Adolescent Concealment: Causes and Consequences

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Abstract

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What motivates individuals to lie and withhold information from others? There are multiple definitions of dishonest and secretive behavior—ranging from impulsive delinquency to strategic self-preservation, each stemming from different conceptualizations of motivations behind the act. Drawing upon work on agency in both sociology and economics, this dissertation specifies a theoretically grounded explanation of why individuals in general—and adolescents in particular—conceal information from others. Specifically, I propose that—just like adults—adolescents have the capacity to act in any given environment, where that capacity is a function of conscious choice (i.e. deliberative cognitive processes) as well as objective and subjective constraints. When adolescents lie or keep secrets, such information management is both an agentic behavior in-and-of itself, and a behavior that expands one's future agency (or capacity to act in any given environment), generating more autonomy and control over one's life. In testing

this definition of agentic concealment a) against other theories of secrecy and lying, b) across multiple data sets, and c) with regard to different concealable behaviors, this dissertation improves our understanding of information management. In doing so, it adopts a cross-disciplinary approach, drawing on research in developmental psychology, sociology, criminology, and economics.

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DEDICATION

To Blaine.

CHAPTER 1: INTRODUCTION

"...Let's not tell dad!"
-Eloise Grigoryeva

Managing private information is a double-edged sword: on the one hand we want others to provide us with true information. On the other, we don't want to live in a Panopticon, with the entirety of our actions on display. This tension between the keepers and receivers of information, as well as the conditions that induce individuals to lie and keep secrets has been of central concern for social scientists (Goffman, 1959; Stattin and Kerr, 2000; Ross, 1973).

What motivates individuals to lie and withhold information from others? There are multiple definitions of dishonest and secretive behavior—ranging from impulsive delinquency to strategic self-preservation, which each stem from different conceptualizations of motivations behind the act. By proposing a theoretically grounded explanation of why individuals in general—and adolescents in particular—conceal information from others and testing it a) against other theories of secrecy and lying, b) across multiple data sets, and c) with regard to different concealable behaviors, this dissertation attempts to improve our understanding of information management. In doing so, it adopts a cross-disciplinary approach, drawing on research in developmental psychology, sociology, criminology, and economics.

Defining concealment

How do social scientists define lying and concealing behavior? The answer is that there are multiple, usually field-specific, conceptualizations of secret keeping and lying. In this chapter, I review the different definitions of lying and secrecy as it pertains to adolescents. I also show that

these definitions are often rooted in discipline-specific understanding of human behavior and agency, and are rarely evaluated against one another. In general, such isolationism precludes accumulation of knowledge and may lead to biased approaches to examining social phenomena. To generate a broader and more complete understanding of concealment I engage and build upon research from across the social sciences.

Before reviewing differences in scholarly understandings of information management and concealment, it is necessary to describe what it is we are talking about. There are many ways to manage private information. Such gate-keeping can take on the form of selectively projecting non-verbal cues, to secrecy, to collusion, among others (Goffman, 1959; Stattin and Kerr, 2000; Simpson, 2013). In this dissertation I will focus on two dimensions of verbally concealing information: secret keeping—the act of knowingly withholding information, and lying—knowingly providing false information. Some scholars choose to treat the two concepts as analytically distinct, on the grounds that lying (an act of commission) generates false knowledge while secret keeping (an act of omission) does not (Buller and Burgoon, 1994; Smetana and Rote, 2014). I depart from this view. Instead, I argue that deliberately withholding correct information, whatever the strategy of concealment, yields a gap in the recipient's correct knowledge. In the case of a lie, that gap is filled in (incorrectly) by the liar, and the case of a secret that gap is filled in (also incorrectly) by the recipient themselves. Additionally, in this dissertation, my focus is on self-serving lies and secrets. In other words, the primary motivation for the act of consciously failing to provide the correct information to another to benefit oneself. For the remainder of this chapter I will use the terms *information management* and *concealment* interchangeably to mean the gate-keeping of private information through lying and secret keeping.

The focus on adolescents

People conceal information throughout their lives, starting in early childhood—as soon as they are able to understand consequences of behavior and have ideas about how other people think (Talwar and Lee, 2008). I examine how individuals lie and keep secrets throughout adolescence, with a particular focus on the conditions under which teen children conceal information from their parents. The key reason for this focus is that there is a lot of ambiguity as to the meaning of concealing behavior within the parent-adolescent exchange, with disparate conclusions drawn by developmental psychologists, criminologists, sociologists and communication scholars. These conflicting accounts of what happens when adolescents lie and keep secrets from parents are dependent on how each discipline views adolescents. Depending on the subfield, adolescents are seen as impulsive or strategic, autonomous from parents or wholly defined by parental behavior. Correspondingly, concealment has been conceptualized as a problem behavior in and of itself or a means to an end; as a way to assert independence or a symptom of being too dependent on an environment which demands dishonesty and secrecy. In other words, concealment is a behavior that has been linked to core elements of the self—at least for adolescents. Therefore, getting a better understanding about what motivates children to lie to parents—and what the outcomes of such concealment are—adds to what we know about lying and also to what we know about agency, autonomy, and how parents and children negotiate the process of growing up. Below, I briefly review what we know about both concealment and adolescents vis-à-vis work in sociology, criminology, developmental psychology, and communication studies. Then I provide an overview of my core arguments, and summarize how each empirical chapter examines my proposed view of concealment.

Sociology and Criminology

As a discipline, sociology—and criminology as its subfield—largely assumes that children are empty vessels who are socialized into personhood. The main focus of research on child and adolescent behavior has been on the family environment in which children are reared and the strategies parents employ in shaping a child's development (Baumrind, 1967; Gottfredson and Hirschi, 1990; Hirschi, 1969; Heimer, 1997; Sampson and Laub, 1993, 2005; Steinberg, Lamborn, Darling, Mounts, and Dornbusch, 1994). While a new crop of research shows that prior classic parent-centered research programs tend to overstate the actions of parents and understate elements of child agency (Pugh, 2009, 2014; Calarco 2011, 2014; Ojeda and Hatemi, 2015), parent-centric explanations of child behavior still dominate the discourse, especially in criminological research (Akers, 1973; Gottfredson and Hirshi, 1990).

Given the view that proper parental socialization is key to optimal outcomes for children, attempts to diminish parental control by concealing information are considered problem behaviors (Stouthamer-Loeber, 1985; Gottfredson and Hirschi, 1990). The acceptance of the idea that lying to parents is a problem behavior is reflected in the way sociological surveys structure questions about lying: In the large, nationally representative, data set analyzed as part of this dissertation the lying-to-parents question is placed among delinquency measures. Likewise, the second data set used presently, focusing on disadvantaged youth, has a measure of lying that was excluded from the analyses because it was assessed jointly with cheating—and also relegated to the delinquency section of the survey.

How do criminologists and sociologists theorize motivations for concealment and the adolescents who conceal? In this dissertation I draw on the work of Michael Gottfredson and Travis Hirschi (1990) who put forth the most parsimonious and influential explanation of concealment as part of their thesis of problem behavior, termed General Theory of Crime (GTC).

The core argument of the GTC is the idea that individuals are born motivated to commit crime by a self-interested pursuit of pleasure and avoidance of pain. Crime and other problem behaviors—such as lying—fulfill these desires by providing easy and immediate gratification.

Despite this universal need for selfish and quick gratification, individuals can be taught to control their impulses, take into account the interests of others, and regulate anti-social behavior through successful parental socialization (Hirschi, 1969; Gottfredson and Hirschi, 1990; Hirschi, 2004). By monitoring and effective sanctioning of problem behavior in a warm and caring manner, parents teach children to control impulsive and selfish acts (Gottfredson and Hirschi, 1990; Burt et al., 2006). By early adolescence most children internalize parental discipline and behavioral consequences as *self-control*—the ability to personally delay gratification, plan ahead, and consider the interests of others when making decisions (Gottfredson and Hirschi, 1990; Hirschi, 2004; Bridgett et al., 2015). Those who fail to develop self-control are more impulsive, excitement-seeking, and selfish. Low self-control individuals engage in antisocial behaviors—including lying, cheating, and delinquency because these bring about most immediate gratification of impulses, even at the cost of long term outcomes (Gottfredson and Hirschi, 1990; Burt et al., 2014).

In short, according to the GTC, parents define how well adolescents navigate their worlds. Parents have the agency, internal locus of control, and power to mold the behavioral outcomes of their children—and not the other way around. Adolescent agency and autonomy is not theorized beyond what parents impart on their children: children are only as agentic as parents make them. Lying and concealment—things that children do in defiance of parents—are seen as impulsive, selfish, and—ultimately—maladaptive behaviors.

Other disciplines have recently adopted a view of both concealment and adolescence that contrasts with the GTC definitions. Classically, the field of developmental psychology was also dominated by parent-centered explanations of adolescent behavior, with a similar focus on parental control of behavior in a context of warmth and affection (Baumrind, 1967; Maccoby and Martin, 1983; Steinberg et al., 1994). However, recent work has redefined the pattern of influence between parents and children, conceptualizing secret keeping and lying as a key tool by which adolescents gain autonomy from their parents (Stattin and Kerr, 2000). Stattin and Kerr show that in order to make decisions about how to act towards their children, parents need information about child behavior. Importantly, much of this information can only be voluntarily disclosed to them by their children—it is not knowledge that can be gained through parent-controlled tactics of information gathering (Stattin and Kerr, 2000, Soenens et al., 2006). The authors argue that since parents discipline their children based on what they know about their child's behavior, children have more autonomy and control in the parent-child disciplinary encounter than has been previously acknowledged. In short, child information management—not parental attempts at monitoring and supervision—generates the knowledge that parents require to discipline children and prevent them from engaging in delinquent or other problem behaviors.

Research in communication has also shown that children manipulate personal information to influence parents' treatment of them. Moreover, such studies of secret keeping and concealment reveal that information management can have an important self-preservation quality: children who have to navigate memberships in multiple households use concealment tactics to promote peace between parents and reduce the emotional toll involved in juggling disparate demands of caretakers (Afifi et al., 2005; Afifi and Weiner, 2004).

Taken together, these studies redefine both the adolescent and the act of concealment. Instead of being passively socialized, adolescents can influence their parent—and gain power and independence as a result. By extension, the defining feature of concealment becomes its ability to grant such autonomy, for better or for worse. The shift is one from concealment as an end-in-itself—an impulsive problem behavior, to concealment as a means-to-an-end—a strategy of getting what you want. In light of this evidence, concealment can be thought of as adaptive or maladaptive depending on the information being concealed: In other words, studying concealment *only* as it pertains to problem behaviors provides an incomplete and misleading definition of concealment.

A View of Concealment Rooted in Agency and Economics

In sum, these changes in how scholars in communication and psychology define concealment ascribed to adolescents the ability consciously and strategically enact their interests within their environment. However, the same research lacked an explicit model of adolescent agency and decision-making. In other words—a theory of how adolescents strategically make decisions about concealing information.

To better specify a model of motivations behind concealment, I draw upon work on agency in both sociology and economics (Emirbayer and Mische, 1998; Hitlin and Johnson, 2015; Shapiro, 2005). I propose that—just like adults—adolescents have the capacity to act in any given environment, where that capacity is a function of conscious choice (i.e. deliberative cognitive processes) as well as objective and subjective constraints. Choice is the process by which individuals weigh the value of and expected success for each behavioral alternative. Constraints are any anticipated punishment or reward that restricts the behavioral alternatives an individual can pursue by altering the costs or benefits of action (Ingram and Clay, 2000).

Constraints arise from the social and physical environment in which the individual is embedded, the information available to the decision maker, and the individual subjective interpretations of events as occurring in the past, present, future, and vis-à-vis others (Emirbayer and Mische, 1998; Hitlin and Johnson 2015; Matsueda, 2006).

Given my definition, there are two primary ways in which concealment engages the objective and subjective dimensions of agency. First, if information is concealed to avoid punishment or other negative outcomes, then the decision to conceal is made with conscious reference to future impression making and anticipated sanctions. Furthermore, concealment is an attempt by adolescents to resolve the problematic situation of conflicting interests: parents desire knowledge about and control over a child's behavior, while children want to keep their behavior private and self-directed. Such conscious and forward-looking efforts at problem solving are consistent with existing criteria for agentic choice and action, and with the ability to act strategically (Matsueda, 2006; Emirbayer and Mische, 1998; Ross, 1973). Second, if concealment successfully limits parental knowledge and control, it objectively (and subjectively) yields children more autonomy and power to make choices (Hitlin and Long, 2009). This second property defines agency as something that can vary in magnitude: an individual can have more or less agency.

In sum, I propose that information management is both an agentic behavior and a behavior that generates more autonomy and control over one's life by expanding one's agency (or capacity to act in any given environment). This definition of concealment—forward oriented and strategic—implies that both the behavior and its enactor are rational, and that theories about when, how, and by whom strategies of concealment are enacted may be in line with economic research (Hechter and Kanazawa, 1997).

Indeed, a large literature within economics examines how individuals exploit information asymmetries—knowing more than the other person—for personal gain (Ross, 1973). Research on the principal-agent problem is of particular salience to the case of parents and children. The principal-agent problem describes a competitive interaction between two actors: the principal and the agent. The principal usually has more power and authority, but needs to delegate that authority to the second actor—the agent—in return for some service that the agent can provide to the principal and that the principal cannot provide for themselves. The agent, whose interests may differ from those of the principal, acts on their own interests by withholding and otherwise manipulating private information about their willingness and ability to render the service. The principal, as a counter-strategy, can adopt several ways of obtaining compliance, including monitoring and sanctioning the actions of agents (Ross, 1973; Kiser,1999; Shapiro, 2005). If we assume that the "good" provided can take the shape of any of the number of adolescent behaviors that parents are interested in controlling, then it is easy to envision children as the agents, concealing information from parents—principals who attempt to monitor and sanction (i.e., discipline) to get what they want. Importantly, within the principal-agent (PA) paradigm, there is no normative value placed on the act of concealing information: it is neither good nor bad, but self-interested.

Economists rarely study the relationships between parents and adolescents. As such, the principal-agent paradigm has been classically used in studies of compliance with economic contracts and firm-level cooperation, or of compliance with state laws and regulations (Spence and Zeckhauser, 1971; Shapiro, 2005; Kiser and Schneider, 1994). However, I argue that applying it at the level of the family is important to research on the PA problem: examining the

principal-agent model in a case that is sociologically rooted brings real-world complexity to a model that has been criticized for being overly reductionist (Kiser, 1999; Schapiro, 2005).

Impulse or Strategy?

In sum, there is ample reason to suspect that a concept that has been defined (and in some research continues to be defined) as impulsive and problematic, is strategic and can achieve both pro- and anti- social outcomes. However, because the disparate literatures summarized above seldom reference one-another, it is hard to determine which argument has more empirical support or if there is a way to reconcile the seemingly disparate definitions of concealment. Given this, my dissertation has two main goals. First, I draw on theories of agency to theoretically specify adolescent concealment as both a form and expression of agency. Second, I use analytic tools and prior knowledge from relevant social science research to provide a better understanding of what it means to manage information as an adolescent. Such an interdisciplinary approach expands the range of possibilities for social action, and allows us to examine a particular concept—such as information management—from many angles. My hope is that, taken together, my analysis offers a more complete and accurate portrayal of a key social process.

The analyses conducted as part of this project are quantitative, and use data from two large, longitudinal, US-based surveys. The first, the Denver Youth Survey (DYS), targets disadvantaged youth in Denver, Colorado. The second, National Longitudinal Study of Adolescent to Adult Health (Add Health), is a multi-cite survey, designed to be nationally representative. With regard to models of concealment each survey has unique strengths and weaknesses, and complement each other well: The DYS has five waves of data on 5 cohorts of children and adolescents, allowing for trajectory models of behavior, as well as models where

complex relationships—including mediating effects—can be estimated in correct temporal order. The representativeness of Add Health means that model results are generalizable to a large population. Beyond this, the diversity of measures supplied by both datasets allows a multi-faceted examination of concealment in a way that would not have been possible using only one of the two samples.

The rest of the dissertation consists of 5 chapters. Chapter 2 outlines the disparate definitions of concealment in criminology, sociology and developmental psychology and describes the idea that children gain autonomy and influence via strategic information management in greater detail. I amend this model by drawing on theories of agency to generate testable propositions about how child information management constitutes and increases agentic behavior. To identify which definition—concealment as impulsive problem behavior, or concealment as strategic and agentic—best describes secret keeping and lying among teens, I estimate three four-wave cross-lagged panel models of parenting, information management, and problem behavior. These statistical models use data from the Denver Youth Survey to explore how parenting, child information management, self-control, and delinquent behavior interrelate over time.

Chapter 3 attempts to replicate the findings from Chapter 2 using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Findings of any given study—especially published work—run the risk of yielding false results, including incorrect rejections of a true null hypothesis (a false positive or a Type I error) and failure to reject a null hypothesis when it should be rejected (a false negative or a Type II error). Replication of an empirical model is an important step in assessing its generalizability, and reducing both Type 1 and Type 2

errors (Simons, 2014). Because it is a nationally representative sample, estimating the model using the Add Health data speaks to its applicability outside of the context of high disadvantage.

Chapter 4 extends the general model developed in chapter 1 in another way: using the DYS data, I examine if the relationship between self-control, parenting and concealment changes with age. I model the evolution of concealment as individuals transition from childhood to adolescence, alongside factors—such as self-control, delinquency, and parenting—that have been shown to influence information management. Beyond testing the robustness of prior results to age, I attempt to answer several questions that are important for understanding how children negotiate the process of growing up. Adolescent concealment has been shown to be a central way in which children assert their independence and exert influence over parents (Stattin and Kerr, 2000; Smetana, 2008), and is associated with higher IQ, problem solving, and greater self-control in childhood (Talwar and Crossman, 2011). On the other hand, research shows that frequent lying by adolescents may be associated with suboptimal outcomes (Stouthamer-Loeber, 1986, Gervais et al., 2000). Little is known about whether there are developmental differences in lying and secrecy between childhood and adolescence, and what factors may affect individual trajectories of concealment and disclosure. We know that individuals differ in the frequency with which they lie and keep secrets. This chapter helps to identify if these differences are stable or fluid throughout childhood and adolescence, as well as pinpoint the causes of any developmental changes. To do this, I model trajectories of concealment between the ages of 10 and 19 and estimate the relation between self-control and concealment throughout that developmental stage. Second, I estimate the model in Chapter 1 separately for the youngest and oldest cohorts of the DYS, in order to test whether the previously observed relations among the variables change with

age. In sum, Chapter 4 aims to generate a better understanding of the processes—and, by extension, the meaning—of information management during childhood and adolescence.

Chapter 5 draws on agency theory to model parent-child negotiations surrounding teens' sexual behavior. As part of this model, I examine the relationship between concealment and teen sex. This application allows an assessment of concealment with regard to a behavior that is not seen as unequivocally problematic as delinquency. Recent qualitative work has shown significant cultural differences in the ways in which parents and children define as well as negotiate boundaries surrounding teen sex, including teen secrecy about being sexually active (Schalet, 2011; Villalobos, 2014). These differences in negotiation, in turn, yield different patterns and consequences of sexual behavior including pregnancy, STIs, self-esteem surrounding sex, and enjoyment of sex. However, these findings have not been evaluated by quantitative methods in representative samples. Chapter 5 attempts to quantitatively reproduce the findings of qualitative work, as well as build on them by reframing the mechanism by which parents and teens compete to gain control over teen sex as the PA problem. Data from the National Longitudinal Study of Adolescent to Adult Health is used to estimate a PA model of parent-child relationships. Consistent with the principles of the PA problem, I propose that teens who do not comply with parents' directives regarding sex, exploit the information asymmetry surrounding their sexual behavior, such that they lie more and withhold more information from parents who disapprove of sex. In doing so, I re-examine whether concealment can be modeled as a strategy within the well-researched structure of a competitive economic game. At the same time, I test whether the principal-agent model can fruitfully integrate sociological principals—such as relationship quality or culturally specified norms—with economic assumptions and concepts to offer a deeper understanding of this parsimonious model.

Finally, chapter 6 summarizes and discusses the key findings from the four empirical models. Here, I take stock of the dissertation findings as a whole, reflect on what knowledge has been gained as a part of this project and outline directions for future research on adolescents and concealment.

CHAPTER 2: STRATEGIC ACTION OR SELF-CONTROL? ADOLESCENT INFORMATION MANAGEMENT AND DELINQUENCY

ABSTRACT

Recent scholarship has begun to challenge the prevailing view that children are passive recipients of parental socialization, including the common belief that parental disciplinary practices are central to explaining adolescent problem behaviors. This research shows that children exert a significant influence over parents via information management, or the degree to which children disclose information about their behavior to parents. Despite the incorporation of child information management into contemporary models of parenting, significant theoretical and empirical concerns cast doubt on its utility over classic parent-centered approaches. The current paper addresses these concerns and adjudicates between disparate definitions of adolescent information management in two ways. First, it provides a theoretically grounded definition of information management as agentic behavior. Second, it specifies a model that tests definitions of secret keeping as agentic against a non-agentic definition of secret keeping supplied by criminological theories of self-control. The model is estimated with three four-wave cross-lagged panel models, which disentangle the interrelationships between parenting, child concealment of information, and child problem behavior in a high risk sample of youth. The results offer support for a definition of concealment as strategic and self-regarding, and have implications for research on delinquency, parent-child interactions, and child agency.

INTRODUCTION

Social scientists have long viewed parents and parenting as fundamental to the specific life chances and overall fate of children (Kohn, 1969; Akers, 1973; Lareau 2003; Thompson, Hanson and McLanahan, 1994; Fan and Chen, 2001). Consequently, a substantial amount of research has focused on the family environment in which children are reared and the strategies parents employ to shape a child's development (Baumrind, 1967; Gottfredson and Hirschi, 1990; Hirschi, 1969; Heimer, 1997; Sampson and Laub, 1993, 2005; Steinberg, Lamborn, Darling, Mounts, and Dornbusch, 1994). This work shows that parental disciplinary practices—such as engagement, discipline, and control—are central to the evolution of child behavioral problems and juvenile delinquency (Gottfredson and Hirschi, 1990; Simmons et. al., 2005). These classic parent-centered research programs, however, tend to overstate the actions of parents and understate elements of child agency.

Recent scholarship has begun to challenge the view that children are passive recipients of parental socialization (Pugh, 2009, 2014; Calarco 2011, 2014; Ojeda and Hatemi, 2015; for classic treatments of this topic, see: Bell, 1968; Scarr, 1992). Theoretical work in this area redefines parental discipline as an exchange between parents and children, where children influence the parent-child relationship and parental discipline as much as parents (Stattin and Kerr, 2000). According to this model, the main source of child influence is information management, or the degree to which children strategically disclose information about their behavior (Stattin and Kerr, 2000; Kerr and Stattin, 2000; Affifi and Weiner, 2004). Despite the incorporation of child information management into recent models of parenting (*Fletcher, Steinberg*, and Williams-Wheeler, 2004; Soenens, Vansteenkiste, Luyckx, and Goossens, 2006; Cumsille, Darling, and Martinez. 2010; Tilton-Weaver et al., 2010; Keijsers, Branje, Van der

Valk, and Meeus 2010; Kerr, Stattin, and Özdemir, 2012; Rote and Smetana 2015), significant theoretical and empirical concerns cast doubt on its utility over classic parent-centered approaches.

Theoretically, a clear conceptualization of child agency and an explicit model of how information management constitutes agency is absent from the child information management literature. Without such theoretical elements, it is difficult to generate causal claims about child information management or assert that it is in fact strategic (Cohen, 1989). Empirically, models of parent-child exchange and strategic child information management have yet to be directly tested against competing models. The general theory of crime offers one such competing model, which views parents as primary agents of change in child behavior and conceptualizes child information management—secret keeping and lying—as symptomatic of low self-control: an inherently nonstrategic problem behavior stemming from trait-like propensities for impulsivity rather than agency, autonomy, and strategic decision-making (Gottfredson and Hirschi, 1990).

Given the lack of explicit theoretical links to agency as well as studies testing competing explanations of child information management, the present paper aims to accomplish two important goals. The first goal is to integrate theories of information management with research on agency and agentic behavior (Emirbayer and Mische, 1998; Hitlin and Long, 2009). Doing so provides a theoretically grounded explanation for how and why information management can (and should) be viewed as strategic and child-driven. The second goal is to specify and conduct a test of whether adolescent information management stems from trait-like propensities for impulsivity and problem behavior or is a strategy of obtaining power and control. Adjudicating between these two competing models will help refine definitions of information management and shed light on how children contribute to the parent-child disciplinary process.

In the remaining sections of this paper, I review the general theory of crime as a model for understanding parent-child interactions, information management, and problem behavior. I then present an alternative theoretical model that grants more autonomy and influence to children via strategic information management. I amend this model by drawing on theories of agency to generate testable propositions about how child information management constitutes and increases agentic behavior. To identify which theory accounts for more variation in parenting, information management, and problem behavior, I estimate three four-wave cross-lagged panel models. These statistical models explore how parenting, child information management, self-control, and delinquent behavior interrelate over time. The results indicate that through concealing information children are able to influence how much parents know about their behavior. Likewise, the findings suggest that concealing information is a strategic response to how parents discipline their children and to the type of delinquent behavior children engage in. However, contrary to the strategy-based model of information management, low self-control youths are more likely to conceal information from their parents, and self-control renders the relation between one type of delinquency and concealment spurious. These findings have implications for definitions of lying and secret-keeping as well as for research on child agency.

PARENT-CENTERED EXPLANATION: SELF-CONTROL THEORY

The idea that, within the family, parents and not children possess agency and an internal locus of control has long dominated the social sciences. While multiple theories feature parents as key actors who shape and mold child behavior (e.g., Akers, 1973), in this paper I focus on self-control theory or what criminologists refer to as the general theory of crime (hereafter, GTC). I do so for three reasons. First, the GTC is a parsimonious theory with substantial empirical support and a leading perspective on parenting, delinquency, and crime (see Pratt and Cullen,

2000 for a review). Second, the GTC employs a conceptualization of parenting practices widely accepted in the social sciences: parental attachment, monitoring, and control produce the lowest rates of antisocial behavior among children (Baumrind, 1967; Maccoby and Martin, 1983; Gray and Steinberg, 1999; Lamborn, et al., 1991; Simons, et al., 2005; Simons et al., 2006; Steinberg et al., 1994; Weiss and Schwartz, 1996). Third, in contrast to theories of information management, GTC considers lying and secrecy as stemming from trait-like propensities for impulsivity and problem behavior (i.e., low self-control) and not from rational decision-making or future planning on the part of children (i.e., agency). Due to space limitations, I cannot do justice to the large literature testing and refining GTC. I do, however, provide a brief review of its key principles, especially as these relate to the idea of child agency.

The GTC is rooted in control theory—a foundational model of criminal behavior. Its theoretical core consists of the idea that individuals are not socialized into crime but are born motivated to commit crime by a self-interested pursuit of pleasure and avoidance of pain. Crime fulfills these desires by providing easy and immediate gratification. Despite this universal need for self-regarding gratification, individuals can be taught to control their impulses, take into account the interests of others, and regulate anti-social behavior through successful socialization (Hirschi, 1969; Gottfredson and Hirschi, 1990; Hirschi, 2004).

For control scholars who subscribe to the GTC and focus on self-control, prosocial values and the ability to delay gratification are taught early in life by parents who recognize and sanction problem behavior. Echoing other research on optimal parenting strategies, parents teach children to control impulsive and selfish behavior through monitoring, recognizing, and controlling problem behavior in a warm and caring manner (Baumrind, 1967; Maccoby and Martin, 1983; Steinberg et al., 1994; Gottfredson and Hirschi, 1990; Burt et al., 2006).

By early adolescence many children internalize parental discipline and behavioral consequences as *self-control*—the ability to delay gratification, plan ahead, and consider the interests of others when making decisions (Gottfredson and Hirschi, 1990; Hirschi, 2004; Bridgett et al., 2015). Originally, Gottfredson and Hirschi (1990) proposed that children internalize the consequences of their actions via experience, which is largely a function of parental monitoring and sanctioning of problem behavior. Drawing on his classic theory of social control (Hirschi 1969), Hirschi (2004) amended the concept of self-control by underscoring the necessity of social bonds for internalizing external controls. According to Hirschi, attachment to parents and prosocial others alters the calculus of delinquent behavior by enabling individuals to consider how their actions impose costs on others (i.e., internalize externalities). Yet, the synthesis of social bonds and self-control remains a divisive issue, with research showing that the two may best be considered separate theories (Ward, Boman and Jones, 2015). Therefore, the present study focuses on the original GTC definition of self-control (Gottfredson and Hirschi, 1990; Bridgett et al., 2015).[1] Once formed, the relative levels of self-control between individuals persist through time (Gottfredson and Hirschi, 1990; but see Burt et al., 2014). Finally, empirical evidence suggests that self-control is somewhat malleable within individuals over the life-course (Burt et al., 2006; Heatherton, 2011). In sum, the GTC proposes that levels of self-control are determined by parental actions early in childhood, and uniformly remain relatively stable throughout the life-course.

According to the GTC, individuals who fail to develop self-control are more impulsive and excitement-seeking (unable to delay gratification or plan ahead) as well as self-regarding

[1] Notably, the expectation for concealment remains the same for both the 1990 and 2004 versions of self-control theory. Concealment is considered a manifestation of low self-control and not an agentic behavior (Hirschi, 2004, p .545)

(unable to take others' interests into account). As a result, those with low self-control are prone to a range of problem behaviors, including lying, cheating, poor social skills, theft, substance use, violence, and other forms of delinquency (Gottfredson and Hirschi, 1990; Burt et al., 2014). Importantly, such findings are robust to various fields and methods of study. Work in clinical psychology, for instance, indicates that individuals with low self-control externalize problem behaviors and have difficulty accomplishing long-term goals (see Heatherton, 2011).

In keeping with other adult-centered views of decision making in criminology (Matza, 1967; Laub and Sampson, 2003; Sampson & Laub, 2005), the GTC emphasizes choice-making in adults and ascribes individual agency to parents but not children; specifically, parents have the agency, internal locus of control, and power to mold the behavioral outcomes of their children (and not the other way around). Although research has acknowledged bidirectional relations between the behavior of parents and children (Patterson, 1982, Thornberry et al., 1991; Laird et al., 2003; Warr, 2007; Pardini et al., 2008; Meldrum et. al 2012), such work falls short of attributing agency to children. In other words, the GTC paradigm does not examine whether children *deliberately choose* to act or to influence parental behavior and parenting strategies. There is evidence that when it comes to delinquent behavior, adolescents can and do act rationally and agentically (Matsueda et al., 2006a). Despite this, with regard to parent-child interactions, the integration of agency at the child-level escapes the criminological literature at large and the GTC in particular.

BRINGING THE CHILD BACK IN: CHILD INFORMATION MANAGEMENT

Fifteen years ago, research in developmental psychology showed that existing models of parenting and parental influence—such as the model offered by self-control theorists—fail to account for an important source of child influence. Stattin and Kerr (2000) argue that parental

supervision of a child—the backbone of optimal parenting for Gottfredson and Hirschi and many others (e.g. Baumirind, 1967; Steinberg et al., 1994)—is comprised of two theoretically distinct concepts: parental attempts at monitoring (i.e. solicitation of information) and parental possession of information (i.e., parental knowledge about the child).[2] Treating the concepts as a single construct makes it difficult to dissect whether parental strategies of gathering information or actual knowledge of what children do impacts child behavior. It also leads to upwardly biased estimates of relations between parent-driven monitoring and child delinquency (Kerr, Stattin, and Özdemir 2012).

Importantly, Kerr and Stattin (2000) show that while solicitation and monitoring are initiated and controlled by parents, parental knowledge is principally controlled by children rather than parents. This is because parents predominantly gain knowledge about their children from information voluntarily disclosed to them by their children, rather than parental tactics of information gathering (Stattin and Kerr, 2000, Soenens et al., 2006). The authors argue that since parents discipline their children based on what they know about their child's behavior, children have more agency and control in the parent-child disciplinary encounter than has been previously acknowledged. In short, child disclosure and secrecy—not parental attempts at monitoring and supervision—generate the knowledge that parents require to discipline children and prevent them from engaging in delinquent behaviors.

Following Stattin and Kerr (2000), developmental psychologists have integrated child disclosure and secret keeping into models of parenting and child behavior (Smetana, 2008). These studies show that child disclosure and secret-keeping are influenced by how warmly the

[2] In the GTC tradition, key indicators of parental monitoring include items that measure parental knowledge, such as "Does your mother (father) know where you are when you are away from home?" and "Does your mother (father) know whom you are with when you are away from home?" (Gottfredson and Hirschi, 1990).

parents act towards children, how often parents solicit information from children, children's acceptance of parental authority, and parental reactions to prior disclosure (Crouter, et al., 2005; Blodgett, Gondoli, and Grundy, 2009; Cumsille et al., 2010, Tilton-Weaver et al., 2010, Keijsers and Laird, 2014). Adolescents also cite self-preservation and boundary maintenance as important reasons for keeping secrets and withholding private information from parents (Afifi et al., 2005; Afifi and Weiner, 2004; Marwick and boyd, 2014). With regard to consequences of information management, studies show that secret keeping and dishonesty increase delinquent outcomes both directly and indirectly through decreasing parental knowledge (Fletcher at al., 2004; Soenens et al., 2006, Keijsers et al., 2010). Moreover, once child disclosure is accounted for, research reveals inconsistent evidence for a direct relation between specific parenting practices—like monitoring or control—and delinquent behavior (Fletcher et al., 2004; Keijsers et al., 2010), although poor relationship quality between parents and children increases secret keeping (Smetana 2010).

Finally, while some research examines the general withholding of information, other work treats child information management as multi-dimensional, with honesty and disclosure comprising empirically distinct concepts (Rote and Smetana, 2015). The present paper focuses on general processes of withholding information via secrecy and lying, and therefore treats dishonesty and lack of disclosure as a single construct. For the remainder of the paper, general withholding of information from parents, including secret keeping and lying, is referred to as *concealment*.

DEBATE ON THE NATURE OF CONCEALMENT

While related themes, such as impression management and information management at the organizational level, have received ample attention in sociology (Goffman, 1959,

Ramaswami et al., 1997), the notion that children are capable of strategically managing information in their interactions with parents has yet to be adopted by sociologists and criminologists (see Warr, 2007 for an exception). This lack of cross-pollination reflects two fundamental issues. First, current research on adolescent concealment neglects a robust research program on agency, and adolescent agency in particular, within sociology (Emirbayer and Mische, 1998; Hitlin and Johnson, 2015). Such an omission makes it difficult to conceptualize the ways in which concealment constitutes agency and to examine concealment as a strategic, agentic act on the part of the children.

Second, contemporary developmental definitions of concealment (e.g. Stattin and Kerr, 2000) are incongruent with definitions of concealment shared by many criminologists (Gottfredson and Hirschi, 1990; Stouthamer-Loeber, 1986). The former believe that concealment is a strategic forward looking act, while the latter maintain that concealment is impulsive and not guided by rational decision making. These opposing views have yet to be directly tested against one-another. To resolve these outstanding issues, the present paper shows that adolescent concealment constitutes a particular form of agency and that agency and self-interest are central to bridging the information management and criminology literatures. This is where I turn to next.

AGENCY

The concept of agency is important to understanding human behavior as interacting with—but not completely determined by—the social context. Agency offers an account of how individuals, acting in response to their physical and social environment can intentionally enact change at both the micro and macro level of social space (Matsueda, 2006). The concept of agency has a long history in sociology (see Hitlin and Long, 2009) and it is important to situate

adolescent concealment within this literature to make claims about information management-as-agency. To this end, I provide a working definition of agency in keeping with recent work in sociology and social psychology (Emirbayer and Mische, 1998; Hitlin and Jonson, 2015), and identify specific links between agency and information management for adolescents.

In sociology, the study of agency is largely rooted in theories of symbolic interactionism (Mead, 1934; Blumer, 1986; Matsueda 2006) and rational choice (Hechter and Kanazawa, 1997).[3] Out of harmony with these two literatures and their prior synthesis (Emirbayer and Mische, 1998), I define agency as follows: agency is an individual's capacity to act in any given environment, where capacity is a function of conscious choice (i.e. deliberative cognitive processes) as well as objective and subjective constraints. Choice is the process by which individuals weigh the value of and expected success for each behavioral alternative. Constraints are any anticipated punishment or reward that restricts the behavioral alternatives an individual can pursue by altering the costs or benefits of action (Ingram and Clay, 2000). Decision-making then is neither free nor perfect but limited by structural and temporal constraints—the social and physical environment in which the individual is embedded, the information available to the decision maker, and the individual subjective interpretations of events as occurring in the past, present, future, and vis-à-vis others (Emirbayer and Mische, 1998; Hitlin and Johnson 2015).[4]

[3] As Hitlin and Long (2009) point out, the main concerns in the literature on agency involve two matters: determining whether agency exists and operationalizing agency. The existence of agency is an ongoing debate, in which the strongest claims for the existence of agency come from arguments that (1) there is variation in behavior for individuals who share cultural and structural determinants of behavior (i.e., shared social positions), and (2) choice making is a conscious decision used to resolve problematic situations. With regard to operationalizing agency, there is a divide among treatments of agency as objective levels of power and control versus subjective beliefs about how much power and control an individual has over their own behavior (Hitlin and Long, 2009), although most agree that agency is a combination of objective and subjective processes (Emirbayer and Mische 1998). Recent empirical research in social psychology, however, identifies agency as subjective beliefs and self-efficacy (Hitlin and Jonson, 2015, Hitlin and Long, 2009).

[4] The subjective temporal components of decision making are intertwined: the value of a possible choice or action in the present is determined by the future self or anticipated rewards. Future selves and

Given my definition, there are two primary ways in which concealment engages the objective and subjective dimensions of agency. First, if information is concealed to avoid punishment or other negative outcomes, then the decision to conceal is made with conscious reference to future impression making and anticipated sanctions. Furthermore, concealment is an attempt by adolescents to resolve the problematic situation of conflicting interests: parents desire knowledge about and control over a child's behavior, while children want to keep their behavior private and self-directed. Such conscious and forward-looking efforts at problem solving are consistent with existing criteria for agentic choice and action (Matsueda, 2006; Emirbayer and Mische, 1998). Second, if concealment successfully limits parental knowledge and control, it objectively yields children more autonomy and power to make choices. Greater *objective* agency, in turn, may increase *subjective* beliefs about agency with regard to areas in life where parents would be, if not for concealment, in control (Hitlin and Long, 2009).[5] This second property defines agency as something that can vary in magnitude: an individual can have more or less agency. In sum, I propose that information management is both an agentic behavior and a behavior that generates more autonomy and control over one's life by expanding one's agency (or capacity to act in any given environment). That is, concealment is a form of agentic behavior that can be used to limit parental knowledge and control, thereby increasing one's objective

aspirations are based on desires and views of the self that are rooted in a history of experiences. Past experiences and behavior are selectively recalled and organized in a way that allows the past to make sense and provide support for beliefs about the self and circumstances in the present. This definition allows for subjective appraisals of the environment and the self, and also references objective environmental impacts on choice-making.

[5] By treating concealment as both an implementation of agency and a decision that begets greater agency—at least with regard to parental control—I do not ascribe a normative component to agentic behavior. In other words, I do not expect agency and agentic decisions to necessarily yield prosocial or beneficial outcomes for individuals and groups over the life course.

levels of agency and subjective beliefs about one's own agency. These propositions are tested at a later point in the paper.

INFORMATION MANAGEMENT AS PROBLEM BEHAVIOR

However, the theory of concealment as agentic behavior has not been tested against competing explanations of why children conceal information from parents. One such explanation is supplied by the GTC. As stated by the GTC, lying, like other anti-social behaviors, is a manifestation of low self-control—the pursuit of immediate gratification through exciting and risky behavior as well as the inability to consider long-term benefits or the interests of others (Burt, Sweeten and Simons, 2014; Gottfredson and Hirschi, 1990).[6] In other words, concealment is a maladaptive behavior which is neither agentic nor strategic. Empirically, the implication is that concealment and delinquent behavior are spuriously related as both are manifestations of low self-control. This contradicts the concealment-as-agency view, where concealment would increase as a result of prior delinquency (as a strategy of concealing problem behavior) even when self-control is accounted for. Because such relationships between concealing information, self-control, and delinquency have not been assessed empirically, it is difficult to fruitfully evaluate an agentic definition of child concealment against definitions provided by existing models of delinquent behavior. The present paper investigates these relationships and examines whether secrecy and lying are mere symptoms of low self-control or conduits of agency.

PRESENT PAPER

Given the literature reviewed above, I now define my concepts and hypothesize how they interrelate. Drawing on the parenting literatures in criminology (Browning, Leventhal, and

[6] The conceptualization of child disclosure as strategic (Afifi et al., 2005; Afifi and Weiner, 2004) establishes child secrecy as a rational and premeditated approach to boundary maintenance and self-preservation— an approach that low self-control youth should *by definition* be less capable of.

Brooks-Gunn, 2005; Burt et al., 2006; Furstenberg, et al., 1999; Heimer, 1997; Simons, et al., 2001) and developmental psychology (Baumirind, 1967; Maccoby and Martin, 1983; Steinberg et al., 1994; Stattin and Kerr, 2000; Fletcher et al., 2004), I argue that optimal parenting practices consist of four distinct but interrelated concepts: parental solicitation (monitoring), parental warmth, parental control, and parental knowledge. Parents who set behavioral limits (parental control) and solicit information about their children (parental solicitation or monitoring) in a warm and affectionate manner (parental warmth) and who are informed about their child's life (parental knowledge) foster pro-social outcomes in children (e.g., Steinberg et al., 1994). Concealment, on the other hand, is defined as an agentic choice to lie and to withhold information from parents. Self-control is defined as the ability to delay gratification, plan ahead, and consider the interests of others when making decisions and enacting behavior. With these definitions I now specify my model and hypotheses.

HYPOTHESES

The empirical component of the present paper consists of two primary goals. The first goal is to evaluate which of the two accounts of concealment presented thus far—my concealment-as-agency model versus low self-control—is supported in a statistical model that includes parenting, concealment, self-control and delinquency. To clarify the similarities and differences between the two approaches, and what we might expect if either one is correct, I briefly summarize their key points below.

According to both conceptualizations, concealment is a self-interested and self-regarding act, something that may be done against the wishes of others. The main difference is that according to the GTC concealment is impulsive, while under the concealment-as-agency conceptualization concealment is strategic, forward-looking, and rooted in cost-benefit analysis.

Finally, while the GTC does not address this, my definition of concealment suggests that it may yield increases to future agency and autonomy for the youth through limiting parental involvement and control.

What are the empirical implications of these differences? First, if impulsivity is the driving force behind concealment, we would expect lying and delinquency to be spuriously related, as both are manifestations of low self-control (Paternoster and Brame, 2000). In other words, children lie more *and* commit more delinquent acts due to low self-control, presumably because both bring about immediate gratification. This means we should expect to see a positive relationship between concealment and delinquency, but that this relationship should be fully accounted for by fact that delinquency and concealment are both predicted by low self-control.

Conversely, if agency and strategy drive concealment, youth should conceal information when lying and secrecy seem like a good strategy given the circumstances. I expect two factors to drive the anticipated costs and benefits of concealment: prior delinquency and parental disciplinary practices. Regarding delinquency, I expect—net of self-control—prior delinquency to motivate beliefs about concealment as a beneficial strategy (assuming that parents disapprove of delinquency).[7] Concealing prior delinquent behavior prevents punishment and other unwanted

[7] The notion that parents disapprove of delinquency is a classic assumption in the GTC. A brief reflection on its plausibility is warranted. Gottfredson and Hirschi (1990) state that even parents who participate in criminal activities desire different paths for their children, and want their children to be prosocial and abstain from delinquency. In reality, parents who commit crime are more likely to have delinquent children. Beyond genetic and structural factors driving the intergenerational transmission of crime Thornberry et al., 2003), it could be that witnessing parental crime undermines the effect of parental disapproval of crime on child delinquency; or, that some parents may indeed approve of certain delinquent acts in specific situations—like those where a display of violence may ensure future safety—though it is unlikely that any parent wants their child to commit all crimes, indiscriminately (Anderson, 1999; Matsueda et al., 2006b). While examining this issue is beyond the scope of the present paper, future research should investigate the strength of this assumption.

parental interventions to restrict future delinquent behavior. If this is the case, prior delinquency should be positively related to present concealment and *not rendered insignificant* once accounting for self-control.

I also expect factors beyond delinquency to affect the costs and benefits of information management. In particular, affectionate and communicative parents reduce the costs associated with disclosing private information. These types of parents respond less harshly toward reports of problem behavior and communicate often and effectively, thereby providing a setting where sharing is less costly. It follows that, net of self-control and prior delinquency, prior parental warmth and monitoring should be negatively related to concealment. Conversely, the GTC predicts that parental warmth and communication should be *unrelated* to concealment after accounting for self-control. By early adolescence, children will have internalized parental involvement and discipline, which will manifest as either high or low self-control depending on the effectiveness of monitoring and sanctioning. Once self-control is solidified as a personality trait, any observed correlation between parenting and concealment is purely a function of self-control (Gottfredson and Hirschi, 1990). These arguments yield the first set of hypotheses:

Hypothesis 1a. Prior delinquent behavior increases concealment once accounting for the effect of self-control.

Hypothesis 1b. Parental warmth and monitoring decrease concealment once accounting for the effect of self-control.

The second goal of the analysis is to assess whether concealment contributes to agency by suppressing parental knowledge. What parents know about their children affects how they respond to their children as well as the extent to which parents are able to influence child behavior (Stattin and Kerr, 2000). For instance, if parents never learn that their child shoplifts

after school, they cannot intervene by grounding their child to prevent future shoplifting. In this example, the child will achieve the autonomy to shoplift in the future. This indirect path from concealment to knowledge to future delinquency is important to investigate for two reasons. First, it allows us to establish whether concealment generates youth autonomy and internal locus of control. Generally, if concealment limits parental knowledge of child behavior (delinquent or not), it reduces the scope of parental involvement and control over behavior. Reductions in parental regulation grant the child autonomy to deliberate over and enact certain behaviors. Second, this part of the analysis evaluates whether it is appropriate to treat concealment as a problem behavior because it enables future problem behavior: Does concealment grant youth the ability to enact delinquency without parents "being the wiser"? Specifically, if we assume like Gottfredson and Hirschi (1990) that parents want to decrease youth delinquency, then reductions in parental knowledge and control stemming from concealment should increase delinquency. Evidence of indirect effects of concealment on parental control and delinquency via parental knowledge would suggest greater child agency in the domain of delinquency. Finally, these relationships should hold after accounting for self-control. Thus:

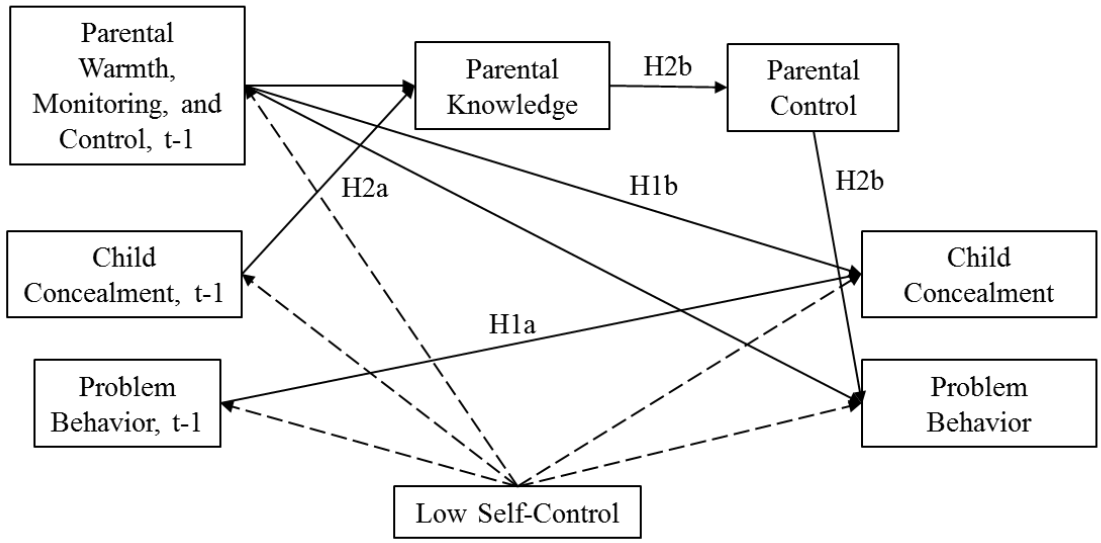
Hypothesis 2a. Concealment reduces parental knowledge.

Hypothesis 2b. Parental knowledge increases parental control and decreases delinquent behavior.

Figure 2.1 provides a model of the causal relations and expectations outlined above. Parental monitoring, warmth, and control directly influence youth delinquency (Steinberg et. al., 1994) and indirectly by increasing parental knowledge of youth behavior (Stattin and Kerr, 2000). Youth concealment arises as a way of dealing with prior delinquent behavior, a reaction to prior parental behavior, and or as a manifestation of low self-control. Adolescents manipulate

parental knowledge by varying the frequency and honesty with which they share personal information (Stattin and Kerr, 2000). Parental knowledge, in turn, affects parental attempts to regulate child behavior (i.e., parental control), which impacts delinquent behavior.

Figure 2.1 Conceptual Model.



This model contains feedback loops and reciprocal relations between the variables. Because of this, specific data and statistical tools are required for its estimation, including repeated measures of variables over time and simultaneous estimation of reciprocal relations between variables. The methods section below details both the sample and the analytic methods used to address these modeling requirements.

METHODS

DATA

The data used to analyze the model illustrated in Figure 1 come from the Denver Youth Survey (DYS), an ongoing longitudinal data collection effort conducted by David Huizinga and colleagues at the University of Colorado, Boulder. The goal of the design was to identify a

representative sample of children and youth at high risk of behavioral problems. Using cluster analysis of census tracts by arrest rates and census-based indicators of social disorganization (such as high mobility, low SES, and high percent minority population), the investigators selected the most disadvantaged neighborhoods in Denver, Colorado. From an initial sampling frame of 20,300 households, they drew a stratified probability sample of households containing youths aged 7, 9, 11, 13, and 15, resulting in a sample of 1530 respondents at the first wave. The response rate was 85 percent at wave 1, while attrition rates across the first five waves were remarkably low, ranging between 7 and 9 percent (see Esbensen and Huizinga, 1990 for details).

During survey administration, respondents age 11 and older at a given wave received a youth questionnaire, while youth less than 11 years old received a child questionnaire. The present sample is limited to those respondents (N = 805) who have youth survey data available for all 4 waves considered here (i.e., those who were 11, 13, or 15 at wave 1). At wave 2 (completed in 1989 and the first wave considered in this analysis) these respondents were 12 to 16 years old and at wave 5 (completed in 1992 and the last wave considered in this analysis) these respondents were 15 to 19 years old. Youth were interviewed in their homes by trained interviewers. Information was also obtained by household interviews of parents at each wave.

The DYS is representative of youth in at-risk neighborhoods, where the sample is ethno-racially diverse and sampled households face substantial economic disadvantage. Regarding race and ethnicity, 48 percent of the respondents identified as Hispanic or Latina/o, 34 percent identified as black, 8 percent identified as white, and 9 percent identified as neither of those three categories. As expected for a disadvantaged sample, the average income for a youth's family was less than $8,000 a year. Only one-third of youth respondents reported living with both biological parents.

Overall, the sample permits a longitudinal analysis of the effects of parenting on a stratified random sample of children who are—spatially and economically speaking—at the highest risk of delinquency, while still allowing for sufficient variation in both the key parenting variables and the outcome variables of interest (i.e., delinquency and substance use).

MEASURES

The theoretical constructs of interest are assessed with youth reports of parental discipline, parental knowledge, adolescent concealment, and delinquent behavior at waves 2, 3, 4, and 5, as well as youth reports of self-control at waves 2, 3 and 4. Youth reports are also used to measure gender, age, race, and family structure (all assessed at wave 2), whereas parent reports are used to measure family income (assessed at wave 2). Table 1 provides summary statistics for all measures used in the analysis. For exact wording of the measures and response categories, please see Table S1 in the Supplemental Materials online.

Parental warm monitoring. Because of the high correlation between parental monitoring and parental warmth in the substantive models (r = .80, exhibiting multicollinearity in some of the substantive models), and because the combination of warmth and involvement by parents is a defining feature of authoritative discipline (Maccoby and Martin, 1983), warmth and monitoring are combined into a single scale measuring *warm monitoring*, averaged across five Likert-scale items. The *monitoring* dimension is captured by three items (ranging from 1 = Never to 3 = Often), which assess the efforts of parents to procure information about their child. Some example items include “How often do your parents talk with you about how things are going in school?” and “How often do your parents find time to listen to you when you want to talk to them?” This operationalization of monitoring closely parallels Stattin and Kerr’s measure of solicitation, and has been used across psychology and sociology as a necessary component of the

more general concept of monitoring, which usually conflates solicitation, knowledge, and control (e.g., Gottfredson and Hirschi, 1990; Gray and Steinberg, 1999; Laub and Sampson, 1988; Steinberg et al., 1994). The *warmth* dimension captures how warm and responsive parents are in their interactions with their child. The two items used to capture *warmth* measure how often parents respond to their child's good behavior with hugs and smiles (both items range from 1 = Never to 3 = Often). The alpha reliabilities for *warm monitoring* at waves 2, 3, 4, and 5 are .694, .731, .731 and .754, respectively. Higher values of the *warm monitoring* scale indicate more frequent and affectionate monitoring.

Parental control. Parental control is measured as the average of two Likert-scale items assessing the extent to which parents enforce curfew for the child on school and weekend nights. Both items were rated on a 3-point scale (1 = No, 2 = Sometimes, 3 = Yes). This measure captures the common items shared by both Stattin and Kerr's (2000) and Fletcher et al.'s (2004) measures of parental control. The alpha reliabilities for parental control at waves 2, 3, 4, and 5 are .662, .703, .730 and .808, respectively. Higher values indicate greater parental control.

Parental knowledge. Parental knowledge evaluates how much parents know about their child. This construct is assessed with a mean of four standardized Likert-scale items: how many of the child's friends the parents know (1 = None, 2 = Some, 3 = Most, 4 = All), how often the parents know if the child is home on-time (1 = Never, 2 = Sometimes, 3 = Often), how often parents know who the child is with when they are away from home (1 = Never, 2 = Sometimes, 3 = Often), and how often the parents know where the child is when they are neither at home nor at school (1 = Never, 2 = Sometimes, 3 = Often). Kerr and Stattin (2000) use similar items as part of their knowledge measures, and the last two knowledge items are identical to Hirschi's (1969) supervision items. The alpha reliabilities for the knowledge scale at waves 2, 3, 4, and 5 are .456,

.422, .479 and .484, respectively. Although the alpha reliabilities for these scales are low, I nevertheless use these four items and the resulting composite knowledge scale for theoretical reasons.[8]

Child concealment. A mean of four standardized Likert scales is used to measure child concealment, or the extent to which children withhold information about their own behavior from a parent. The indicators reflect two aspects of information management: how often *and* how honestly a child reports on their own behavior (Cumsille et al., 2010). The frequency item assesses "How often do you leave a note for your parents or call them about where you are going if they are not at home?" (1 = Never, 2 = Sometimes, 3 = Often). The three remaining items are attitudinal indicators of honesty. Each of these item asks how much the child respondent agrees with the following: "It's important to be honest with your parents, even if they become upset and you get punished," "It's ok to lie to parents to keep their trust," and "Making a good impression is more important than telling the truth to parents" (each item ranges from 1 = Strongly Disagree to 5 = Strongly Agree).

Although attitudinal, the honesty items are necessary to capture key elements of information management concerned with (a) concealing information that could elicit punitive behavior from parents (e.g., concealing behavior that conflicts with a parent's interests), and (b) self-preservation—a motivating factor behind the withholding of information (Afifi et al., 2005) and a key dimension of secrecy. While attitudinal measures generally suffer from response bias

[8] The alpha reliabilities for the scales using adolescent reports of parental knowledge are very similar to the alpha reliabilities of parents self-reports of what they know about their children. These similarly low reliabilities of the scales, regardless of the source, suggest that for respondents in the DYS sample, parental possession of knowledge of certain domains of their child's life is not strongly associated with knowledge of other such domains. Even in the absence of high correlation among the knowledge categories, it is important to sample from as many domains as possible in order to fully capture this multidimensional construct.

to a greater extent than behavioral indictors, research shows that attitudes both produce and are a product of behavior (Rebellon et al., 2014) and that—more specifically—measures of attitudes toward lying are strongly associated with objective measures of child secrecy and concealment (Rote and Smetana, 2015). Finally, DYS parents report those youth who score higher on the concealment scale as significantly more secretive than those who score lower on the concealment scale, which indicates construct validity of this measure.[9] Taken together, the behavioral and attitudinal items reflect both the unwillingness to disclose *and* the dishonesty of information, both of which are included in Stattin and Kerr's (2000) operationalization of concealment. Increases in the child concealment scale indicate greater use of and support for concealing information from parents. The alpha reliabilities for this measure at waves 2, 3, 4, and 5 are .390, .442, .479 and .450, respectively.[10]

Self-Control. Seven Likert-scale items are averaged to operationalize self-control consistent with its recent theoretical treatments, which center on impulsivity and excitement-seeking (Burt et al., 2014). The self-control items measure agreement with statements such as "[You] are impatient—want to have things right away", "[You] act without stopping to think", and "[You] like to do daring things." Please see Table S1 in the Supplemental Materials for a complete list of self-control items. To be consistent with the GTC's stipulations for adolescent self-control, self-control is modeled as affecting—but not affected by—the parenting,

[9] Results are available from the author upon request.
[10] The lower alpha reliabilities reflect the two dimensional nature of this measure. Although the attitudinal measures alone result in larger alpha reliabilities, I include all four items in keeping with the theoretical definition of concealment as any withholding of information, either through omission or commission (i.e., dishonesty).

concealment, and delinquency variables (Gottfredson and Hirschi, 1990).[11] The alpha reliabilities for self-control assessed at waves 2, 3, and 4 are .564, .601, .605, respectively.

Child problem behavior. Three types of child problem behavior—violent behavior, theft, and substance use—are used in the present analysis.[12] This is done for several reasons. First, subscales of delinquent behavior are preferred to an all-inclusive index of delinquency (Sweeten, 2012). Second, both violence and substance use are understudied as possible outcomes of child secrecy and lying. Third, rational decision making, planning, and strategic concealment may impact these three outcomes to varying degrees. For instance, substance use maps onto addiction and, as a result, is a behavior more likely practiced by individuals prone to impulsivity and excitement-seeking than violent behavior or theft (Allen et al. 1998). Violence, in turn, is generally (a) more susceptible to impulsivity than theft (Loughran et al., 2011), and (b) more visible to the public than theft and substance use, which may render concealment an ineffective strategy. As such, the relations between self-control, secrecy and problem behavior may vary depending on the outcome considered, with theft most likely to be related to concealment.

The *violence* measure is generated from averaged responses to three survey items. Each item captures how many times adolescents reported engaging in simple assault, aggravated assault, and gang fights over the prior year. The alpha reliabilities for violence at waves 2, 3, 4, and 5 are .864, .629, .537, and .622, respectively. The *theft* measure consists of mean responses to ten survey items that ask how many times adolescents engaged in avoiding payment, stealing

[11] Alternative models (available from the author upon request) where self-control was allowed to be predicted by (as well as predict) parenting, show that no parenting variables are significantly associated with self-control. This parallels results from other cross-lagged panel models estimating the relations between parenting and self-control over time, which find that parenting does not predict self-control in adolescence (Meldrum et al., 2012).

[12] The cube root function is used to transform right-skewed variables, such as the counts of delinquency variables considered here. The transformation to normal allows for efficient estimates and unbiased standard errors.

less than five dollars, between 5 and 50 dollars, between 50 and 100 dollars, and more than 100 dollars, shoplifting, purse-snatching, auto-larceny, fencing, and auto-theft over the prior year. The alpha reliabilities for theft at waves 2, 3, 4, and 5 are .329, .682, .700, and .842, respectively. *Substance use* consists of eight self-report survey items that measure how frequently adolescent respondents consumed beer, wine, hard liquor, marijuana, hallucinogens, cocaine, crack, and amphetamines over the prior year. The alpha reliabilities for substance use at waves 2, 3, 4, and 5 are .453, .497, .445 and .459, respectively.

Exogenous control variables. Control variables include age, dummy variables for gender and race-ethnicity of the child, family income, and a dummy variable assessing whether the child lives with both biological parents. These control variables were selected because the literature consistently shows that each accounts for variation in parenting and child delinquency (Browning et al., 2005; Fagan, Van Horn, Antaramian, and Hawkins, 2011).

ANALYTIC STRATEGY

In order to identify reciprocal effects between child secrecy, parenting practices, adolescent self-control, and delinquent behavior, and to account for errors in the variables across time and between endogenous variables of interest, I estimate three four-wave cross-lagged panel models using waves 2, 3, 4, and 5 of the DYS. Cross-lagged panel models help identify the causal direction of relations between variables over time by estimating reciprocal effects between variables. Additionally, cross-lagged panel models estimated across 4 waves of data facilitate the examination of complex mediation processes such as whether and to what extent variable Z mediates the relation between variables X and Y.

In the present analysis, I model endogenous variables at each wave with a lagged t – 1 autoregressive term as well as with cross-lagged t – 1 explanatory variables (see Figures 2-4).

Additionally, consistent with other specifications of control variables in cross-lagged panel models, all control variables are assessed at time 1 (i.e., wave 2), allowed to covary with substantive variables at time 1 (i.e., wave 2), and directly predict substantive variables at each subsequent time point (i.e., waves 3 through 5) (Matsueda and Anderson, 1998). The autoregressive coefficients represent stability of individual differences for a given variable measurement from $t - 1$ to t. The cross-lagged effects refer to the effects of a $t - 1$ explanatory variables on other endogenous variables measured at t. If an individual's relative value on the prior variable is associated with their relative value on the current variable, then a significant cross-lagged relationship will be observed (Selig and Little, 2012). In other words, the cross-lagged relations explain the residual variance in a variable that is left after accounting for its autoregressive path. The errors among all endogenous variables within each wave are allowed to covary, while the errors for each variable are allowed to covary across time (i.e., first order autocorrelation of the error terms). Given the large number of covariates, all parameters are constrained to be equal across the four waves in order to obtain stable and precise estimates of the model parameters (see Matsueda and Anderson, 1998).

All analyses were conducted in Mplus 7 (Muthen and Muthen 1998-2015). Maximum likelihood estimation with robust standard errors (MLR) was used to estimate three separate four-wave cross-lagged panel models examining relations between secrecy, parenting, and one of three youth problem behaviors: violence, theft, and substance use. Because a number of youth (N = 607) received the child and not youth survey at wave 2 (or wave 2 *and* wave 3), a large percentage of not-at-random missing values were observed for all variables of interest and, as a result, were excluded from the models. For the remaining data, a full information maximum likelihood (FIML) estimation approach to missing data was used. For purposes of clarity, only

statistically significant effects ($p < 0.05$) are shown in each figure. The relations between key explanatory variables and control variables are discussed but not shown in Figures 2 through 4. For full model results, see Tables S2 through S4 in Supplemental Materials.

RESULTS

Table 2.1 provides descriptive statistics for the variables used in the analysis. Despite the concentrated disadvantage faced by families of the DYS youth, the reports of parental discipline indicate moderately involved parenting. Table 1 shows that, on average, parents are warm, affectionate, and communicative with their children, and sometimes set and enforce curfew.

Since both the parental knowledge and concealment variables are standardized, I summarize these measures in the text with the mean of each item across the 4 waves. Youth report that their parents know most of their friends ($M = 2.88$, $SD = .74$). Parents also know more often about a broken curfew ($M = 2.70$, $SD = 0.43$) than about where their kids were ($M = 2.46$, SD = 0.49) or who their kids were with when not at home ($M = 2.54$, $SD = 0.46$). For their part, adolescents report that making a good impression is not more important than telling the truth ($M = 2.19$, $SD = 0.64$), report that it's important to be honest with parents even if it results in punishment ($M = 3.88$, $SD = 0.53$), and somewhat disapprove of lying to parents in order to keep their trust ($M = 2.45$, $SD = 0.70$). Finally, adolescents report sometimes contacting their parents to tell them of their whereabouts ($M = 2.35$, $SD = 0.60$).

Table 2.1. Descriptive Statistics (N = 754)

	Time 1 Mean (SD)	**Time 2** Mean (SD)	**Time 3** Mean (SD)	**Time 4** Mean (SD)
Parental Knowledge (Standardized)	-0.009 (0.420)	-0.026(0.446)	-0.039 (0.511)	-0.040 (0.611)
Parental Warm Monitoring	2.400 (0.190)	2.389 (0.208)	2.369 (0.195)	2.331(0.213)
Parental Control	2.396 (0.515)	2.291 (0.555)	2.063 (0.622)	1.925 (0.695)
Child Concealment (Standardized)	0.002 (0.352)	0.010 (0.391)	0.042 (0.378)	0.062 (0.403)
Low Self-Control	1.828 (0.130)	1.878 (0.128)	1.874 (0.146)	
Violence (cube root transformation)	0.209 (0.285)	0.230 (0.285)	0.214 (0.233)	0.218 (0.329)
Theft (cube root transformation)	0.167 (0.139)	0.199 (0.176)	0.176 (0.158)	0.180 (0.178)
Substance Use (cube root transformation)	0.831 (0.617)	0.831 (0.617)	0.891(0.630)	1.040 (0.694)
Gender				
Female	46.55%			
Male	53.45%			
Age w2	14.054			
Race/ethnicity				
Hispanic/Latino/Latina	49.60%			
Black	33.02%			
White, non-Hispanic	9.36%			
Other	9.02%			
Family income (log of dollars/year)	7.434 (2.462)			
Both biological parents (Yes=1)	33.69%			

Figures 2.2 through 2.4 summarize results from the four-wave cross-lagged panel models. Each figure shows both unstandardized and standardized coefficients but excludes estimates of the control variables (see Tables S2 through S4 in the Appendix for the full set of estimates)[13]. For ease of interpretation, I show the estimates for waves 2 and 3 only. Because the unstandardized coefficients are constrained to equality from wave to wave, the estimates in Figure 2.2-2.4 reflect all t-1 to t relations among variables. The standardized coefficients in Figures 2.2 through 2.4 have slight variations in the effect sizes from one wave to another, though not in statistical or substantive

[13] Sample size is 754 for the substance use model, but is reduced to 752 for theft and violence models due to missingness. In order to check that the results of the present models are robust to sample size, I restricted the sample size of the substance use model to be identical to the other two models and found that the substantive results remain the same. Results are available upon request.

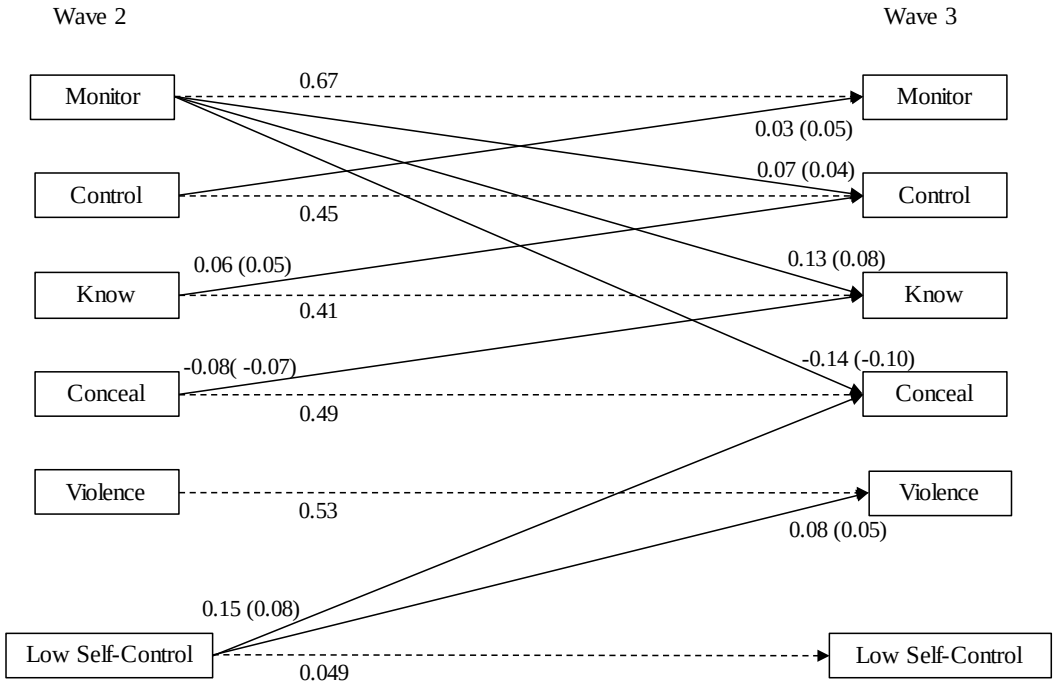
interpretation of the effects. Full results are summarized in tables S2 through S4 in the Appendix. Regarding overall model fit, all three models have Comparative Fit Indices (CFI) greater than .90 and Root Square Mean Error of Approximation (RMSEA) less than .05, indicating a reasonable fit of the model to the data (Hu and Bentler, 1990). As expected for a sample of this size, the χ^2 tests (χ^2 (256) = 576.70, $p < .001$) for violence model; χ^2 (256) = 609.90, $p < .001$ for theft model; χ^2 (256) = 563.20, $p < .001$ for substance use model) are significant at the $p < .001$ level.

Overall, associations between parenting and concealment are common to the three models. Consistent with prior theoretical work on parental warmth, involvement, and control (Steinberg et al., 1994; Gray and Steinberg, 1999), I find that parental warm monitoring and parental control mutually influence each other: parents who engage in affectionate communication and information seeking are more likely to enforce curfew, and parents who enforce curfew are also more likely to initiate affectionate communication and information gathering techniques with their children. Moreover, attempts by parents to affectionately solicit information from children are associated with increased knowledge about the child's whereabouts and companions, which supports Stattin and Kerr's (2000) specification of the positive relation between parental monitoring and knowledge. Importantly, consistent with hypotheses 1b—and the view of concealment as situationally dependent and strategic (rather than trait-like and impulsive)—warm monitoring by parents is negatively related to concealment: parents who ask more questions about their children's lives and are affectionate tend to have children who are more forthcoming with private information and oppose lying or being secretive with their parents.

Concealment is associated with less parental knowledge—parents whose children conceal more information from them know significantly less about their children. That children are able

to circumscribe parental knowledge lends support to hypothesis 2a. While decreased parental knowledge is, in turn, associated with reductions in parental control, indirect effects of concealment on parental control through knowledge (shown in Tables S2 through S4 in the Supplemental Materials) are small and not statistically significant at $p < .05$ level. The absence of indirect effects of concealment on control fails to support hypothesis 2b. Additionally, because there are no statistically significant relations between parental knowledge and delinquent behavior or parental control and delinquent behavior, I find no support for hypothesis 2b.

Figure 2.2. Four-wave Cross-lagged Panel Models with Violence, Standardized Coefficients (N = 752, CFI = .92, RMSEA = .04, BIC = 17499; all coefficients significant at $p < .05$).

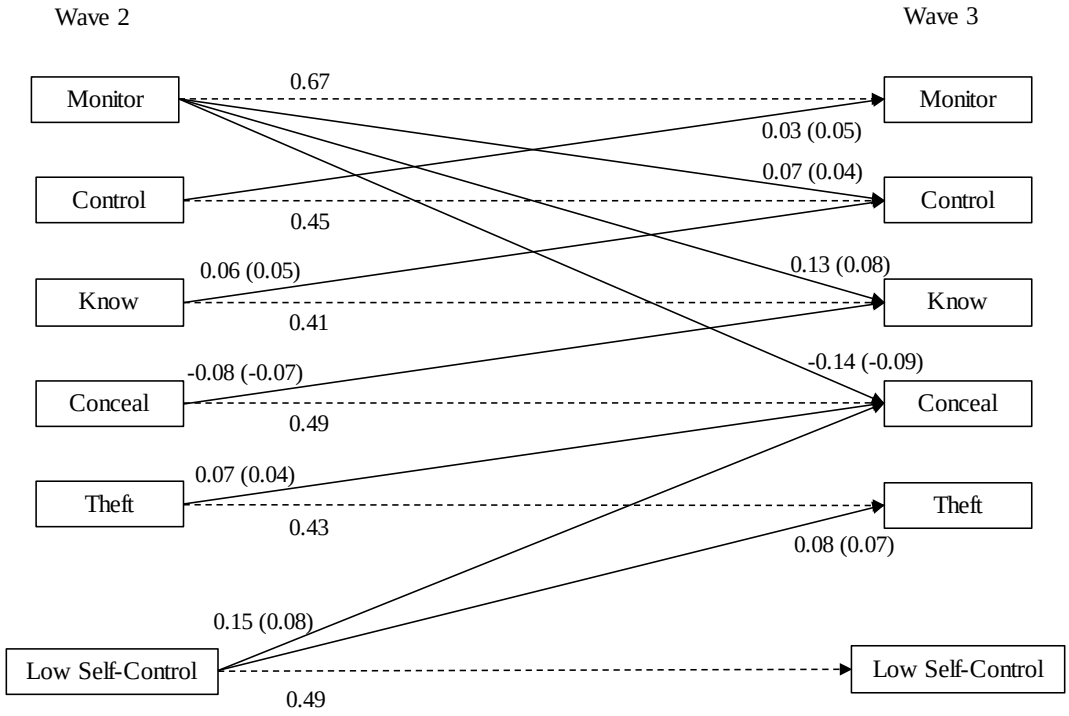


The three models also exhibit substantively identical relations between self-control and the other covariates of interest.[14] In all three models, self-control predicts increases in both

[14] The temporal stability of self-control is an important feature of the GTC. I assess the stability of the DYS measures of self-control in two ways. First, across all models, there is significant stability of self-control from one wave to another—with around half of the variance of self-control attributed to past self-control. Second, following recent research (Burt et al., 2014) I also assess the stability of self-control

concealment and delinquent behavior. These results support self-control theory's propositions that lying and secret-keeping, as well as delinquency, are both sourced from the underlying propensity to have low self-control. Notably, unlike concealment, delinquent behavior is not directly predicted by any of the parenting variables.

Figure 2.3. Four-wave Cross-lagged Panel Models with Theft, Standardized Coefficients (N = 752, CFI = .91, RMSEA = .04, BIC = 16442; all coefficients significant at $p < .05$).

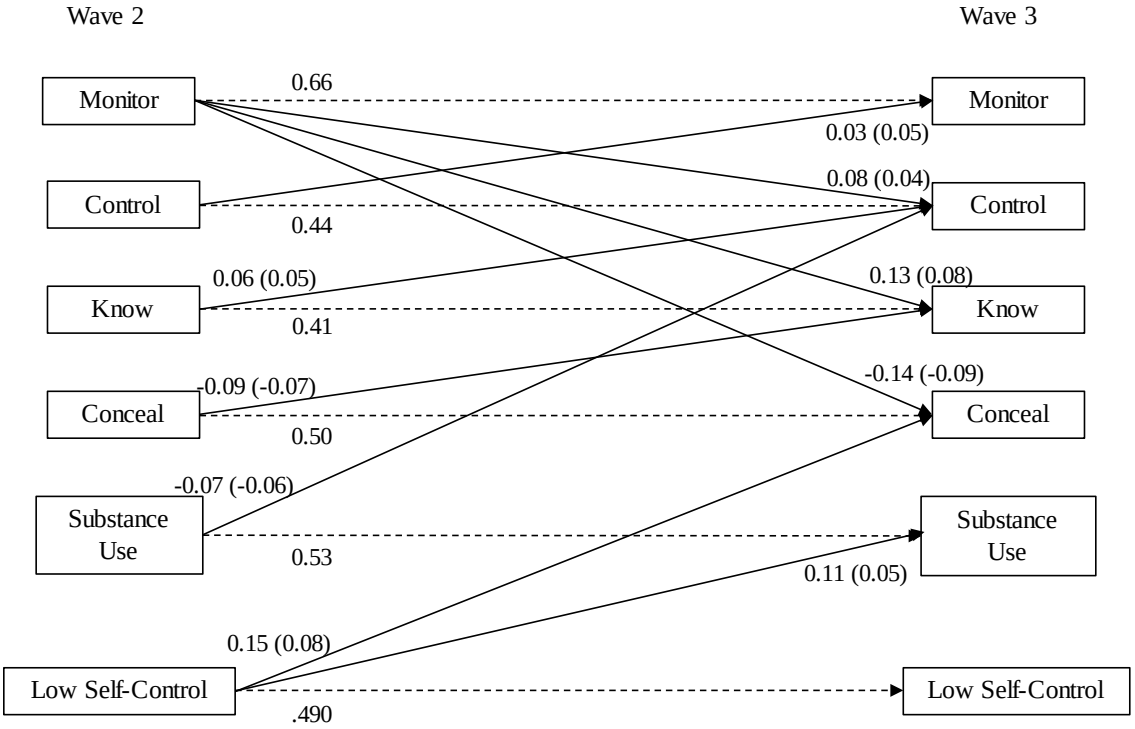


Additionally, two model-specific relations are observed. First, net of self-control, theft predicts increases in future concealment. This lends support to hypotheses 1a and the proposition that concealment is used strategically to prevent parents from knowing about problem behavior. Lastly, substance use predicts decreases in parental control. Although not hypothesized, this

using trajectory modeling in Mplus as part of a separate working paper. Similar to Burt et al.'s (2014) findings and contrary to Gottfredson and Hirschi's (1990) proposition, I find that there is significant intra-individual variation in both levels and slopes of the trajectories over time. In other words, individuals vary in their starting points and development of self-control over time. In sum, the Denver Youth Survey (DYS) data indicates that while self-control is considerably stable, there is variation in individual trajectories of self-control over time.

effect may be interpreted as either the inability or unwillingness of parents to enforce curfew for kids who use controlled and illegal substances.

Figure 2.4. Four-wave Cross-lagged Panel Models with Substance Use, Standardized Coefficients (N = 754, CFI = .92, RMSEA = .04, BIC = 19626; all coefficients significant at p < .05).



As expected, control variables assessing the social context in which parent-child interactions take place significantly affect both parenting and child behavior. Tables S2-S4 in Supplemental Materials provide complete parameter estimates for the control variables. Notably, parents are more likely to control girls' behavior than boys' behavior via curfew enforcement (β = 0.14, *SE* = 0.03, p < .001, theft model only). Parents are also more likely to know about girls' whereabouts and companions than boys' whereabouts and companions (all models). For their part, girls are less likely to conceal information from their parents than boys across all models.

Older children are also less likely to conceal information from their parents than younger children.

Finally, because self-control has been omitted from prior models of concealment, it is important to compare models that include self-control to those that do not.[15] The violence models with and without self-control are substantively identical: the association between child concealment and violence is statistically insignificant regardless of the presence or absence of self-control. Conversely, in the theft and substance use models without self-control, child concealment is significantly associated with future delinquency (theft: $\beta = 0.06$, $SE = 0.02$, $p < .001$; substance use: $\beta = 0.07$, $SE = 0.03$, $p < .01$). These results parallel other work on child information management, which finds that concealment increases future delinquency (Fletcher et al., 2004; Keijsters et al., 2010). However, the association between concealment and delinquency is rendered statistically insignificant in both models once self-control is accounted for, providing evidence that self-control confounds any direct effect of secret-keeping on future theft and substance use.

DISCUSSION

This study focused on testing and revising existing definitions of adolescent concealment. Cross-lagged panel models were used to estimate the interrelations between concealment, self-control, parenting, and problem behavior and to investigate whether adolescents conceal information from their parents as a result of strategic information management or low self-control. The results suggest that concealment is a deliberative and situationally induced strategy, but that low self-control is associated with increased concealment. The findings also indicate that concealment reduces parental knowledge but does not reduce parental control or increase future

[15] Full results of models without self-control are available upon request.

delinquent behavior, casting doubt on whether concealment can increase adolescent autonomy and agency. Overall, I find support for the idea that information management is both agentic *and* sourced from low self-control. In the following paragraphs, I detail the ways in which my results augment prior theoretical approaches to concealment, discuss limitations of the present research design, and offer suggestions for future work on agency, information management, and delinquency.

While I find strong support for the hypothesis that youth conceal information strategically, I find only limited support for my hypothesis that the act of concealment itself generates further agency. Regarding the former, I draw on two key pieces of evidence. First, I find that youth are more candid with inquisitive and affectionate parents who provide fewer penalties to disclosing information (see also Affifi and Weiner, 2004; Affifi et al., 2005). Second, I find that youth are more likely to conceal information if they had previously committed theft—suggesting that concealment is used to cover up certain behaviors that might warrant parental interventions and control. These two key findings support the hypothesis that concealment is a strategic act stemming from a child's agency.

Regarding the latter hypothesis of concealment as an agency-building act, I find that concealment is effective at undermining parental knowledge. Effect sizes across all three models suggest that concealment accounted for as much variation in parental knowledge as parent-driven strategies of information gathering, a finding consistent with prior research (Kerr and Stattin, 2000). In this regard, children can be thought of as gaining autonomy from parents through the ability to prevent parental access to those parts of their life that they want to keep private. However, my models do not offer evidence that adolescents alter parents' behavior by limiting what they know. In other words, while parents who know less about their child do place fewer

limits on their child's behavior, the knowledge lost as a result of concealment does not alter levels of parental control. By limiting knowledge, concealment may reduce parental control and power in ways not measured here. However, in the absence of decreased parental control or increased delinquency as a result of concealment, it is hard to conclude that concealment generates gains to adolescent agency.

Additionally, corresponding to the GTC's treatment of concealment (Gottfredson and Hirschi, 1990) and contrary to the view of concealment-as-agency, I find that concealment is associated with low self-control. Additionally, any apparent link between concealment and future delinquency is accounted for by low self-control (but note that prior theft remains a predictor of concealment after accounting for self-control). My results, in other words, offer support for both models of concealment. Yet, this presents a puzzle: How can concealment—a strategic behavior—be increasingly practiced by individuals who are, by definition, impulsive and non-strategic decision makers? I offer two possible solutions, one empirical and one theoretical. First, it is possible that measures of self-control are capturing unobserved forms of delinquency and other externalizing problem behaviors. Low self-control children commit more problem behaviors and, consequently, may lie more to conceal those behaviors from others. The self-control-to-concealment link, then, could be observed because the current models fail to account for all problem behaviors that are produced by low self-control and consequently require concealing. While testing this proposition is beyond the scope of the current paper, probing the relations between self-control, concealment, and a wider range of problem behavior is an important next step for future research.

Second, suppose that low self-control truly predicts concealment in the absence of measurement error. Is there a way to theoretically reconcile both the strategic and low self-

control views of concealment? Recall that for self-control theory, problem behaviors largely stem from two key inputs: impulsivity and self-interest (Gottfredson and Hirschi, 1990; Hirschi, 2004). Impulsivity and self-interest, however, constitute distinct dimensions of self-control which map onto different personality domains (Burt et al., 2014). Therefore, it is possible that some individuals—like those with low self-control—are impulsive and self-regarding, while others are goal-oriented and self-regarding. Theoretically, this suggests that all low self-control children are likely self-interested but not all self-interested children have low self-control. The implication is that the GTC is unable to fully account for all types of behavior that stem from self-regard. For instance, the combination of goal orientation, strategic planning, and self-interest is frequently observed among white-collar criminals (Benson and Moore, 1992; Vaughan, 1998) and is theoretically consistent with a rational choice view of individual action (Hechter and Kanazawa, 1997; Matsueda, 2013).

I argue that concealment is similarly driven by self-regard—acting on self-interest at the expense of others. This self-regarding property of concealment allows it to be sourced from low self-control, which is a trait characterized in part by excessive self-regard. In this case, the relation between self-control and concealment will mimic those observed in the present paper—low self-control youths will be more likely to conceal, but other factors affecting self-preservation and strategic self-regard will predict concealment beyond self-control. For instance, my models suggest that quality of interpersonal relationships matter over-and-above the classic model of self-control (Laub and Samson, 2003; Hirschi, 2004). However, the mechanism linking relationship quality to disclosure of information may be one of alignment of interests, rather than attachment: the benefits of disclosing information increase in warm and inquisitive environments, and so in disclosing information adolescents still act in a strategic and self-

interested way. Warm and communicative parenting aligns the interests of parents and adolescents by reducing the costs associated with disclosing personal information. In short, self-regard helps explain why youths with low self-control conceal information from their parents.

Importantly, I find that despite its ability to limit parental knowledge, concealment is not associated with delinquent behavior. This finding calls into question the widely used and normatively charged definitions of concealment as a problem behavior or gateway to other problem behaviors (Stouthamer-Loeber, 1986; Gottfredson and Hirschi, 1990; Warr, 2007). Although my research design does not dissect concealment at all stages of human development, my results indicate that autonomy from parents during adolescence does not bring about more delinquency. Moreover, this finding is observed in a sample of youth who lack many environmental safeguards afforded to white middle class populations (Browning et al., 2006).

In light of the evidence presented here, I argue that concealing information from parents, even when done against the interests of parents, is not necessarily deviant or antisocial, but merely a strategic behavior used to further one's own interests. In other words, concealment represents an attempt by adolescents to shift the balance of power away from parents, something that is neither bad nor good in and of itself. In this way, the present analysis provides initial support for moving away from a problem-oriented definition of concealment and child information management. It is my hope that future research continues to examine and refine the concept of concealment in this regard.

Beyond revising the meaning of concealment, my results have several implications for existing research on parent-child interactions and problem behavior. First, the growing literature on youth information management should include self-control in models of concealment. Given the present results, previously observed effects of concealment on future problem behavior are—

in all likelihood—upwardly biased (and possibly spurious) due to omitting self-control from statistical models (Fletcher et al., 2004; Tilton-Weaver et al., 2010; Keijsers et al., 2010, Frijns et al., 2010). Second, scholars studying the effects of parenting and self-control on delinquency should amend their conceptualizations of parental monitoring to reflect the robust finding that monitoring and knowledge are theoretically and empirically distinct constructs (Stattin and Kerr, 2000). Finally, adolescent concealment should be included in such models as an important predictor of parental knowledge *and* as a possible mechanism linking low self-control to parenting practices (Meldrum et. al, 2012; Warr, 2007).

Like many empirical pieces, my research design is not without limitations. First, the measures of concealment used in the present manuscript consist of behavioral *and* attitudinal items. Although these measures facilitate a multi-dimensional assessment of concealment, future research on the subject should nonetheless include an expanded range of behavioral indicators of concealment, such as whether children are secretive or lie about specific activities. Such measures will allow a more nuanced analysis of the conditions that induce adolescents to conceal information. Second, while I control for age in my models, such a procedure falls short of describing the ways in which the relationships between parents and children may change over time. For example, some aspects of the parent-child relationship may be more salient for younger adolescents (Meldrum et al. 2012). While fully exploring such processes is beyond the scope of the present paper, I did examine the models of theft and substance use separately for the youngest and oldest cohorts of the DYS. The results show that the relations between parenting, delinquency, concealment, and self-control are robust across teenage years. However, examining the development of concealment in younger populations that are potentially more affected by

parenting strategies, and whose levels of self-control may be more malleable, is an important next step in this research program.

CONCLUSION

The present findings indicate that moving away from parents as exclusive agents of the disciplinary encounter provides researchers with a richer and more accurate depiction of parent-child relationships. By strategically managing private information, adolescents shape the way parents think about them. Given this, affectionate and communicative parents motivate children to be more forthcoming with information and to favor honest reporting of sensitive and potentially punishable behavior. That the quality of interpersonal relationships provides a powerful incentive to take others' interests into account—by aligning the interests of the self with others—has been a long standing finding in models of adult decision-making, which assume agency on the part of adult actors (Horne, 2009; Laub and Sampson, 2003). Researchers would do well to acknowledge how similar principles might guide the behavior of children and adolescents.

CHAPTER 3: ADD HEALTH REPLICATION OF THE DYS MODELS

Chapter 1 specified and tested a model of strategic information management by adolescents against a model of information management as a symptom of low self-control. This chapter attempts to replicate the findings from chapter 1—that prior delinquent behavior, parenting, and low self-control influence adolescent concealment, and that concealment, in turn, predicts less parental knowledge—using a new sample of respondents.

Can we obtain the same results observed in Chapter 1 under different but comparable study conditions? How reliable and generalizable are the results from the DYS models? Replication of an empirical model is an important step in assessing its generalizability, and reducing both Type 1 and Type 2 errors (Simons, 2014). In this chapter, I attempt such a replication using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Because it is a nationally representative sample, estimating the model using the Add Health data will assess its applicability outside of the context of high disadvantage. In the remainder of this chapter I provide a justification for the utility of replication studies; describe the differences and similarities between the original study and the present replication; and discuss the results of the replication and their significance for the salience of the theoretical arguments put forth in Chapter 1.

WHY REPLICATE?

Findings of any given study—especially published work—run the risk of yielding false results. False results are generally categorized as two types: first, an incorrect rejection of a true null hypothesis (a false positive or a Type I error); and second, incorrectly failing to reject a null

hypothesis (a false negative or a Type II error). Recent research shows that false results—especially Type I errors—occur more frequently than expected by chance, largely as a consequence of publication bias—the tendency of journals in any given field to publish positive findings, as well as publishing findings that keep with popular topics or field-specific understandings of how the world operates (Ioannidis, 2005).

Beyond reducing the visibility of null findings in the literature and distorting the landscape of prior scientific knowledge, publication bias incentivizes researchers to differentially pursue topics of study, and engage in pernicious practices such as "p-hacking" (or the selective reporting and manufacturing of statistically significant results, see Head et al., 2015; Simmons et. al., 2011). Simmons and colleagues' now classic paper on how decisions at all stages of scientific inquiry have led to a preponderance of false positive results in psychology have both exposed severe bias and called into question the interpretability of any given study conducted within the field (Simmons et al., 2011; Fanelli, 2012; Pashler and Wagenmakers, 2012).

Replication—a Partial Solution

The solution to research and publication bias seems to be multipronged, including restructuring the process by which articles get published; re-assessment and replication of previously accepted findings; grounding empirically driven research in theory; and insulation of research practices from the incentives to produce desirable results (Ioannidis, 2005; Simmons et al., 2011; boyd and Crawford, 2001). Consequently, replications of findings are not a panacea—a replication is not consequential if it never gets published and replications may not be immune to the temptation to produce positive results. Likewise, care needs to be paid to the conditions under which replications are carried out (Freese and Peterson, 2017). Sufficient replications are those where study conditions are similar enough to those in the original study such that the replication results

can meaningfully speak to the original findings. However, setting too high a bar for sufficiency can make it easy to dismiss any replication effort as meaningless (Simons, 2011). Nonetheless, replications are important in that they can reduce both random and systematic errors of the Type I and Type II variety, and are key in the accumulation of unbiased scientific knowledge (Open Science Collaboration, 2015).

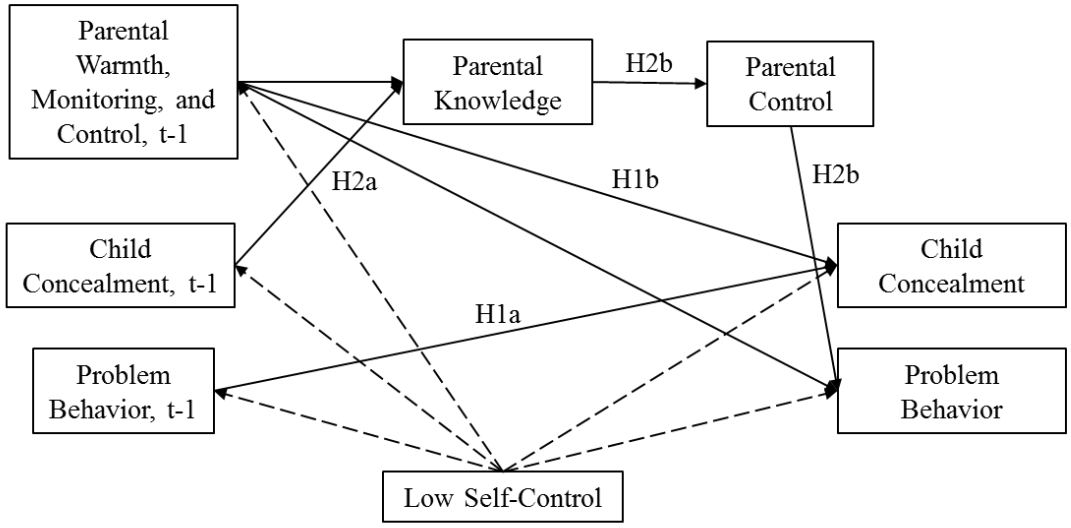
Specifically, an (unbiased, sufficient) replication can reduce Type 1 errors by examining if the significant results in the original study are obtained in a consequent replication. For example, if an effect is found such that the probability of a null hypothesis being true is $p < .05$ by both the original study and the replication, then the updated probability of a false positive result is $p < .0025$ across both studies. Replications using large datasets can also reduce the likelihood of Type II errors by providing the statistical power necessary to reveal previously undetected results. Finally, taken together, multiple replications can generate information about the generalizability of original findings and help establish common standards of carrying out and interpreting a body of research (Simons, 2014).

PRESENT PAPER

In this spirit, the present analysis attempts to replicate the findings in the first empirical chapter using the National Longitudinal Study of Adolescent to Adult Health (Add Health)—a large US-based longitudinal panel study. By re-estimating my model using Add Health data I hope to build on the initial analysis in three ways: First, I aim to reduce the possibility that the results observed in the original study suffer from Type I error by testing if the Add Health models produce the same results. Second, I aim to reduce Type II error by examining whether the null findings from the original study remain statistically non-significant in a larger data set.

Third, and finally, I examine if the findings from the original study are generalizable to a sample that differs from the DYS primarily in the decreased socioeconomic disadvantage faced by the respondents. Despite this key difference, Add Health data allow for sufficient replication of the original study in three ways. First, the concepts from the theoretical models are operationalized very similarly in both surveys. Second, the longitudinal nature of both surveys allows for a similar temporal order of effects. And third, the focal respondents are of similar age and are members of approximately the same generational cohort. In sum, I argue that the similarities and differences between the two data sets allow for a replication that assesses both the repeatability and the generalizability of the initial study (Freese and Peterson, 2017).

Figure 3.1. Conceptual Model



The conceptual model being re-analyzed is summarized in Figure 3.1. Embedded in this model are three key questions about the sources and consequences of concealment. First, do parental affection, monitoring, and prior delinquent behavior—factors that impact the decision to

conceal or disclose information to parents—influence child concealing behavior net of low self-control (Hypotheses 1a and 1b)? Second, does child concealment predict future parental knowledge? And third, does parental knowledge alter parental control of child behavior, and by extension, increase the child's autonomy and agency with regard to delinquent behavior? I employ cross-lagged panel models—the same estimation procedures used in the original study—to re-examine hypotheses 1a-2a. The lack of measures of parental knowledge at wave 1, as well as having only 2 waves of data available for the replication, preclude the re-assessment of Hypothesis 2b. I detail the ways in which the Add Health measures mimic and deviate from the DYS measures in the methods section, below.

METHODS

Add Health Data

Add Health is a nationally representative probability-based sample, surveying children in grades 7-12, their parents, and school administrators from 132 (80 high schools and 52 middle (feeder) schools) schools across the country. The interviews with the children were conducted at school and at the child's home. The measures used here come from the first two waves of the publically available data collected from in-home surveys. I use data from child and parent surveys (parents report on the household income variable) at wave 1, and child surveys at wave 2. The wave 1 in-home child and parent surveys were collected in 1995, approximately 6 months after the in-school questionnaire. Of those, 6,504 teen respondents comprise the publically available sample. The second wave in-home survey was collected in 1996, with 4,834 individuals available as part of the publically available sample.

Add Health Measures

Measures of all variables used in the DYS models are available in Add Health, with three caveats. First, child reports of parental knowledge were only assessed at wave 2. Therefore, measures of parental knowledge are left out of the cross-lagged panel models. I do, however predict parental knowledge with alternate models. Second, the concealment measure available at both waves 1 and 2 is a single item indicator of frequency of lying to parents. This measure does not allow me to capture both the honesty and the extent of disclosure of information dimensions featured in the DYS models. However, extent of disclosure questions were asked of the teen respondents at wave 2 only—specifically whether they tell their mom where they are going after school and if they usually tell their parents where they go when they go out on weekends or evenings. Combining these two items with the honesty measure generates a concealment measure at wave 2 that best captures the multi-dimensional nature of the DYS construct. I compare the model featuring this more complete measure of concealment with the model where the wave 1 and wave 2 constructs are identical and reflect honesty only in the analysis subsection, below. Finally, the items assessing communication between parents and children lack information about who initiated communication. In other words, instead of asking "Do your parents ask you about what's going on at school?" The Add Health items are phrased as "How often do you and your mom/dad talk about what's going at school?" The information provided by the Add Health items, therefore, should be interpreted as communication, rather than solicitation of information by parents. The warmth components of "warm communication variable" do specifically ask if parents are warm and loving towards the respondents, indicating the desired direction of behavior. For the purposes of these models, the measure of warm communication can still indicate the extent to which the family setting may reward or aid the

teens in sharing of personal information with parents. Detailed descriptions of measures are provided below.

Warm Communication. Child reports of parental warm communication are assessed with six items. Two items—child reports of whether their mother and father were warm and loving in their interactions with them most of the time—reflects the warmth dimension. Four additional items—child reports of talking with their mother/father about grades and schoolwork, and other things that happen at school. While the topics of conversation are nearly identical to the DYS measures, the Add Health lacks information on who initiated conversation. Therefore, this measure cannot assess true solicitation of information, but can speak to the general setting in which children share information. The alpha reliability for the measure is .646 at wave 1 and .655 at wave 2.

Parental Control Following the DYS measure, parental control is assessed with two items: Child reports that parents inforce a set curfew on weekend nights and weekday nights. This measure has a low reliability (.322 at wave 1; .361 at wave 2), but is identical to the control measure used in the DYS models. Higher values indicate greater parental control.

Parental knowledge is a single Likert-scale (0-4) item measure assessed at wave 2 only. The item measures agreement with the statement "your mother usually knows what's going on in your life". While less detailed than the DYS measure which captures knowledge about friends and whereabouts, this measure none-the-less taps into parental awareness of child behavior.

Concealment is assessed in two ways. First, concealment is measured with a single item—child reports of how often during the past year they lied to parents about where they were or who they were with, which ranges from 0 (Never) to 3 (5 or more times); Second, for wave 2 only, I

created a three-item scales of concealment, including the lying item described above and two additional disclosure items which measure agreement (1-5): “You usually tell {MOM} where you are going after school”, and “You usually tell your mother or father where you are going when you go out on weekends or evenings.” The three items were standardized and combined them into a mean scale (alpha reliability is .587 – notably higher than the DYS concealment measure).

Low self-control Unlike the DYS, the excitement seeing dimension of low self-control (Burt et al., 2014) was not available in Add Health. As a result, the available behavioral and personality measures mainly revolve around delaying gratification and rational decision making. These measures fall into one of two categories—items that ask about problem solving and delayed gratification in general (Warr et al., 2007) and items that assess conctere problems getting work done and getting along with others at school (Perrone, 2004; Young et al., 2011). An EFA including both sets of items revealed a 3 factor solution, one for general problem avoidance and relying on gut feelings to make a decision, one for reporting getting into trouble at school, and one for rational problem solving by weighing pros and cons in a systematic manner. Since the personality components 1 and 3 were more closely related to one another than the school performance, and since school difficulties may have multiple underlying issues beyond self-control, the final scale consists of personality questions referencing rational decision making and problem solving. The resulting scale consists of seven items that range from 1 (Strongly Agree) to 5 (Strongly Disagree). The first three items, avoiding problems, difficult problems making the respondent upset, and going with gut feeling when making decisions were reverse coded. The other four items asked whether the respondent attempts to get facts about a problem when trying to solve it, tries to think of different solutions, weighs different solutions in a systematic way,

and analyzes what went right and what went wrong. Alpha reliability for this scale was .513 at wave 1. Higher values indicate *lower* self-control. As with the DYS models, self-control here is considered as predicting—but not predicted by—parenting, delinquency, or concealment. As a result, it is modeled as an exogenous variable at wave 1 only.

Violence. Add Health *violence* measure is nearly identical to the DYS measure. It consists of 4 items—how many times over the past year adolescents engaged in simple, and aggravated (as well as attempted aggravated) assault, and gang fights. Unlike the count data in the DYS, the response categories for the Add Health violence variables range from 0(never) to 2 (more than once) for the aggravated assault variables and from 0 (never) to 3 (5 or more times) for the simple assault and gang fights variables. The alpha reliabilities for this measure was .703 at wave 1 and .722 for the wave 2.

Theft. Theft measure has fewer items than the DYS measure. The Add Health theft measure excludes avoiding payment for goods and services and purse snatching but retains 4 items matching the DYS—how many times over the past year the respondent engaged in in sealing less than 50 dollars, stealing more than 50 dollars, shoplifting, and stealing a car. Unlike the DYS, each item is not a count, but ranges from 0 (never) to 3 (5 or more times). The four items were averaged to create a scale with alpha reliabilities of .720 at wave 1 and .737 at wave 2.

The *Substance Use* variable contains behaviors that differ in the length of the observation period: Frequency of alcohol use, including wine, beer and liquor is assessed for the past year (0 (everyday) to 6 (never), and reverse coded, such that higher values indicate more frequent alcohol consumption). However, the items measuring how often the individual used other controlled or illegal substances including: marijuana (count) cocaine (0(no times) to 7 (33 or more times) at wave 1 and count at wave 2), and other drugs (including hallucinogens,

amphetamines, and heroin—items captured with distinct items in DYS; and measured as a count at both waves) are assessed for the previous month. These four items were standardized and averaged into a scale which has an alpha reliability of .580 at wave 1 and .652 at wave 2.

Exogenous control variables. Like in the DYS, the Add Health models control for age, gender, and race-ethnicity of the child, family income, and whether the child lives with both biological parents (Browning et al., 2005; Fagan, Van Horn, Antaramian, and Hawkins, 2011).

Analytic Strategy

Particularities of Add Health preclude a complete replication of the DYS models in two ways. First, because only two waves of data are available, the cross-lagged panel models considered here cannot estimate any mediation processes of interest (for example if concealment predicts knowledge, which in turn predicts parental behavior. Second, because the knowledge measure is only available for wave 2, we cannot examine the sources and consequences of parental knowledge as part of the cross-lagged models. However, all other direct relations specified in the DYS cross-lagged panel models can be re-examined here.

Just for like the DYS models, all control variables (child gender, race/ethnicity, age, family income, and whether the child lives with both biological parents) are assessed at wave 1, covary with the substantive variables at wave 1 (parental warm communication, parental control, child lying, child low self-control, and child delinquent behavior), and predict substantive variables wave 2 (parental warm communication, parental control, child lying, and child delinquent behavior) (Matsueda and Anderson, 1998). The autoregressive coefficients represent stability of individual differences for a given variable measurement from wave 1 to wave 2. The cross-lagged effects refer to the effects of a wave 1 explanatory variables on other endogenous variables measured at wave 2. The cross-lagged panel models were estimated in Mplus 7

(Muthen and Muthen 1998-2015), using maximum likelihood estimation with robust standard errors (MLR). Additional ordered logistic and linear regression models predicting parental knowledge at wave two and a multi-indicator measure of concealment at wave 2 were estimated using STATA 14 (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP).

Results of the Add Health Models

Table 3.1 provides summary statistics for the Add Health sample. The sample means of the demographic variables highlight the differences between the Add Health and the DYS. Whereas the majority of the DYS respondents live in poverty and primarily within households where one or both biological parents are absent, the majority of the Add Health respondents have middle class incomes and predominantly reside in households where both biological parents are present. The majority of the DYS respondents are people of color, while the majority of the Add Health respondents are white. In other words, the teens in the two samples differ greatly in the advantages they are afforded by their socio-structural surroundings.

Table 3.1 Descriptive Statistics.

Variable	Mean	Std.Dev	Min	Max
Warm communication w1	1.78	0.408	0	5
Warm communication w2	1.81	0.401	0	4
parental control w1	0.509	0.366	0	1
Parental control w2	0.454	0.371	0	1
Parental knowledge w2	2.929	1.019	0	4
Lying wave w1	0.878	1.038	0	3
Lying wave w2	0.72	0.942	0	3
Concealment w2	.003	0.749	-.846	3.164
Theft w1	0.217	0.448	0	3
Theft w2	0.179	0.417	0	3
Violence w1	-0.0001	0.728	-.51	6.3
Violence w2	0.0012	0.742	-.34	6.87
Substance use w1	0.002	0.706	-.72	21.53
Substance use w2	0.003	0.7	-.38	31.12

Female	0.516	0.5	0	1
Age	15.037	1.773	11	20
White	0.662	0.473	0	1
Black	0.25	0.433	0	1
Hispanic	0.115	0.319	0	1
Asian	0.042	0.2	0	1
American-Indian	0.036	0.187	0	1
Other	0.066	0.247	0	1
Income	47,701	56,354	0	999,000
Living with both bio parents	0.525	0.499	0	1
Low self-control	2.6	0.479	1	5

Figures 3.2-3.4 show standardized effects of the 2 wave cross-lagged panel models. Because these models are fully saturated, I cannot evaluate the overall model fit. However, I can still examine the significance of hypothesized relations between the variables of interest. Below, I first summarize findings from the cross-lagged panel models, with reference to the hypotheses tested using the DYS sample. Finally, I summarize the findings of some supplementary models which include measures of parental knowledge and a more complete measure of concealment at wave two.

Figure 3.2. Cross-lagged panel model featuring theft.

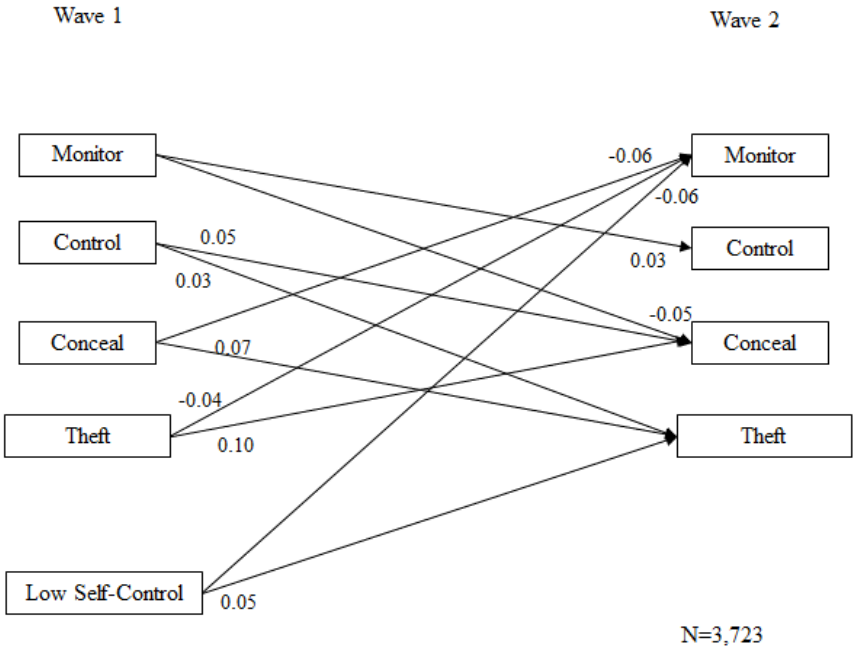


Figure 3.3. Cross-lagged panel model featuring violence.

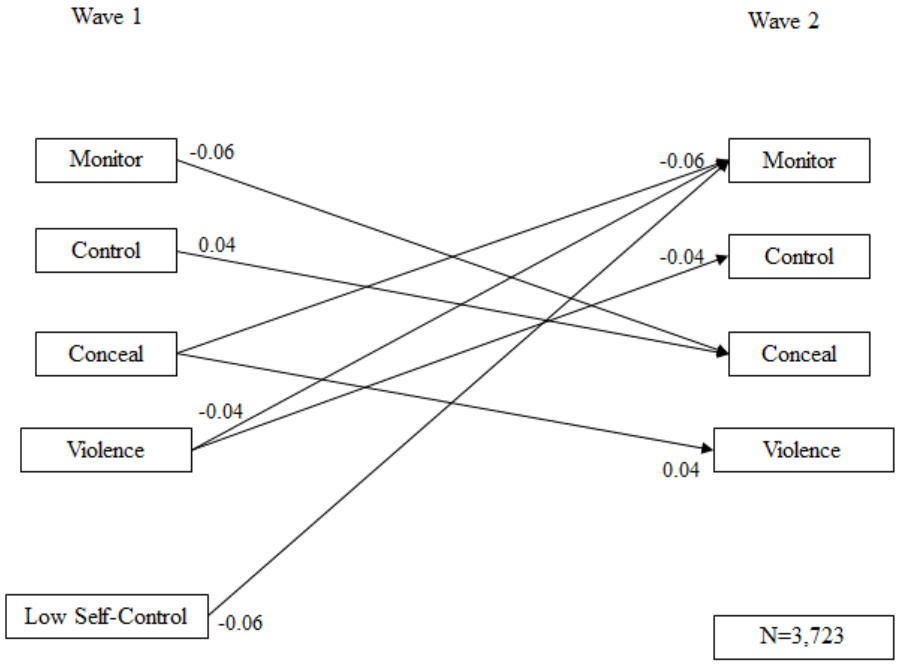
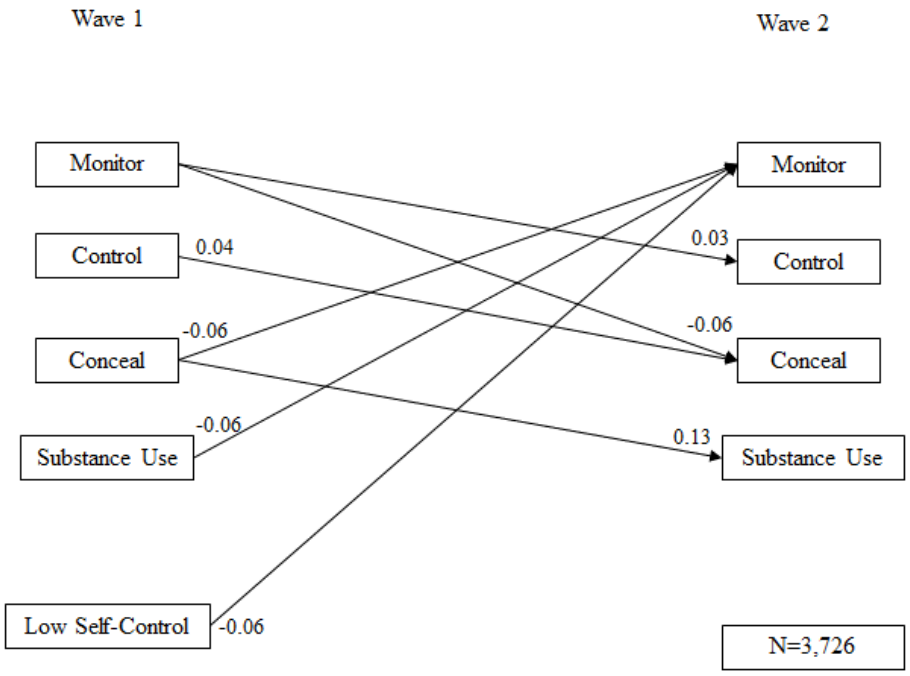


Figure 3.4. Cross-lagged panel model featuring substance use.



Recall that hypotheses 1a and 1b proposed that prior parental communication and warmth, and prior delinquent behavior should influence lying and concealment net of self-control. Replicating the findings of the DYS models net of self-control, prior parental warm monitoring predicts decreased lying in all three models. Likewise, as with the DYS models, prior theft—but not violence or substance use—predict lying. Similar to the DYS models girls commit less delinquent behavior than boys, but—unexpectedly—report lying more often.

While low self-control at wave 1 doesn't predict lying at wave 2 in the cross-lagged models, it is highly correlated with lying at wave 1. Following the GTC logic that self-control stabilizes before adolescence (Gottfredson and Hirschi, 1990) I estimated a path model where low self-control was treated (along with gender, age, family income and race) as an exogenous variable, and used to predict parenting and child behavior variables at waves 1 and 2. This model yields a significant direct effect of low self-control on lying at wave 1, as well as a significant total effect

of low self-control on lying at wave 2 (results are available upon request). These findings suggest that, despite being unrelated to changes in lying, self-control is related to lying generally. Unlike the DYS model, but similar to other studies of disclosure (e.g., Keijsers et al., 2010), lying at wave 1 predicts all delinquent behavior at wave 2. However, due to the unavailability of parental knowledge measures at both waves, and the limited number of waves, it is unclear if this effect of lying on future delinquency flows through decreasing parental knowledge or otherwise altering parental behavior.

In sum, the cross-lagged panel models replicate the findings with regard to hypotheses 1a and 1b, but cannot be used to ascertain the generalizability of hypotheses 2a and 2b. While hypothesis 2b—which refers to the indirect effects of lying on future delinquent behavior through knowledge—cannot be assessed with the Add Health models, I attempt to replicate the DYS findings with regard to hypothesis 2a—which proposes that concealment decreases parental knowledge—in a separate model, below.

Predicting knowledge

The results of a generalized linear regression model predicting parental knowledge at wave1 with parenting, child behavior, and relevant demographic variables, are summarized in Table 3.2.

Table 3.2. Predicting parental knowledge (ordered logit, N=3,526).

Predictors (wave 1)	Coefficient (S.E.)
Lying	-.307*** (.034)
Low Self-Control	-.339***(.070)
Parental Warm Communication	.975***(.086)
Parental Control	-.136 (.091)
Theft	-.357*** (.081)
Violence	-.014 (.052)
Substance use	.049 (.067)
Female	.253*** (.065)
Age	-.057** (.022)
Black	'-.090 (.081)

Hispanic	.002 (.127)
American Indian	.021 (.163)
Asian	-.374(.168)
Other	-.095 (.166)
Both Parents	.170* (.069)
Income	-.059 (.039)

*** p < .001, ** p < .01, * p < .05; pseudo R^2=.05

Like in the DYS models—in support of hypothesis 2a—both parental warmth and communication and child honesty significantly increase parental knowledge. Also similar to the DYS models, parents know significantly more about younger children and female children. However, prior theft and low self-control predict significant decreases in parental knowledge—something that was not evidenced in the DYS cross-lagged models. Respondents who identified as Asian reported lower parental knowledge, while respondents who live with both parents reported significantly higher parental knowledge. In sum, while I cannot model consequences of parental knowledge using the Add Health data, these supplementary models replicate the DYS findings on the hypothesized sources of parental knowledge (concealment and parent-child communication), and identify several previously unobserved sources of parental knowledge.

Models with alternate measures of concealment at wave 2

Because the second wave of the Add Health survey collected data on not just lying, but withholding information from parents—measures that better reflect the DYS concealment variable—I estimated linear regression models using this new construct, and compared them to models where the outcome is the single-indicator w2 lying measure used in the cross-lagged models. These models included all w1 parenting, delinquency, and demographic variables from the cross-lagged models as predictors. Because the relationship between the two measures of concealment and the lagged (w1) lying variable will likely be lower for such models—due to a

change in the operationalization of the variable as well as passage of time—I examined models with and without a lagged measure of lying. The results of these models—not included here but available upon request—suggest that a measure of concealment that includes extent as well as honesty of disclosure is more closely positively related to low self-control (the effect of the standardized coefficient of low self-control on the single indicator lying measure (in models without a prior lying measure) is almost half that of low self-control on the lying-and-disclosure measure (.044** vs .088***)). This measurement-specific effect of low self-control on concealment may account for the discrepancy between effects in the DYS and Add Health Models. The standardized effect of parental warm communication is also more than two times larger for the multi-dimensional concealment construct (standardized effect of -.14*** vs. -.06***). Finally, prior violence is a stronger predictor of the multidimensional, rather than the lying-only construct (.078*** vs .039*). These differences effects are observed in models with and without a control for prior lying. Notably, while including prior lying in models predicting multi-dimensional concealment at wave 2 reduces the effects of low self-control and violence, they are still greater than then effects the same variables on lying *without* a control for prior lying. In sum, it is likely that using a multi-dimensional measure of concealment would reveal a direct effect of self-control on concealment, aligning the Add Health results with those of the DYS.

DISCUSSION

Replication is a key component of the accumulation of knowledge (Simons, 2014; Schmidt, 2009; Thompson, 2002). Replicating results under different study conditions evaluates the generalizability of initial findings, and helps minimize type I and II errors. To ascertain the scope and further test the results from the DYS models in Chapter 1, here I attempted a replication of

the models using the Add Health data set. Using the Add Health data allowed a reexamination of my models in a nationally representative sample of teens who, on average, face far less disadvantage than the DYS respondents.

Since Add Health was not designed to mimic the DYS, there were several ways in which the two data sets diverged in measurement, complicating the replication. Notably, only two waves of Add Health data had repeated measures of key variables (whereas the DYS analysis featured 4 waves of data), and two measures—such as parental knowledge and a multidimensional measure of concealment like the one used in the DYS models—were only available at the second wave. These measurement differences precluded a replicated examination of one of the 4 hypotheses (whether decreased parental knowledge predicts decreased parental control and, indirectly, increased child delinquency) from chapter 1. Likewise, it is unclear whether the lack of association between low self-control and concealment in the cross-lagged panel models is due to a different operationalization of concealment, since self-control impacts a multidimensional measures of concealment in the regression model (Table 3.2).

Nevertheless, results from the cross-lagged models as well as several supplemental models replicate the significant findings with regard to the remaining three hypotheses: concealment is predicted by the extent and quality of parental communication on the one hand; by prior delinquent behavior on the other hand; and concealment predicts decreased parental knowledge. That these findings were replicated in Add Health suggest that the way parents and children communicate, and the way situational factors impact information management is generalizable across settings of varying disadvantage, and the US population. With regard to Type I error, the replication suggests that the likelihood of the null being true for hypotheses 1a-

2a is very unlikely. With regard to Type II error, the Add Health did not reveal any significant hypotheses-specific relations beyond those observed in the DYS data.

Additionally, this replication serves as a bridge between the analyses conducted in chapters 2 and 4 (using DYS data) and the analyses conducted in chapter 5 (using Add Health data). Present findings indicate that the negotiations between parents and children examined in chapter 4 take place within an interactional context that is similar (at least with regard to the variables examined here) to that between the parents and children in the DYS sample.

In sum, this replication lends further support for strategic and situational underpinnings of concealing information from parents. Likewise, these results add to a growing body of evidence that, across different subpopulations, teens effectively manipulate what their parents know about them (Stattin and Kerr, 2000; Fletcher et al., 2004; and many others).

CHAPTER 4: DEVELOPMENT OF SECRECY AND LYING THROUGH LATE CHILDHOOD AND ADOLESCENCE

INTRODUCTION

Strategically disclosing and withholding information about private behavior is a fundamental way in which individuals influence how others see and treat them (Goffman, 1959; Stattin and Kerr, 2000; Grigoryeva, 2018). Does how honest and forthcoming people are change with age? This chapter examines the evolution of honesty and secrecy—the two dimensions of information management—throughout late childhood and adolescence, alongside factors—such as self-control, delinquency, and parenting—that have been shown to influence information management. In so doing, I attempt to answer several questions that are important for understanding how children negotiate the process of growing up. Adolescent concealment has been shown to be a central way in which children assert their independence and exert influence over parents (Stattin and Kerr, 2000; Smetana, 2008), and is associated with both higher IQ, problem solving, and greater self-control in childhood (Talwar and Crossman, 2011). On the other hand, research shows that frequent lying by adolescents may be associated with suboptimal outcomes (Stouthamer-Loeber, 1986, Gervais et al., 2000). Little is known about whether there are developmental differences in lying and secrecy between childhood and adolescence, and what factors may affect individual trajectories of concealment and disclosure, and help explain conflicting findings on the sources and consequences of information management. We know that individuals differ in the frequency with which they lie and keep secrets. This chapter helps to identify if these differences are stable or fluid throughout childhood and adolescence, as well as explore the correlates of any developmental changes. In doing so I hope to generate a better

understanding of the processes—and, by extension, the meaning—of information management during childhood and adolescence.

Given this, the main goal of this chapter is to examine and explore age differences in concealing information from parents during the transition to adolescence. I do this in two ways. First, I examine the evolution of concealment throughout late childhood and adolescence and model the relation between trajectories of self-control and concealment throughout that developmental stage. Second, I estimate the model in Chapter 2 separately for the youngest and oldest cohorts of the DYS, in order to test whether the previously observed relations among the variables change with age. In the following sections I review what we already know about the development of parent-child relationships, self-control, and information management and identify the shortcomings that this analysis seeks to address. Importantly, the scarcity of concealment studies that span both childhood and adolescence leave several fundamental gaps in our understanding of development of secrecy and lying. First, what does the average concealment trajectory look like? Is there change over time? Second, does information management evolve in the same way for everyone, or are there systematic differences in trajectories of concealment and disclosure over time? Third, if there are differences—either within individuals across time or between individual trajectories—do factors such as gender or self-control help explain it? To answer these questions, I outline several possible ways in which the relations between parenting, information management, self-control, and problem behavior change with age. To explore how concealment changes with age and which—if any—of the existing models may account for such change, I analyze Denver Use Survey data using latent growth curve models, growth mixture models, and cross-lagged panel models. The results

provide an initial account of how information management within parent-child interactions develops as adolescents grow older.

PRIOR LITERATURE

Definition of Information Management

In order to track the evolution of information management, it is first necessary to define the concept. As detailed in Chapter 2, individuals manage information by either disclosing or concealing it. Concealment is purposeful manipulation of information which encompasses both secret keeping and deception. Disclosure—the lack of concealment—is the honest and cooperative sharing of private information. To be effective, information management requires an asymmetry of information such that the person who possesses information unavailable to others can either choose to conceal or reveal that information. Individuals, then, are able to influence less informed others by manipulating information available only to themselves. In chapter 1, I argue that information management can be thought of as an agentic process—one that is guided by decision making based on strategy (evaluating different behavioral possibilities given situational constraints), forward-looking planning, and self-interest (Emirbayer and Mische, 1998). In other words, kids influence parents by being secretive or lying *intentionally*. While some criminological literature defines lying and secrecy as inherently problematic (Gottfredson and Hirschi, 1991), I argue that concealment is not necessarily anti-social. Rather it can yield pro-or anti-social outcomes, depending on the information being concealed. Below I detail what we know about concealment and disclosure from studies of lying and agency in young children, as well as how we can expect concealment to develop if it is not agentic or strategic, but rather sourced from low self-control—a competing explanation of dishonest and secretive behavior.

Lying

What do we know about children's capacity for managing information to influence others? Possibly because the scholarly interest in adolescent concealment and disclosure is fairly new and confined to middle adolescence (Stattin and Kerr, 2000), our knowledge of the development of information management in children is limited to lying. Children develop a capacity for lying around 3-4 years of age (Newton et al., 2000; Stouthamer-Loeber, 1986; Wilson et al., 2003), and lying is initially used as a tool to conceal punishable behavior (Newton et al., 2000; Stouthamer-Loeber, 1986; Wilson et al., 2003). By the time they are seven, children become capable of maintaining deception during follow up questioning and can sustain initial lies with secondary and tertiary lies (Talwar and Lee, 2002a). For example, kids will not only claim to have not touched a forbidden item, but will also generate a narrative for why they didn't: "I didn't touch the toy on the table because I was busy playing with the blocks on the floor." This development is indicative of the mastery of third-order beliefs or "theory of mind"—the ability to predict the thoughts and beliefs of others—and to guess what others may find as convincing evidence to back up the initial lie (Talwar and Lee, 2002a; Ridgeway and Correll, 2006; Talwar & Lee, 2008). Importantly, for the ages 3 to 7, lying is positively associated with both higher IQ (Lewis & Crossman, 2003; Pauls & Crost, 2005-for adults) and *higher* levels of self-control (Carlson et al. 1998). Finally, while the main motivation for early lying is to avoid punishment, most children develop a capacity for altruistic lying by the age of 7 (Talwar and Lee, 2008). In sum, by late childhood, children are capable of effective dishonesty, which they engage in for both pro-social and selfish reasons, and which is *negatively* related to low self-control.

Only a single study has examined trajectories of lying for both childhood and adolescence (Stouthamer-Loeber 1986). Most other studies compare lying behavior between two differently aged groups, or compared lying behavior for one group at 2 time points. Among these studies, there is no consensus on whether lying is a stable behavior, whether there are within-individual changes in lying through childhood and late adolescence, and whether there are group differences in trajectories of lying. Gervais, Tremblay, Desmarais-Gervais, and Vitaro (2000) and Stouthamer-Loeber (1986) find that there is relatively little within-individual change in lying in late childhood. Jensen, Arnett, Feldman, and Cauffman, (2004) find that fifteen year olds were more likely to lie to their parents than 20 year olds, which may reflect young adults' greater ability to deal with situations without resorting to lying. Keltikangas-Jarvinen and Lindeman, (1997) found that 14 and 17 year olds were more likely to approve of lying than 11 year olds. Some studies of lying in adults (DePaulo, Kashy, Kirkendol, Wyer, and Epstein, 1996; Serota et al., 2010) and children (Stouthamer-Loeber, 1986) offer evidence of two distinct classes of lying where a small percentage of individuals engage in chronic lying (i.e., those that consistently lie at a much greater frequently than others). Frequent lying is associated with a number of suboptimal outcomes, such as delinquency and externalizing problem behaviors (Stouthamer-Loeber, 1986, Gervais et al., 2000; Stouthamer-Loeber & Loeber, 1986). Due to the scarcity of empirical work dissecting chronic lying, scholars struggle to interpret the suboptimal outcomes of chronic liars within the context of the high aptitude of children who master lying early. Of those scholars that have, some suggest that the adaptive quality of lying is tied to frequency of use—it can bring about benefits when used in moderation: "evidence suggests that lying has an adaptive value as a social strategy only if it is used sparingly" (Tyler et al., 2006). Others interpret chronic lying as an inability to deal effectively with their surroundings, or a symptom of being immersed in an

environment that necessitates lying to the exclusion of all other coping strategies (Ostrov et al. 2008;Talwar and A.. 2011).

Finally, while some longitudinal studies of lying feature male-only samples (Stouthamer-Loeber, 1985, 1986), other studies relying on representative random samples indicate gender differences. Specifically, respondents (teachers and parents) report less lying behavior by girls than boys (Gervais, et. al., 2000; Serota, et.al., 2010). Explanations of these effects include boys being more open to dishonesty (Jensen et al., 2004), and greater parental approval of girls (rather than boys) being forthcoming and cooperative (Galambos, Berenbaum, & McHale, 2009). However, at least one study suggests that girls are seen by others as lying less because they are better liars—in other words, their lies are less likely to be detected (Lewis, Stanger, & Sullivan, 1989). These studies indicate a need to account for gender in the trajectories of lying, as well as examining lying from self-reports, despite issues such as social-desirability bias (Serota, 2004). To address this, the present analysis uses self-reports of both child-initiated disclosure of information and attitudes towards lying parents, and examines the role of gender both in the trajectory and cross-lagged panel models of information management.

Secrecy

The presence and absence of both secrecy (information withholding) and lying (providing false information) are considered in this dissertation. Therefore, I briefly review work that compares and contrasts the two concepts, and specify how looking at trajectories of both may differ from considering only a trajectory of lying. While there are no studies that examine change in secrecy over time separately from lying, Buller and Burgeon (1994) and others (Smetana and Rote, 2015) distinguish between acts of omission (not providing information) and acts of commission (providing false information). Buller and Burgoon (1994) argue that the two

concepts are analytically distinct, with the main difference between lying and secret keeping being that lying (an act of commission) generates false knowledge while secret keeping (an act of omission) does not. Therefore, lying is harder to deny and leads to greater experienced loss of honesty and trust. Indeed, deception via secret keeping tends to be viewed more favorably than deception through lying (Marshall et al.,2005; Perkins & Turiel, 2007; Keltikangas-Jarvinen & Lindeman, 1997; Hopper & Bell, 1984). The finding that secrecy is more acceptable than lying implies that secrecy may be less sanctioned when discovered and used more frequently than lying. However, the observational studies of differences between secrecy and lying do not account for the context in which the lies or omissions were committed. Therefore, it could be that acts of omission are reserved for less serious, significant, or hard-to-cover-up information than lying. If this is the case, the observed differences between lying and secrecy may be due to the information being concealed, not to the actual tactic of concealment.

Furthermore, other studies have identified alternate cleavages within the concept of concealment. For example, acceptability of concealment can also hinge on whether lies or secrets are altruistic versus self-regarding (Jensen et al., 2004). Another key distinction pivots on who the information belongs to—who *should* have authority over the information being concealed—whether it is the person with the private information, or the recipient of the lie. If the information is within the domain of the person possessing information, then lying or secrecy is more acceptable (Smetana, 2011).

In sum, there are several ways in which the general concept of information management can be dissected into more elemental components, with secrecy and lying being one such distinction. Empirically, all of these cleavages have been shown to yield incremental differences in whether individuals see a type of concealment as a socially acceptable behavior. Despite this, I

depart from Buller and Burgoon's (1994) propositions that lying and secrecy represent qualitatively distinct concepts. I argue that deliberately withholding correct information, whatever the strategy of concealment, yields incorrect information to the recipient. That shared feature—purposeful manipulation of information—is key to my definition concealment, and so I treat both secrecy and lying as part of one overarching, if multi-dimensional concept. Because studies comparing age differences have only been done on lying, I anticipate that the results of my analyses using a combined secrecy and lying measure may show greater mean use of concealment at each age.

As this overview of the research indicates, while we know some things about how kids and teens manipulate private information—mainly that youths have the ability to conceal information and do so at different rates—we do not know much about the developmental trajectories of concealment. We currently know little about how individual decisions to conceal or disclose are shaped by age, including whether there are different patterns of age-based change or what accounts for within and between individual differences over time (if such differences exist). To help specify how we may expect information management to change as children get older, I draw on two additional ways of thinking about concealment—as agency or as low self-control.

Evolution of Agency

Recall that my definition of concealment requires the concealer to have capacity for agentic behavior, including the ability to plan, weigh the benefits of action, and be motivated by self-interest (Grigoryeva, 2018). To specify the developmental parameters of a concealment-as-agency model, we need to specify both how capacity for agency develops and also how changes

in situational factors such as parenting/problem behavior can make lying and concealment more or less attractive at different ages.

First, it is important to know when children become capable of agentic behavior. Children as young as three years of age are able to identify the difference between intentional actions and mistakes for themselves as well others (Shultz, Wells and Strada 1980). By the age of five, children can apply a diverse set of rules that guide attribution of external and internal causes to actions based on evidence such as whether the outcome of the action benefits the actor, whether the intended outcome of an action matches the actual outcome, and whether an actor exhibits care in carrying out the action (Shultz and Wells 1985). Moreover, young children's attribution of causality closely matches adults' attributions (Schlottman et al., 2002). This means that by the age of three children are capable of enacting strategic behavior, which is predicated on the evaluation of cause and effect. In sum, older children, just like adolescents, have the cognitive tools necessary to intentionally and strategically enact lying and secrecy.

Second, while we expect the *capacity* for agentic action to be a constant in the present models, which span ages 7 to 19 (10 to 19 for the trajectory models), several other important parameters that affect the adoption of concealment as an agentic behavior are likely to change as children develop. First, opportunities to conceal personal information may increase as individuals go through adolescence and spend increased time away from parents and direct parental supervision—allowing more opportunities to choose and enact concealment (Osgood and Anderson, 2004). Second, adolescents' activities may differ from children and, as a result, may necessitate a different type information management, which generates greater rewards to concealment. For instance, sexual relationships and delinquent behavior are more prevalent in adolescence than childhood (Farrington 1986). These types of behaviors may spur the need to

conceal information from parents in order to avoid punishment if detected. Third, as children get older, there is an increased understanding that privacy and autonomy from parents are to be sought out—that many personal matters should no longer concern or be controlled by parents (Rote and Smetana 2016, Schalet, 2011). While parents often lag behind children in the acceptance and support for adolescents' increased privacy, both parents and children agree that as children get older, parents lose the privilege of unlimited access to their kids' lives (Smetana 2012, Rote and Smetana 2016, Schalet, 2011). All else equal, this might mark concealment as a less sanctionable event by parents. Each of these shifts should facilitate adolescent concealment and decrease disclosure.

These three points underscore the importance of looking at changes in concealment as a function of the social context in which children are embedded. Concealment is not performed in a vacuum, but rather is predicated upon situational opportunities to conceal. This chapter examines trajectories of information management in the context of the family, an important social setting in a child's life. Within this context—the more general environment in which parents and children are embedded, I examine factors that can systematically alter the immediate situations—the specific conditions—in which children disclose information to parents.[16] Here, the focus is on the child as the concealer and the parent(s) as the recipient of information that may or may not be manipulated/withheld by the concealer. The relationship between parents and children is often characterized by high intimacy, extensive duration, and multiple interdependencies (De Mol and Buysse, 2008), and thus is likely to affect patterns of information

[16]A key conceptual difference between context and situation is that context refers to more time-stable (but still malleable) environmental conditions—such as parental overall approaches to discipline. These affect the more immediate situational conditions—for instance the in-the-moment evaluation of rewards and costs of an given action. In practice, my measures are able to capture patterns of situations through time, somewhat muddying this distinction.

sharing (Keijsers et al., 2010). To account for the situations in which children do and do not share information with parents, I examine the role that parental control, warmth, and solicitation of information have on information management. Parental control—measured here as curfew enforcement, can reduce the amount of private time available to children and increase direct parental supervision, thereby reducing opportunities for concealment. Parental solicitation of information, especially when done in an environment that is affectionate, can reduce perceived costs of information sharing (such as the anticipation that parents will react with anger to disclosure) and increase opportunities to share, therefore increasing disclosure and decreasing concealment.

Self-control

While I argue that concealment is a strategic act, an alternate account of lying and secrecy has been put forward by criminologists (Gottfredson and Hirschi, 1990). This account links lying and secretive behavior to low self-control. Here, the argument is that concealment is a problem behavior which stems from underlying lack of self-control. Those with low self-control will tend to lie and keep secrets—impulsive and self-interested behaviors— because they do not have the requisite levels of self-control to abstain from lying, and because lying affords them the easiest means of goal attainment. Self-control has been extensively studied over the transition from childhood to adolescence, and these findings can inform our expectations of concealment to the extent that it may be a symptom and manifestation of low self-control. For the age range considered in the trajectory models (10-19), there are several features of self-control we expect to observe: First, within individuals, levels of self-control should be either stable or increase with age at a decreasing rate. While Gottfredson and Hirschi (1990) stipulate that absolute levels of self-control stabilize after 10 years of age, empirical tests of their theory suggests that self-

control continues to increase, at a decreasing rate, throughout adolescence—although this process is not uniform across samples (Hay and Forrest, 2006; Burt, Sweeten, and Simmons, 2014). Second, we expect that individuals belong to distinct groups, characterized by their levels of self-control. While Gottfredson and Hirschi (1990; see also Winfree et al., 2006; Hay and Forrest 2006) expect that over time such groups will differ only in their levels of self-control (following the same growth trajectory over time) others find that individuals belong to groups that differ both in their initial levels and trajectories of growth over time (Burt et al., 2014). In this paper I model age-dependent trajectories of self-control, both to speak to the debate over its development, and to determine whether concealment can be thought of as a symptom of low self-control. For concealment to be considered a manifestation of self-control it must exhibit similar patterns of change across time. Additionally, other variables in the model—like parenting practices and gender—should predict changes in lying similarly to changes in self-control. For example, parenting practices should be more closely coupled with lying for younger children, because, theoretically, parents can still shape self-control and related behaviors at younger ages (Gottfredson and Hirschi, 1990)[17].

THE PRESENT ANALYSIS

As the prior review of the literature suggests, there is little consensus regarding the functional form or number of trajectories of information management. Likewise, it is unclear how the effects of contextual variables, such as parenting, might affect concealment. Rather, what we know—vis-à-vis the literature on parent-child relationships, lying, and self-control—

[17] Burt, Simmons and Simmons (2006) find that parents continue to influence children throughout early adolescence, contrary to Gottfredson and Hirschi's stipulation that parental influence on self-control disappears by age 10.

forms a piecemeal and conflicting guide for possible changes in concealment and disclosure from childhood through adolescence. Synthesizing these disparate findings, I lay out several possibilities for the development of concealment. Prior studies indicate that there are four ways in which concealment may develop. Two of these possibilities are derived from theories of concealment and lying, and the other two are derived from prior empirical findings on lying behavior in children and adolescents. Below I outline what we may observe in the data if each of the four possible developmental processes is true. In the analysis section, I use several methods to explore and describe how concealment changes with age and to see if the findings are suggestive of any of the four models.

First, what do we expect trajectories of concealment and disclosure to look like if, as proposed by GTC, information management is a manifestation of self-control? If secrecy and lying are a manifestation of self-control, then the developmental trajectory of disclosure should be the opposite of the trajectory of self-control. The latent growth curve analysis conducted here spans the ages 10-19. For that age range, disclosure should either stay the same (given Gottfredson and Hirschi's (1990) stability argument) or increase at a decreasing rate over time (Burt et al., 2014). Individuals will have different starting points of disclosure, but the same slopes over time—in other words there will be stable between individual differences in disclosure over time. Additionally, I expect a two-class trajectory model to fit best, with a sub-population of individuals who have distinctly higher mean levels of secrecy and lying than the rest of the population, but similar pattern of growth over time (Gottfredson and Hirschi, 1990). Still another expectation, if concealment is a symptom of self-control and if Burt et al.'s (2014) findings are replicated by the DYS sample, would be for multi-class model to fit the data best. Finally, in terms of correlates of disclosure, I expect the following: First, self-control will be

associated with decreased disclosure both in the growth mixture models, and in the split-sample cross-lagged panel models. Second, parenting variables will be more strongly correlated with disclosure for younger children, and variables such as gender and parenting will affect levels, but not slopes, of disclosure (Gottfredson and Hirschi 1990).

The second possibility for the development of information management—that there exists a subpopulation of "chronic liars"— yields similar empirical expectations to the GTC model, but is not theoretically grounded in low self-control (Stouthamer-Loeber, 1986). Here, there is no expectation about the functional form of the developmental trajectory of disclosure within individuals. However, the findings from prior literature on chronic liars suggests a two-class trajectory model, with a sub-population of chronic liars who have distinctly lower mean levels of disclsoure than the rest of the population, but similar pattern of growth over time (Stouthamer-Loeber, 1986; Gottfredson and Hirschi, 1990). Moreover, these chronic liars may disproportionately exhibit other adjustment problems, findings that parallel descriptions of low self-control individuals (Gervais et al., 2000).

The third possibility is that information management is strategic, and develops with the capacity for agency and intent, as well as changing situations which alter the costs and benefits of concealing behavior. This conception diverges the GTC theoretically, and from both the GTC and "chronic liar" narratives in its empiric expectations. If information management is strategic, then disclosure may decrease because, as they get older, adolescents will increasingly face situations that favor keeping secrets from parents. A deceleration or reversal of the decrease in late adolescence (18-19) is possible, as adolescents become less dependent on parents, and less likely to use concealment as a tactic of gaining autonomy from parents. However, since the capacity for both agency and lying are constant from the age of 7 onward, the absence of any

significant within-individual change may still be consistent with an agentic information management perspective. In short, increases in disclosure provide evidence for GTC, decreases in disclosure provide evidence consistent with strategy, a lack of change with time may be accounted by both theories.

Any number of latent classes of trajectories is possible under the strategy model. If the behavior is guided by preferences and situational incentives, then individuals are likely to have different starting points (reflecting different preferences), and different slopes (reflecting different situations that change with time) of disclosure. To the extent that either preferences or situations are patterned—for example children who share in the context of affectionate and involved parenting, we would expect different classes of trajectories of disclosure. With regard to correlates of information management-as-a-strategy, I expect that self-control will account for a portion of the stable within-individual differences in disclosure (due shared dimension of self-interest), but that, after accounting for self-control there will be significant variation about the intercept – unexplained variance due to stable differences in environments that may influence disclosure. I expect that situational factors that alter the costs and rewards of concealment—parenting and delinquent behavior—will have similar effects for younger and older youth.

The fourth possibility is that either the substantive meaning of information management, or the individuals who are more secretive and dishonest, or both, differ from late childhood to adolescence. This proposition is based on prior findings that children (3-8 years of age) who lie more than their peers tend to be better adjusted and score higher on aptitude tests than peers, while older adolescents who lie more tend to do worse than their peers on the same adjustment and aptitude indicators (IQ and self-control among others) (Talwar and Crossman, 2011). However, this "flip" in concealment has not been examined in the same sample— the

comparison thus far has been between studies of younger children and studies of older adolescents. Therefore, it is unclear what accounts for this change. Are the higher achieving children who lie the same individuals as the poorly adjusted teens who lie more? This would predict that while individual differences and patterns of disclosure over time remain the same, concealing information becomes *substantively* different—increasingly maladaptive—from childhood to adolescence. In this case, trajectories of disclosure will have different intercepts, similar slopes, and differences in sources and outcomes of information management in the split sample analysis. Or, do the well-adjusted children start lying less as they get older, and poorly adjusted children start lying more? This would mean different intercepts and different slopes of disclosure—possibly one latent class decreasing disclosure and another latent class increasing in disclosure with age, but similar sources and consequences of disclosure for both the younger and older subsamples in the split sample analysis. Or it could be that one subset of the population has the same levels of disclosure as they age, while other individuals increase or decrease their lying behavior. This would mean different intercepts and different slopes—with one latent class where disclosure does not change over time and another latent class with either positive or negative change in disclosure (sources and consequences of disclosure would be similar for both the younger and older subsamples in the split sample analysis).

To examine each of these hypothesized processes, this analysis proceeds in several steps. First, I model trajectories of disclosure and self-control that span ages 10 to 19. A look at the pattern of within and between individual change, reveals (a) whether disclosure and self-control follow the same general patterns of evolution within the sample and whether self-control influences concealment throughout adolescence; (b) whether significant between-individual differences in within-individual change exist and whether these can be grouped into distinct

classes of trajectories over time; and (c) whether time-invariant covariates such as gender explain initial levels and change over time in information management. In other words, latent growth curve models provide an initial description of the dynamic development of information management and self-control.

However, latent growth curve modeling is insufficient to disentangle relations of mutual dependence between multiple variables over time. To compare models where variables are allowed to mutually influence one another, but also to account for the changes in such relations as children age, I divide the sample and estimate identical cross-lagged panel models for each subsample. The first set of models is estimated on the two youngest cohorts, who were 7 and 9 at the first wave of data collection and who ranged from 7-14 years of age over the five waves of data collection considered here. The second set of models are estimated on respondents from the three olds cohorts who were 11, 13 and 15 at the first wave of data collection and ranged from 7-14 years of age over the five waves of data collection. I compare and contrast the models to examine whether becoming older changes the interrelationships between concealment, parenting, self-control and delinquent behavior. Splitting the sample in this way imposes an artificial boundary between differently aged respondents. Ideally, time and age would be synonymous in the models, allowing a model of how the relationships between variables change continuously as kids age. However, the cohort sequential design of the DYS, the size of each cohort, and the computational demands of cross-lagged panel models preclude this more realistic approach to modeling change by requiring that differently aged individuals be pooled together at a given wave. Nonetheless, the present split-sample "snapshot" approximation of the continuous process attempts to accomplish two things. First, to examine if the findings from Chapter 2 are robust across the entirety of age range (7-19) considered here, or if a younger and older subsample yield

disparate findings. And second, to use observed differences and similarities in the subsamples to adjudicate between alternate hypotheses about the change in concealment with age.[18]

In sum, I use a number of different modeling techniques to answer key questions about the development of information management: As children grow older are there differences in the ways they manage private or sensitive information? Does tracing the evolution of concealment offer evidence suggesting agentic behavior, or a symptom of low self-control? Is there systematic between-person variation in how these changes unfold? And how does the transition to adolescence and resulting change in the context in which parents and children interact—relationships with parents, increased participation in delinquent behavior, gendered treatment of children—alter the situational motivations for and consequences of information management?

SAMPLE

The data used in the chapter come from the Denver Youth Survey (DYS). As outlined in Chapter 2, the DYS is an ongoing longitudinal data collection effort conducted by David Huizinga and colleagues at the University of Colorado, Boulder. The goal of the design was to identify a representative sample of children and youth at high risk of behavioral problems. Using cluster analysis of census tracts by arrest rates and census-based indicators of social disorganization (such as high mobility, low SES, and high percent minority population), the investigators selected the most disadvantaged neighborhoods in Denver, Colorado. From an initial sampling frame of 20,300 households, they drew a stratified probability sample of households containing youths aged 7, 9, 11, 13, and 15, resulting in a sample size of 1530

[18] Because the decision to juxtapose a subsample of 7 and 9 year-old cohorts with a subsample of 11, 13, and 15 year-old cohorts is somewhat arbitrary (see also discussion on pages 27-29), I assess whether the present findings are sensitive to a different distribution of cohorts (splitting the sample into 7,9, and 11 year-old component and a 13 and 15 year-old component) in a supplement to this chapter.

respondents at the first wave. The youth and child respondents were interviewed in their homes by trained interviewers. Information was also obtained by household interviews of parents at each wave. Attrition rates across the first five waves range between 7 and 9 percent (see Esbensen and Huizinga 1990). During survey administration, respondents age 11 and older at a given wave received a youth questionnaire, while youth less than 11 years old received a child questionnaire. The present analysis uses data from both the youth and child questionnaires collected from all five cohorts between waves 1(completed in 1988) and 5 (completed in 1992).

The DYS is representative of children in at-risk neighborhoods, where the sample is ethno-racially diverse and sampled households face substantial economic disadvantage. Regarding race and ethnicity, 48 percent of the respondents identified as Hispanic or Latina/o, 34 percent identified as black, 8 percent identified as white, and 9 percent identified as neither of those three categories. As expected for a disadvantaged sample, the average income for a youth's family was less than $8,000 a year. Only one-third of youth respondents reported living with both biological parents.

The longitudinal, sequential-cohort design of the DYS makes it ideal for studying between and within individual changes over time on the key variables of interest—concealment, parenting, self-control, and delinquent behavior.

MEASURES

As outlined above, the type of survey questions asked of focal respondents varied based on age: those children 11 and older (or 10 and older in some waves) received the youth questionnaire, while children 10 and younger received the child questionnaire. The differences in the questionnaires required several adjustments in analyzing the data. First, multiple items in the survey, while assessing the same theoretical constructs, were assigned different units of

measurement depending on the questionnaire. For the cross-lagged panel models, any scales containing items that differed in this way between the two surveys were standardized to allow for uniform interpretation of the measure across the two surveys. This allows the use of both the child and youth survey in estimating the cross-lagged panel models. However, for both approaches to estimating trajectories of concealment—the latent growth curve models (LGC) and growth mixture models (GM)—standardizing variables is inappropriate as it distorts the growth trajectories (Muthen and Muthen 20105). For these models, I use only the youth surveys, which range from 10-19 years of age. Second, some of the items comprising the measures for the models in chapter 1 (which use only the youth surveys) were not replicated in the child surveys. That resulted in use of slightly different scales for some of the measures (parental knowledge, theft and substance use scales were reduced to include only measures common to the two surveys), and—in the case of the measure of violent behavior—abandoning the scale altogether.

For the LCG and GM models, the theoretical constructs of interest are assessed with youth reports of disclosure and self-control at waves 1 through 5, and gender at wave 1. For the cross-lagged panel models, the constructs of interest are assessed using both child and youth reports of parental discipline, parental knowledge, concealment, self-control, and delinquent behavior at waves 1 through 5. Youth and child reports at wave 1 are also used to measure gender. Table 1 provides summary statistics for all measures used in the analysis.

Parenting. The parenting measures used here have been shown by literatures on child development, delinquency, self-control, and concealment to be associated with lowest levels of delinquent behavior, high levels of self-control, and low levels of concealment (e.g. Baumirind, 1967; Maccoby and Martin, 1983; Gottfredson and Hirschi, 1990; Steinberg et al, 1994; Stattin

and Kerr, 2000) . These include parental attempts at soliciting information from children in a warm and affectionate manner (parental warm monitoring), parental possession of information (i.e., parental knowledge about the child), and parental behavioral control of the child.

Parental warm monitoring. Because the combination of warmth and involvement by parents is a defining feature of authoritative discipline (Maccoby and Martin, 1983), warmth and monitoring are combined into a single scale measuring *warm monitoring*, averaged across five Likert-scale items. The *monitoring* dimension is captured by three items (ranging from 1 = Never to 3 = Often), which assess the efforts of parents to procure information about their child. Some example items include "How often do your parents talk with you about how things are going in school?" and "How often do your parents find time to listen to you when you want to talk to them?" The *warmth* dimension captures how warm and responsive parents are in their interactions with their child. The two items used to capture *warmth* measure how often parents respond to their child's good behavior with hugs and smiles (both items range from 1 = Never to 3 = Often). The alpha reliabilities for *warm monitoring* for youth at waves 2, 3, 4, and 5 are .694, .731, .731 and .754, respectively. The alpha reliabilities for parental *warm monitoring* in the child surveys at waves 1, 2, and 3 are .564, .552, and .623, respectively. Higher values of the *warm monitoring* scale indicate more frequent and affectionate monitoring of children by parents.

Parental control. Parental control is measured as the average of two Likert-scale items assessing the extent to which parents enforce curfew for the child on school and weekend nights. Both items were rated on a 3-point scale (1 = No, 2 = Sometimes, 3 = Yes). The alpha reliabilities for parental control at waves 2, 3, 4, and 5 are .662, .703, .730 and .808, respectively.

For the child survey measures, the reliabilities for waves 1, 2, and 3 were .535, .547, and .531. Higher values indicate greater parental control.

Parental knowledge. Parental knowledge evaluates how much parents know about their child. This construct is assessed with a mean of four standardized Likert-scale items: how many of the child's friends the parents know (1 = None, 2 = Some, 3 = Most, 4 = All), how often the parents know if the child is home on-time (1 = Never, 2 = Sometimes, 3 = Often), how often parents know who the child is with when they are away from home (1 = Never, 2 = Sometimes, 3 = Often), and how often the parents know where the child is when they are neither at home nor at school (1 = Never, 2 = Sometimes, 3 = Often). The alpha reliabilities for the knowledge scale at waves 2, 3, 4, and 5 are .456, .422, .479 and .484, respectively. The alpha reliabilities for the knowledge scale for child respondents were .372 at wave 1, .142 at wave 2, and .247 at wave 3. Although the alpha reliabilities for these scales are low, I nevertheless use these four items and the resulting composite knowledge scale for theoretical reasons.[19]

Child information management. A mean of four standardized Likert scales is used to measure information management, or the extent to which children withhold or reveal information about their own behavior from a parent. The indicators reflect two aspects of information management: how often *and* how honestly a child reports on their own behavior (Cumsille et al., 2010). The frequency item assesses "How often do you leave a note for your parents or call them about where you are going if they are not at home?" (1 = Never, 2 = Sometimes, 3 = Often). The

[19] The alpha reliabilities for the scales using adolescent reports of parental knowledge are very similar to the alpha reliabilities of parents self-reports of what they know about their children. These similarly low reliabilities of the scales, regardless of the source, suggest that for respondents in the DYS sample, parental possession of knowledge of certain domains of their child's life is not strongly associated with knowledge of other such domains. Similar scales for the models using Add Health data have higher alpha reliabilities.

three remaining items are attitudinal indicators of honesty. Each of these items asks how much the child respondent agrees with the following: "It's important to be honest with your parents, even if they become upset and you get punished," "It's ok to lie to parents to keep their trust," and "Making a good impression is more important than telling the truth to parents" (each item ranges from 1 = Strongly Disagree to 5 = Strongly Agree in the youth surveys; and from 1=Agree to 2=Disagree for child surveys).

Although attitudinal, the honesty items are necessary to capture key elements of information management concerned with (a) concealing information that could elicit punitive behavior from parents (e.g., concealing behavior that conflicts with a parent's interests), and (b) self-preservation—a motivating factor behind the withholding of information (Afifi et al., 2005) and a key dimension of secrecy. While attitudinal measures generally suffer from response bias to a greater extent than behavioral indicators, research shows that attitudes both produce and are a product of behavior (Rebellon et al., 2014) and that—more specifically—measures of attitudes toward lying are strongly associated with objective measures of child secrecy and concealment (Rote and Smetana, 2016). Finally, DYS parents report those youth who score lower on the disclosure scale as significantly more secretive than those who score higher on the disclosure scale, increasing the face validity of this measure.[20] Taken together, the behavioral and attitudinal items reflect both the willingness to disclose *and* the honesty of information, both of which are included in Stattin and Kerr's (2000) foundational operationalization of concealment. Increases in the child disclosure scale indicate greater use of and support for honestly reporting information to parents. The alpha reliabilities for this measure assessed from youth respondents

[20] Results are available from the author upon request.

at waves 1, 2, 3, 4, and 5 are .472 .390, .442, .479 and .450, respectively.[21] The alpha reliabilities for the child surveys are .222, .122, and .136 over the first 3 waves. Although the reliabilities are low, especially for the child surveys—some of which is accounted for by the two dimensional nature of the construct—I keep this construct as a single scale based on theoretical specification of concealment, and to be consistent with operationalization in Chapter 2—to allow for the evaluation of the general models considered therein. Higher values indicate *greater* disclosure or *less* concealment.

Self-Control. Seven Likert-scale items are averaged to operationalize self-control in a manner consistent with its recent theoretical treatments, which center on impulsivity and excitement-seeking (Burt et al., 2014). The self-control items measure agreement with statements such as "[You] are impatient—want to have things right away." "[You] act without stopping to think," and "[You] like to do daring things." The alpha reliabilities for self-control assessed from youth surveys at waves 1, 2, 3, 4, and 5 are .562, .564, .601, .605, and .605 respectively. For child surveys, the alpha reliabilities are .448 at wave 1, .416 at wave 2, and .481 at wave 3. Higher values indicate lower self-control or higher impulsivity.

Child problem behavior. Two types of child problem behavior—theft and substance use—are used in the present analysis. This is done for several reasons. First, subscales of delinquent behavior are preferred to an all-inclusive index of delinquency (Sweeten, 2012). Second, substance use is understudied as a possible outcome of child secrecy and lying. Third, rational decision making, planning, and strategic concealment may affect the two outcomes to

[21] The lower alpha reliabilities reflect the two dimensional nature of this measure. Although the attitudinal measures alone result in larger alpha reliabilities, I include all four items in keeping with the theoretical definition of concealment as any withholding of information, either through omission or commission (i.e., dishonesty).

varying degrees. For instance, substance use maps onto addiction and, as a result, is a behavior more likely practiced by individuals prone to impulsivity and excitement-seeking than theft (Allen et al. 1998). As such, the relations between self-control, secrecy and problem behavior may vary depending on the outcome considered, with theft more likely to be related to concealment than substance use.

The *theft* measure consists of mean responses to ten survey items that ask how many times adolescents engaged in avoiding payment, shoplifting, purse-snatching and auto-larceny over the prior year. In the youth surveys, the alpha reliabilities for the theft measure at waves 1, 2, 3, 4, and 5 are .014, .181, .521, .446, and .238, respectively. In the child surveys, the alpha reliabilities for the theft measures at waves 1, 2, and 3 are .136, .00, and .032 respectively[22].

Substance use consists of eight self-report survey items that measure how frequently adolescent respondents consumed beer, wine, hard liquor, and marijuana over the prior year. In the youth surveys, the alpha reliabilities for the substance use scale at waves 1, 2,3, 4, and 5 were .385, .486, .337, .266, .404, respectively. In the child surveys, the alpha reliabilities for the substance use measures for waves 1, 2, and 3 are .054, .377, and .021, respectively (the scale for wave 3 substance use includes zero-variance item—smoking pot over the past year).

Exogenous controls. I include a dummy variable for gender (male=0, female=1) as an exogenous predictor in all models. Literature on parenting and disclosure literature consistently shows that gender accounts for variation in parenting, self-control, concealment, and child delinquency (Browning et al., 2005; Fagan, Van Horn, Antaramian, and Hawkins, 2011).

[22] Despite the low alpha reliabilities, I use these particular items for the theft scale (and likewise the items for the substance use scale) for two reasons: First, each of the items is defined as theft in the criminological literature (Sweeten et al., 2012); Second, these items are featured in the child and youth surveys, allowing me to measure theft across the full age range in the DYS. However, for this and other measures used in the models, the reliabilities are lower for the youngest respondents. I return to this issue in the discussion section.

ANALYTIC METHODS

Latent Growth Curve and Growth Mixture Models

I use Latent Growth Curve Models and Growth Mixture Models, both estimated in Mplus 7, to model between individual variation in within-individual change in both disclosure and self-control (Bollen and Curran, 2006; Muthen and Muthen, 2010; 2015). Both LGC and GMM models are structural equation growth models, which treat time scores as parameters to be estimated, rather than data points. In my LGC models, growth over time is specified by three freely estimated latent variables, which each represent random coefficients that vary across individuals. The random coefficients are assumed to be normally distributed, and therefore, can be characterized by their mean and variance (computed across individuals). First, the random intercept is described by its mean (the average outcome over all individuals when the time score equals zero), and its variance (the variance across individuals of the outcome variable when the time score equals zero (Muthen and Muthen, 2015). Second, the slope is described by its mean (average linear growth over individuals for a time score increase of one unit), and variance (how linear growth over time differs among individuals. Third, in keeping with research on self-control and the age-crime curve, the present models include a quadratic slope parameter to capture the curvature of the outcome variable across age. It is described by its mean (the average rate of change in the slope over time (Burt et al, 2014) and variance (individual differences in the rate of change over time)—which is constrained to zero in the final models because of convergence issues (Muthen and Muthen, 2015). I also estimate the covariances between the intercept and the slope—the relation between individual intercepts and growth values. The covariances between the quadratic slope on the one hand, and the intercept and slope on the other, were constrained to zero, reflecting the lack of covariance between the quadratic slope (a

constant) and other parameters in the model. Within this model, individual values on the outcome variables of interest, concealment and self-control, and be summarized as follows:

Individual value on the outcome variable, *y*, at time score *t*: $yti = \eta 0i + \eta 1i\ wt + \eta 2i\ wt^2 + \varepsilon ti$
Individual intercept: $\eta 0i = \alpha 0 + \gamma 0\ wi + \zeta 0i$
Individual slope: $\eta 1i = \alpha 1 + \gamma 1\ wi + \zeta 1i$
Individual quadratic slope: $\eta 2i = \alpha 2 + \gamma 2\ wi + \zeta 2i$

Where ***y*** is the outcome variable, ***ε*** is the random variation in ***y,*** ***η*****0** is the intercept, ***η*****1** is the slope, ***η*****2** is the quadratic slope; ***α*****0**, ***α*****1**, and ***α*****2** represent the average intercept, slope and quadratic slope over all individuals. ***γ*****0**, ***γ*****1**, and ***γ*****2**, are the systematic components of between-individual variation in the intercept, slope, and quadratic slope, respectively. ***ζ*****0** is the random variation in the intercept, ***ζ*****1** is the random variation in the slope, and ***ζ*****2** is the random variation in the quadratic slope (here constrained to zero); ***w*** is the time-invariant covariate, and t is the time-score variable.

To estimate the parallel processes of the change in self-control and change in concealment within the LGC framework, I go through the following steps: I estimate the growth curve model separately without covariates, conduct a joint analysis of both processes, and then add covariates into the joint models (Muthen and Muthen, 2015).

I employ Growth Mixture models to identify distinct classes within developmental change in both self-control and concealment. The GM models relax the assumption that the change in the outcome variable over time is best described by a single average growth curve. Instead, GM models address heterogeneity by allowing different sub-groups to have distinct average growth curves. These models attempt to locate a model with the number of latent classes that fit the data best. Specifically, the GM models compare the fit of a one group model with a two group model using a goodness of fit test, such as the Bayesian Information Criterion

(BIC), and continues until a best-fitting model is found or additional groups cannot be identified. I first test for multiple group trajectories, and, if such differences are observed, I try to account for latent class membership by the inclusion of exogenous grouping variables such as gender. However, in the present models, I do not assume to know the entirety of the underlying latent grouping variables that account for distinct classes of either disclosure or self-control. Unlike semi-parametric group based-trajectory models (Nagin, 1999) the GM models allow for within class individual variation around the group mean growth curve. All growth models are estimated using maximum likelihood estimation with robust standard errors (MLR).

Finally, the DYS data are organized as a cohort-sequential design—where measurements are taken over a relatively short time period (here, 5 waves) from differently aged groups that will "overlap" in age throughout the course of the study. For example, children in the 9 year-old cohort are 11 years of age at the wave 3, while the respondents in the 11 year-old cohort are 11 years of age at wave 1. The present trajectory models use a cohort sequential specification in Mplus in order to combine data from the respondents across the five cohorts who had answered the youth questionnaire in a way that approximates a longitudinal study which follows respondents from 10 to 19 years of age (Duncan et al., 2007).

Cross-lagged panel models

While the LGC models and the GM models examine the between and within individual change in the trajectories of concealment, and allow such changes to be conditioned on other factors, such models stop short of estimating reciprocal effects between the covariates of interest. However, as shown in Chapter 2, parent-child interactions are reciprocal, where parents and children mutually influence one-another. To identify reciprocal effects between child secrecy, parenting practices, adolescent self-control, and delinquent behavior, and to account for errors in

the variables across time and between endogenous variables of interest, I estimate four five-wave cross-lagged panel models using the first five waves of the DYS. To examine whether the relations between the variables differ by age, I split the sample by age. The two "younger subsample" models are estimated on data from the two youngest cohorts in the DYS—respondents who were 7 and 9 years old at the time of the first wave. One of these models examines theft as the problem behavior while the other focuses on substance use. The two "older subsample" models are estimated using data from the three older DYS cohorts—respondents who were 11, 13, and 15 years old at the first wave. The two older sample models serve as counterparts to the two younger sample models— with each set of older-younger models being specified in exactly the same manner. Therefore, like for the younger models, one older sample model includes theft and the other—substance use. By splitting the sample in this manner, the choice of which age to use as a cut-point is a subjective decision, and one that may have consequences for the comparison of the two samples. There are 5 cohorts in the DYS, and the decision about where to assign the middle cohort were largely driven by two considerations. First, since evaluating the relation between concealment and self-control is an important part of this analysis, it was important to distinguish between respondents who were 10 and younger, since 10 is the age at which self-control becomes a stable trait. Second, the youngest cohorts were, for the first 3 waves, administered the "child" questionnaire. While the measures in the child questionnaire closely follow those of the youth questionnaire, there are a few differences between the way the questions were asked (see the measures section for greater detail). To explicitly compare those cohorts that received the child questionnaire to those how had not, and to best pinpoint any questionnaire–specific differences that may be obscured by combining the two cohorts that received the child questionnaire with one that did not, the decision was made to

split the sample with the 7 and 9 year-old cohorts in one subsample, and the 11, 13, and 15 year olds in another subsample.

Cross-lagged panel models help identify the causal direction of relations between variables over time by estimating reciprocal effects between variables. Comparison of models for younger and older respondents allows me to see how the interrelationships between the variables of interest—especially as they relate to concealment—differ between the older and younger samples.

In the present analysis, I model endogenous variables at each wave with a lagged t – 1 autoregressive term as well as with cross-lagged t – 1 explanatory variables. Additionally, consistent with other specifications of control variables in cross-lagged panel models, all control variables are assessed at time 1 (i.e., wave 1), allowed to covary with substantive variables at time 1 and directly predict substantive variables at each subsequent time point (i.e., waves 2 through 5) (Matsueda and Anderson, 1998). The autoregressive coefficients represent stability of individual differences for a given variable measurement from *t* to *t* + 1. The cross-lagged effects—the effect of a *t* – 1 explanatory variable on other endogenous variables measured at *t* represent individual differences in standings between the variables. If an individual's relative value on the prior variable is associated with their relative values on the current variable, then a significant cross-lagged relationship will be observed (Selig and Little, 2012). In other words, the cross-lagged relations explain the residual variance in a variable that is left after accounting for its autoregressive path. The errors among all endogenous variables within each wave are allowed to covary, while the errors for each variable are allowed to covary across time (i.e., autocorrelation of the error terms $\rho_{t, t-1}$). Given the large number of covariates, all parameters are constrained to be equal across the four waves in order to obtain stable and precise estimates of

the model parameters (see Matsueda and Anderson, 1998). All analyses were conducted in Mplus 7 (Muthen and Muthen 1998-2015). Maximum likelihood estimation with robust standard errors (MLR) was used to estimate each cross-lagged panel model. For both sets of models, a full information maximum likelihood (FIML) estimation approach to missing data was used.

Notably the "time" variable means different things in the trajectory models and the cross-lagged panel models. For the trajectory models, the time unit measure is "years of age". This means that the data are arranged such that all individuals observed at time one are 10 years old, all individuals observed at time two are 11 years old, and so on, regardless of what wave (calendar year) they were surveyed as being 10, 11, etc. For the cross lagged panel models, the time unit measures are "waves"—calendar years. So all individuals observed at time 1 are those who responded to survey questions at wave 1 (1988), those individuals who were observed at time 2 were those who responded to survey questions at wave 2 (1989), and so forth, regardless of how old they were at each wave of the survey. Figure 4.1 illustrates these differences in the relationship between age and time yielded by each data structure. The cross-lagged panels have individuals 7-16 years of age at wave 1 (time 1), 8-17 years of age at wave 2 (time 2), 8-19 years of age at wave 3 (time 3), 9-19 years of age at wave 4 (time 4), and 10-19 years of age at wave 5 (time 5). The trajectory models contain 307 individuals who are 10 years old at time 1, and are one year older at each additional time point, with, for example, 207 being 19 years old at time 10 (see column 7).

Table 4.1. Age distribution differences between cross-lagged models (waves 1-5) and trajectory models.

Age	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Age/Time
7	278					
8	69	268	3			

9	238	50	253	1		
10	70	245	59	273		307
11	234	41	233	41	280	837
12	71	225	61	249	40	530
13	227	56	232	45	239	781
14	76	241	57	237	46	506
15	215	45	234	44	236	713
16	53	208	52	238	44	458
17		28	190	45	239	458
18			41	198	37	207
19			1	38	204	207
Total	1531	1407	1416	1409	1365	5004

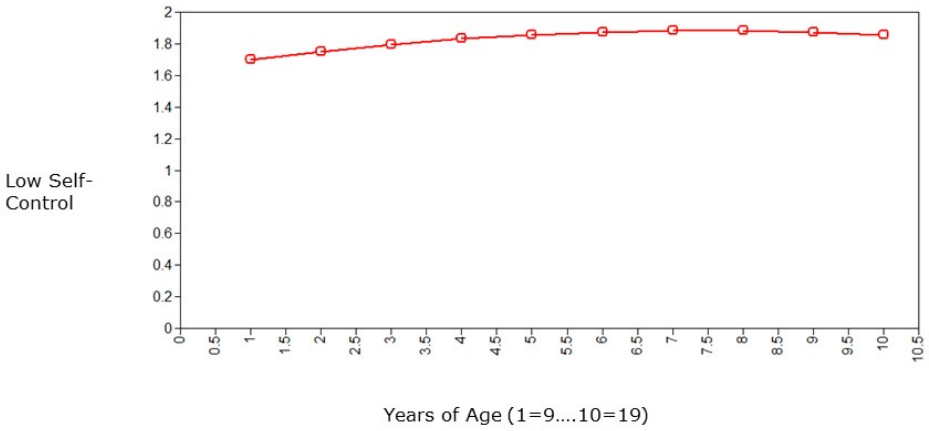
Another difference in trajectory models, is that they use data from the youth survey only, and thus do not have information on respondents who were less than 10 years old at the time of the survey administration. Some 10 year-olds were also excluded from the trajectory analysis because of inconsistencies in administration of youth, rather than child, surveys.

RESULTS

Are trajectories of self-control and concealment related?

Evidence from Growth Curve Models. I first present findings from growth curve models. In keeping with the literature on trajectories of self-control, I model self-control with a quadratic growth function (Gottfreson and Hirschi 1990; Hay and Forrest, 2006; Burt et al., 2014. The results for the LCG models of self-control are summarized in Table 4.2. I find a significant quadratic term, as well as slope, indicating that between the ages 10 and 19 self-control decreases at a decreasing rate (See Figure 4.1, below).

Figure 4.1. Estimated Growth Curve Model of Low Self-control



These results are contrary Gottfredson and Hirschi's (1990) stipulations that self-control is stable throughout adolescence.[23] However, in keeping with recent findings on the variation in individual trajectories, I observe statistically significant variation around the intercept and the slope of growth of self-control (Burt et al., 2014). This suggests that, by age 10, individuals vary in their levels of self-control and also exhibit different patterns of developing self-control from

[23] While the change in slope of self-control is statistically significant, the effect is substantively small, making it difficult to interpret these results as evidence for or against the stability of self-control. Gottfredson and Hirschi (1990) assert that self-control should be largely stable after 10 years of age: While some changes are possible, they will be in the direction of increasing self-control, because "de-socialization is rare" (p. 107). Furthermore, they dismiss any slight changes in the direction of decreasing self-control as misidentification and measurement error (Gottfredson and Hirschi, 1990, p. 108; See also Gottfredson, 2008). In other words, Gottfredson and Hirschi would interpret the present results as inconsequential and not a challenge to the stability property of low self-control. However, other empirical studies have scrutinized the stability proposition, reaching conclusions different from Gottfreson and Hirschi. These studies find moderate correlations (varying from .33 to .68) between measures of self-control through time (age), as well as significant and non-trivial changes in individual levels of self-control, including decreasing trends in self-control for some subgroups and dimensions of self-control as adolescents grow older (Turner and Piquero, 2002; Hay and Forrest, 2006; Burt et al., 2006; Burt et al, 2014). Because GTC does not include a theoretical explanation of decreasing self-control during adolescence, scholars have turned to other theories in order explain the findings that a minority of individuals do experience reductions in self-control. These include situational factors such as economic hardship, changes to informal social control, a "resource" based view of self-control, and normative age-graded increases in sensation-seeking (Hay and Forrest, 2006; Baumeister et al., 1998; Burt et al., 2006; Burt et al, 2014). In light of this work, I interpret the direction of present effects as inconsistent with GTC and perhaps suggestive of any of the alternate processes mentioned above. However, because the effect is small and my measures of self-control are imperfect, it is therefore possible that the observed decreases in self-control do not accurately reflect its true trend with age.

10 to 19 years of age. Finally, the covariance between the intercept and slope of low self-control is negative: those who have higher self-control at wave 1 tend to experience less decline in self-control over time than those who report lower self-control at wave 1.

Table 4.2. Low Self-Control Age 10-19; Quadratic Form Function (N=1290)

	Model 1 (no cov)		Model 2 (ti cov)	
	Estimate	SE	Estimate	SE
Intercept	1.699***	0.016	1.788***	0.025
Linear Slope	0.057***	0.007	0.028*	0.012
Quadratic Slope	-0.004***	0.001	-0.001	0.001
Variance Intercept	0.076***	0.008	0.071***	0.008
Variance Slope	0.002***	0	0.002***	0
Variance Quadratic Slope	0	0	0	0
Covariance Intercept and Slope	-0.006***	0.002	-0.006**	0.002
Effects on Intercept:				
Gender (Female=1)			-0.119***	0.031
Both Parents (Yes=1)			-0.075*	0.031
Effects on Linear Slope:				
Gender			0.049**	0.014
Biological Parents			0.01	0.015
Effects on Quadratic Slope:				
Gender			-0.006***	0.002
Biological Parents			-0.002	0.002
RMSEA	0.025		0.022	
$\chi 2$	53.178** (df=29)		1185.005*** (df=45)	

**** p < .001, ** p < .01, * p < .05*

To partially account for the role of social context, Model 2 in Table 4.2 introduces into the model two covariates—gender and whether the respondent reported living with both parents at the start of the survey. While these variables don't comprise the full range of possible correlates of low self-control (additional contextual variables are considered in the cross-lagged panel models), they represent elements important to family processes in general, and the development of self-control in particular (Gottfredson and Hirschi, 1990, Burt et. al., 2014). Echoing prior research,

present models show that being female and living with both parents are both associated with significantly higher initial levels of self-control. However, being female is related to mean within individual change in self-control. Females have, on average, a greater linear growth term, than do males, but a significantly more negative quadratic term than do males. For the models of information management, summarized in Table 4.3, the quadratic growth model was not a significant improvement over the linear model, which offered the best fit to the data. Thus, the results of the LCG models for disclosure, summarized in Table 4.3, show the results for the linear model. In contrast to self-control, the linear growth curve model of disclosure without covariates (Model) does not offer evidence that lying and secret-keeping, on average, increase over time. However, I do observe statistically significant variation around the intercept and slope of disclosure, suggesting that disclosure varies between and within individuals (although not systematically) as they grow older—and that some individuals do experience changes in disclosure.

Table 4.3. Disclosure age 10-19; Linear Growth Function.

	Model 1 (no cov)		Model 2 (ti cov)	
	Estimate	SE	Estimate	SE
Intercept	3.408***	0.021	3.433***	0.034
Linear Slope	0.001	0.004	-0.017**	0.006
Variance Intercept	0.203***	0.023	0.200***	0.023
Variance Slope	0.005***	0.001	0.004***	0.001
Covariance Intercept and Slope	-0.023***	0.004	-0.021***	0.004
Effects on Intercept:				
Gender			-0.022	0.041
Biological Parents			-0.035	0.042
Effects on Linear Slope:				
Gender			0.028***	0.008
Biological Parents			0.012	0.008
RMSEA	0.043		0.034	
$\chi 2$	929.629*** (df=25)		974.935***(df= 45)	

**** p < .001, ** p < .01, * p < .05*

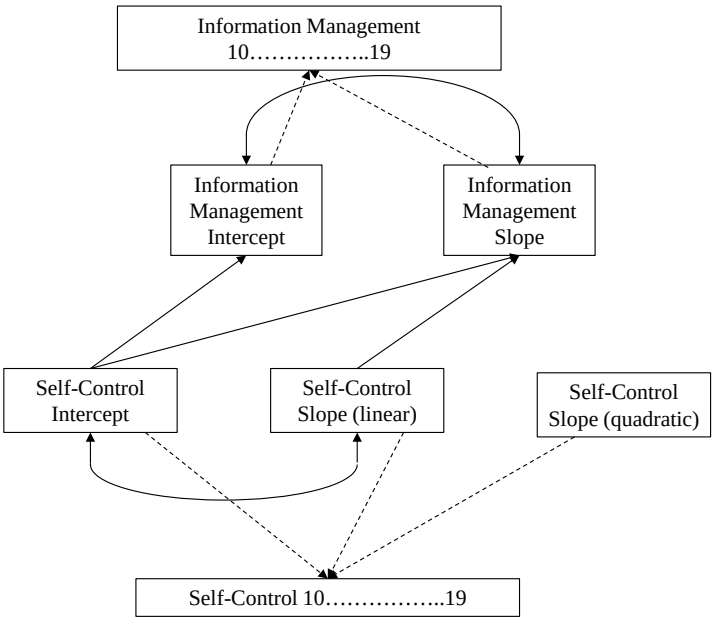
Model 4 estimates the intercept and slope of information management as a function of two covariates—gender and living with both biological parents. In this model, both a significant slope and a significant intercept are estimated, indicating a decrease in disclosure across age. Those respondents identifying as female experienced a significantly less steep drop off in disclosure with age, but gender did not predict differences in initial levels of information management. In other words, males stop disclosing at a faster rate than females—possibly due to more enduring expectations of cooperation and sharing for girls, a greater effort at independence by boys, or emerging differences in behavior that require concealment.[24] Family structure did not have a significant effect on either the initial levels or mean within individual changes in how children manage information.

[24]I discuss age graded differences in both child behavior and parental treatment of children in greater detail on page 42.

In sum, information management and low self-control have different patterns of evolution with age, but gender significantly affects change in both processes.

Evidence from parallel processes model. While discrete models of self-control and disclosure indicate different developmental trajectories, modeling both processes within one model can tell us more about whether trajectories of self-control and information management operate in tandem in the transition to adulthood, and if self-control may influence information management. Figure 4.2 depicts the parallel process model. The intercepts and slopes of self-control and information management are modeled as latent factors which generate the observed measures of self-control and information management at each time point. The intercept of self-control predicts both the initial levels and change in information management, while the slope of self-control impacts only the slope of information management.

Figure 4.2. Parallel Processes Model.



Model 5 in Table 4.4 summarizes the results of the model depicted Figure 4.2. Here, self-control, modeled as a quadratic growth curve, impacts concealment which is modeled as a linear growth curve. The results suggest that, if the direction effects is specified according to the GTC (Gottfredson and Hirschi, 1990), self-control appears to significantly impact information management through time: Individuals with lower self-control at age 10 will be less honest and forthcoming with their parents at that age, and will also experience fewer gains in disclosure as they age. Similarly, individuals who have steeper decreases in self-control exhibit greater increases in lying and withholding of information as they go through adolescence. The parallel process models offers a reasonable fit to the data. Fit statistics for the model without time-invariant covariates is χ= 215.046 (p-value < 0.001 with 106 degrees of freedom) and the RMSEA is 0.028 (0.021- 0.032).

Table 4.4. Parallel Process Model of Low Self-Control Predicting Disclosure; Age 10-19

	Model 5 (no cov)		Model 6 (gender)		Model 7 (corr)	
	Estimate	SE	Estimate	SE	Estimate	SE
Disclosure						
Intercept Mean	4.031***	0.15	4.033***	0.158	3.421***	0.024
Intercept Variance	0.14***	0.015	0.14***	0.015	0.153***	0.016
Linear Slope Mean	0.127**	0.037	0.102**	0.038	-0.015**	0.005
Linear Slope Variance	0.004***	0.001	0.004***	0.001	0.004***	0.001
Covariance Intercept and Slope	-0.015***	0.003	-0.015***	0.003	-0.016***	0.003
Low Self-Control						
Intercept Mean	1.702***	0.016	1.756***	0.021	1.756***	0.021
Linear Slope Mean	0.055***	0.007	0.032**	0.01	0.032**	0.01
Quadratic Slope Mean	-0.004***	0.001	-0.001	0.001	-0.001	0.001
Intercept Variance	0.076***	0.008	0.073***	0.008	0.073***	0.013
Slope Variance	0.002***	0.00	0.002***	0	0.002	0.004
Quadratic Slope Variance					0	0
Covariance Intercept and Slope	-0.007***	0.002	-0.006***	0.002	-0.006***	0.002
Predicting Disclosure Intercept						
Low Self-Control Intercept	-0.360***	0.087	-0.349***	0.089		
Gender			-0.044	0.036	-0.005	0.034
Predicting Disclosure Slope						
Low Self-Control Intercept	-0.059**	0.021	-0.059**	0.021		
Low Self-Control Slope	-0.486***	0.11	-0.426***	0.117		
Gender			0.043***	0.011	0.029***	0.008
Predicting Low Self-Control Intercept						
Gender			-0.114***	0.031	-0.113***	0.031
Predicting Low Self-Control Slope						
Gender			0.047**	0.014	0.047**	0.014
Predicting Quadratic Slope						
Gender			-0.006***	0.002	-0.006***	0.002
Correlation Disclsoure Intercept with Self-Control Intercept					-0.034***	0.008
Correlation Disclsoure Slope with Self-Control Slope					-0.001**	0.00
Correlation Self-control Intercept with Disclsoure Slope					0	0.002
Correlation Disclosure Intercept with Self-control Slope					-0.006**	0.002
RMSEA	0.028		0.027		0.026	
$\chi 2$	215.046***(df=106)		231.012***(df=121)		226.084*** (df=120)	

**** p < .001, ** p < .01, * p < .05*

Next I estimate a parallel process model (Table 4.4, model 6) with gender as a time-invariant covariate predicting both low self-control and disclosure. In terms of the RMSEA goodness of fit

statistic (RMSEA= 0.027, 90% CI=0.021=0.032), this model offers a similar fit to the data than the model without gender. Similar to model 4 in Table 4.3, female respondents do not differ from male respondents in how honest and forthcoming they are with their parents at age 10 but do report greater increases in disclosure than males as they get older. Including gender in the model does not alter the relation between self-control and disclosure: youths with low self-control at age 10 are both more willing to conceal information from their parents at that age and also increasingly conceal information as they get older. Increases in impulsivity and low self-control over time are also related to increased concealment—approval of lying to parents and increased incidences of withholding information from them.

Finally, because the temporal order necessary for establishing causal effects of self-control on disclosure is missing from the parallel process model (these processes are modeled as simultaneous), I estimate correlations among the intercepts and slopes of disclosure and self-control (Model 7, Table 4.4). Instead of imposing the causal structure consistent with GTC, this model better reflects the simultaneity of the parallel process model. This model reveals that both the slopes and the intercepts of low self-control and disclosure are negatively significantly correlated: The standardized betas are -0.326*** for the association between intercepts, and -0.379** for the association between slopes, respectively. In other words, kids who have low self-control are less likely to be honest and forthcoming with private information. Moreover, those children for whom self-control increases over the age range considered here, will also become more honest as they grow older. These models corroborate the findings from Model 5 and Model 6, with one key caveat: When no causal structure is imposed on associations between self-control and disclosure, the intercept of disclosure significantly predicts slopes of low self-control, while the initial levels of low self-control are not significantly associated with within-individual

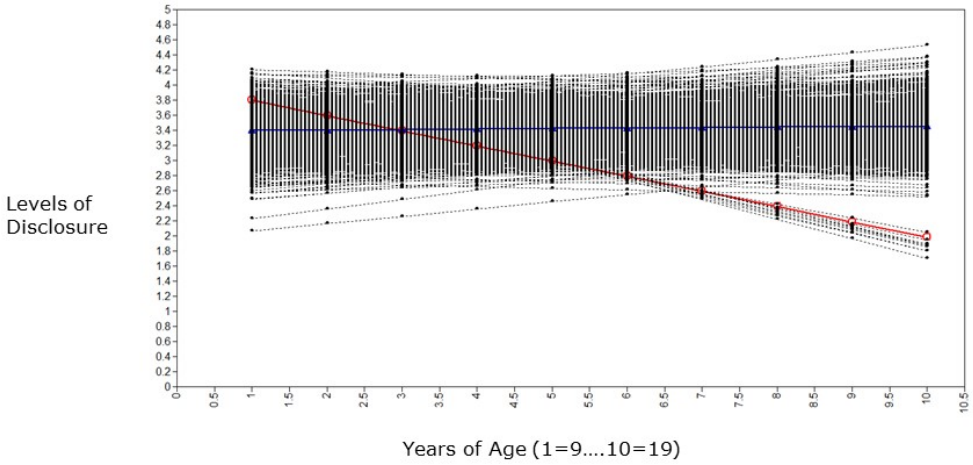
changes in disclosure. This direction of effects is the opposite of what we would expect given the GTC conceptualizations of both self-control and lying.

In sum, while the two constructs have different functional forms, low self-control is associated with more concealing behavior and attitudes in adolescence. However, it is unclear if the direction of the association is consistent with the GTC framework. Despite girls reporting higher self-control over time while also reporting greater increases in willingness to honestly share information with parents, gender does not account for the relation between low self-control and information management in adolescence.

Are there different classes of liars?

The extant literature on lying suggests that there may be systematic and substantive differences between the majority of individuals who lie rarely and those who lie often—chronic liars. Models 3-7 reveal that there is significant variation in how individuals evolve their information management practices over time. To investigate whether the DYS offers evidence of a class of chronic liars and withholders of information, I estimate a two class model of information management. In this model, like in models 3-7, information management is specified with both an intercept and slope. Figure 4.3 diagrams a two class model.

Figure 4.3: Two-class model (estimated means and estimated individual values of disclosure over time).



I expect that any trajectory that describes a "chronic liar/concealer" group to be below the other class of individuals in disclosure throughout the observed time period—in other words, their trajectories should not intersect. However, the two class solution estimates a class of individuals who are fairly stable in their lying behavior, and a minority (N=9) class of individuals who have relatively high levels of disclosure at age 10 but who begin concealing information at a greater rate than their peers as they get older, eventually becoming the "low disclosing" class. In terms of fit statistics, BIC (BIC=7436.931for the one-class model and BIC=7471.127 for the two-class model) indicate that a single class model is a better fit to the data than the two-class model shown here. My results, therefore, offer no support for a distinct sub-population of children who consistently lie and withhold information at greater levels than others—either the GTC or the chronic liar narratives, but may be consistent with the strategic information management narrative which is agnostic with regard to the number of latent classes. Additionally, despite the lack of fit of the two class model, it may offer some explanation of the puzzling finding in developmental literature that younger children who lie more tend to be better

adjusted than peers, while adolescent who lie more tend to be worse off than their peers (Talwar and Crossman, 2011): The present models indicate that this could be explained by different classes of individual who experience intersecting trajectories of information management over time: those who lie more in childhood are, indeed, not the same individuals who lie more in adolescence.

Does the context in which information management occurs differ by age?

The trajectory models shown here suggest that as they get older, most children experience only very modest increases in secrecy and lying to parents. The final part of this analysis examines whether, although individual levels of information management are similar across adolescence, there might be substantive changes in conditions that facilitate disclosure or concealment. In other words, I want to see if the particular sources or effects of information management change as children get older. I explore such potential age-graded changes with cross-lagged panel models that compare the relations between parenting and child behavior in younger and older subsamples of the DYS youth.

I compare the interrelations among the key variables—information management, parenting, self-control, gender, and delinquency—with four cross-lagged panel models. The first two models, summarized in Table 4.5, include theft and are estimated on the youngest and oldest subset of the samples, respectively. The second pair of contextual models, summarized in Table 4.6, feature substance use rather than theft and also compare model results between the youngest and oldest subsets of respondents. The youngest subsample consists of the two younger DYS cohorts, who were 7 years of age and 9 years of age at the first wave of the survey; The oldest subsample consists of the three older DYS cohorts who were 11, 13, and 15 years old at the first wave of the survey. All four models exhibit a reasonable fit to the data (RMSEA for youth/drug

model = 0.046; RMSEA for child/drug model = 0.054; RMSEA for youth/theft model 0.051; RMSEA for child/theft model = 0.051). Please see Tables 4.5 and 4.6 for the fit statistics and the complete set of parameter estimates for the four models.

Table 4.5 Results for the Cross Lagged Panel Model with Theft (Standardized Coefficients).

Theft, 2 youngest cohorts	Estimate (S.E)	Theft, 3 oldest cohorts	Estimate (S.E)
Parental Knowledge t on		**Parental Knowledge t on**	
Parental Knowledge t-1	0.274 (0.057)	Parental Knowledge t-1	0.387 (0.053 ***)
Parental Monitoring t-1	0.108 (0.022***)	Parental Monitoring t-1	0.080 (0.022***)
Parental Control t-1	-0.013 (0.021)	Parental Control t-1	0.040 (0.020*)
Child Disclosure t-1	0.065 (0.020**)	Child Disclosure t-1	0.064 (0.019**)
Theft t-1	-0.120 (0.067)	Theft t-1	-0.007 (0.042)
Gender t-1	0.013 (0.036)	Gender t-1	0.171 (0.033***)
Low Self-Control t-1	0.014 (0.018)	Low Self-Control t-1	-0.011 (0.018)
Parental Monitoring t on		**Parental Monitoring t on**	
Parental Knowledge t-1	0.066 (0.022**)	Parental Knowledge t-1	0.010 (0.017)
Parental Monitoring t-1	0.414 (0.048***)	Parental Monitoring t-1	0.663 (0.029)
Parental Control t-1	0.004 (0.019)	Parental Control t-1	0.034 (0.016*)
Child Disclosure t-1	0.092 (0.021***)	Child Disclosure t-1	0.005 (0.018)
Theft t-1	-0.086 (0.064)	Theft t-1	-0.018 (0.043)
Gender t-1	0.009 (0.035)	Gender t-1	0.027 (0.026)
Low Self-Control t-1	-0.018 (0.018)	Low Self-Control t-1	-0.027 (0.014*)
Parental Control t on		**Parental Control t on**	
Parental Knowledge t-1	0.012 (0.027)	Parental Knowledge t-1	0.042 (0.017*)
Parental Monitoring t-1	0.056 (0.023*)	Parental Monitoring t-1	0.064 (0.017***)
Parental Control t-1	-0.004 (0.094)	Parental Control t-1	0.504 (0.041***)
Child Disclosure t-1	0.017 (0.020)	Child Disclosure t-1	-0.002 (0.017)
Theft t-1	-0.016 (0.066)	Theft t-1	-0.085 (0.036*)
Gender t-1	0.032 (0.052)	Gender t-1	0.070 (0.033*)
Low Self-Control t-1	-0.017 (0.020)	Low Self-Control t-1	-0.017 (0.017)
Child Disclosure t on		**Child Disclosure t on**	
Parental Knowledge t-1	0.081 (0.020***)	Parental Knowledge t-1	0.011 (0.018)
Parental Monitoring t-1	0.082 (0.022***)	Parental Monitoring t-1	0.078 (0.018***)
Parental Control t-1	-0.013 (0.020)	Parental Control t-1	-0.001 (0.015)
Child Disclosure t-1	0.355 (0.046***)	Child Disclosure t-1	0.506 (0.038***)
Theft t-1	-0.081 (0.058)	Theft t-1	-0.036 (0.041)
Gender t-1	0.046 (0.036)	Gender t-1	0.162 (0.029***)
Low Self-Control t-1	-0.066 (0.018***)	Low Self-Control t-1	-0.083 (0.016***)
Theft t on		**Theft t on**	
Parental Knowledge t-1	0.007 (0.007)	Parental Knowledge t-1	-0.007 (0.008)

Parental Monitoring t-1	-0.009 (0.007)	Parental Monitoring t-1	0.008 (0.009)
Parental Control t-1	-0.001 (0.006)	Parental Control t-1	-0.007 (0.008)
Child Disclosure t-1	-0.012 (0.006)	Child Disclosure t-1	-0.022 (0.009*)
Theft t-1	0.182 (0.059**)	Theft t-1	0.193 (0.071**)
Gender t-1	-0.013 (0.012)	Gender t-1	-0.091 (0.016***)
Low Self-Control t-1	0.011 (0.006)	Low Self-Control t-1	0.034 (0.008***)
Low Self-Control t		**Low Self-Control t**	
Low Self-Control t-1	0.436 (0.040***)	Low Self-Control t-1	0.633 (0.032***)
RMSEA	0.051	RMSEA	0.051
$\chi 2$	925.302 (df=357)	$\chi 2$	1144.045 (df=357)
N	621	N	853

**** p < .001, ** p < .01, * p < .05*

A major difference between the models for younger and older samples (also referred to as children and youth for ease of comparison) is that—for youth, but not children—both respondent behavior, and parental discipline are structured by gender. In other words, as children get older, gender becomes more salient in parent-child interactions. In both the theft and the substance use models, older girls engage in significantly less problem behavior and disclose more information to their parents. Parents of youth, in turn, know more about girls, and are more likely to enforce curfew for girls than for boys. Notably, since girls tend to be more forthcoming and engage in fewer problem behaviors, the increase in parental control of girls cannot be explained by a response to greater delinquency. Rather, this change in parenting may signal a post-pubescent shift in gendered perceptions of adolescents. That parents treat adolescent boys and girls differently is a robust finding in research on parenting and the family (Tucker et al., 2003; Raley and Bianchi, 2006). However, there is a striking gap in the research on how gendered behavior evolves as children transition to adolescence, as many studies are cross-sectional in nature (Raley and Bianchi, 2006). The present findings address this gap, highlighting important age graded cleavages in gendered treatment: Parents start to treat boys and girls differently in adolescence,

and such differential treatment is intertwined with emerging differences in child behavior based on gender.

Another difference between child and youth models is that both parenting and child behavior appear to have greater stability from wave to wave in the older sample. This difference may represent a greater consistency in how parents and children interact with each other. On the other hand, it may be that there are age differences in how children and youths report on parent-child interactions.

Finally, low self-control increases delinquency in the older samples, but is unrelated to delinquency in the younger samples. This may be accounted for by the GTC stipulation that self-control is internalized in adolescence, rather than childhood, and therefore is more likely to be a direct source of problem behavior for adolescents, rather than children. Neither parenting nor information management predict delinquent behavior in the child samples.

Table 4.6. Results for the Cross Lagged Panel Model with Substance Use (Standardized Coefficients)

Substance Use, 2 youngest cohorts	Estimate (S.E)	Substance Use, 3 oldest cohorts	Estimate (S.E)
Parental Knowledge t on		**Parental Knowledge t on**	
Parental Knowledge t-1	0.283 (0.057***)	Parental Knowledge t-1	0.380 (0.053***)
Parental Monitoring t-1	0.108 (0.022***)	Parental Monitoring t-1	0.081 (0.022***)
Parental Control t-1	-0.013 (0.021)	Parental Control t-1	0.043 (0.020*)
Child Disclosure t-1	0.068 (0.019**)	Child Disclosure t-1	0.065 (0.019**)
Substance Use t-1	0.094 (0.062)	Substance Use t-1	-0.007 (0.020)
Gender t-1	0.015 (0.035)	Gender t-1	0.167 (0.033***)
Low Self-Control t-1	0.006 (0.018)	Low Self-Control t-1	-0.010 (0.019)
Parental Monitoring t on		**Parental Monitoring t on**	
Parental Knowledge t-1	0.067 (0.022**)	Parental Knowledge t-1	0.010 (0.017)
Parental Monitoring t-1	0.408 (0.050***)	Parental Monitoring t-1	0.660 (0.030***)
Parental Control t-1	0.001 (0.019)	Parental Control t-1	0.031 (0.016)
Child Disclosure t-1	0.093 (0.021***)	Child Disclosure t-1	0.006 (0.018)
Substance Use t-1	-0.028 (0.060)	Substance Use t-1	-0.019 (0.016)
Gender t-1	0.019 (0.035)	Gender t-1	0.029 (0.026)

Low Self-Control t-1	-0.017 (0.018)	Low Self-Control t-1	-0.025 (0.014)
Parental Control t on		**Parental Control t on**	
Parental Knowledge t-1	0.015 (0.026)	Parental Knowledge t-1	0.039 (0.016*)
Parental Monitoring t-1	0.053 (0.022*)	Parental Monitoring t-1	0.067 (0.016***)
Parental Control t-1	-0.015 (0.087)	Parental Control t-1	0.499 (0.039***)
Child Disclosure t-1	0.015 (0.020)	Child Disclosure t-1	-0.008 (0.017)
Substance Use t-1	-0.194 (0.072**)	Substance Use t-1	-0.128 (0.016***)
Gender t-1	0.034 (0.052)	Gender t-1	0.066 (0.032*)
Low Self-Control t-1	-0.014 (0.019)	Low Self-Control t-1	-0.001(0.016)
Child Disclosure t on		**Child Disclosure t on**	
Parental Knowledge t-1	0.081 (0.021***)	Parental Knowledge t-1	0.012 (0.018)
Parental Monitoring t-1	0.083 (0.023***)	Parental Monitoring t-1	0.076 (0.018***)
Parental Control t-1	-0.015 (0.020)	Parental Control t-1	0.002 (0.016)
Child Disclosure t-1	0.360 (0.048***)	Child Disclosure t-1	0.513 (0.038***)
Substance Use t-1	0.007 (0.062)	Substance Use t-1	0.017 (0.016)
Gender t-1	0.052 (0.036)	Gender t-1	0.163 (0.029***)
Low Self-Control t-1	-0.068 (0.018***)	Low Self-Control t-1	-0.088 (0.017***)
Substance Use t on		**Substance Use t on**	
Parental Knowledge t-1	0.004 (0.007)	Parental Knowledge t-1	-0.012 (0.018)
Parental Monitoring t-1	-0.002 (0.007)	Parental Monitoring t-1	0.008 (0.017)
Parental Control t-1	-0.002 (0.006)	Parental Control t-1	-0.011 (0.018)
Child Disclosure t-1	-0.006 (0.006)	Child Disclosure t-1	0.024 (0.016)
Substance Use t-1	0.379 (0.100***)	Substance Use t-1	0.695 (0.034***)
Gender t-1	0.007 (0.014)	Gender t-1	-0.098 (0.028**)
Low Self-Control t-1	0.010 (0.007)	Low Self-Control t-1	0.054 (0.016**)
Low Self-Control t		**Low Self-Control t**	
Low Self-Control t-1	0.437 (0.041***)	Low Self-Control t-1	0.633 (0.032)
RMSEA	0.054	RMSEA	0.046
χ^2	994.218 (df=357)	χ^2	1008.301 (df=357)
N	620	N	852

**** p < .001, ** p < .01, * p < .05*

For specific relations among the covariates, I first summarize the findings common to both models of theft and substance use. In all four models, disclosure is predicted both by self-control and by parenting. For children, both parental knowledge and parental solicitation increase disclosure, while for adolescents only parental solicitation increases disclosure. Disclosure, in turn, increases both parental solicitation and knowledge in the child sample, but only increases

parental knowledge in the youth sample. These findings suggest that child information management and parenting reinforce one-another to a greater extent for the younger respondents, but that the link between parenting and information management in adolescence is consistent with earlier findings (Stattin and Kerr, 2000; Fletcher et al., 2004). In all four models, parental warm solicitation increases parental knowledge, parental control and child disclosure. Parental knowledge increases parental solicitation for the younger sample and parental control for the older sample. Finally, parental control influences future parenting for older respondents: it exerts small but significant effects on solicitation (theft model only) and knowledge (both models). In sum, as predicted by prior work on parenting, parental control, solicitation, and knowledge form complementary, mutually reinforcing dimensions of parenting both for children and adolescents (Maccoby and Martin, 1983; Steinberg et al., 1994). In keeping with prior models (see Chapter 2), child information management is sourced from both low self-control and parenting, regardless of the age of the respondents.

Finally, for both models of theft (older sample only) and substance use (both younger and older samples) delinquent behavior significantly reduces future parental control. Additionally, in the theft model (older sample only), disclosure predicts decreased future theft. This is in keeping with prior research on adolescents which links concealing behavior to externalizing behavior problems (Gervais et al., 2000; Fletcher et al 2004;).

In sum, the cross-lagged panel models support much of the prior research on the relations between parenting, information management, low self-control and delinquency. Specifically, more affectionate and involved parenting is associated with more disclosure on the part of the children, while low self-control is associated with greater concealment (Fletcher et al., 2004).

The most striking difference between the child and youth samples is the structuring of both parent and child behaviors by gender in the older sample of respondents.

DISCUSSION

This chapter attempted to model child information management practices across late childhood and adolescence, vis-à-vis other variables that have been found to be important for children's overall social development in general, as well as the development of child information management in particular. Since Stattin and Kerr's seminal article (2000), we have learned much about information management in adolescents, and the way it relates to parent-child communication and child autonomy. However, the trajectories of between *and* within individual changes in lying and secretive behavior over the transition to adolescence have yet to be empirically examined (Stouthamer-Loeber and Loeber, 1985, come closest). In attempting to fill this gap, I focused on adolescent disclosure as it pertains to interactions between parents and children and used several modeling approaches—latent growth curve models, growth mixture models, and cross-lagged panel models comparing younger and older children—to tease out the effects of age on how children manage their private information in interactions with parents.

My models yielded several important findings with regards to information management. First, as children transitioned to adolescence, they experienced, on average, virtually no change in their levels of disclosure. Second, while there was significant variation in within-individual change in disclosure as children got older, my models offered no evidence for the existence of a class of chronic liars and secret keepers. Third, low self-control was associated with less disclosure at age 10, and with steeper declines in disclosure throughout adolescence. Finally, while gender did not account for initial differences in disclosure for younger kids, it affected the rate of change in disclosure as children get older, as well as differences in parenting and

delinquent behavior for older adolescents. Below, I discuss the significance of these findings; outline some shortcomings of the present research; and suggest directions for future scholarship on parent-child communication and the transition to adolescence.

The results of my LCG models revealed that, while in some models disclosing information from parents becomes slightly less frequent as children get older, that, on average, individuals experienced little change in their levels of disclosure over time. Between-individual variation in within-individual change, while significant, was substantively small. Adolescence brings about increased opportunities to lie, as well as experiences (such as increased delinquency, private time with friends, and transition to being sexually active) that make secrecy and lying more rewarding (Farrington, 1986; Schalet, 2011). Therefore, it is striking that individuals did not experience greater decreases in how forthcoming and honest they were with their parents. This may speak to either the relative stability of the way parents and children communicate, children's commitment to a certain code of conduct regardless of age-graded opportunity structures, or parental adjustments to ensure certain levels of disclosure throughout adolescence.

However, the cross-lagged panel models and the LCG models reveal one important change taking place during the transition to adolescence. As kids get older the relations between them and their parents take a gendered turn. For the LCG models, gender does not predict initial differences in disclosure at age 10, but structures changes in disclosure—with boys experiencing greater increases in secrecy and lying with age. The cross-lagged panel models tell a similar story, and offer clues as to why disclosure may be increasingly adopted by girls rather than boys. In the youth sub-sample, parents of girls were more likely to enforce curfew and knew more about their children's whereabouts and friends. In turn, respondents who identified as female

were significantly more likely to disclose information to their parents and favor honesty in their disclosure. None of these effects were evidenced in the child models. Through curfew enforcement, parents invest more in keeping girls where they can see them—possibly giving less opportunities for girls to engage in secret-worthy behavior privately, and thus reducing the need for concealment. Notably, such increases in parental surveillance and control cannot be explained by a response to problem behaviors, as younger girls and boys did not differ in levels of theft or substance use, and older girls reported *lower* problem behavior than older boys. The current study cannot speak to the motivation behind these age graded changes in controlling girls. However, given the extensive studies documenting parents socializing girls in ways that reproduce the existing hegemonic gender roles, similar mechanisms may be at work here (Hagan, Gillis, Simpson, 1987; McHale, Crowder and Whiteman, 2003)

While the gender differences—more parental control and knowledge of girls' lives, greater disclosure and less externalizing problem behaviors—are consistent with prior findings on gendered family relationships (e.g., Hagan, Gillis, Simpson, 1987; Smetana and Daddis, 2002; Tucker et al., 2003), the *emergence* of gender as defining parent-child interactions in adolescence is a new finding, due mainly to the paucity of longitudinal studies on parent-child interactions mixed gender samples (Raley and Bianchi, 2006; Talwar and Crossman, 2011). That parents and children both start to enact gender in adolescence may speak to the cultural significance of biological transitions to adulthood. Future research is needed to detail age-graded changes in how parents and children how parents and children understand and enact gender within the confines of their relationship.

The present chapter offers no evidence of a class of respondents who, between the ages of 10 and 19, are characterized by consistently higher levels of concealment. In other words, the DYS

sample does not appear to have a class of "chronic liars" who are systematically different in their levels and trajectories of information management. However, some individuals do lie and withhold more than others, and increased concealment is associated with future increases in problem behavior (theft). Existing explanations linking information management to problem behaviors have touched on internal mechanisms—low self-control (Gottfreson and Hirschi, 1990; Loeber and Stouthamer-Loeber 1985) and external mechanisms—environments that necessitate concealment as a primary way of interaction (Ostrov et al. 2008; Talwar and Crossman, 2011). The results of this analysis are consistent with both narratives. On the one hand, both the LCG and cross-lagged panel models show that low self-control predicts decreased disclosure both at age 10, and as individuals go through adolescence. On the other hand, children will increasingly adopt concealing behavior when living with parents who aren't warm and affectionate, seek out information about their child, or know much about the child's friends or activities, and these factors predict disclosure net of individual levels of self-control. Following similar findings in Chapter 2, I argue that the property of information management that allows it to be explained by both self-control and the environment is self-interest. This self-regarding property of secrecy and lying allows this behavior to be sourced from low self-control—which is a trait characterized in part by *excessive* self-regard, as well as situational factors affecting self-preservation and *strategic* self-regard—in other words, aspects of the environment that tip the behavioral calculus toward lying and secret keeping. In this way, concealment can be seen as agentic rational behavior, but one that may be increasingly practiced by those individuals who are more self-regarding than others (this can be interpreted as the "preferences" part of the rational choice frameworks) (Hechter and Kanazawa, 1997; Matsueda, 2013). Depending on the situation, information management can span the range from necessary self-preservation, to

calculating and predatory behavior similar to white collar crime (Benson and Moore, 1992; Vaughan, 1998). Vignette experiments where rewards to lying and concealment are varied, in combination with survey questions regarding the respondents' levels of self-control, would help shed further light on the relation between self-interest and strategy, and are a likely next step in my research program.

Two aspects of this study presented problems to be resolved by future research. First, the indicators comprising the honesty dimension of disclosure are attitudinal in nature. Although these measures facilitate a multi-dimensional assessment of concealment, future research on the subject should nonetheless include an expanded range of behavioral indicators of concealment, such as whether children are secretive or lie about specific activities. Second, in the cross-lagged panel models, the reliability of measures for the child sub-sample was considerably lower than the same measures in the youth sub-sample. This can signal either that these concepts—such as substance use, or parental control—to be less salient for the youngest respondents, or that younger children may be less reliable informants on these behaviors when targeted though a survey. While ruling out the latter is beyond the scope of this project, future work using information collected through both surveys and other means will be able to speak to the underlying cause of the observed sub-sample differences.

CONCLUSION

The way individuals disclose and conceal private information is a key determinant of information available to others, power structures, and self-regulation and autonomy. Specifically, the way children interact with their parents and the socialization processes that take place within the context of the family depend on how honest and forthcoming children are about their private lives (Stattin and Kerr 2000; Fletcher et al 2004; Smetana 2008; Frijns et al., 2010; Keijsers et

al., 2010; Rote and Smetana 2015). Our understanding of this important process, however, is incomplete without knowledge about how patterns of disclosure and concealment may shift with age, and whether factors motivating concealment differ across the life course. This study showed that how forthcoming and honest children are remains virtually unchanged with the transition from childhood to adolescence; that a distinct class of chronic liars is unlikely, given the data; that parenting and self-control explain the way both kids and teens disclose information to parents; and that as children get older, gender emerges as a key influence in how parents and teens interact. My hope is that these findings serve as a guide for future research on information management.

CHAPTER 5: NONE OF YOUR BUSINESS: THE PRINCIPAL-AGENT PROBLEM AND PARENT-CHILD NEGOTIATIONS OF SEX

INTRODUCTION

The onset of sexual activity is an important developmental milestone in most adolescents' lives. Interpretations of adolescent sex by both the lay and academic communities are wide ranging, running the gamut between risky and undesirable behavior to a normative rite of passage to both. At the heart of such classification issues is the understanding that sex and romantic relationships are an important arena for youths to assert their independence from parents. At the same time, teen sex can yield life altering consequences such as sexually transmitted infections (STI), pregnancy, and sexual violence—consequences that most teens are not prepared to assess and mitigate without the help of adults. Moreover, teen sex poses direct consequences not just to the teens themselves, but to their families as well. The negative externalities of teen sex can range from financial burdens borne by parents in the event of teen pregnancy (Schalet, 2011) to the normative, such as rejection of parental values or the emotional costs to self when undesirable things happen to close others (Horne, 2009). Moreover, the negative externalities of teen sex are not counter-weighed by the rewards of sex that teens may experience (such as peer pressure to have sex, physical pleasure derived from sex, exploring adult roles/relationships, etc.). Consequently, parents and teens commonly have opposing interests with regard to whether *and* how teens have sex: parents are more likely to want their adolescent children to abstain from sex than the children themselves, while children will vary in the degree to which they desire and want to engage in sexual activity.

Given this, parents face a common social dilemma. How do we get others, whose actions negatively affect us, to behave in accordance with our interests? Despite controlling much of

what their kids do, parents are at a considerable disadvantage when it comes to shaping the sexual behavior of their children. This is because parents lack information about what their children desire and how their children behave, which can ultimately help parents enforce compliance when available. This information is critically controlled by the children and can be exploited to maximize their own interests. More broadly speaking, attempts at controlling the behavior of others in a context of information asymmetries is generally referred to as the principal-agent (PA) problem (Kiser, 1999, Shapiro, 2005). The present chapter applies the PA model to negotiations surrounding sex between parents and children.

Recent qualitative work has shown significant cultural differences in the ways in which parents and children define as well as negotiate boundaries surrounding teen sex (Schalet, 2011; Villalobos, 2014). These differences in negotiation, in turn, yield different patterns and consequences of sexual behavior including pregnancy, STIs, self-esteem surrounding sex, and enjoyment of sex. However, these findings have not been evaluated by quantitative methods in representative samples. This chapter attempts to quantitatively reproduce the findings of qualitative work, as well as build on them by reframing the mechanism by which parents and teens compete to gain control over teen sex as the PA problem. I first summarize findings surrounding parent-child relationships especially as they pertain to dating and sex on the part of the teen. Then, I provide a brief overview of the PA problem, and apply it to the case of teen sex. I use data from the National Longitudinal Study of Adolescent to Adult Health to test a PA model of parent-child relationships. Finally, I discuss the relevance of my findings for future work on parenting and agency.

LITERATURE REVIEW

Families, Teen Sex, and Suboptimal Outcomes

Substantively, learning about the ways adolescents and their parents negotiate teen sex is important for several reasons. First, despite a cross-cultural consensus on minimizing risks associated with teen sex, there is substantial group variation in actual outcomes (Kirby, 2002). Some communities provide children and their families with resources in managing risks associated with sex, like birth control and school-based sexual education while others refrain from doing so entirely (Fields, 2008). Relatedly, populations differ in outcomes such as teen pregnancy, relationship violence, and STIs. Therefore, it is important to understand why some communities and families are better at managing risk than others. Second, while adult sexual behavior is largely considered private and controlled by the individual having sex, the sexual behavior of teens is more ambiguous—with both parents and children (and sometimes communities) vying for control (Rote and Smetana, 2016; Mann, 2013). Therefore, teen sex is an appropriate case for examining how individuals negotiate autonomy and agency.

How do parents, children, and social scientists conceptualize teen sex? In the past two decades, scholars have come to recognize that teen sexual exploration is an important developmental process which is not problematic in-an-of itself, but which can unfold in different, often healthy ways (Tolman and McClelland, 2011). Consequently, research has begun to examine variation in definitions and attitudes toward sex, not just on the part of the children, but on the part of the parents. Parents –especially those who hold more conservative or traditional values—tend to disapprove of teen sex (Moore, Peterson, & Furstenberg, 1986; Resnick et al., 1997; Fingerson, 2005). However, parental values with regard to premarital sex are becoming increasingly diverse, and adolescents tend to overestimate their parents' disapproval with regard to sex (Lucker, 1996; Jaccard, Dittus, & Gordon, 1998; although Fingerson (2005) finds evidence for teen underestimation of mothers' disapproval). Parents also differ with regard to

which aspects of their teen's sex lives they want to know about, with a minority reporting that they never want to know about whether their teen is sexually active or having safe sex (Smetana and Rote, 2015). Teens report more support for adolescent sex than parents, even though disapproval among teens may have increased since 1990 and varies according to gender, and race (Fingerson, 2005; Kreager and Staff, 2009; Risman and Schwartz, 2002). Behaviorally, teen sex is the norm rather than the exception, with nine out of ten adolescents transitioning to sex before they turn 20 (Risman and Schwartz, 2002).

Parent and child attitudes toward sex may be explained by the perceived risks and objective risks of sex, and contests over who has the right to control teens' sexual behavior, all of which vary by cultural-specific definitions of teen sex. Two qualitative studies by Amy Schalet (2011) and Myriam Villalobos (2014) find that cultural differences in the meaning of teen sex affect how communities and families govern teen sex. In her book, *Not Under My Roof*, Amy Schalet investigates how middle-class American families and middle-class Dutch families differ in their approaches to teen sex. American parents define teen sex as undesirable, possibly because they are very concerned with the risks of pregnancy: parents believe that the financial burden of pregnancy will have to be shouldered by the whole family. Furthermore, American parents tend to view sex as an uncontrollable urge for teens, and therefore lack confidence that teens will minimize risks associated with sex. Finally, American legal codes prohibit teen sex under certain conditions, giving formal support for informally disapproving attitudes. As a result, American parents in Schalet's sample condemn teen sex in general, are more likely believe in abstinence until marriage or financial independence, and are more reticent to talk to their children about sex or support teens getting birth control out of fear that such discussions may invite sexual promiscuity. Both the parents and children in the American sample depict

confrontations surrounding sex as dramatic and characterized by parental attempts at top-down control of sexual behavior. Teens are more likely to express discomfort in talking about sex with their parents, and to be secretive about sexual behavior. Consequently, American teens navigate sex on their own without parental support and often in direct opposition to parental wishes. American teens also have riskier sex—sex which is more likely to result in pregnancy or STIs: exactly the outcomes that American parents seek to prevent (Kirby, 2002; Schalet, 2011).

In contrast, Dutch parents define teen sex as a normative behavior and largely under the control of adolescents themselves. Although Dutch parents prefer to minimize risks associated with sex like their American counterparts, the ease of access to and normative support for both birth control and abortion—as well as low levels of STIs in the population—allay most of the fears expressed by American parents. Contrary to American parents, Dutch parents trust that their teens are capable of good decision-making when it comes to sex, and that they have access to resources—such as birth control and sex education—that help minimize risks associated with sex. Finally, Dutch parents often think of their children as equals in the common enterprise of mitigating sex risks, and therefore are more likely to allow the children freedom and autonomy to decide what works best for them, even at the risk of child behavior that runs counter to the parents' desires. Most Dutch parents approve of teen sleepovers (i.e., having their adolescent children and their children's significant other sleep in the same bed within the parents' home) with the understanding that sex may happen. Dutch parents are also more likely to initiate conversations about sex with their teen children, encourage children to share information and engage in equal-footing negotiations about proper sexual timing and practices. Schalet refers to this as a "control-though-connection," and contrasts this with the top-down approach to rule setting of the American parents. By being accepting and supportive of teen sex, Dutch parents

are able to more successfully negotiate parameters surrounding their children's behavior. Consequently, Dutch teens report greater honesty and less conflict when talking about and negotiation sex with their parents, as well as more satisfying, less gendered, and less risky sexual encounters. Therefore, Dutch parents are better at aligning their interests with their children's interests and behaviors. In sum, Schalet (2011) finds that for American samples, cultural definitions of teen sex decouple the interests of parents and children with regard to teen sex, and employ ineffective strategies of monitoring and sanctioning child behavior. Given these opposing interests and parental inflexibility, teens strategically manage information about their sexual behavior, and achieve outcomes that are sub-optimal from the parents' point of view.

Another set of qualitative studies focusing on the role of culture examine parent-child relationships and adolescent secrecy surrounding sex in a sample of Latino families (Villalobos, 2014; Villalobos et al., 2017). Villalobos and colleagues argue that norms of *familism* (putting family interests above the interests of any one individual) and *respeto* (expression of deference, subordination, and respect to parents and elders), coupled with prescriptions of abstinence before marriage (especially for girls), dictate the levels of secrecy surrounding adolescent sex (see also Diaz-Royo, 1975; Marín & Marín, 1991). Norms of familism and respeto also sometimes clash with teens' desire for autonomy. When it comes to parents' intolerance of dating and sex, adolescent Latina girls will choose to lie and conceal information about being sexually active to achieve both autonomy with regard to sex and also keep up the façade of obeying values that are important to their parents. In lieu of institutional supports such as those offered the Dutch teens (easy access to birth control and sexual education in school), such secrecy and resulting parental unawareness leaves Latina girls especially vulnerable to risks such as unwanted sex, pregnancy, and STI's. Here, again, cultural definitions of teen sex as undesirable under any circumstance

leads to riskier sex and the inability of parents to effectively realize their interest with regard to teen abstinence. And again, child secrecy and strategic management of information allows teens to engage in sex despite parental disapproval. In sum, the two qualitative studies underscore the importance of norms about sex in understanding power dynamics, alignment of interests, and patterns of communication between parents and children.

Despite the important dynamics suggested by Schalet's and Villalobos' research, their findings have yet to be examined in large-scale quantitative samples. Furthermore, I argue that the parent-child dynamics described by Schalet (2011) and Villalobos (2014) and colleagues (Villalobos et al. 2017) are consistent with a specific competitive pattern of social interaction characterized by an asymmetry of information, termed the principal-agent (PA) problem. I describe the PA approach below and argue that applying this concept to parent-child interactions is useful both as it extends applications of the PA model beyond what is commonly done, and as it re-organizes and re-frames the findings of the qualitative work on teen sex as a specific example of principles of social action.

The Principal-Agent Problem

As the PA problem has been thoroughly reviewed elsewhere (Kiser, 1999; Miller, 2005; Shapiro, 2005), I only briefly summarize it here before applying it to the case at hand. At its core, the PA problem specifies two actors. The first—the principal—usually has more power and authority, but needs to delegate that authority to the second actor—the agent—in return for some service that the agent can provide to the principal and that the principal cannot provide for themselves. The problem is that once authority and power are delegated, the agent—whose interests may differ from those of the principal with regard to the service rendered—has control

over, including more complete information about, their willingness and ability to render the service.

A classic example of the principal-agent problem is one of car insurance. Here, the insurance company is the principal and the driver being insured is the agent. It is in the insurance company's interests that the driver drives safely while insured. However, it is in the driver's best interest (here I am disregarding issues of personal safety for the sake of argument) to take more risks while insured. Because only the driver themselves have access to the complete information about their actions and driving decisions, the insurance agency cannot monitor, assess, and sanction the driver perfectly. As a result, it fails to maximize its profit.

As the above example illustrates, information asymmetry and strategic information management are central to the problem: the agent acts on their own interests by withholding and otherwise manipulating private information. The principal, as a counter-strategy, can attempt to ensure that the outcome of the service yields the greatest benefit to them in several ways: (a) through selection of motivated, honest and capable agents, (b) through monitoring the actions of agents, and (c) through aligning the interests of agents with their own by value transmission or employment of selective incentives.

Beyond this, other variables play a role in the extent to which the principal can resolve the problem. First, the nature of the contract between the principal and the agent can affect both compliance and the capacity to monitor and sanction; second, the degree to which the agent is dependent on the principal, or sees the principal's authority as legitimate, will affect compliance with the principal's interests; third, preferences for and assessment of risk on the part of the principal can affect whom they choose as an agent as well as how they monitor and sanction an agent's behavior. Finally, social structure in which principals and agents are embedded can affect

the prior three factors by affecting the relationship between principals and agents, specifying the preferences of both, and altering the principals monitoring capacity including the costs of surveillance.

Classically, the principal-agent paradigm has been used in studies of compliance with economic contracts and firm-level cooperation, or of compliance with state laws and regulations (Spence and Zeckhauser, 1971; Shapiro, 2005; Kiser and Schneider, 1994). In such studies, the interests, costs, and outcomes are financial and the relationships are usually contractual or legal in nature. Here, I take a different route in applying the model at the level of the family, and to the often normatively ambiguous subject of teen sex. In the following paragraphs I re-frame what is known about how parents and teens navigate and negotiate teen sexual behavior in terms of a PA model. This specification will allow me to derive a series of testable hypotheses with regard to parent-child interactions. The rest of the review is organized along the themes of the principal-agent model to demonstrate where and how the model may be applied to the case of teen sex.

The Social Setting and the Role of Context

A central goal in applying the principal-agent problem to a case that is sociologically rooted is to bring in real-world complexity to a model that has been criticized for being overly reductionist (Kiser, 1999; Schapiro, 2005). Parents and children are embedded in families, which are, in turn, embedded in various—often overlapping—social settings, such as schools, churches, and neighborhoods. These communities—through physical and social resources and rules of conduct—can help define parent and child understanding of their immediate environment (both the social and the physical), their preferences and goals, and their choices and behavior (Emirbayer and Mische, 1998). In short, social context matters. Following the work of Schalet (2011), Villalobos (2014), and many others (Anderson, 1999), I attempt to model the role of

culture and social structure in both how principals and agents define teen sex and, consequently, in specifying the interests and strategies of both the principals and the agents with regards to teen sex.

There are several ways in which the environment can inform a parent's and a child's definitions of teen sex—including what constitutes proper sexual behavior and the risks associated with sexual onset. First, religious adherence should define sex as inappropriate in extra-marital contexts. Given that very few teens are married (in fact, married teens—while interesting subjects in their own right—are excluded from the present analysis) we might expect religious individuals—both teens and parents—to be unsupportive of teen sex (Bearman and Brueckner, 2002). Additionally, religious adherence at the family level and membership in a community dominated by religious institutions should limit resources available for mitigation of risks associated with sex, such as birth control or access to abortion (Schalet, 2011). In this way, religiosity at the family or community level will make parents and teens more risk averse with respect to sex, even in the case when sex poses no moral costs. Embeddedness in schools that provide resources—condoms, birth control, etc.—for mitigating risks associated with sex should insulate children from any lack of resources at the community level and may decouple the attitudes of parents and children about sex. Finally, the extent that both parents and children are of similar religiosity, we would expect an alignment of preferences regarding the sexual behavior of teens. Therefore, family participation in a church or other religious community may align interests of parents and teens regarding teen sex.

Financial resources for mitigating the risks associated with sex should also play a role in how parents and children view sex (Schalet, 2011). We would expect parents who are more affluent to be less risk averse about the possibility of their child becoming pregnant, given that

they would be in a good financial position to support their teens in an event of pregnancy. Less affluent parents, embedded in communities that do not offer resources such as birth control or abortion access will be the least supportive of teen sex. However, it is possible that there is a deceleration of reversal of the trend for the most disadvantaged populations: Teens embedded in communities (schools or neighborhoods) where economic returns to abstinence and avoiding pregnancy are negligible may be less risk averse regarding teen sex (Anderson, 1999).

Norms associated with respecting parents, their interests, and the rights to parental authority over teen behavior (see Villalobos, 2014; Smetana and Rote 2015) will affect what behavior parents and children deem as under the control of parents. Drawing on the findings of Villalobos and colleagues (2017), I propose that parents who identify as Latino/a will exert greater control over child sexual behavior and be more disapproving of teen sex (especially for girls). Latina children, on the other hand, will be less likely to defy parents directly and will increasingly conceal non-compliant behavior in order to avoid directly challenging parents.

Parents as Principals

Because the relation between parental attitudes toward sex, communication about sex, and their teens' sexual practices has been well studied (Jaccard and Dittus, 1993; Meier, 2003; Buhi and Goodson 2007; Schalet, 2011; Villalobos, 2014;), we know a great deal about parents' interests shaping teen's sex lives. Broadly, parents in U.S. samples express their interest in controlling the onset and riskiness of their children's sex lives. Parents see sex as a matter of health and safety, and therefore are less likely to grant teens rights to privacy and control over sex as they would in other private matters, such as teen's spending of their own money (Rote and Smetana, 2016; Daddis and Smetana, 2011). Additionally, many parents attempt to enforce religious proscription of premarital sex while children are young enough to be in their care

(Bearman and Bruckner, 2001; Villalobos, 2014). In the United States, lack of state and normative support for access to abortion and birth-control for teens increase the risks of pregnancy and the financial externalities it imposes on families. Finally, U.S. parents do not believe that children are capable of assessing and mitigating these risks on their own (Schalet 2016). As a result, American parents expect rights to control sex until adolescents are financially and legally independent (Schalet, 2011). In short, parents are risk-averse principals who define teen sex as bearing significant direct costs to themselves (financially supporting grandchildren) as well as indirect costs through the potential impact on teens (STIs, "sinful" behavior, etc.) (Horne, 2009). Therefore, parents want their teens to mitigate these risks, largely by abstaining from sex.

Parents—treated as a single unit, are the focal principals considered here, and classic economic models center on a single principal and a single agent. In reality, children may be interacting with several principals—for example, parents with divergent opinions on sex—who may have disparate interests, and favor different contract and enforcement styles. Likewise, parents—like those in a multiple-child household— may be interacting with multiple agents (Hao et al., 2008). While accounting for this complexity is beyond the present chapter, I revisit this issue in the discussion and propose ways of testing it empirically.

What is the Service Being Provided?

Given the interests of parents, the service the kids can provide them is either abstaining from sex or engaging in various tactics of reducing the risks associated with sex. For the purposes of this study, my focus is on whether teens engage in or abstain from sex, given parental disapproval of sex. I hope to explore teen motivations for risk mitigation in the context of having sex in the future.

Flexible and Incomplete Contracts: Talking about the Birds and the Bees

Principal-agent relationships usually hinge on a contract—a mutually-agreed upon understanding of how the exchange will take place, including the conditions under which the agents will provide the service to the principal (Kiser, 1999; Shapiro, 2005). The contract is important. How the principal communicates their interests and expectations is what makes the agent aware of their role in service provision or compliance. While it's a bit uncommon to think about parent-child negotiations about sex as contractual, outlining whether and how both parties initially come to an understanding about sex will help specify the strategies that each may employ going forward, as part of this ongoing negotiation. Given that the parent has a preference with regard to teen sexual conduct, how do they communicate this to the child? Do they think they have the right and the ability to control child behavior? Is there bargaining that happens around the topic of sex?

Contracts can range in their levels of *completeness*—their ability to account for all aspects of the situation under which the service is provided—and *flexibility*—whether the contract can be renegotiated during the process of service provision. While, in theory, a complete contract is preferable to an incomplete contract, in reality almost all contracts contain some level of incompleteness (Tirole, 1999). While flexible contracts are less efficient than rigid contracts, due to the possibility of disagreement between parties during re-negotiation, under conditions of extensive communication between the principal and the agent (not necessarily with regard to the contract), flexible contracts outperform rigid contracts (Brandts, Ellman and Charness, 2016).

Given my case there are several possibilities for a contract. Because sex may be seen as a taboo subject for many parents, they may be reticent about engaging in discussions surrounding sex, and thus may not effectively or completely communicate their expectations to children.

Talking to their children about sex—or "having the sex talk"—is one way in which parents can communicate their expectations and attitudes about sex and negotiate a shared understanding. Such contracts may feature degrees of incompleteness and flexibility; for example an understanding between parents and children may be re-negotiated in light of a serious relationship (Schalet, 2011), and thus may be most efficient in situations where parents and children have positive and extensive communication in general (Brandts et al., 2016).There are other ways in which kids may become aware of parental wishes; for example, knowing that a parent subscribes to a religion that prohibits extramarital sex may effectively signal to the teen that their parents expect abstinence until marriage. However, such tacit understandings can be rife with issues of signaling—whether the child truly understands what the parent is trying to communicate—and may even lie outside of what can be defined as a contract. The most clearly communicated, complete, and inflexible iteration of parent-child agreements may be virginity pledges—where the child, sometimes very publically, promises to remain abstinent until marriage (Bearman and Bruckner, 2002). In sum, there are several possible ways in which parents can communicate and negotiate expectations surrounding sex.

The Problem of Enforcement

Once the contract has been communicated to children, what induces them to follow it? Recall that the problem facing parents is that they do not have complete information about a child's ability and willingness to abstain from sex. To gather evidence of compliance—and enforce it—principals can use different strategies (or a combination of strategies) including selection of agents, monitoring, the use of selective incentives, or value transmission. Because parents cannot choose kids based on their inclination for abstinence, the first strategy is not available to parents, so here I focus on the other three strategies.

Monitoring. Parents are able to monitor children directly or seek indirect ways of obtaining information about child behavior. Two types of indirect monitoring considered here are communicating with the child about the child's behavior, and communicating with the parents of the child's friends and significant others. Direct supervision and indirect supervision through communication with the child have been linked to greater knowledge about child behavior (Steinberg et al., 1994; Fletcher et al., 2004;). Likewise, getting information from parents of friends—termed *intergenerational closure*—has been associated with greater ability of parents to control child behavior (Sampson et al., 1999).

Selective incentives. Positive and affectionate discipline and relationships with children have been classically linked to pro-social child behavior and outcomes (Baumirind, 1967; Maccoby and Martin, 1983; Burt, Simmons and Simmons, 2006). In particular, supportive and communicative parents have adolescents who are older at the time of first sexual encounter and are more likely to engage in practices (like wearing a condom) that mitigate some of the risks associated with teen sex—and can be interpreted as increased compliance with parental interests (Meier, 2003; Whittaker and Miller, 2000). Conversely, negative sanctions within the context of parenting have been linked to suboptimal outcomes, including teen compliance with parental rules surrounding romantic relationships (Gershoff, 2002; Schalet, 2011). Given this evidence, I expect that rewards will be more effective than negative sanctions: parents who are warm and caring and practice calm discipline will be more effective at aligning teens' interests with their own relative to parents who use sanctions such as physical punishment, yelling, and the like.

Value transmission. Another way in which parents can discourage sex is by transmitting their values of disapproval of teen sex to their children. Value transmission represents the most effective alignment of interests since in this case to act against the interests of the principal, the

agent has to act against their own interests. There is evidence of some but incomplete value transmission with regards to teen sex (Meier 2003), as well as in other spheres of parental influence (Calarco, 2011). I expect that value transmission—shared attitudes about sex—will induce teens to behave consistent with parental wishes.

In sum, despite their desire for control over sex, parental ability to influence their kids' behavior and transmit their values with regard to the timing and riskiness of teen sex is by no means absolute. When that influence is detected, it seems to operate by aligning parent and child interests through close parent-child relationships, and rewarding disclosure of information through positive communication channels (Stattin and Kerr, 2000). On the other hand, the fact that teen's attitudes predict their behavior regardless of parental attitudes (Meier, 2003) suggests that teen sex is an arena where adolescents have significant autonomy, and parents face a problem of enforcing their interests.

However, the independent strategies employed by children to gain control over their sexual behavior are understudied. Information management may be one such strategy since sex and romantic relationships have potential to generate significant asymmetries of information between parents and children. Children may conceal the nature and extent of their romantic relationships which can dictate the way parents and teens discuss sex, and prevent parents from intervening in their children's sexual and romantic encounters (Stattin and Kerr, 2000).

Children as Agents

To model the strategies that teens use to enact their interests, we need to make assumptions about their interests. Fortunately, we can turn to the empirical literature to probe what teens want with regards to sex? Schalet (2011) claims that independent of culture, teens are

uniformly interested in having sex as part of their romantic relationships; an interest that increases as teens age. Other studies, however, find that teenagers interest in having sex differs depending on such factors as religiosity and perceptions of peer behavior (Bearman and Brueckner, 2002; Meier, 2003).

What about teens' perceptions of risk associated with sex and their preference for risks in general? Research suggests little to no differences in how teens aged 13 years or older (91% of the respondents sampled here are 13 years and older) and adults perceive the riskiness of a given behavior (Steinberg, 2004; Steinberg, 2008). However, teens' preferences for committing exciting and risky behavior (sensation seeking) is likely greater than adults in general, especially if the behavior in question is done in the presence of peers (Smith et al., 1985; Steinberg, 2004). Given this, I have two expectations. First, teens will participate in sex, and unprotected sex, despite perceiving it as risky behavior; a finding revealed by Schalet (2011). Second, as agents, children will be less compliant with principals, and act in a way that risks incurring sanctions to a greater extent than adult agents modeled in the economic literature. In other words, teens will take more risks with regards to parental sanctions and sexual behavior, but teens are able to assess and evaluate risk as well as adults.

Given that some teens will want to engage in sex, despite the wishes of their parents, what are a child's strategies of non-compliance? Consistent with the principles of the PA problem, I propose that teens who do not comply with parents' directives regarding sex, exploit the information asymmetry surrounding their sexual behavior, such that they lie more and withhold more information from parents who disapprove of sex. However, close and affectionate parent-child relationships, as well as positive and open communication about sex, will reduce the need for lying. Warm and affectionate parenting reduces lying by (a) aligning the interests of

teens with parents, or (b) by providing rewards (or reducing punishments) for disclosing information about sexual behavior—even for sexual behavior that violates parental wishes.

For the present analysis, I examine two aspects of non-compliance: having sex and lying about sex. First, I examine predictors of teen transition to sex—whether children engage in sex despite parental disapproval, and what predicts compliance and non-compliance, given parental disapproval of sex. Second, I focus on those teens that have transitioned to sex despite parental disapproval—the non-compliers—and the strategies they use to limit what parents know about their sexual behavior.

Toward a Wider Version of the Principal-Agent Problem: Legitimacy and Exchange

Several other variables can affect the resolution of the principal-agent problem. First, the exchange relationship between parents and children differ from most exchange relationships examined by PA research. Therefore, it's important to examine what this difference may mean for strategies used by both principals and agents. Like in classically modeled PA relationships, teens (the agents) are very dependent on their parents (the principals), and parents wield an enormous amount of power and ability to influence much of what their kids experience. However, parent-child relationships are more intimate, long-term, and usually characterized by a higher degree of affection and shared interests between the classic economic principal and agent(s).

In the case of teen sex, what parents want for their children may be more congruent with what their children want for themselves than in other manifestations of the PA problem. Likewise, sex is something that parents want their children to gain control over at some point, which means that parental enforcement of their interests declines as children age, even if

children are non-compliant (Collins, Laursen, Mortensen, Luebker, & Ferreira, 1997; Smetana et al., 2006). Second, because sex may be a taboo subject for some parents, and because there are no hard and fast rules about how, when, and whether to talk to kids about sex, parental expectations with regard to sex may remain unclear to adolescents. Therefore, it is important to examine how effective parents are in signaling their disapproval of sex as well as their assessment that sex is risky. In sum, I expect that communication deficiencies as well as the structure and affective quality of the exchange relationship between parents and children affects how parents and teens behave in this iteration of the PA problem.

Table 5.1 summarizes the concepts discussed above, and relates the specific features of the case considered here to the abstract concepts of the PA process.

Table 5.1. Summary of principal-agent components

Context	Principal	Agent	Service	Contract	Parental Strategy	Child Strategy
Religion	Parent	Teen	No sex	Sex talk	Value Transmission	Lying to parents
School			Safe sex	Tacit agreement	Autonomy and	
Income				Virginity Pledge	Affection	
Neighborhood					Legitimacy	
					Monitor/ Sanction	

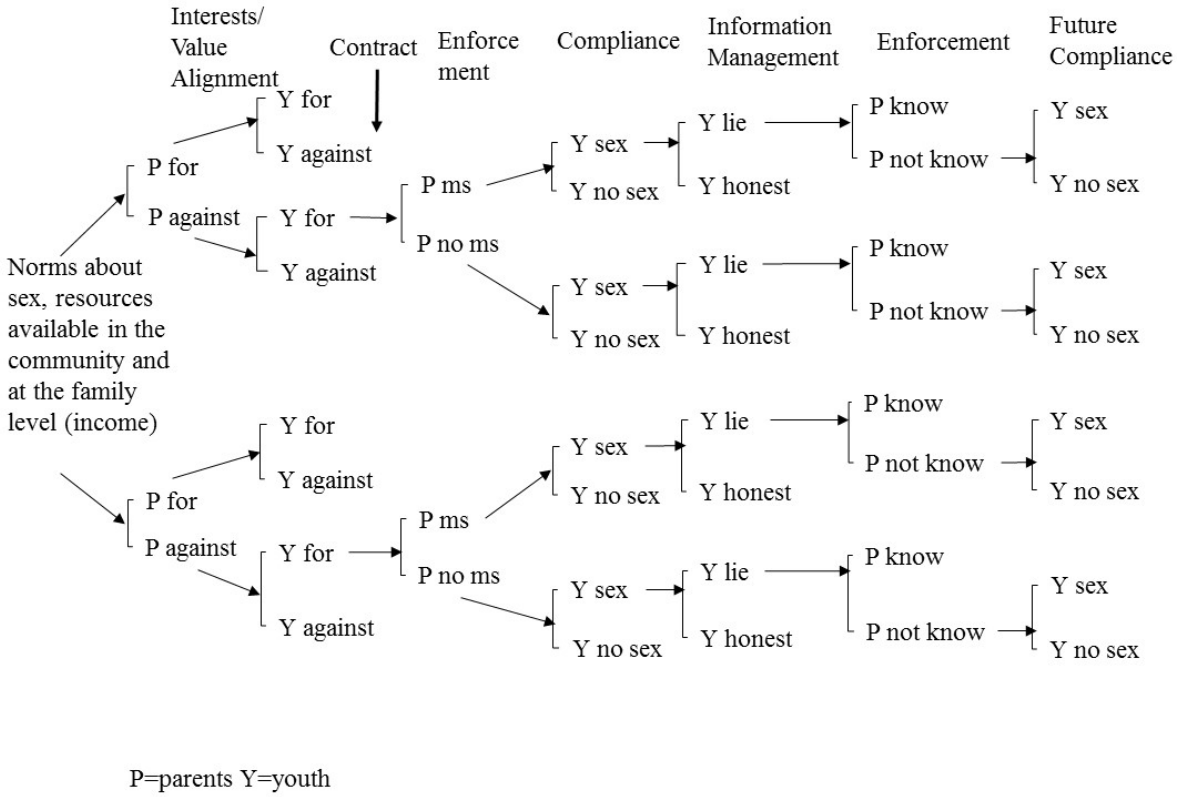
THE PRESENT CHAPTER

The present chapter attempts to specify and quantitatively test a principal-agent model of teen sex (Kiser, 1999; Miller, 2005; Shapiro, 2005). To situate the case of teen sex within the PA paradigm, I draw on qualitative work describing how parents and teens vie for control over adolescent sexual behavior (Schalet. 2011, Villalobos, 2014), as well as other work on strategic

information management and informational asymmetries within the parent-child exchange (Stattin and Kerr, 2000; Rote and Smetana, 2015).

Figure 5.1 below summarizes the negotiation surrounding teen sex as a simplified decision tree. Figure 5.1 is meant to illustrate the process and is not a true game theoretic model—I do not calculate payoffs for particular actions. This model incorporates the findings of qualitative work and work on teen concealment in general (Schalet 2011, Villalobos, 2014, Rote and Smetana, 2016), and applies a game-like structure to parent-child negotiations, generating a multi-iteration PA model.

Figure 5.1. Principal-Agent Model of Parent-Child Negotiations Surrounding Sex



At the macro level—what I refer to as the social context—norms about teen sex and resources available to families and teens (religious proscriptions of sex, family income,

neighborhood resources, school based sexual education), help specify parent and teen attitudes about propriety of teen sex (*for* or *against*). Parental attitudes that correspond with child attitudes (net of other influences), can be thought of as value transmission—one way in which parents can align interests between themselves and their children. Here, a positive relationship between the parents and child may increase the likelihood of value transmission from parent to child. Notably, instead of assuming preferences and interests, like much work on agency and decision making, I explicitly model both parental and child interests about teen sex. I also estimate the degree of alignment and misalignment between parental and child interests.

Given a misalignment of interests (i.e., parents are against teen sex while their children favor sex), parents can negotiate a set of agreed-upon behaviors: establish a contract and employ monitoring and sanctioning techniques to ensure compliance. I examine whether parental attitudes, child attitudes, religious beliefs, and the quality of the parent-child relationship predict two contract-like events: having the child take a virginity pledge and having a "sex talk" with the child. These two negotiations differ in flexibility. The virginity pledge is a rigid promise of abstinence until marriage, while the "sex talk" is parental information sharing about sex in the context of parental disapproval of sex that may or may not result in an agreed upon course of behavior. The sex talk, more generally, is an informal contract—it is an effort by parents to influence a child's view of a given behavior through information sharing. Still, for the purposes of the present analysis, it represents parents communicating their interests about teen sex to their children and it allows teens to consider the interests of their parents (which may undermine teen sex in the future).

Given parental disapproval, what tactics can parents use to increase abstinence? In terms of strategies that boost compliance, we would expect positive sanctions (such as affectionate

parenting), direct supervision of behavior which allows parents to both monitor and control behavior, solicitation of information (frequent and positive communication between the parent and the child), and intergenerational closure (parents of the focal child knowing parents of friends and significant others) to increase compliance. Publicly enforceable contracts, such as a virginity pledge, may be especially effective at inducing compliance due to the social control sourced from third-party witnesses to the contract.

In the case of non-compliance (those kids who transition to sex despite parental disapproval), we expect teens to lie and conceal information from parents to "get away with" sex. Teens are more likely to conceal sex and conceal sex *effectively* in a way that restricts parental knowledge about non-compliance (i.e., when parents do not practice effective monitoring and sanctioning). Ineffective monitoring includes a lack of intergenerational closure in parental networks, sanctioning in a controlling or negative manner, and not soliciting information in a positive (i.e., affectionate, non-confrontational) manner.

In sum, my conceptual model applies the structure of the principal-agent problem at the level of the family, to examine how individuals enmeshed in dependent and long-term relationships (parents and children) negotiate competing interests.

SAMPLE

National Longitudinal Study of Adolescent to Adult Health

The data used in the present analysis come from the first wave of the National Longitudinal Study of Adolescent to Adult Health (Add Health). Add Health is a nationally representative, probability-based sample, surveying children in grades 7-12, their parents, and school administrators from 132 schools across the country (80 high schools and 52 middle

schools). The measures used here come from the publicly available data collected from school, parent, and in-home surveys, and include information for 6,504 respondents and their parents (when available). The first wave in-school survey was collected during 1994-1995; the first wave in-home child and parent surveys were collected in 1995, approximately 6 months after the in-school questionnaire; and the second wave in-home survey was collected in 1996.

MEASURES

For descriptive statistics of all measures, please see Table A1 in the Appendix.

Parental attitudes about their child having sex. Parental disapproval of sex is asked of both parents and children. Whether parents disapprove of sex in general—for both parent and child reports—are Likert scales, ranging from 1 to 5, and are reverse coded, so that higher values indicate greater disapproval.

Youth attitudes toward sex. To capture youth attitudes toward sex, I employ a measure that was asked of respondents 15 years of age and older. Therefore, the analysis using youth attitude variables are limited to a subsample of teens who were at least 15 years old. Following Meier (2003), I estimate youth attitudes with answers to four Likert scale items, asked as follows: "If you had sexual intercourse", (a) "your friends would respect you more," (b) "it would give you great physical pleasure," (c) "it would make you more attractive to women/men," and (d) "you would feel less lonely." Higher values indicate disagreement with each statement.

Discrepancy of attitudes towards sex. The measure of discrepancy in attitudes between parents and children was created using a residual score measure, consistent with prior literature on discrepancy measures (Young et al., 2011; Prinstein and Wang, 2005). The measure is created

in four steps. First, both measures of parental and child attitudes are standardized. Second, parents' measures are regressed on kids' measures and the residuals are stored. Third, kids' measures are regressed on the parents' measures and the residuals are stored and multiplied by negative one to obtain residuals increasing in the same direction. Fourth, residuals are averaged to create the discrepancy measure, where negative values indicate teens reporting greater disapproval of sex than parents, positive values indicate greater parental disapproval of sex relative to teens, and values close to zero indicate similarity of attitudes.[25]

Relationship quality. That parent and adolescent reports of parent-child relationships are only moderately related is a robust finding in the literature (Taber 2010; Korelitz and Garber, 2016; Laird et al., 2003). The differences in perception are significant enough to treat parental perceptions and child perceptions as separate constructs. However, both types of reports add value and validity to the assessment of parenting (Sessa et al., 2001; Korelitz and Garber 2016). For the present analysis, whenever possible, I use both parent and child reports of parenting practices and relationship quality as distinct measures, and do not treat them as indicators of a single latent construct.

My expectation is that parental assessment of relationship quality will be more salient for parental behavior, while child assessment of parent-child dynamics will be more salient for adolescent choices and behaviors. Two 5-point Likert scale items are averaged to make a scale of parental reports of relationship quality: how often the parent gets along with the adolescent, and whether the parent agrees that they are satisfied with their relationship with the adolescent (α = .592). Greater values indicate better self-reported relationship quality with the child. Child

[25] Notably, this value should be interpreted relative to the sample, not as absolute value of discrepancy.

reports of relationship quality are assessed with an average of scores on seven 5-point Likert scale items. These items include how close the respondent feels to their mom and or dad, how much they think their mom and or dad cares about them, how satisfied the respondent is with the relationship with their mom and or dad, and how much they feel that their parents care about them ($\alpha = .806$). Higher values indicate a better self-reported relationship quality with the parent(s).

Parent-child communication. Likewise, I access parent-child communication with two scales, one sourced from child reports and the other from parent reports. For the child reports, the scale is an average of 10 binary items and 3 Likert scale items. The first ten assess whether children talked with their mom and or dad in the past week about the following: someone they were dating or a party they went to, a personal problem, school or grades, other things at school, and a serious argument with their parents (reverse coded). These are asked as binary "yes or no" questions. The next two items measure how satisfied the respondent is with the communication with their mom and or dad. The final item asks whether, when the child does something wrong that is important, their mother talks about it with them and helps them understand why it is wrong. The last three items are assessed on a 5 point Likert scale. All items were standardized to adjust for the different metrics of the items. Higher values on the scale mean more extensive and positive communication with parents ($\alpha = .665$ at wave 1).

The parent-child communication scale sourced from parent reports is an average of two items, whether the parents talk with their child about schoolwork, grades, and other things happening at school. While this scale is narrower in range than the child-reported communication scale, I include it here to capture both parent and child perceptions of communication. The items are assessed as a presence (1) or absence (0) of such conversations over the past week ($\alpha = .559$).

Parental supervision and control. I assess parental opportunities to directly and indirectly supervise their child in two ways. First, I employ a measure of direct parental supervision sourced from child reports of parents being home in the after-school hours. This construct measures how much the parent is able to observe the child directly as a result of spending time at home together with the child. The first four items assess how often the mother or father is there when the child leaves for school or comes home from school. These items range from 1 (Always) to 5 (Never), with a value of 6 indicating that the parent takes the child to school. These items were reverse coded to allow for more supervision at higher values. 6 was recoded to equal 5 under the assumption that taking the child to school offers at least as high a level of supervision as being at home when the child leaves for school. The next two items assess how often mom and or data is at home when the child goes to bed. These items range from 1 (Always) to 5 (Never) and were reverse-coded so that higher values reflect more frequent bedtime supervision. The final item measures how many times during the past seven days at least one parent was present at dinner time. This item ranges from 1(0 days) to 8 (7 days). All items were standardized before scaling to address differences in metrics. The α reliabilities for this measure were fairly low (α = .395 at wave 1; α = .430 at wave 2), but I nonetheless combine these items into a scale on theoretical grounds.

The *intergenerational closure* measure assesses whether parents are able to indirectly gather information about their child through networks of parents of the child's friends. This type of indirect supervision has been found to be an effective deterrent of unwanted behavior (delinquency). Here, I test whether this concept can be extended to monitoring sexual behavior. This construct is measured with a scale of two items: whether the parent has met the parents of their child's best friend (binary) and how many parents of the child's friends the parent has

talked to in the past month (alpha reliability.335). I also include a separate, romantic relationship-specific measure for whether the parent has met the parents of the child's significant other (a dichotomous variable). Higher values on all measures indicate more intergenerational closure and indirect supervision.

Child strategic information management. I measure child strategy of information management as an average of two measures about lying to parents (one assessed as part of the school sample, and one asked during the in-home interview). The first lying item, how often during the past year the child reports lying to parents about where they were or who they were with, ranges from 0 (Never) to 3 (5 or more times). The second lying item, how often during the past year the child reports lying to parents in general, ranges from 0 (Never) to 6 (Nearly every day). Both measures were standardized before being combined into a scale ($\alpha = .528$).

Contracts. Contract-like interactions between parents and children are operationalized in two ways. I assess whether the child has made a pledge to remain a virgin until marriage. The *virginity pledge* is a binary (yes or no) measure, assessed at waves 1 and 2.

I also measure whether parents discussed sex with their children. The "*sex talk*" measure is comprised of six items measuring discussion of different topics such as the risks associated with pregnancy and STI's, moral and social issues surrounding sex, and birth control. The alpha reliability of the sex talk item is .903, at it is assessed from parent reports at wave 1 only.

Compliance: Child sex. I measure if child had sex with a dichotomous variable (0 = No, 1 = Yes): "Have you ever had sexual intercourse?" This question defines sex as limited to heterosexual vaginal intercourse.

Self-Control. I include a measure of low self-control to account for the impact of impulsive behavior both on lying and on the likelihood of having sex. There are multiple permutations of self-control measures among the papers that have used Add Health Data (Warr, 2007; Beaver et al, 2009; Young, 2011). The excitement seeing dimension of low self-control (see Burt et al., 2014) is not asked about in this data set, so behavioral and personality measures mainly revolve around delaying gratification and rational decision-making. The main differences between the use of these in the literature seem to be the focus on items that tap problem solving and delayed gratification in general (Warr et al., 2007) and items that assess problems about getting work done and getting along with others at school (Perrone, 2004; Young et al., 2011).

An exploratory factor analysis including both sets of items revealed a three factor solution, one for problem avoidance and relying on gut feelings to make a decision, one for trouble at school, and one for rational problem solving by weighing pros and cons in a systematic manner. Since the personality components (i.e., factors 1 and 3) were more closely related to one another than the school performance factor, and since school difficulties may have multiple underlying issues, the final scale consist of personality questions referencing rational decision making and problem solving. The resulting scale has an α reliability of .513 and consists of seven items that range from 1 (Strongly Agree) to 5 (Strongly Disagree). The first three items, avoiding problems, difficult problems making the respondent upset, and going with gut feelings when making decisions were reverse coded. The other four items included getting facts about a problem when trying to solve it, trying to think of different solutions, weighing different solutions in a systematic way, and analyzing what went right and what went wrong. Alpha reliability for this scale was .513 at wave 1. Higher values indicate *lower* self-control.

Parental Control Following the DYS measure, parental control is assessed with two items: Child reports that parents inforce a set curfew on weekend nights and weekday nights. This measure has a low reliability (.322 at wave 1; .361 at wave 2), but is identical to the control measures used in Chapters 1and 3 (using DYS data) of the dissertation. Higher values indicate greater parental control.

Personal Religious Adherence. I measure how important religion is to teens and parents. Parents and teen were each asked about the frequency with which they pray, and the importance of religion, and the two items were averaged to create a scale. For both parents and children this measure is assessed at wave 1 only.

Social context: I include religious participation at the community level (frequency of "Sunday school" attendance and attendance of general religious ceremonies) to examine if being immersed in a religious community a)has an effect on attitudes about sex net of personal religious beliefs b) serves to align the attitudes of parents and children with regard to sex (net of personal beliefs of each separately) and c) increases the likelihood of a binding abstinence contract; I include family income and residence in a socially disorganized neighborhood to examine the role of economic concerns on parental disapproval of sex; Finally I include whether school-based sexual education (whether the teen has taken a class on pregnancy and HIV) has an effect on child attitudes about sex. All context variables are assessed at wave 1 only.

Demographic Variables: I include child age, sex, and race/ethnicity in the current models

ANALYTIC STRATEGY

Ideally, in estimating the process depicted in Figure 1 with survey data, I would employ a longitudinal data set that has at least 8 waves of data, includes parental and child reports, and

contains measures of all the pertinent concepts. Add Health meets two of those requirements, including parent and child reports, and the necessary measures. However, only the first two waves of data were relevant analytically, since wave 3 and beyond sampled respondents when they were adults. Moreover, parent reports of their own and child behavior were only available at wave 1. To best approximate the principal-agent structure of the exchange between parents and children, this analysis proceeds with a series of generalized linear regression models; where each model corresponds to a particular phase of the principal-agent process.

The first set of models examine the role of context in specifying parental attitudes toward sex, child attitudes toward sex, and the discrepancy between parent-child attitudes toward sex. The second set of models predict different "contracts" about sex, including virginity pledges and sex-specific communication. The third set of models predict non-compliance, or whether the child had sex despite parental disapproval. Finally, I analyze predictors of parental detection of non-compliance. For the contract and compliance models I use wave 1 variables to predict outcomes at wave 2. For the attitudes and detection models, due to key measures being unavailable at wave 2, I examine associations between variables at wave 1 only.

Note that compliance and detection of non-compliance are estimated in subsamples where membership is conditional on sorting during a conceptually "prior" step of the process. For example, the compliance model is restricted to respondents whose parents disapprove of teen sex, while the detection models are restricted to non-compliant respondents (those who have had sex despite their parents' disapproval). Taken together, these four sets of models yield a series of "snapshots", aiming to describe the complete process from Figure 1. I cannot, however, ascertain sanctioning of non-compliance when detected using the Add Health data. I return to this issue in the discussion section of this chapter. I use a linear and generalized linear regression

models to estimate the relations between wave 1 and wave 2 variables. All model estimation procedures were conducted in STATA 14. Where heteroscedasticity was detected, models were estimated with robust standard errors.

RESULTS

Parental interests and value transmission

I first examine which demographic characteristics, community characteristics, and family-level resources predict parental attitudes toward sex, child attitudes toward sex, and the alignment between parental-child interests.

Both parents and teens report that parents mostly disapprove of teen sex. Teens are actually *more* likely to report parental approval of sex than the parents themselves: only 0.6 percent of teens report that parents strongly agree with their child having sex, while almost 6 percent of parents report such agreement. Likewise, 86 percent of teens report that their parents either agree or strongly agree that the teen should not be having sex, while 81 percent of parents report similar attitudes. In sum, teens are likely to overestimate parental disapproval of sex relative to parent self-reports. This suggests that parents signal disapproval too strongly.

Table 5.2 summarizes the results of 6 models predicting parent and child attitudes about teen sex. Models 1 and 2 predict parental attitudes towards sex from parent reports. Model 3 predicts child reports of parental attitudes. Models 4 and 5 predict child attitudes toward sex as reported by children. Finally, Model 6 examines predictors of alignment and misalignment between parent-child attitudes toward sex.

Table 5.2. Predicting Parent Approval of Sex and Child Approval of Sex

	Parent Approval of Sex			Child Approval of Sex		Discrepancy
	Parent Reports	Parent Reports	Child Reports	Child Reports	Child Reports	
Model	1	2	3	4	5	6
Age (child)	-.117***	-.112***	-.140***	-.014	-0.011	-.073***
Female (child)	0.042	0.037	.122***	.633***	.626***	-.409***
Hispanic (child)	-.387***	-0.237***	-.285***	-.082	-.109*	-.052
Black (child)	-.214***	-.217***	-.397***	-.103***	-.134***	-.004
Asian (child)	0.016	-.091	.138	0.008	0.016	-.012
American Indian (child)	'-.044	-.024	0.019	'-.072	.006	-.022
Other Ethnicity/race (child)	0.107	-.025	0.05	0.056	0.076	-.037
Income (family)		-.026	.078***		0.007	.049**
Sex Education		-.027	-.038		0.09	-.072
Disorganized Neighborhood		-.028	-.014		-.025	.016
Religious Community		-.029	.232***		.063**	0.034
Religiosity (Parent)		-.030	0			.058**
Religiosity (child)		-.031			0.031	-.045*
Interaction Female*Hispanic		-.032	.289**			-.007
R2	0.048	-.033	0.185	0.185	0.192	0.102
N	5,596	4,781	4,586	3,833	2,766	2, 736

*** p < .001, ** p < .01, * p < .05; For models 2, 3, and 6, interactions between female and the other race categories were estimated but not shown here

Higher earning parents, and parents of younger children report greater disapproval of teen sex. Parents of older respondents, and those who identify as Latino or black report less disapproval of teen sex. Resources affect parental interests differently then would be expected according to Schalet's argument: Greater income is associated with more disapproval of teen sex. However, residence in a bad neighborhood does not significantly predict less disapproval of teen sex for parents or children, which is what we would expect from studies of concentrated

disadvantage (Anderson 1999). Religious context, however, matters for attitudes: parents who are more religious and belong to a religious community report greater approval for teen sex.

Child perceptions of parental disapproval (see Model 3) are predicted by a slightly different set of variables. Notably, respondents who are both female and Latina perceive higher parental disapproval of sex. This finding echoes Vilallobos' and colleagues ethnographic evidence of Latino parents' strong disapproval of girls having sex. However, the lack of consensus between what parents report about themselves and what the children report about their parents makes it difficult to figure out who accurately depicts parental attitudes. Likewise, contrary to Villalobos' findings, Latino parents report less disapproval of sex as compared to white parents. Finally, net of belonging to a religious community, the personal religiosity of the parents does not influence child perceptions of parental disapproval.

Models 4 and 5 predict children's own attitudes about sex. Female and younger respondents reported significantly greater disapproval of sex. Unlike for parents, the importance of kids' personal religious beliefs has no effect on their attitudes towards sex. Of the variables considered here, only religious community and identifying as black (and Latina in on model) significantly affect both parent and child attitudes about sex.

Discrepancy measures show that alignment of values with regard to sex is, on average strong. The distribution of the discrepancy measure indicates that, on average, parents and children view the propriety of teen sex similarly (see Figure A1 in the Appendix). While the attitude toward sex variables were not identically asked of parents and children, its seems that relative to the sample, parents and children have a corresponding understanding of the propriety of sex—kids of parents who are more disapproving of sex also tend to have more disapproving view of sex relative to their peers. Still, a substantively large portion of the sampled parents

disapprove of sex more than their children, while some children disapprove of sex much more compared to their parents. Model 6 examines predictors of discrepancy of attitudes between parents and children. Parents of older children, parents who are more religious, and parents in higher-income families reported greater disapproval relative to teens. Female children, and children who report importance of personal faith report greater disapproval of sex relative to their parents. In sum, most parents disapprove of sex, and children are aware of this disapproval. Finally, of the context variables considered here, religious identification and immersion in a religious community plays an important role in how both adolescents and parents define sex.

Contract

Given that parents disapprove of sex, how do they communicate their disapproval? Models 1 through 4 in Table 5.3 analyze two types of communication between parents and children about expectations surrounding sex—virginity pledges and sex talks—discussions about the positive and negative aspects of being sexually active. These could loosely be interpreted as contracts, in the sense that they allow parents to communicate their wishes and expectations to the children, and—in the case of the virginity pledge—receive assurances about abstinence from the children.

Table 5.3. Predicting Contracts.

	Model 1 Virginity Pledge wave 2 (logit)	Model 2 Virginity Pledge wave 2 (logit)	Model 3 Sex Specific Communication	Model 4 Sex Specific Communication
Age	-.202***	-.254*	0.046***	0.012
Female	.410***	0.366	.242***	.223***
Hispanic (child)	0.232	-0.549	-.107*	-0.049
Black (child)	-.741***	-1.44***	.279***	0.254***
Asian (Child)	0.054	-.099	-.170**	-.181

American Indian (Child)	0.402	0.053	0.116	-.062
Other Ethnicity/race (Child)	-0.424	0.645	0.016	-.184
Income (Family)	-0.054	-0.164	-.041**	-.072**
Sex Education	-.141	-.638	.137***	0.004
Disorg. Neighborhood	0.011	0.196	.062***	.068*
Religious Community	.784***	.893***	-.080***	-.084*
Religiosity (parent)	.243*	0.27	.08***	.083**
Religiosity (child)	.239*	0.16	.052**	.056
Parent-Child Relationship (Parent)		0.095		.133***
Parent-Child Relationship (Child)		0.42		-.106*
Communication (Parent)		-0.594		.298***
Communication (Child)		0.06		.184***
Parent Attitudes (Parent)		0.123		-0.027
Child attitudes (Child)		0.659***		-0.015

*** p < .001, ** p < .01, * p < .05;

Theoretically, the two types of contracts differ in several ways: The "sex talk" is less complete, more flexible, less public, and places less, if any, obligations on the child. Empirically, the models suggest that the two contracts are predicted by different variables, with two key exceptions. First, girls are more likely to both have discussions surrounding sex in general, and pledge their virginity in particular. Second, stronger personal faith—for both parents and kids—increases the chances that they have had discussions surrounding sex and have made virginity pledges.

Being a member of a religious community, however, has opposing effects on the two contracts: Teens are more likely to make a virginity pledge, but less likely to have had discussions about sex if their family regularly participates in religious socializing. On the other hand, the quality of the parent-child relationship matters for the sex talk: parents and children are more likely to discuss sex in the context of a close, caring, and communicative relationship—but parent-child relationship quality does not affect pledging. This is consistent with the public/private distinction between the two contracts, and suggests that the act of pledging—and

by extension the sexual behavior of the pledgee—is controlled by the greater community (Gorsky; Bearman and Brueckner, 2002). Given the data, it is also possible that religious communities encourage more public, and less private negotiations surrounding sex. Pledging requires a behavioral commitment on the part of the teens. These models show that teens have flexibility to enter into these contracts when doing so aligns with their interests—when they disapprove of sex. Given that the parents largely disapprove of teen sex, the finding that parental attitudes do not affect either pledging or the sex talk is unexpected, and I outline possible interpretations of this in the discussion section.

Although full results are not shown, I re-estimated the models predicting pledging with the discrepancy variable in the place of parent and child attitudes. The results indicate that discrepancy has a negative effect on pledging (b = -0.329, $p < .01$)—in other words families where parents are more disapproving of sex than kids are less likely to experience pledging. However, the effect goes away after including measures of relationship quality and communication. This offers additional evidence that teens have significant autonomy in agreeing to the pledging contract, and that disapproving parents may experience more success in getting their children to pledge in the context of a good relationship.

Finally, although not hypothesized, young respondents and black respondents are less likely to make virginity pledges but more likely to have had the sex talk as compared to their older, white peers.

Non-compliance

Next, I examine the condition under which teens engage in sex in a sample restricted to respondents whose parents disapprove of sex—where sex may be thought of as "non-compliance".

Table 5.4. Predicting Non-compliance: Child Sex (logit) in a sample restricted to children whose parents disapprove of sex.

	Model 1 Demographic and Self-Control	Model 2 Sex Specific Attitudes and Contract	Model 3 Monitoring and Sanctioning	Model 4 Quality of relationship
Age	.229***	.124***	0.117	0.079
Female (child)	-.847***	-.578***	-.688***	-.747***
Hispanic (child)	0.225	0.232	0.378	0.355
Black (child)	.781***	.680***	.698***	.990***
Asian (child)	-1.374**	-1.88*	-1.99**	-2.09*
American Indian (child)	0.251	0.177	0.243	0.245
Other ethnicity/race (child)	-.190	-.345	-0.413	0.023
Low self-control (child)	.454***	.368**	0.226	0.199
Income	-0.099	-.075	-.116	-.029
Virginity pledge		-.982***	-.910***	-.951**
Parent talk about sex with child		.177*	.194*	0.184
Child attitudes toward sex		-.371***	-.323**	-.419**
Intergenerational closure (sig. other)			-.140	
Curfew			-.032	-.011
Direct supervision			-.414**	-0.259
Lying			.339***	.263*
Parent-child relationship (parent)				0.008
Parent-child relationship (child)				-.373
Communication (parent)				0.388
Communication (child)				-.669
Pseudo R-squared	0.076	0.087	0.112	0.125
N	3,177	1,843	1,817	877

*** p < .001, ** p < .01, * p < .05;

Table 5.4 summarizes results of four models. Model 1 predicts whether the teen has had sex in the prior year with demographic variables and low self-control. Model 2 adds teen attitudes about sex and contract (whether the teen had taken a virginity pledge at wave 1, and whether

they had a sex-specific discussion with parents at waves 1). Model 3 adds monitoring and sanctioning variables and a lying variable to examine whether hypothesized parent and child strategies predict non-compliance. Finally, Model 4 accounts for the quality of parent-child relationship and the extent of parent-child communication. Notably, the sample is reduced by more than half after accounting for the relationship and communication variables.

Consistent with parental strategy of monitoring to promote compliance, direct supervision before and after school and at night is positively related to compliance. However, curfew and intergenerational closure were unrelated to compliance. On the other hand, consistent with teen use of strategic information management to enable non-compliance, lying at wave 1 predicted increased likelihood of teen sex over the next year.

Finally, the quality of parent-child relationship and frequency and quality of parent-child communication did not have a significant effect on compliance. Although adding these predictors into the model attenuated the effect of direct supervision on compliance, it is not clear whether the drastic reduction in samples size may have decreased the power necessary to detect a significant effect of direct supervision, or if relationship quality and communication substantively account for the association between direct supervision and compliance. In sum, these models indicate that, net of child attitudes towards sex, clear contractual obligations and parental monitoring increase compliance, while information management is associated with non-compliance.

Parental Knowledge

When teens have sex despite parental disapproval, do parents find out? Principals can only sanction non-compliance or re-negotiate an underperforming contract if they are aware that

non-compliance has taken place (Kerr and Stattin, 2000). What predicts parental knowledge of non-compliance? To answer that question, I model the lack of parental knowledge with regard to sex: If parents reported that their teen had not had sex, while at the same time the child reported that they had, parents were labeled as not knowing about sex. Table 5.5 summarizes the results of models predicting the likelihood of parents incorrectly reporting that their child has not had sex using demographic predictors (Model 1) and parent and child strategies with regard to information acquisition and management (Model 2). In general, parents who wrongly assumed abstinence on the part of their child were in the slight minority: out of the 2,040 teens who reported having sex, 963—nearly half—had parents who incorrectly reported that they had not.

Table 5.5. Predicting parents not knowing about teen sex (for teens who transitioned to sex despite their parents' disapproval)

	Model 1 Demographic	Model 2 Communication, Supervision, Concealment
Age	-.091**	-0.044
Female (child)	-.06	.094
Hispanic (child)	0.353	0.411
Black (child)	0.071	0.219
Asian (child)	0.627	0.537
American Indian (child)	0.356	0.456
Other ethnicity/race (child)	-.093	-.091
Income	0.057	0.072
Lying		0.045
Pledge		.490*
Sex-specific communication		-.392***
Curfew		.453**
Direct supervision		.221*
Intergenerational closure: general		.072*
Intergenerational closure: sig-other specific		-0.023
Communication (child)		-.170
Pseudo R-squared		0.0293
N	1,531	1, 495

*** p < .001, ** p < .01, * p < .05;

Of the variables considered here, only sex-specific communication—the sex talk—significantly decreased the likelihood of parental underreporting of teen sex. Having taken a virginity pledge was associated with incorrectly assuming abstinence, suggesting that when teens renege on the pledge, they do so covertly enough that their parents are left unaware. Finally, many of the monitoring and supervision variables—including curfew setting, direct supervision, and intergenerational closure (talking to the parents of the child's friends)—were associated with incorrectly assuming abstinence, but the reasons for this are unclear. At the very least, these results seem to imply that, despite parents preferring and making efforts to ensure abstinence, teens manage to both have sex and limit parental knowledge with regard to their noncompliance. In other words, the principals cannot effectively solve the agency problem with regard to teen sex.

DISCUSSION

This chapter builds on the qualitative research addressing parent-child negotiations surrounding sex. Specifically, I argue that parent-child negotiations of sex are best conceptualized as a principal-agent problem, where parents are the principals who strive to align the interests of the agents—children—with respect to abstaining from sex. To obtain detect non-compliance, parents monitor and sanction the sexual behavior of their children; to obtain compliance, parents attempt to align their children's interests with their own interests via value transmission. Children, on the other hand, may or may not share parental attitudes, and may or may not comply with parental wishes. Given desired and actualized non-compliance, children

strategically manage personal information about sex to decrease parental knowledge of non-compliance.

Evidence from the Add Health Survey offers preliminary evidence for a socially-situated principal-agent model of sexual negotiation between parents and children. I find that religious communities gain control of teen sex by defining both parental and child attitudes toward teen sex, and also through enabling contractual promises of abstinence. At the family level, I find that parents largely disapprove of teen sex, and achieve compliance (i.e., abstinence) through monitoring and contractual obligations. Teens, on the other hand, enable non-compliance through strategic information management. Finally, parental awareness of non-compliance is fairly low, with about half of parents of sexually active teens incorrectly reporting abstinence. Below, I discuss the results and their significance for research on the principal-agent problem, as well as for the general understanding of how parents and children navigate the onset of teen sexual activity.

First, I find that religious adherence, being immersed in a religious community, and family economic resources matter for parental disapproval of sex. While this is consistent with Schalet (2011) and Villalobos' (2014) findings, the direction of some of the effects is contrary to what is expected, given the qualitative data. First, higher family income is positively related to parental disapproval of sex. This is the opposite of what we would expect if a key reason for parental disapproval of teen sex is the concern over the straining of family resources to care for a pregnancy and the resulting baby (Schalet, 2011). Second, while greater religiosity increases disapproval of sex, identifying as Latino uniquely associated with *less* parental disapproval of sex—in contrast to what Villalobos finds. I do observe a significant interaction effect where Latina girls report that their parents are more disapproving of sex. However, these reports are not

matched by parental self-reports. In general, the mismatch between what parents think about sex and what teens think their parents think has several interesting implications. First, studies like Villalobos' work and many others that use child reports of parental attitudes and behavior, should be cautious of the possibility that the reports of others' behavior and attitudes are less reliable and potentially biased (Young et al., 2011; Young et al., 2014; Taber 2010; Korelitz and Garber, 2016). However, this also suggests that theory-of-mind, or third-order beliefs, are central in modeling game-like situations: if the players are strategizing about what they think the other players are doing or thinking, then modeling those perceptions is key to predicting future behavior (Ridgeway and Correll, 2006; Talwar & Lee, 2008). Likewise, issues of signaling become important: How effective are individuals at signaling their preferences, goals, and strategies? The present chapter indicates that parents may be too effective at signaling disapproval of sex, since teens overestimate parental disapproval of sex.

The distribution of the discrepancies (See Figure A1 in the Appendix) in attitudes between parents and children with respect to teen sex indicate that there are many parents that are somewhat more disapproving of sex than their children, and that there are a few children who are much more disapproving of sex than their parents. Given that there is misalignment of interests, I explored several ways in which disapproving parents increase the odds of compliance, including binding contracts and monitoring practices. With respect to contracts, I find that children's attitudes rather than parents' attitudes predict contract adoption, and that increased parental disapproval relative to their child's decreases the chances of a virginity pledge. Parental disapproval is also unrelated to sex talks. What may account for this lack of parental influence? Prior research suggests that the association between parents' desire to control teen sex and the vocalization of this desire may be weakened by such factors as belief that inviting conversation

encourages sex, or cultural discomfort surrounding the topic (Schalet, 2001; Villalobos 2014). For their part, teens may be effective at dictating participation in both pledging and sex discussions. These possibilities should be explored as potential sources of decoupling between attitudes and contract in the future.

Consistent with the idea that sex is child-driven, there is substantial non-compliance as 39 percent (n = 1,841) of the subsample of children whose parents disapprove of sex reported being sexually active. Of the monitoring variables considered here, increased direct supervision of the child—parents being in the same physical space as children outside of school hours—decreases the odds of teen sex. This is evidence that direct monitoring, rather than indirect monitoring (and sanctioning) through positive communication (in general and specifically about sex) or intergenerational closure, is an effective way to enforce compliance. Finally, child information management—lying to parents—increases non-compliance above and beyond parental efforts to monitor and sanction, suggesting that teens have significant autonomy when it comes to teen sex. Moreover, and consistent with the principal-agent model, children exploit information asymmetries to act on their own interests. However, the present measures of lying are not sex specific: they merely tap the frequency of lying in general to parents. I hope to examine sex-specific concealment and other ways of gate-keeping romantic information—such as having the parents meet a romantic partner—in future work.

What are some ways in which parents can detect non-compliance? I examined predictors of parents' incorrect reports of teen abstinence in a non-compliant sample—one restricted to children who have had sex despite parental disapproval. Surprisingly, I find that most parental monitoring tactics yielded a biased understanding of their child's sexual behavior. Furthermore, the two modes of negotiating expectations surrounding sex—the virginity pledge and the sex

talk— yielded effects on parental knowledge with opposite signs . If a child had sex in the context of a virginity pledge, their parents were significantly less likely to know about it. However, if a child had had sex in the context of a sex talk, the parents were more likely to accurately report teen sex. These differences may relate to the flexibility of the sex talk relative to the pledge: a sex talk—while conducted in the context of disapproval—may allow for agreed-upon outcomes outside of abstinence and may even signal a negotiation about sex after the teen has experienced sexual onset. Meanwhile, the rigid, public nature of the pledge defines sex as a defection on the part of the teen not just in the eyes of the parents, but also to the community, and may increase the costs of honestly reporting sexual behavior (Bearman and Brueckner, 2001).

Limitations and Directions for Future Research

Like other empirical work, this study is not without shortcomings. Below, I discuss three elements of the design that require improvement, and outline ways in which this may be done in the future. First, the present chapter focused on a situation with one principal and one agent. In reality, principals can be interacting with multiple agents, and agents may be juggling the interests of multiple principals. In the case of teen sex, considering three additional principal-agent relationships in particular will result in a more realistic model of negotiations surrounding sex. First, parents usually have multiple children whose sexual behavior they have an interest in controlling. Prior work has examined parental sanctioning strategies aimed at multiple children and found that parents employ reputation-based strategies in controlling the behavior multiple children (Hao et al., 2008). Future work should compare and contrast the adoption and effectiveness of parental strategies in negotiating the sexual behavior of children. Second, children may be faced with different principals, whose interests may compete with one another.

For instance, parents may have differing opinions about what constitutes appropriate sexual conduct, and may make competing demands on the child. Studies of children whose parents live apart and who are embedded in multiple households shows that children adopt additional strategies of information management to appease both parents (Affifi et al., 2005), suggesting that the structure of the principal-agent problem may depend on consensus among parents. Finally, a teen's significant other may also be considered a principal whose interests likely compete with the interests of parents. In future work using Add Health data, I hope to account for this by modeling the relationship status of teens, the quality of the romantic relationship, and the attitudes towards sex of the teens' romantic partners.

Second, there are many data requirements for estimating a game-like process such as the one presented here, including a host of measures pertinent to the analysis, the self-reports of parents and children, and repeated measures over time. The last of these was difficult to achieve, given that there were only two waves of data assessing respondents before adulthood, and that the parenting measures were only asked at the first wave. As a result, two sets of models presented here—models predicting attitudes and models predicting parental ignorance—lack the temporal order necessary for causality. It can be argued that the exogenous variables in the first set of models reflect durable features of the social context—gender, race and ethnicity, religion on attitudes, or factors such as neighborhood residence which are unlikely to be caused by attitudes towards sex. Regardless, because I cannot disentangle the directions of effect using cross-sectional data, the results from these models should serve as evidence suggestive of the processes outlined in my principal-agent model.

Third, and finally, the Add Health data lack information on sanctioning mechanisms that parents may use to bargain with teens and to ensure compliance. Schalet's (2011) research

suggests that parents use both the threat of sanctions—communicating that they will not financially support teens in the event of pregnancy—and actual sanctions such as "grounding" to enforce compliance. Parental disappointment can also serve as a "soft" non-monetary sanction (Schalet, 2011; Villalobos, 2014). Future work exploring such sanctioning mechanisms is necessary to speak to this important aspect of the principal-agent model.

In spite of these shortcomings, my findings show that parents and children interact in ways consistent with the principal-agent model. That a case far removed from the usual applications of this model in economics and political science—applied here to a relationship characterized by imperfect signaling of principal interests, by a high emotional valence, long-term interdependence, and informal codes of conduct—yields support for the principal-agent problem, is a testament to the model's applicability outside the realms of economic and legal transactions. The present application takes a step toward mapping the ways in which the principal-agent model can fruitfully integrate sociological principals—such as relationship quality or culturally specified norms—with economic assumptions and concepts to offer a deeper understanding of this parsimonious model (Kiser, 1999).

Likewise, reframing parent-child relationships as a principal-agent problem both supports and augments process suggested by qualitative work. While Schalet (2011) cites resource scarcity as an argument for parental disapproval, my models reveal that income is positively related to disapproval—something that is hard to glean from Schalet's sample of families with homogenous earnings. In another departure from Schalet's claims of uniform teen preferences, I find that just like parents, children differ in their attitudes toward sex, and that those attitudes help predict sexual onset. However, in support of Schalet's (2011) research, I find that concealment on the part of the child is associated with a greater likelihood of having sex. When

considered in total, the present results suggest that teen sexuality is predominantly controlled by teens, and that parenting strategies identified by Schalet (2011) do not affect teen sexual behavior as much as expected. In other words, parents really do have a principal–agent problem on their hands.

CONCLUSION

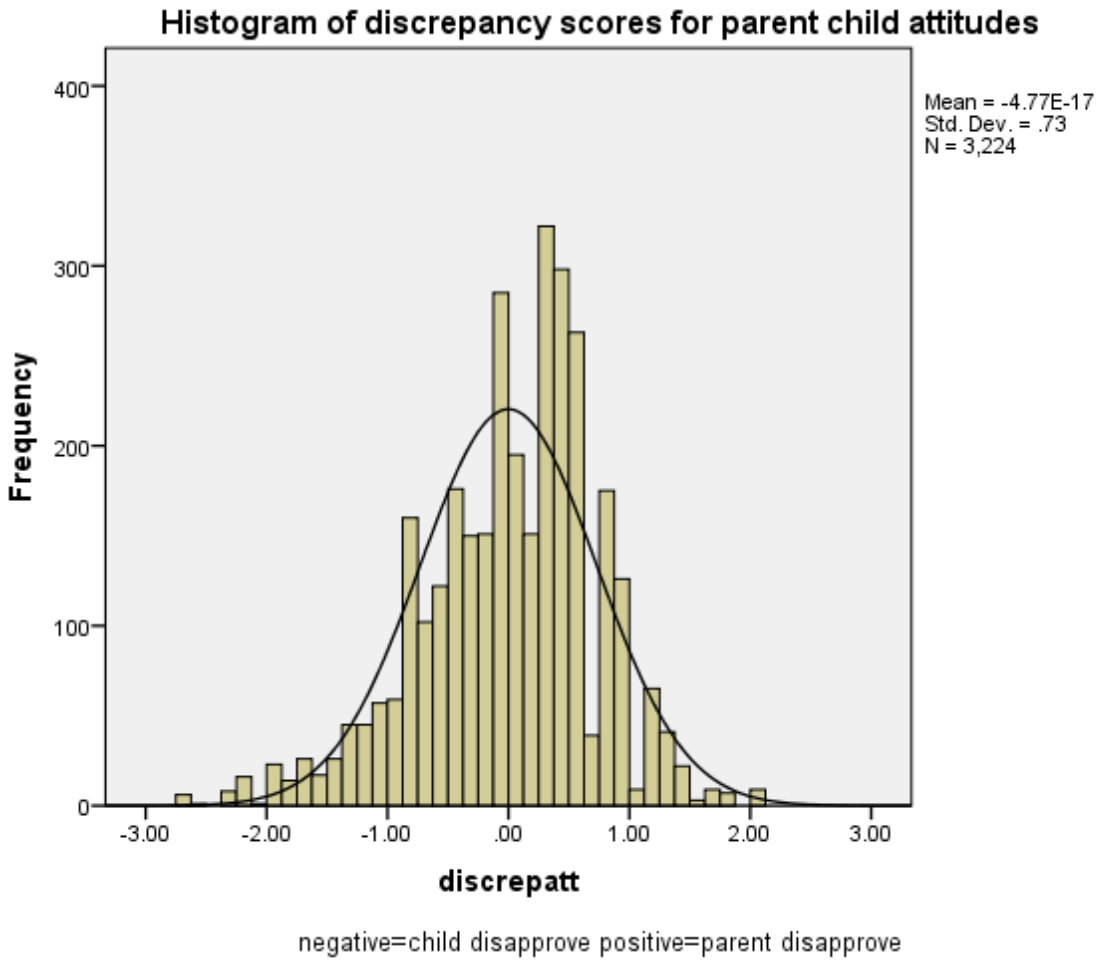
At the heart of the principal-agent problem is a fundamental sociological question: How do we get others whose actions affect us, to behave in a way that we want them to behave? I find that to know why some families approach teen sex differently from others, we need to examine their attempt to answer this question. On the other hand, applying the principal-agent problem to complex social settings reveals new ways of thinking about the issues facing principals and agents. For example, the perceptions of principals' interests differ from their actual interests or that the embeddedness in a religious community conditions how parents and children conduct negotiations about what we consider private behavior. In short, when it comes to teen sex, parents and children are more economic than we think, but also more social than they appear on paper.

APPENDIX

Table A1. Descriptive Statistics

	Mean (SD)	Range
Age	15.025 (1.769)	11 - 20
Female (child)	0.515	0 - 1
Hispanic (child)	0.114	0 - 1
Black (child)	0.25	0 - 1
Asian (child)	0.042	0 - 1
American Indian (child)	0.037	0 - 1
Other ethnicity/race (child)	0.065	0 - 1
White	0.66	0 - 1
Income	3.549 - .828	0 - 6.906
Lying	-.006 (.880)	-1.194 - 2.131
Pledge	0.13	0-1
Sex-specific communication	2.91(.856	1-6
Sex Education	0.89	0-1
Bad Neighborhood	.0041 - .776	-.807 - 2.929
Religious community	.00004 - .837	-1.555 - 1.572
Religiosity (parent)	.001 (.934)	-2.68 - .614
Religiosity (child)	.001 (.937)	-1.770 - .915
Direct Supervision	-.011 (.51)	-2.688 - 1.098
Intergenerational Closure: general	2.16 (1.90)	0 - 6
Intergenerational Closure: sex-specific	0.652	0 - 1
Parent-child relationship (parent)	4.289 (.667)	1 - 5
Parent-child relationship (child)	4.54 (.556)	1 - 5
Communication (parent)	1	0 - 1
Communication (child)	.009 (.473)	-2.41 - 1.42
Low self-control	2.64 - .478	1 - 5
Parents don't know about sex	0.176(.381)	0-1
Parent Attitudes	4.33(1.11)	1-5
Parent Attitudes (child reports)	4.32 (.882)	1-5
Curfew	.510 (.365)	0-1
Sex wave 1	0.396	0 - 1
Sex wave 2	0.193	0 - 1

Figure A1. Distribution of the discrepancy of attitudes for parents and children.



CHAPTER 6: CONCLUSION

Extant social research is divided on why adolescents keep secrets and lie to parents, as well as how to classify concealing behavior. My dissertation has attempted to generate an improved understanding of secretive and dishonest behavior on the part of adolescents. As a part of this enterprise, I use two large longitudinal data sets, multiple modeling approaches, and test competing theoretical treatments of concealment. This chapter reviews my key findings, discusses the significance of what was found, and outlines directions for future research on adolescent concealment.

A central goal of this project was to test a theory of adolescent concealment as agentic behavior against the proposition that concealment is impulsive and inherently problematic. To do so, I examined the relationships between parenting, concealment, problem behavior, and low self-control in two large, longitudinal data sets, the DYS and Add Health. The initial model using DYS data showed that concealment is a deliberative and situationally induced strategy, but that low self-control is associated with increased concealment. The findings offer some support for the proposition that concealment generates further agency: parents are less likely to know about behavior of adolescents who conceal, but this ignorance does not change parental behavior with regard to children. However, the Add Health analyses in Chapters 2 and 4 reveal significant associations between concealment and the ability to enact behavior that parents have an interest in preventing. In other words, teens who conceal have more agency in enacting behavior against the wishes of parents, but is unclear how parenting strategies help explain this association. In short, additional work is needed to identify the process by which concealment generates gains to agency.

Overall, I find support for the idea that information management is both agentic *and* sourced from low self-control. I argue these seemingly competing findings can be explained by the dimension of self-interest that is a common property of concealment across the disparate definitions. This self-regarding property of concealment allows it to be sourced from low self-control, which is a trait characterized in part by excessive self-regard. Finally, I find that despite its ability to limit parental knowledge, concealment is not associated with delinquent behavior.

The replication of the model using Add Health data confirmed three key findings from the DYS models: that concealment is predicted by the extent and quality of parental communication on the one hand, and by prior delinquent behavior on the other hand; and that concealment predicts decreased parental knowledge. Unlike the DYS models, self-control does not directly predict future lying, but still has a total effect on lying at wave 2. These findings lend further support for strategic and situational underpinnings of concealing information from parents on the one hand, and for greater concealment among low self-control youth on the other hand. Likewise, the finding that child concealment effectively reduces parental knowledge is robust across the samples considered here (Stattin and Kerr, 2000). A notable difference between the models is that Add Health models indicate that net of low self-control, prior concealment increases future delinquent behavior. This result suggests that concealment may increase adolescent autonomy with regard to behavior that parents have an interest in controlling (Keijsers et al., 2010). However, the structure of the data precludes a more conclusive test of this proposition. In sum, the replication results offer strong evidence for the model of concealment as strategic and self-regarding, as well as an effective means of reducing parental knowledge.

Chapter 4 extends the general model in Chapters 2 and 3 by examining whether the observed results among parenting, concealment, self-control, and delinquency vary with the age

of respondents. Beyond re-examining my model, Chapter 4 aims to fill in a gap in what is known about how concealment changes from childhood to adolescence. The results of split sample cross-lagged panel models indicate that, in keeping with models in Chapters 2 and 3, child information management is sourced from both low self-control and parenting, regardless of the age of the respondents. As in prior models, and regardless of age, what parents know about children increases as a result of children being honest and forthcoming with information about their own behavior and whereabouts. However, prior delinquent behavior did not significantly increase concealment either for the older or younger respondents. The most striking difference between children and youth—one that is echoed by the trajectory models—is the structuring of both parent and child behaviors by gender in the older sample of respondents. For the LCG models, gender does not predict initial differences in disclosure at age 10, but structures changes in disclosure—with boys experiencing greater increases in secrecy and lying with age. The cross-lagged panel models tell a similar story, with boys significantly more likely to lie and be secretive with parents in the older but not the younger samples. Other parenting and child variables were similarly gendered in the older sample of respondents, and together indicate that girls increasingly experience greater social control as they get older: In the older sub-sample, parents of girls were more likely to enforce curfew and knew more about their girls' whereabouts and friends. Moreover, such increases in parental surveillance and control cannot be explained by a response to problem behaviors, as younger girls and boys did not differ in levels of theft or substance use, and older girls reported *lower* problem behavior than older boys. This tightening of parental controls and increased surveillance capabilities of girls as they go through puberty is suggestive of patterns found in prior work, that parents socialize girls in ways that reproduce the

existing hegemonic gender roles (Hagan, Gillis, Simpson, 1987; Smetana and Daddis, 2002; McHale, Crowder and Whiteman, 2003;).

Trajectory models describe concealment as a behavior that, on average, changes little as children grow older, despite an increase in both opportunities to lie and experiences that make secrecy and lying more rewarding throughout adolescence (Farrington, 1986; Schalet, 2011). Such stability may speak to the relative stability of the way parents and children communicate, children's commitment to a certain code of conduct regardless of age-graded opportunity structures, or parental adjustments to ensure certain levels of disclosure throughout adolescence.

Moreover, latent class analysis showed no evidence for a chronic class of "chronic liars" who are systematically different in their levels and trajectories of information management. However, some individuals do lie and withhold more than others, and increased concealment is associated with future increases in problem behavior (theft). Additionally, despite its lack of fit relative to the single-class model, a two-class model solution offers some explanation of the puzzling finding in developmental literature that younger children who lie more tend to be better adjusted than peers, while adolescents who lie more tend to be worse off than their peers (Talwar and Crossman, 2011). The present models indicate that this could be explained by different groups of individuals who experience intersecting trajectories of information management over time: those who lie more in childhood are, indeed, not the same individuals who lie more in adolescence. In sum, like the previous empirical chapters, the results of Chapter 4 describe concealment as sourced from both situational and trait-like elements.

Chapters 2-4 largely focused on concealment as it relates to problem behavior. Chapter 5 builds on the proposition that concealment strategic, and examines the role of adolescent lying with regard to sex. Specifically, the analysis tests whether adolescents use concealment in a way

that is consistent with rational actors embedded in a situation commonly described as a principal agent problem (Kiser, 1999; Shapiro, 2005). Beyond examining concealment, I wanted see if the principal-agent model can accurately describe the negotiations between parents and children when it comes to sex, something that was suggested by prior qualitative studies (Schalet, 2011; Villalobos, 2014). Using the first two waves of the Add Health data, I find support for both the principal-agent model in general, and for the use of concealment as a strategy of hiding non-compliance in particular. In doing so, I capitalize on the strength of research in both economics and sociology, in a way that, I hope, benefits both fields: By integrating sociological principals with economic assumptions about behavior, this analysis offers a deeper understanding of a parsimonious model (Kiser, 1999). For example, I show that, net of personal religiosity, embeddedness in a religious community affects the preferences of parents and children, as well as the type of contracts they adopt in negotiating sex. Likewise, reframing parent-child relationships as a general behavioral model, and theoretically grounding prior findings, allows me to both evaluate and expand upon the process suggested by qualitative work in a systematic manner. For example, I find that signaling of parental attitudes is imperfect, and that the findings on parental attitudes observed by Villalobos (2014) may be explained by teens' imperfect reports of parental behavior.

Like the majority of empirical work, the present analyses limited in several ways. I describe two such limitations below, in hopes that they provide fruitful directions for future research on concealment. First, the concealment measures in DYS and Add Health would ideally consist of behavioral measures of lying to and being secretive with parents with regard to a particular behavior—theft, substance use, or sex. The measures of concealment in the DYS consist of behavioral items assessing keeping secrets from parents about more general concepts

such as companions and whereabouts, *and* attitudinal items of lying to parents about topics that may incur sanctions. Likewise, the Add Health had general measures of concealment, such as lying to parents and concealing information about whereabouts and companions. Although these measures facilitate a multi-dimensional assessment of concealment, future research on the subject should nonetheless include an expanded range of focused behavioral indicators of concealment, such as whether children are secretive or lie about specific activities. Such measures will allow a more nuanced analysis of the conditions that induce adolescents to conceal information.

Second, the ability of survey data to assess causal processes is flawed. As a result of relying on non-experimental data, my results may suffer from omitted variable bias, and—in the case of two models in Chapter 4—an incorrect temporal order of effects. In other words, experimental data is necessary to make causal claims about the patterns of behavior observed here. Currently, experimental data on concealment that takes into account sociological concepts such as norms or affective relationships in general or the interactions between parents and adolescents in particular is nonexistent. However, laboratory experiments on lying are increasingly conducted in economics and psychology, and there are examples from social psychology that can serve as guidelines for how to assess small group dynamics and socio-affective qualities with lab-experimental data (Talwar and Lee, 2008; Molm, 1991; Lovaglia and Hauser, 1996). Additionally, vignette experiments where rewards to lying and concealment are varied within hypothetical parent-child interactions, in combination with survey questions regarding the respondent characteristics such as levels of self-control, would allow for causal inference about the relation between concealment as self-interest and strategy, and are a likely next step in my research program.

Nonetheless, my findings provide a better understanding of concealment with regard to multiple behaviors, different points in the transition to adolescence, and competing theoretical models of social behavior. Existing explanations of the sources of information management have focused on low self-control (Gottfreson and Hirschi, 1990; Loeber and Stouthamer-Loeber 1985) or on the strategic evaluation and manipulation of one's physical and social environment (Emirbayer and Mische, 1998; Kiser, 1999; Affifi et al, 2004; 2008; Talwar and Crossman, 2011). The results of this dissertation are consistent with both narratives. I argue that the self-regarding property of secrecy and lying allows this behavior to be sourced from low self-control—which is a trait characterized in part by *excessive* self-regard, as well as situational factors affecting self-preservation and *strategic* self-regard—in other words, aspects of the environment that tip the behavioral calculus toward lying and secret keeping. In this way, concealment can be seen as agentic rational behavior, but one that may be increasingly practiced by those individuals who are more self-regarding than others (Hechter and Kanazawa, 1997; Matsueda, 2013).

These results also reveal that adolescents are agentic—that within the context of the family, they can evaluate situations and enact behaviors just like adults. The idea that, for adolescents, concealment is synonymous with agency should inform future research on adolescents and parents in at least two ways. First, sociologists should increasingly consider the ways in which adolescents intentionally influence parent-child interactions. Second, the finding that concealment becomes increasingly gendered as children transition to adolescence, coupled with the fact that parents know more about and exert greater control over girls' behavior, suggests that girls are socialized away from autonomy and agency. Future research on how gender shapes agency should consider the role of information management.

Finally, because it is a situationally induced strategy, concealment has to be interpreted in the context situation within which it occurs—including the nature of the parent-child relationship and the matter being concealed. Depending on the context, adolescent information management can be defined as a wide range of phenomena. It can take on the form of necessary self-preservation, such as when children keep secrets from parents who are prone to excessive punishment or place psychological strain on the child (Affiffi et al, 2004). Concealment can represent age-appropriate attempts at autonomous behavior in a context of long-term and wide-ranging dependence, and with regard to parents who are slow to give up control (Smetana and Rote, 2015). Lastly, by precluding parental knowledge and interventions with regard to such outcomes as substance use or theft, concealment itself becomes a problem behavior, allowing autonomy with regard to maladaptive behavior. In sum, my project simultaneously provides evidence that the answer to what concealment is, is: “it depends”, and describes what it is that concealment depends upon.

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APPENDIX: SUPPLEMENTAL MATERIALS.

Table S1. Exact Wording of Measures

Parental warm monitoring
How often do your parents talk with you about what you actually did during the day? (Never = 1, Sometimes = 2, Often = 3)
How often do your parents talk with you about how things are going in school? (Never = 1, Sometimes = 2, Often = 3)
How often do your parents find time to listen to you when you want to talk to them? (Never = 1, Sometimes = 2, Often = 3)
When you have done something your parents like or approve of, how often do your parents wink or smile at you? (Never = 1, Sometimes = 2, Often = 3)
When you have done something your parents like or approve of, how often do your parents give you a hug? (Never = 1, Sometimes = 2, Often = 3)
Parental control
Do you have a certain time to be home on school nights? (1 = No, 2 = Sometimes, 3 = Yes)
Do you have a certain time to be home on weekend nights? (1 = No, 2 = Sometimes, 3 = Yes)
Parental knowledge
How many of your friends do your parents know? (1 = None, 2 = Some, 3 = Most, 4 = All)
How often do your parents know where you are when you are neither at home nor at school? (Never = 1, Sometimes = 2, Often = 3)
How often do your parents know who you are with when you are neither at home nor at school? (Never = 1, Sometimes = 2, Often = 3)
How often do your parents know if you are not home on time? (Never = 1, Sometimes = 2, Often = 3)
Child Concealment
It's important to be honest with your parents, even if they become upset and you get punished (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)
Making a good impression is more important telling the truth to parents (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Sometimes it is necessary to lie to your parents in order to keep their trust (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral,
4 = Agree, 5 = Strongly Agree)
Do you leave a note for your parents or call them about where you are going if they are not at home? (Never = 1, Sometimes = 2,
Often = 3)

Low Self-Control

You are careful about what you do? (Reverse-coded: Disagree = 3, Somewhat Agree = 2, Strongly Agree = 1)
Get upset when you have to wait for something? (Disagree = 1, Somewhat Agree = 2, Strongly Agree = 3)
Act without stopping to think? (Disagree = 1, Somewhat Agree = 2, Strongly Agree = 3)
Like to do daring things? (Disagree = 1, Somewhat Agree = 2, Strongly Agree = 3)
Get bored easily? (Disagree = 1, Somewhat Agree = 2, Strongly Agree = 3)
Get restless if you have nothing to do?(Disagree = 1, Somewhat Agree = 2, Strongly Agree = 3)
Are impatient--want to have things right away? (Disagree = 1, Somewhat Agree = 2, Strongly Agree = 3)

Violence (How many times in the past year have you:)

Attacked someone with a weapon or with the idea of seriously hurting or killing them?
Hit someone with the idea of hurting them?
Been involved in gang fights?

Theft (How many times in the past year have you:)

Knowingly bought, sold, or held stolen goods or tried to do any of these things?
Snatched a woman's purse or wallet or picked someone's pocket?
Stolen or tried to steal money or things worth $5 or less?
Stolen or tried to steal money or things worth between $5 and $50?
Stolen or tried to steal money or things worth between $50 and $100?
Stolen or tried to steal money or things worth more than $100?
Stolen or tried to steal a motor vehicle such as a car or motorcycle?
Taken something from a car that did not belong to you?
Taken something from a store without paying for it (including the events you have already told me about)?
Avoided paying for things such as movies, bus or subway rides, food, or computer services?

Substance use (How many times in the past year have you:)

Drunk beer?

Drunk or used wine?
Drunk hard liquor?
Used amphetamines, uppers, ups, speed, pep pills, or bennies?
Used marijuana or hashish?
Used hallucinogens, LSD, Acid, Peyote, Mescaline, Psilocybin?
Used cocaine, or coke other than crack?
Used crack?

Table S2. Results for the Cross Lagged Panel Model with Violence (Unstandardized Coefficients) N=752

Wave 3 variables	Estimate (S.E)	Wave 4 variables	Estimate (S.E)	Wave 5 outcomes	Estimate (S.E.)
Parental Knowledge w3 on		**Parental Knowledge w4 on**		**Parental Knowledge w5 on**	
Parental Knowledge w2	0.41*** (0.05)	Parental Knowledge w3	0.41*** (0.05)	Parental Knowledge w4	0.41*** (0.05)
Parental Monitoring w2	0.13** (0.04)	Parental Monitoring w3	0.13** (0.04)	Parental Monitoring w4	0.13** (0.04)
Parental Control w2	0.03 (0.02)	Parental Control w3	0.03 (0.02)	Parental Control w4	0.03 (0.02)
Child Concealment w2	-0.08** (0.03)	Child Concealment w3	-0.08** (0.03)	Child Concealment w4	-0.08** (0.03)
Violence w2	-0.02 (0.03)	Violence w3	-0.02 (0.03)	Violence w4	-0.02 (0.03)
Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)
Gender (Female) w2	0.14*** (0.03)	Gender (Female) w2	0.14*** (0.03)	Gender (Female) w2	0.14*** (0.03)
Race w2 (Black)	0.05 (0.06)	Race w2 (Black)	0.05 (0.06)	Race w2 (Black)	0.05 (0.06)
Race w2 (Hispanic)	0.02 (0.06)	Race w2 (Hispanic)	0.02 (0.06)	Race w2 (Hispanic)	0.02 (0.06)
Race w2 (Other)	0.05 (0.07)	Race w2 (Other)	0.05 (0.07)	Race w2 (Other)	0.05 (0.07)
Income w2	-0.02 (0.01)	Income w2	-0.02 (0.01)	Income w2	-0.02 (0.01)
Both Bio Parents w2	0.04 (0.03)	Both Bio Parents w2	0.04 (0.03)	Both Bio Parents w2	0.04 (0.03)
Low Self-Control w2	-0.04 (0.04)	Low Self-Control w3	-0.04 (0.04)	Low Self-Control w4	-0.04 (0.04)

Parental Monitoring w3 on		**Parental Monitoring w4 on**		**Parental Monitoring w5 on**	
Parental Knowledge w2	0.02 (0.01)	Parental Knowledge w3	0.02 (0.01)	Parental Knowledge w4	0.02 (0.01)
Parental Monitoring w2	0.67*** (0.02)	Parental Monitoring w3	0.67*** (0.02)	Parental Monitoring w4	0.67*** (0.02)
Parental Control w2	0.03** (0.01)	Parental Control w3	0.03** (0.01)	Parental Control w4	0.03** (0.01)
Child Concealment w2	-0.00 (0.02)	Child Concealment w3	-0.00 (0.02)	Child Concealment w4	-0.00 (0.02)
Violence w2	-0.02 (0.02)	Violence w3	-0.02 (0.02)	Violence w4	-0.02 (0.02)
Age w2	0.00 (0.01)	Age w2	0.00 (0.01)	Age w2	0.00 (0.01)
Gender (Female) w2	-0.01 (0.02)	Gender (Female) w2	-0.01 (0.02)	Gender (Female) w2	-0.01 (0.02)
Race w2 (Black)	0.01 (0.03)	Race w2 (Black)	0.01 (0.03)	Race w2 (Black)	0.01 (0.03)
Race w2 (Hispanic)	0.02 (0.03)	Race w2 (Hispanic)	0.02 (0.03)	Race w2 (Hispanic)	0.02 (0.03)
Race w2 (Other)	-0.01 (0.04)	Race w2 (Other)	-0.01 (0.04)	Race w2 (Other)	-0.01 (0.04)
Income w2	0.00 (0.01)	Income w2	0.00 (0.01)	Income w2	0.00 (0.01)
Both Bio Parents w2	0.02 (0.02)	Both Bio Parents w2	0.02 (0.02)	Both Bio Parents w2	0.02 (0.02)
Low Self-Control w2	-0.02 (0.02)	Low Self-Control w3	-0.02 (0.02)	Low Self-Control w4	-0.02 (0.02)
Parental Control w3 on		**Parental Control w4 on**		**Parental Control w5 on**	
Parental Knowledge w2	0.06* (0.03)	Parental Knowledge w3	0.06* (0.03)	Parental Knowledge w4	0.06* (0.03)
Parental Monitoring w2	0.07* (0.04)	Parental Monitoring w3	0.07* (0.04)	Parental Monitoring w4	0.07* (0.04)
Parental Control w2	0.45*** (0.05)	Parental Control w3	0.45*** (0.05)	Parental Control w4	0.45*** (0.05)
Child Concealment w2	-0.00 (0.03)	Child Concealment w3	-0.00 (0.03)	Child Concealment w4	-0.00 (0.03)
Violence w2	-0.05 (0.03)	Violence w3	-0.05 (0.03)	Violence w3	-0.05 (0.03)
Age w2	-0.12*** (0.01)	Age w2	-0.12*** (0.01)	Age w2	-0.12*** (0.01)

Gender (Female) w2	0.04 (0.03)	Gender (Female) w2	0.04 (0.03)	Gender (Female) w2	0.04 (0.03)
Race w2 (Black)	0.04 (0.05)	Race w2 (Black)	0.04 (0.05)	Race w2 (Black)	0.04 (0.05)
Race w2 (Hispanic)	-0.01 (0.05)	Race w2 (Hispanic)	-0.01 (0.05)	Race w2 (Hispanic)	-0.01 (0.05)
Race w2 (Other)	-0.07 (0.06)	Race w2 (Other)	-0.07 (0.06)	Race w2 (Other)	-0.07 (0.06)
Income w2	0.01 (0.01)	Income w2	0.01 (0.01)	Income w2	0.01 (0.01)
Both Bio Parents w2	-0.02 (0.03)	Both Bio Parents w2	-0.02 (0.03)	Both bio parents w2	-0.02 (0.03)
Low Self-Control w2	-0.06 (0.04)	Low Self-Control w3	-0.06 (0.04)	Low Self-Control w4	-0.06 (0.04)
		Concealment w2 (Indirect via Knowledge w3)	-0.01 (0.00)	Concealment w3 (Indirect via Knowledge w4)	-0.01 (0.00)
Child Concealment w3 on		**Child Concealment w4 on**		**Child Concealment w5 on**	
Parental Knowledge w2	-0.04 (0.02)	Parental Knowledge w3	-0.04 (0.02)	Parental Knowledge w4	-0.04 (0.02)
Parental Monitoring w2	-0.14*** (0.03)	Parental Monitoring w3	-0.14*** (0.03)	Parental Monitoring w4	-0.14*** (0.03)
Parental Control w2	-0.01 (0.02)	Parental Control w3	-0.01 (0.02)	Parental Control w4	-0.01 (0.02)
Child Concealment w2	0.49*** (0.05)	Child Concealment w3	0.49*** (0.05)	Child Concealment w4	0.49*** (0.05)
Violence w2	0.02 (0.02)	Violence w3	0.02 (0.02)	Violence w4	0.02 (0.02)
Age w2	-0.02* (0.01)	Age w2	-0.02* (0.01)	Age w2	-0.02* (0.01)
Gender (Female) w2	-0.09*** (0.02)	Gender (Female) w2	-0.09*** (0.02)	Gender (Female) w2	-0.09*** (0.02)
Race w2 (Black)	-0.05 (0.04)	Race w2 (Black)	-0.05 (0.04)	Race w2 (Black)	-0.05 (0.04)
Race w2 (Hispanic)	-0.02 (0.04)	Race w2 (Hispanic)	-0.02 (0.04)	Race w2 (Hispanic)	-0.02 (0.04)
Race w2 (Other)	-0.05 (0.05)	Race w2 (Other)	-0.05 (0.05)	Race w2 (Other)	-0.05 (0.05)
Income w2	0.00 (0.01)	Income w2	0.00 (0.01)	Income w2	0.00 (0.01)
Both Bio Parents w2	-0.05 (0.02)	Both Bio Parents w2	-0.05 (0.02)	Both Bio Parents w2	-0.05 (0.02)
Low Self-Control w2	0.15*** (0.03)	Low Self-Control w3	0.15*** (0.03)	Low Self-Control w4	0.15*** (0.03)
Violence w3 on		**Violence w4 on**		**Violence w5 on**	

Parental Knowledge w2	-0.03 (0.02)	Parental Knowledge w3	-0.03 (0.02)	Parental Knowledge w4	-0.03 (0.02)
Parental Monitoring w2	-0.00 (0.02)	Parental Monitoring w3	-0.00 (0.02)	Parental Monitoring w4	-0.00 (0.02)
Parental Control w2	0.00 (0.02)	Parental Control w3	0.00 (0.02)	Parental Control w4	0.00 (0.02)
Child Concealment w2	-0.01 (0.02)	Child Concealment w3	-0.01 (0.02)	Child Concealment w4	-0.01 (0.02)
Violence w2	0.53*** (0.09)	Violence w3	0.53*** (0.09)	Violence w4	0.53*** (0.09)
Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)
Gender (Female) w2	-0.07** (0.02)	Gender (Female) w2	-0.07** (0.02)	Gender (Female) w2	-0.07** (0.02)
Race w2 (Black)	0.02 (0.03)	Race w2 (Black)	0.02 (0.03)	Race w2 (Black)	0.02 (0.03)
Race w2 (Hispanic)	0.02 (0.03)	Race w2 (Hispanic)	0.02 (0.03)	Race w2 (Hispanic)	0.02 (0.03)
Race w2 (Other)	-0.01 (0.03)	Race w2 (Other)	-0.01 (0.03)	Race w2 (Other)	-0.01 (0.03)
Income w2	-0.02** (0.01)	Income w2	-0.02** (0.01)	Income w2	-0.02** (0.01)
Both Bio Parents w2	-0.03 (0.02)	Both Bio Parents w2	-0.03 (0.02)	Both Bio Parents w2	-0.03 (0.02)
Low Self-Control w2	0.08** (0.01)	Low Self-Control w3	0.08** (0.01)	Low Self-Control w4	0.08** (0.01)
Low Self-Control w3		**Low Self-Control w4**			
Low Self-Control w2	0.049*** (0.03)	Low Self-Control w3	0.049*** (0.03)		

*** $p < .001$, ** $p < .01$, * $p < .05$

Table S3. Results for the Cross Lagged Panel Model with Theft (Unstandardized Coefficients) N=752

Wave 3 variables	Estimate (S.E)	Wave 4 variables	Estimate (S.E)	Wave 5 outcomes	Estimate (S.E.)
Parental Knowledge w3 on		**Parental Knowledge w4 on**		**Parental Knowledge w5 on**	

Parental Knowledge w2	0.41*** (0.05)	Parental Knowledge w3	0.41*** (0.05)	Parental Knowledge w4	0.41*** (0.05)
Parental Monitoring w2	0.13** (0.04)	Parental Monitoring w3	0.13** (0.04)	Parental Monitoring w4	0.13** (0.04)
Parental Control w2	0.03 (0.02)	Parental Control w3	0.03 (0.02)	Parental Control w4	0.03 (0.02)
Child Concealment w2	-0.08** (0.03)	Child Concealment w3	-0.08** (0.03)	Child Concealment w4	-0.08** (0.03)
Theft w2	-0.03 (0.04)	Theft w3	-0.03 (0.04)	Theft w4	-0.03 (0.04)
Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)
Gender (Female) w2	0.14*** (0.03)	Gender (Female) w2	0.14*** (0.03)	Gender (Female) w2	0.14*** (0.03)
Race w2 (Black)	0.05 (0.05)	Race w2 (Black)	0.05 (0.05)	Race w2 (Black)	0.05 (0.05)
Race w2 (Hispanic)	0.03 (0.05)	Race w2 (Hispanic)	0.03 (0.05)	Race w2 (Hispanic)	0.03 (0.05)
Race w2 (Other)	0.05 (0.07)	Race w2 (Other)	0.05 (0.07)	Race w2 (Other)	0.05 (0.07)
Income w2	-0.02 (0.01)	Income w2	-0.02 (0.01)	Income w2	-0.02 (0.01)
Both Bio Parents w2	0.03 (0.03)	Both Bio Parents w2	0.03 (0.03)	Both Bio Parents w2	0.03 (0.03)
Low Self-Control w2	-0.04 (0.04)	Low Self-Control w3	-0.04 (0.04)	Low Self-Control w4	-0.04 (0.04)
Parental Monitoring w3 on		**Parental Monitoring w4 on**		**Parental Monitoring w5 on**	
Parental Knowledge w2	0.02 (0.01)	Parental Knowledge w3	0.02 (0.01)	Parental Knowledge w4	0.02 (0.01)
Parental Monitoring w2	0.67*** (0.03)	Parental Monitoring w3	0.67*** (0.03)	Parental Monitoring w4	0.67*** (0.03)
Parental Control w2	0.032** (0.01)	Parental Control w3	0.032** (0.01)	Parental Control w4	0.032** (0.01)
Child Concealment w2	-0.01 (0.02)	Child Concealment w3	-0.01 (0.02)	Child Concealment w4	-0.01 (0.02)
Theft w2	-0.00 (0.02)	Theft w3	-0.00 (0.02)	Theft w4	-0.00 (0.02)
Age w2	0.00 (0.00)	Age w2	0.00 (0.00)	Age w2	0.00 (0.00)
Gender (Female) w2	-0.01 (0.02)	Gender (Female) w2	-0.01 (0.02)	Gender (Female) w2	-0.01 (0.02)
Race w2 (Black)	0.01 (0.03)	Race w2 (Black)	0.01 (0.03)	Race w2 (Black)	0.01 (0.03)

Race w2 (Hispanic)	0.02 (0.03)	Race w2 (Hispanic)	0.02 (0.03)	Race w2 (Hispanic)	0.02 (0.03)
Race w2 (Other)	-0.01 (0.03)	Race w2 (Other)	-0.01 (0.03)	Race w2 (Other)	-0.01 (0.03)
Income w2	0.01 (0.01)	Income w2	0.01 (0.01)	Income w2	0.01 (0.01)
Both Bio Parents w2	0.02 (0.02)	Both Bio Parents w2	0.02 (0.02)	Both Bio Parents w2	0.02 (0.02)
Low Self-Control w2	-0.03 (0.02)	Low Self-Control w3	-0.03 (0.02)	Low Self-Control w4	-0.03 (0.02)
Parental Control w3 on		**Parental Control w4 on**		**Parental Control w5 on**	
Parental Knowledge w2	0.06* (0.03)	Parental Knowledge w3	0.06* (0.03)	Parental Knowledge w4	0.06* (0.03)
Parental Monitoring w2	0.07* (0.04)	Parental Monitoring w3	0.07* (0.04)	Parental Monitoring w4	0.07* (0.04)
Parental Control w2	0.45*** (0.05)	Parental Control w3	0.45*** (0.05)	Parental Control w4	0.45*** (0.05)
Child Concealment w2	0.00 (0.03)	Child Concealment w3	0.00 (0.03)	Child Concealment w4	0.00 (0.03)
Theft w2	-0.07 (0.04)	Theft w3	-0.07 (0.04)	Theft w3	-0.07 (0.04)
Age w2	-0.12*** (0.01)	Age w2	-0.12*** (0.01)	Age w2	-0.12*** (0.01)
Gender (Female) w2	0.04 (0.03)	Gender (Female) w2	0.04 (0.03)	Gender (Female) w2	0.04 (0.03)
Race w2 (Black)	0.03 (0.05)	Race w2 (Black)	0.03 (0.05)	Race w2 (Black)	0.03 (0.05)
Race w2 (Hispanic)	0.00 (0.05)	Race w2 (Hispanic)	0.00 (0.05)	Race w2 (Hispanic)	0.00 (0.05)
Race w2 (Other)	-0.07 (0.06)	Race w2 (Other)	-0.07 (0.06)	Race w2 (Other)	-0.07 (0.06)
Income w2	0.01 (0.09)	Income w2	0.01 (0.09)	Income w2	0.01 (0.09)
Both Bio Parents w2	-0.02 (0.03)	Both Bio Parents w2	-0.02 (0.03)	Both bio parents w2	-0.02 (0.03)
Low Self-Control w2	-0.06 (0.04)	Low Self-Control w3	-0.06 (0.04)	Low Self-Control w4	-0.06 (0.04)
		Concealment w2 (Indirect via Knowledge w3)	-0.01 (0.00)	Concealment w3 (Indirect via Knowledge w4)	-0.01 (0.00)
Child Concealment w3 on		**Child Concealment w4 on**		**Child Concealment w5 on**	

Parental Knowledge w2	-0.03 (0.02)	Parental Knowledge w3	-0.03 (0.02)	Parental Knowledge w4	-0.03 (0.02)
Parental Monitoring w2	-0.14*** (0.03)	Parental Monitoring w3	-0.14*** (0.03)	Parental Monitoring w4	-0.14*** (0.03)
Parental Control w2	-0.01 (0.02)	Parental Control w3	-0.01 (0.02)	Parental Control w4	-0.01 (0.02)
Child Concealment w2	0.49*** (0.04)	Child Concealment w3	0.49*** (0.04)	Child Concealment w4	0.49*** (0.04)
Theft w2	0.07* (0.03)	Theft w3	0.07* (0.03)	Theft w4	0.07* (0.03)
Age w2	-0.02* (0.01)	Age w2	-0.02* (0.01)	Age w2	-0.02* (0.01)
Gender (Female) w2	-0.08*** (0.02)	Gender (Female) w2	-0.08*** (0.02)	Gender (Female) w2	-0.08*** (0.02)
Race w2 (Black)	-0.05 (0.04)	Race w2 (Black)	-0.05 (0.04)	Race w2 (Black)	-0.05 (0.04)
Race w2 (Hispanic)	-0.02 (0.04)	Race w2 (Hispanic)	-0.02 (0.04)	Race w2 (Hispanic)	-0.02 (0.04)
Race w2 (Other)	-0.05 (0.05)	Race w2 (Other)	-0.05 (0.05)	Race w2 (Other)	-0.05 (0.05)
Income w2	0.00 (0.01)	Income w2	0.00 (0.01)	Income w2	0.00 (0.01)
Both Bio Parents w2	-0.04 (0.02)	Both Bio Parents w2	-0.04 (0.02)	Both Bio Parents w2	-0.04 (0.02)
Low Self-Control w2	0.15*** (0.03)	Low Self-Control w3	0.15*** (0.03)	Low Self-Control w4	0.15*** (0.03)
Theft w3 on		**Theft w4 on**		**Theft w5 on**	
Parental Knowledge w2	-0.01 (0.01)	Parental Knowledge w3	-0.01 (0.01)	Parental Knowledge w4	-0.01 (0.01)
Parental Monitoring w2	0.00 (0.02)	Parental Monitoring w3	0.00 (0.02)	Parental Monitoring w4	0.00 (0.02)
Parental Control w2	-0.02 (0.01)	Parental Control w3	-0.02 (0.01)	Parental Control w4	-0.02 (0.01)
Child Concealment w2	0.03 (0.02)	Child Concealment w3	0.03 (0.02)	Child Concealment w4	0.03 (0.02)
Theft w2	0.43*** (0.09)	Theft w3	0.43*** (0.09)	Theft w4	0.43*** (0.09)
Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)
Gender (Female) w2	-0.08*** (0.02)	Gender (Female) w2	-0.08*** (0.02)	Gender (Female) w2	-0.08*** (0.02)
Race w2 (Black)	0.01 (0.02)	Race w2 (Black)	0.01 (0.02)	Race w2 (Black)	0.01 (0.02)

Race w2 (Hispanic)	0.06* (0.03)	Race w2 (Hispanic)	0.06* (0.03)	Race w2 (Hispanic)	0.06* (0.03)
Race w2 (Other)	0.04 (0.03)	Race w2 (Other)	0.04 (0.03)	Race w2 (Other)	0.04 (0.03)
Income w2	-0.00 (0.00)	Income w2	-0.00 (0.00)	Income w2	-0.00 (0.00)
Both Bio Parents w2	0.06** (0.02)	Both Bio Parents w2	0.06** (0.02)	Both Bio Parents w2	0.06** (0.02)
Low Self-Control w2	0.08** (0.02)	Low Self-Control w3	0.08** (0.02)	Low Self-Control w4	0.08 (0.02)
Low Self-Control w3		**Low Self-Control w4**			
Low Self-Control w2	0.49*** (0.03)	Low Self-Control w3	0.49*** (0.03)		

*** $p < .001$, ** $p < .01$, * $p < .05$

Table S4. Results for the Cross Lagged Panel Model with Substance Use (Unstandardized Coefficients) N=754

Wave 3 variables	Estimate (S.E)	Wave 4 variables	Estimate (S.E)	Wave 5 outcomes	Estimate (S.E.)
Parental Knowledge w3 on		**Parental Knowledge w4 on**		**Parental Knowledge w5 on**	
Parental Knowledge w2	0.41*** (0.05)	Parental Knowledge w3	0.41*** (0.05)	Parental Knowledge w4	0.41*** (0.05)
Parental Monitoring w2	0.13** (0.04)	Parental Monitoring w3	0.13** (0.04)	Parental Monitoring w4	0.13** (0.04)
Parental Control w2	0.03 (0.02)	Parental Control w3	0.03 (0.02)	Parental Control w4	0.03 (0.02)
Child Concealment w2	-0.09** (0.03)	Child Concealment w3	-0.09** (0.03)	Child Concealment w4	-0.09** (0.03)
Substance Use w2	-0.01 (0.02)	Substance Use w3	-0.01 (0.02)	Substance Use w4	-0.01 (0.02)
Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)	Age w2	-0.01 (0.01)
Gender (Female) w2	0.15*** (0.03)	Gender (Female) w2	0.15*** (0.03)	Gender (Female) w2	0.15*** (0.03)
Race w2 (Black)	0.05 (0.06)	Race w2 (Black)	0.05 (0.06)	Race w2 (Black)	0.05 (0.06)
Race w2 (Hispanic)	0.02 (0.06)	Race w2 (Hispanic)	0.02 (0.06)	Race w2 (Hispanic)	0.02 (0.06)
Race w2 (Other)	0.04 (0.07)	Race w2 (Other)	0.04 (0.07)	Race w2 (Other)	0.04 (0.07)

Income w2	-0.02 (0.01)	Income w2	-0.02 (0.01)	Income w2	-0.02 (0.01)
Both Bio Parents w2	0.04 (0.03)	Both Bio Parents w2	0.04 (0.03)	Both Bio Parents w2	0.04 (0.03)
Low Self-Control w2	-0.04 (0.04	Low Self-Control w3	-0.04 (0.04	Low Self-Control w4	-0.04 (0.04
Parental Monitoring w3 on		**Parental Monitoring w4 on**		**Parental Monitoring w5 on**	
Parental Knowledge w2	0.02 (0.01)	Parental Knowledge w3	0.02 (0.01)	Parental Knowledge w4	0.02 (0.01)
Parental Monitoring w2	0.66*** (0.03)	Parental Monitoring w3	0.66*** (0.03)	Parental Monitoring w4	0.66*** (0.03)
Parental Control w2	0.03** (0.01)	Parental Control w3	0.03** (0.01)	Parental Control w4	0.03** (0.01)
Child Concealment w2	-0.01 (0.02)	Child Concealment w3	-0.01 (0.02)	Child Concealment w4	-0.01 (0.02)
Substance Use w2	-0.01 (0.01)	Substance Use w3	-0.01 (0.01)	Substance Use w4	-0.01 (0.01)
Age w2	0.00 (0.00)	Age w2	0.00 (0.00)	Age w2	0.00 (0.00)
Gender (Female) w2	-0.01 (0.01)	Gender (Female) w2	-0.01 (0.01)	Gender (Female) w2	-0.01 (0.01)
Race w2 (Black)	0.00 (0.03)	Race w2 (Black)	0.00 (0.03)	Race w2 (Black)	0.00 (0.03)
Race w2 (Hispanic)	0.01 (0.03)	Race w2 (Hispanic)	0.01 (0.03)	Race w2 (Hispanic)	0.01 (0.03)
Race w2 (Other)	-0.01 (0.04)	Race w2 (Other)	-0.01 (0.04)	Race w2 (Other)	-0.01 (0.04)
Income w2	0.01 (0.01)	Income w2	0.01 (0.01)	Income w2	0.01 (0.01)
Both Bio Parents w2	0.02 (0.02)	Both Bio Parents w2	0.02 (0.02)	Both Bio Parents w2	0.02 (0.02)
Low Self-Control w2	-0.03 (0.02)	Low Self-Control w3	-0.03 (0.02)	Low Self-Control w4	-0.03 (0.02)
Parental Control w3 on		**Parental Control w4 on**		**Parental Control w5 on**	
Parental Knowledge w2	0.06* (0.03)	Parental Knowledge w3	0.06* (0.03)	Parental Knowledge w4	0.06* (0.03)
Parental Monitoring w2	0.08* (0.04)	Parental Monitoring w3	0.08* (0.04)	Parental Monitoring w4	0.08* (0.04)
Parental Control w2	0.44***(0.05)	Parental Control w3	0.44***(0.05)	Parental Control w4	0.44***(0.05)
Child Concealment w2	0.00 (0.03)	Child Concealment w3	0.00 (0.03)	Child Concealment w4	0.00 (0.03)
Substance Use w2	-0.07**(0.02)	Substance Use w3	-0.07**(0.02)	Substance Use w3	-0.07**(0.02)

	-		-		-
Age w2	0.12***(0.01)	Age w2	0.12***(0.01)	Age w2	0.12***(0.01)
Gender (Female) w2	0.05 (0.03)	Gender (Female) w2	0.05 (0.03)	Gender (Female) w2	0.05 (0.03)
Race w2 (Black)	0.01 (0.05)	Race w2 (Black)	0.01 (0.05)	Race w2 (Black)	0.01 (0.05)
Race w2 (Hispanic)	-0.02 (0.05)	Race w2 (Hispanic)	-0.02 (0.05)	Race w2 (Hispanic)	-0.02 (0.05)
Race w2 (Other)	-0.08 (0.06)	Race w2 (Other)	-0.08 (0.06)	Race w2 (Other)	-0.08 (0.06)
Income w2	0.01 (0.01)	Income w2	0.01 (0.01)	Income w2	0.01 (0.01)
Both Bio Parents w2	-0.02 (0.03)	Both Bio Parents w2	-0.02 (0.03)	Both bio parents w2	-0.02 (0.03)
Low Self-Control w2	-0.05 (0.04)	Low Self-Control w3	-0.05 (0.04)	Low Self-Control w4	-0.05 (0.04)
		Child Concealment w2 (Indirect via Knowledge w3)	- 0.00(0.00)	Child Concealment w3 (Indirect via Knowledge w4)	- 0.00(0.00)
Child Concealment w3 on		**Child Concealment w4 on**		**Child Concealment w5 on**	
Parental Knowledge w2	-0.03 (0.02)	Parental Knowledge w3	-0.03 (0.02)	Parental Knowledge w4	-0.03 (0.02)
Parental Monitoring w2	- 0.14***(0.03)	Parental Monitoring w3	- 0.14***(0.03)	Parental Monitoring w4	- 0.14***(0.03)
Parental Control w2	-0.01 (0.02)	Parental Control w3	-0.01 (0.02)	Parental Control w4	-0.01 (0.02)
Child Concealment w2	0.50*** (0.04)	Child Concealment w3	0.50*** (0.04)	Child Concealment w4	0.50*** (0.04)
Substance Use w2	0.03 (0.02)	Substance Use w3	0.03 (0.02)	Substance Use w4	0.03 (0.02)
	-		-		-
Age w2	0.02***(0.01)	Age w2	0.02***(0.01)	Age w2	0.02***(0.01)
	-		-		-
Gender (Female) w2	0.09***(0.02)	Gender (Female) w2	0.09***(0.02)	Gender (Female) w2	0.09***(0.02)
Race w2 (Black)	-0.04 (0.04)	Race w2 (Black)	-0.04 (0.04)	Race w2 (Black)	-0.04 (0.04)
Race w2 (Hispanic)	-0.01 (0.04)	Race w2 (Hispanic)	-0.01 (0.04)	Race w2 (Hispanic)	-0.01 (0.04)
Race w2 (Other)	-0.05 (0.05)	Race w2 (Other)	-0.05 (0.05)	Race w2 (Other)	-0.05 (0.05)
Income w2	0.00 (0.01)	Income w2	0.00 (0.01)	Income w2	0.00 (0.01)
Both Bio Parents w2	-0.04 (0.02)	Both Bio Parents w2	-0.04 (0.02)	Both Bio Parents w2	-0.04 (0.02)

	0.15***		0.15***		0.15***
Low Self-Control w2	(0.03)	Low Self-Control w3	(0.03)	Low Self-Control w4	(0.03)
Substance Use w3 on		**Substance Use w4 on**		**Substance Use w5 on**	
Parental Knowledge w2	0.01 (0.03)	Parental Knowledge w3	0.01 (0.03)	Parental Knowledge w4	0.01 (0.03)
Parental Monitoring w2	-0.02 (0.04)	Parental Monitoring w3	-0.02 (0.04)	Parental Monitoring w4	-0.02 (0.04)
Parental Control w2	0.02 (0.02)	Parental Control w3	0.02 (0.02)	Parental Control w4	0.02 (0.02)
Child Concealment w2	0.01 (0.03)	Child Concealment w3	0.01 (0.03)	Child Concealment w4	0.01 (0.03)
	0.53***		0.53***		0.53***
Substance Use w2	(0.08)	Substance Use w3	(0.08)	Substance Use w4	(0.08)
	0.05***		0.05***		0.05***
Age w2	(0.01)	Age w2	(0.01)	Age w2	(0.01)
Gender (Female) w2	0.01 (0.03)	Gender (Female) w2	0.01 (0.03)	Gender (Female) w2	0.01 (0.03)
	-0.22**		-0.22**		-0.22**
Race w2 (Black)	(0.07)	Race w2 (Black)	(0.07)	Race w2 (Black)	(0.07)
	-0.17**		-0.17**		-0.17**
Race w2 (Hispanic)	(0.07)	Race w2 (Hispanic)	(0.07)	Race w2 (Hispanic)	(0.07)
Race w2 (Other)	-0.09 (0.07)	Race w2 (Other)	-0.09 (0.07)	Race w2 (Other)	-0.09 (0.07)
Income w2	0.01 (0.01)	Income w2	0.01 (0.01)	Income w2	0.01 (0.01)
Both Bio Parents w2	-0.05 (0.03)	Both Bio Parents w2	-0.05 (0.03)	Both Bio Parents w2	-0.05 (0.03)
Low Self-Control w2	0.11** (0.04)	Low Self-Control w3	0.11** (0.04)	Low Self-Control w4	0.11** (0.04)
Low Self-Control w3		**Low Self-Control w4**			
	.490***				
Low Self-Control w2	(0.03)	Low Self-Control w3			

**** p < .001, ** p < .01, * p < .05*