S-O, L-S, M-D, and LC-P is for sporadic-offender, late-starter, moderate-desister and life-course-persistent trajectories, respectively. S-O is the reference. 2. ** p<.01, * p<.05, * p<=.07, † p<=.10.
Table 18. Delinquency Trajectories Regressed on Socialization Processes and Opportunity Measures using MNRL Model (Girls).

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>e^b</td>
<td>Std.X</td>
<td>e^b</td>
<td>Std.X</td>
</tr>
<tr>
<td>Childhood Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Routines</td>
<td>1.01</td>
<td>1.02</td>
<td>0.93</td>
<td>0.81</td>
</tr>
<tr>
<td>Peer Playtime</td>
<td>1.14</td>
<td>1.14</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>Religious Attendance</td>
<td>1.07</td>
<td>1.29</td>
<td>1.08**</td>
<td>1.34**</td>
</tr>
<tr>
<td>Authoritative Parenting</td>
<td>1</td>
<td>0.95</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Peer Conventionality</td>
<td>1.04</td>
<td>1.08</td>
<td>0.97</td>
<td>0.95</td>
</tr>
<tr>
<td>Religious Commitment</td>
<td>0.99</td>
<td>1</td>
<td>1</td>
<td>1.35</td>
</tr>
<tr>
<td>School Commitment</td>
<td>1.11</td>
<td>1.4</td>
<td>1.08</td>
<td>1.27</td>
</tr>
<tr>
<td>Self-Control</td>
<td>1.05</td>
<td>1.28</td>
<td>0.95</td>
<td>0.8</td>
</tr>
<tr>
<td>Adolescence Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Routines</td>
<td>1.03</td>
<td>1.09</td>
<td>1.06</td>
<td>1.2</td>
</tr>
<tr>
<td>Peer Playtime</td>
<td>1.04</td>
<td>1.03</td>
<td>0.8</td>
<td>0.85</td>
</tr>
<tr>
<td>Religious Attendance</td>
<td>0.88</td>
<td>0.94</td>
<td>0.91</td>
<td>0.96</td>
</tr>
<tr>
<td>School Continuity</td>
<td>0.95**</td>
<td>0.53**</td>
<td>0.97*</td>
<td>0.67*</td>
</tr>
<tr>
<td>Authoritative Parenting</td>
<td>0.76**</td>
<td>0.59**</td>
<td>0.82*</td>
<td>0.67*</td>
</tr>
<tr>
<td>Peer Conventionality</td>
<td>1.06</td>
<td>1.04</td>
<td>1.35</td>
<td>1.21</td>
</tr>
<tr>
<td>Religious Commitment</td>
<td>1.04</td>
<td>1.24</td>
<td>0.98</td>
<td>0.89</td>
</tr>
<tr>
<td>School Commitment</td>
<td>0.83**</td>
<td>0.50**</td>
<td>0.80**</td>
<td>0.45**</td>
</tr>
<tr>
<td>Interaction Terms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Routines*self-control (Child.)</td>
<td>1.01</td>
<td>1.2</td>
<td>1.01</td>
<td>1.13</td>
</tr>
<tr>
<td>Family Routines* self-control (Adol.)</td>
<td>1</td>
<td>0.99</td>
<td>1.01</td>
<td>1.16</td>
</tr>
<tr>
<td>LR $\chi^2$(d.f.)</td>
<td>164.56** (51)</td>
<td>167.42** (57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.17</td>
<td>0.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>376</td>
<td>376</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 1. S-O stands for sporadic-offender trajectory; L-S for late-starter trajectory; M-D for moderate-desister trajectory; E-S for early-starter trajectory. S-O trajectory is the reference trajectory. 2. ** p<.01, * p<.05, *- p<=.07, † p<=.10.
Table 19. Delinquency Trajectories Regressed on Socialization Processes and Opportunity Measures using MNLR (Girls)-Contd.

<table>
<thead>
<tr>
<th>Childhood Variables</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Routines</td>
<td>1 1.01  0.94† 0.82†</td>
<td>1.06 1.19</td>
</tr>
<tr>
<td>Peer Playtime</td>
<td>1.08 1.08 0.95 0.95</td>
<td>1.15 1.16</td>
</tr>
<tr>
<td>Religious Attendance</td>
<td>1.07 1.29 1.08* 1.35*</td>
<td>1.03 1.12</td>
</tr>
<tr>
<td>Authoritative Parenting</td>
<td>0.99 0.94 1 1.01</td>
<td>0.94** 0.50**</td>
</tr>
<tr>
<td>Peer Conventionality</td>
<td>1.04 1.09 0.97 0.94</td>
<td>0.96 0.91</td>
</tr>
<tr>
<td>Religious Commitment</td>
<td>0.99 0.99 1 1</td>
<td>1.53 1.37</td>
</tr>
<tr>
<td>School Commitment</td>
<td>1.12* 1.41* 1.08 1.27</td>
<td>1.12 1.41</td>
</tr>
<tr>
<td>Self-Control</td>
<td>1.06 1.32 0.95 0.79</td>
<td>0.94 0.74</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adolescence Variables</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Routines</td>
<td>1.03 1.11 1.06 1.2</td>
<td>0.9 0.73</td>
</tr>
<tr>
<td>Peer Playtime</td>
<td>1.10 1.08 0.89 0.92</td>
<td>1.03 1.02</td>
</tr>
<tr>
<td>Religious Attendance</td>
<td>0.90 0.73 0.90† 0.74†</td>
<td>0.96 0.88</td>
</tr>
<tr>
<td>School Continuity</td>
<td>0.94 0.97 0.88 0.94</td>
<td>0.88 0.94</td>
</tr>
<tr>
<td>Authoritative Parenting</td>
<td>0.95** 0.54** 0.97* 0.67*</td>
<td>0.97† 0.65†</td>
</tr>
<tr>
<td>Peer Conventionality</td>
<td>0.75** 0.57** 0.82* 0.68*</td>
<td>0.71** 0.52**</td>
</tr>
<tr>
<td>Religious Commitment</td>
<td>1.03 1.02 1.36 1.21</td>
<td>0.98 0.99</td>
</tr>
<tr>
<td>School Commitment</td>
<td>1.04 1.27 0.98 0.88</td>
<td>0.96 0.8</td>
</tr>
<tr>
<td>Self-Control</td>
<td>0.83** 0.50** 0.80** 0.45**</td>
<td>0.77** 0.39**</td>
</tr>
</tbody>
</table>

| Peer Playtime * self-control (Child.) | 1.05 1.27 0.99 0.97 | 1.03 1.14 |
| Peer Playtime * self-control (Adol.) | 0.9 0.75 1 1 | 0.89 0.72 |
| Religious Attendance*self-control (Child.) | 1.01 1.18 1 0.93 1 | 0.96 0.79 |
| Religious Attendance*self-control (Adol.) | 1.01 1.1 0.99 0.89 | 1.01 1.06 |

LR $\chi^2(d.f.)$ | 171.57**(57) | 167.56**(57) |
Pseudo R² | 0.17 | 0.17 |
N | 376 | 376 |

Note: 1. S-O, L-S, M-D, and E-S stand for sporadic-offender, late-starter, moderate-desister, and early-starter trajectories, respectively. S-O trajectory is the reference trajectory.
2. ** p<.01, * p<.05, * p<.07, † p<.10.
## Table 20. Delinquency Trajectories Regressed on Socialization Processes and Opportunity Measures using MNRL Model (Girls)-Contd.

<table>
<thead>
<tr>
<th></th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G2: L-S</td>
<td>G3: M-D</td>
</tr>
<tr>
<td></td>
<td>e^b  e^b Std.X   e^b  e^b Std.X   e^b  e^b Std.X</td>
<td>e^b  e^b Std.X   e^b  e^b Std.X   e^b  e^b Std.X</td>
</tr>
<tr>
<td><strong>Childhood Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Routines</td>
<td>1</td>
<td>1.01</td>
</tr>
<tr>
<td>Peer Playtime</td>
<td>1.12</td>
<td>1.12</td>
</tr>
<tr>
<td>Religious Attendance</td>
<td>1.07</td>
<td>1.3</td>
</tr>
<tr>
<td>Opportunity</td>
<td>0.97</td>
<td>0.94</td>
</tr>
<tr>
<td>Authoritative Parenting</td>
<td>0.99</td>
<td>0.92</td>
</tr>
<tr>
<td>Peer Conventionality</td>
<td>1.04</td>
<td>1.09</td>
</tr>
<tr>
<td>Religious Commitment</td>
<td>1.01</td>
<td>1.01</td>
</tr>
<tr>
<td>School Commitment</td>
<td>1.12*</td>
<td>1.44*</td>
</tr>
<tr>
<td>Self-Control</td>
<td>1.05</td>
<td>1.27</td>
</tr>
<tr>
<td><strong>Adolescence Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Routines</td>
<td>1.03</td>
<td>1.11</td>
</tr>
<tr>
<td>Peer Playtime</td>
<td>1.07</td>
<td>1.05</td>
</tr>
<tr>
<td>Religious Attendance</td>
<td>0.89†</td>
<td>0.70†</td>
</tr>
<tr>
<td>Opportunity</td>
<td>1.13</td>
<td>1.25</td>
</tr>
<tr>
<td>School Continuity</td>
<td>1.12</td>
<td>1.05</td>
</tr>
<tr>
<td>Authoritative Parenting</td>
<td>0.95**</td>
<td>0.53**</td>
</tr>
<tr>
<td>Peer Conventionality</td>
<td>0.75**</td>
<td>0.58**</td>
</tr>
<tr>
<td>Religious Commitment</td>
<td>1.07</td>
<td>1.04</td>
</tr>
<tr>
<td>School Commitment</td>
<td>1.03</td>
<td>1.23</td>
</tr>
<tr>
<td>Self-Control</td>
<td>0.99</td>
<td>0.98</td>
</tr>
<tr>
<td>School continuity* self-control (Adol.)</td>
<td>0.78*</td>
<td>0.45*</td>
</tr>
<tr>
<td>Opportunity * self-control (Child.)</td>
<td>0.99</td>
<td>0.95</td>
</tr>
<tr>
<td>Opportunity* self-control (Adol.)</td>
<td>0.96</td>
<td>0.76</td>
</tr>
<tr>
<td>LR χ²(d.f.)</td>
<td>169.77**(54)</td>
<td>157.14**(48)</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.17</td>
<td>0.16</td>
</tr>
<tr>
<td>N</td>
<td>376</td>
<td>376</td>
</tr>
</tbody>
</table>

**Note:** 1. S-O, L-S, M-D, and E-S are sporadic-offender, late-starter, moderate-desister, and early-starter trajectories, respectively. S-O trajectory is the reference.
2. ** p<.01, * p<.05, * p<.07, † p<.10.
CHAPTER 9

DISCUSSION AND CONCLUSIONS

In chapter 7 and chapter 8, I presented the results from the analyses of the present study and summarized the findings. In this chapter, I first discuss the results and then draw conclusions based on the findings.

Discussion

Since its publication, *A General Theory of Crime* (Gottfredson and Hirschi, 1990) has attracted enormous research attention. A number of studies have been devoted to testing Gottfredson and Hirschi’s (1990) stability postulate that self-control tends to remain stable once it is formed by the age of 10. Generally negating the stability postulate, prior studies have limitations. Most of these studies test the stability of self-control relying exclusively on the magnitude of correlation coefficients between self-control measures at different time points, which is not a good measure of stability. Overcoming this methodological limitation, recent studies only examine the stability of self-control up to early or mid-adolescence. The limited time-span covered by these studies leads to uncertainty in interpreting the research findings – is the found instability of self-control a reflection of long-term trends or is it only a reflection of a misidentification of the age when self-control becomes stable. To clarify this uncertainty, the present study examined the stability of self-control up to early adulthood when self-control should be highly stable according to Gottfredson and Hirschi (1990).
Closely related to the uncertainty about the stability of self-control is yet another unanswered question. If self-control is changeable beyond the mid-adolescence, are parenting and other socialization processes, e.g., those in schools, conventional peer groups, and religion, the social factors that induce changes in self-control? Prior research testing the role of these socialization processes often either focused on early- or mid-adolescence or focuses on one or two types of these socialization processes. Further research is needed to address this unanswered question.

Gottfredson and Hirschi (1990; 2003) have also asserted that self-control is the cause of all crime and analogous behavior. Other factors including criminal opportunities are generally regarded as of no causal significance in explaining delinquency and crime. However, empirical evidence that negates this postulate accumulates. Based on the empirical evidence and drawing from routine activity theory, Hay and Forrest (2008) have incorporated criminal opportunity into self-control theory. Since their extension to self-control theory, there have been few studies that have tested this idea. To be specific, only two studies so far have explicitly tested this extension. To examine the empirical status of this extension, further systematic test is greatly needed.

The present study sought to address the three close-related research questions. In the present study, I used data from a longitudinal study, the Family and Community Health Study (FACHS) on an African American Sample aged 10 to 12 and followed up to age 20-22. I described the developmental trajectories of self-control from age 10 to 22 using GBTM. I also evaluated the impact of effective parenting and other socialization processes in inducing changes in self-control using a MNLR model. In addition, using GBTM and MNLR modeling and using the structural aspects of effective parenting and
other socialization processes as measures of criminal opportunity, I examined the impact of criminal opportunities shown in parenting and other socialization processes on individuals' delinquency trajectories.

**Stability of Self-Control.** Consistent with my hypothesis and prior research (Hay and Forrest 2006), the present study finds that there is heterogeneity among the population in terms of changeability of self-control beyond early childhood and up to early adulthood. For boys, four unique trajectories of self-control are identified; while for girls, five unique trajectories of self-control are identified. Consistent with my hypothesis and prior research (Hay and Forrest, 2006; Burt et al., 2006) focusing on age group up to early- or mid- adolescence, both the absolute levels and the rankings of self-control show substantial changes over time. For boys, 21% remains stable in their absolute levels of self-control, and 79% experiences increases in self-control; for girls, 31% remains stable in their absolute levels of self-control, and 69% experiences increase in self-control.

As expected and consistent with prior research (Hay and Forrest, 2006), the research finds that the changes in the absolute levels of self-control show different directions: increasing and curvilinear change. However, inconsistent with the hypothesis and prior research (Hay and Forrest, 2006; Burt et al, 2006), I did not find a group that showed significant decrease in the absolute levels of self-control. The results seem to show some support for Gottfredson and Hirschi (1990) argument that, once socialization is done successfully, it is hard to undo it. The present study also finds that there is substantial reshuffling in the ranking of self-control. 52% of boys experience changes in
their ranking of self-control, and 80% of girls experience changes in their ranking of self-control.

For both boys and girls, the most notable groups are the M.I. groups. They start with median levels of self-control, but gain high self-control by the early adulthood and rank only second to the group with the highest self-control by age 22. In addition, for both boys and girls, the groups starting with the lowest levels of self-control experience significant increase in their absolute levels of self-control. Although they did not change their ranking in self-control (as in girls’ cases), the changeability of their absolute levels of self-control shows that they are still responsive to socialization processes up to early adulthood. It is very promising in that, although their likelihood of committing crime is relatively higher relative to that of other groups, their increased absolute levels of self-control indicates that they have more control over their impulses and are less likely to commit crime/delinquency during early adulthood relative to themselves during childhood and adolescence.

In addition, the present study shows that authoritative parenting during both childhood and adolescence increases boys’ likelihood of following the trajectories that either have high self-control over time or gain high self-control eventually by early adulthood. This suggests that boys’ self-control is still responsive to authoritative parenting up to early adulthood. This pattern holds for girls as well. It also shows that, during childhood, school is an effective socialization institution in that school commitment increases both boys’ and girls’ likelihood of following trajectories that either have high self-control over time or gain high self-control by early adulthood.
However, during adolescence, school does not seem to be effective in terms of instilling self-control in boys; while it is only marginally effective for girls.

The present study shows that peer groups during adolescence seem to be an effective socialization institution for boys, but not for girls. The conventionality of peer groups during adolescence increases boys’ likelihood of showing trajectories that have either high self-control across time or gain high self-control eventually. In addition, more regular peer playtime marginally increases boy’s likelihood of showing trajectories with high self-control across time or gaining high self-control eventually. However, peer groups during childhood do not seem to play a significant role in instilling boys’ self-control. Regularity of peer playtime during childhood has a marginal impact on boys’ self-control in a negative direction.

The opposite directions that the impact of regular peer playtime shows during childhood and adolescence may be explained by boys’ different circumstances at the two life-course stages (Thornberry, 1987). During childhood, family (i.e., parenting) is the children’s primary life arena, while peer groups are not. Fitting into peer groups is not of special significance for children since they can always turn back to their parents when they are rejected or punished by peers. Thus, peer groups may have less power in monitoring, correcting, and disciplining children’s behavior and be less effective in instilling self-control. This is shown in the result that conventionality of peers during childhood does not impact individuals’ self-control trajectories. In addition, when children spend too much time in peer-playing, their time spent with parents will be curtailed and they will receive less parenting, then primary source of self-control during
this period. Thus, it is reasonable that spending more time with peers during childhood is not beneficial in terms of instilling self-control.

However, it is a very different case for adolescents. During adolescence, the major life arena shifts gradually from home to peer group. The pressure of fitting into the peer group during adolescence is much stronger than that during childhood since turning back to the arms of parents is no longer a desirable option. Following the rules of the peer group and fitting into the peer group becomes a necessity for adolescents. Relative to that for children, the rules of peer group have more power over adolescents. Adolescents have to follow these rules and interact with peers in socially-approved ways to fit into the peer group. As a result, adolescents benefit from playing more with their peer groups and benefit from the higher level of conventionality of their peers in terms of strengthening self-control.

The results also suggest that, during adolescence, religion is a significant socialization agency for girls, but not for boys. For girls, consistent with the hypothesis and prior research suggesting beneficial effect of religion on youth’s self-control (Baumeister, Bauer, and Lloyd, 2010; McZCoulough and Willoughby, 2009) and behavior (e.g., Simons et al., 2004; Landor et al, 2011), higher levels of religious commitment during adolescence increases girls’ likelihood of showing trajectories that have either high levels of self-control or gain high self-control eventually. However, inconsistent with the hypothesis, higher regularity of religious attendance during adolescence increase girls’ likelihood of self-control trajectories that either have low self-control over time or failed to gain high self-control eventually - M.S. and L.I. groups.
This seems contradicting in that stronger religious commitment seems to be a positive thing for girls; while more regular attendance of religious activities is a negative thing. This inconsistency may be due to a pre-selection effect. Among adolescent girls who attend religious activities, there may be two major groups of girls. One group is strongly committed to religious belief; while the other group may be girls who have already had a heap of troubles and use religion as the last resort of discipline, either voluntarily or involuntarily (e.g., under parents’ pressure). Thus, the latter tend to start with very low self-control. They may experience improvement in self-control; however, they are more likely to remain relatively low in their ranking of self-control due to their very low starting point.

Although the significance of other socialization institutions or agencies varies for boys and girls and between childhood and adolescence, the significance of authoritative parenting never changes regardless of an individual’s gender and life-course stage. Regardless of changes in life circumstance during the early life-course stages, authoritative parenting is a salient socialization process that instills self-control in individuals up to early adulthood. Comparing the M.I. group with other groups of boys and girls, respectively, the results show that the M.I. group which starts with median level of self-control and eventually gain high self-control experiences the largest increase in authoritative parenting from childhood to adolescence. For example, the score of authoritative parenting for M.I. group of boys is 97.97, which is the second lowest score among the four groups during childhood. While during adolescence, the score of this group increases to 98.32, which is the second highest and is only lower than that for H.I. group (102.36). Among the five groups for girls, the M.I. group experiences the largest
increase in authoritative parenting from childhood to adolescence as well. The score of authoritative parenting during childhood for the M.I. group of girls is 94.13, which is the second lowest and only above the L.I. group. However, during adolescence, the M.I. group of girls has a score of authoritative parenting of 101.40, which is the second highest and only below that of the H.S. group (108.22). Improvement in parenting helps those adolescents fight against the odds and become high-self-control “achievers”.

**Parenting, Criminal Opportunity, Self-Control, and Delinquency.** According to Gottfredson and Hirschi’ (1990), self-control is the cause of crime. Consistent with prior research (e.g., Hay, 2001; Unnever et al., 2006; Hay and Forrest, 2008) showing that self-control is a significant predictor of crime, the present study finds that self-control during adolescence significantly impacts an individual's delinquency trajectory. This is also consistent with my hypothesis that, for both boys and girls, lower self-control will cause individuals to follow delinquency trajectories that either have the highest level of delinquency across time or have the highest level of delinquency by age of 20.

However, the expected effect of self-control on individuals' delinquency trajectories is only found for the adolescence period. Controlling self-control during adolescence, individuals' self-control during childhood either do not impact their delinquency trajectories (in girls' case) or is in an unexpected direction (in boys' case). Controlling boys' self-control during adolescence, boys with relatively higher self-control during childhood are more likely to follow a late-starter delinquency trajectory relative to their counterpart who has lower self-control during childhood. This is contrary to Hirschi and Gottfredson’s deterministic view that “children in trouble with teachers in the 2nd and
3rd grades are more likely to be in trouble with juvenile authorities at 15 and 16; they are more likely to serve prison terms in their 20’s ...” (Hirschi and Gottfredson 2001:87).

In addition, consistent with my hypothesis, authoritative parenting is shown to decreases individuals' likelihood of showing delinquency trajectories that either have the highest level of delinquency across time or the highest delinquency by age 20. This holds for both boys and girls. The findings are consistent with prior findings that effective parenting directly impacts individuals' level of delinquency (Unnever et al., 2006, Hay, 2001). The findings are also consistent with Moffitt and Nagin's (1995) study on chronic-offenders suggesting high/low-level chronic offenders are often those who receive poor parenting during adolescence.

Self-control during adolescence is also found to mediate the impact of authoritative parenting during adolescence upon both boys' and girls' delinquency trajectories. This is consistent with prior research suggesting a mediating role of self-control in the relationship between parenting and delinquency (e.g., Unnever et al., 2006; Hay, 2001). For both boys and girls, conventionality of peers during adolescence significantly impacts their delinquency trajectories. Peers' conventionality increases the odds that boys and girls will follow a sporadic-offender trajectory whose delinquency level is basically zero. However, conventionality of peers during childhood does not have a significant impact on boys' and girls' delinquency trajectories. This echoes the theme that peer group is one of the major arenas for adolescents (Thornberry, 1978).

Among the opportunity measures which are also the structural aspects of socialization, family routines during childhood, family routines during adolescence, and religious attendance during adolescence are found to significantly impact boys'
delinquency trajectories. However, no significant effect is found for girls. Consistent with my hypothesis, family routines during childhood significant interact with self-control during childhood in impacting boys' delinquency trajectories. Given the same level of self-control during childhood, boys with more regular family routines during childhood are less likely to follow the life-course-persistent delinquency trajectory, relative to those with less regular family routines. In addition, family routines during adolescence significantly decrease boys' likelihood of following the late-starter and the life-course-persistent groups. However, no interactive effect is found for family routines during adolescence.

School continuity during adolescence was found to significantly interact with self-control in impacting girls' delinquency trajectories. For girls who dropped out of school during adolescence, they are more likely than those staying in school to follow a late-starter delinquency trajectory. Keep in mind that, in the case of girls, the late-starter delinquency group shows the highest level of delinquency by age 20. Its' average level of delinquency is even higher or, at least, comparable to that of the early-starter group by age 20. However, school continuity does not significantly interact with self-control in impacting boys' delinquency trajectory.

Interestingly, the present study found that, controlling self-control and other variables, school commitment during adolescence significantly increases boys' likelihood of following a late-starter delinquency trajectory. There is no significant impact of school commitment during childhood on delinquency trajectories for boys. This is contrary to my hypothesis that individuals' school commitment should keep them away from delinquency and following a sporadic-offender group rather than that of the other
groups. Looking at the girls' results, girls' school commitment during childhood significantly increases their likelihood of following a late-starter delinquency trajectory; while school commitment during adolescence does not show significant effects.

I explain this inconsistency with my hypothesis as the following. When children or adolescents are committed to school or academic life, they are a part of school life. During adolescence or late childhood, one of the major themes of adolescents' or children's school life is to test the boundaries of their ability or try out new things that their physical maturity allows them (Moffitt 1993). These new things often include deviant behavior. Thus, for those determined to be a part of school life, this may become a part of their endeavor. The timing of school commitment that impacts boys' and girls' delinquency trajectories (adolescence for boys and late childhood for girls) is consistent with the earlier puberty for girls relative to boys.

Regular religion attendance during adolescence is found to significantly interact with boys' self-control in impacting boys' delinquency trajectories. Contrary to my hypothesis, regular religious attendance significantly increases boys' likelihood of following the life-course-persistent trajectory. This seems to be inconsistent with prior findings (e.g., Simons et al., 2004; Landor et al., 2011) suggesting that regular religious attendance has beneficial effect on youth's behavior. However, on second thought, this inconsistency may largely due to a “pre-selection” effect among individuals who attend religious activities. Prior research examining the impact of religiosity on youth’s behavior focuses on individuals’ changes in level of delinquency (e.g., Simons et al., 2004; Landor et al., 2011). It is likely that, among the population that attends religious activities regularly, there is a group of individuals who had already had enough troubles.
in their life and treat religion as the last resort to their problems. Although it is possible that they benefit from attending religious activities (negative effect of religious attendance on their levels of delinquency), they are still higher in delinquency relative to others due to their very high starting levels of delinquency. With this in mind, this is not surprising to see the regular religious attendance interacts with self-control in determining individuals' delinquency trajectories in this unexpected direction. This pre-selection effect is also shown in the study of trajectories of self-control.

For both boys and girls, regular peer playtime does not show significant effects (either direct or interactive effect). This is inconsistent with findings from Hay and Forrest (2008) which suggests that self-control's effect on delinquency is partially depending on peer playtime. This may be due to the fact that the regular peer playtime is reported by target children's primary caregiver. Once the primary caregiver is notified about the peer playtime, children and their peers may sense parents’ knowledge about their play-time as one way of monitoring.

Conclusions

Based on the findings of the present study, I draw a few conclusions. First, self-control formed by the age of 10 is by no means deterministic of individuals’ development in the life-course stages beyond childhood in terms of criminality and crime. On the one hand, self-control is responsive to socialization processes up to at least early adulthood. Individuals generally can increase their self-control over time. Boys with the lowest self-control by the age of 10, a subgroup of population that has the highest level of criminality, are able to successfully reshuffle their ranking in self-control by the age of 22. On the other hand, self-control during childhood does not have much weight in terms
of predicting individuals’ trajectories of delinquency. Relative to self-control during childhood (around age 10-12), self-control during adolescence is more powerful in terms of predicting trajectories of delinquency from age 10 to 20.

Second, improving the quality of parenting, as a crime-prevention strategy, should not only focus on childhood. It also should focus on the whole period of adolescence and even early adulthood. Among different socialization processes, authoritative parenting is the only socialization process that can consistently instill self-control in individuals and decrease individuals’ levels of delinquency, regardless of individuals’ gender and life-course stages. In other words, even if parents failed in the first place in instilling adequate self-control in their children and in preventing their children from committing delinquent behavior, they are able to do so through improving their parenting practices during their children’s adolescent years. Improving parenting practices to help one’s children gain self-control and desist from crime should be regarded as not only within a parent’s ability but also a parent’s responsibility to the society. This ability and responsibility of parents are not limited to children’s childhood and should be extended to children’s adolescence and even early adulthood years.

Third, family routines about children, as the structural aspect of effective parenting, deserve more attention in crime-prevention. Family life with regular family routines about children deprives children of criminal opportunity that facilitates the translation of low self-control into delinquency. This is especially pronounced during childhood. Thus, as the quality of parenting is emphasized in crime-prevention, family routines about children should not be neglected. Further, family routines about children may provide as an effective way to improve quality of parenting. Family routines about
children are the daily “dose” of parenting. It clearly shows how parenting practices is distributed among the daily cycle of family life. It also reflects the regularity or stability of family life over time. Through family routines about children, it is easier to monitor parenting practices and teach parenting skills.

Fourth, helping youth to make the right choice regarding friends is an important way that parents can help youth improve self-control and desist from delinquency. Conventionality of peers during adolescence significantly decreases individuals’ level of delinquency for both boys and girls and improves boys’ levels of self-control. As youth becomes more independent during their adolescent years, they may desire more freedom in terms of choosing their own friends. Although it is necessary for parents to show respect to youth’s desire for independence, “making choices on friends” should be an area over which parents always reserve power for guidance and monitoring. By helping youth make good choices regarding friends, parents are actually choosing the right socialization “agency” for youth where they can continue their conventional socialization processes.

Among social institutions that can socialize individuals into socialized members of the society, the family is of significant importance. Parents are the ones who bring children into the world. It is parents’ primary responsibility to socialize their children into responsible social members of the society. The fulfillment of this responsibility should not be measured simply by the growing-up of their children. Rather, it is measured by the successful socialization of their children into responsible members of the society. As long as this responsibility is not fulfilled, parents are not exempt from this responsibility. In other words, parents should never give up on their children.
REFERENCES


*Criminology* 39:707-736.


Appendices A. Interpretation of $2\Delta BIC$

<table>
<thead>
<tr>
<th>$2\log_e B_{10} = 2\Delta BIC$</th>
<th>$B_{10}$</th>
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<tr>
<td>0 to 2</td>
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</tr>
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</tr>
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</tr>
<tr>
<td>&gt;10</td>
<td>&gt;150</td>
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Note: This table is from Jones, Nagin, and Roeder's (2001) article