

FUTURE ORIENTATION, IMPULSIVITY, AND DEVIANCE: LONGITUDINAL
RELATIONSHIPS AND MULTILEVEL PROCESSES

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RELATIONSHIPS AND MULTILEVEL PROCESSES

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Pan Chen

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Pan Chen, daughter of Wangheng Chen and Xiaoxiang Li, was born July 2, 1980, in Changsha, Hunan, China. She graduated from Affiliated High School of Wuhan University in 1998. And attended Wuhan University in Wuhan for seven years, where she graduated in July of 2005, with a Master degree in Sociology. In August of 2005, she entered Graduate School at Auburn University pursuing a doctoral degree in Human Development and Family Studies under the tutelage of Dr. Alexander T. Vazsonyi. She married Geng Bang Jin, son of Biao Sheng Jin and Xian Xiang Jin, on January 26, 2007.

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Using a sample of over 14,000 adolescents from 145 schools of the National Longitudinal Study of Adolescent Health (Add Health), the current work tested the longitudinal relationship between future orientation and deviance while considering the impact by both impulsivity and the school context. Two interrelated and complimentary studies were conducted, each with a unique set of hypotheses. Based on hierarchical regressions, the first study tested the independent and interactive longitudinal relationships between future orientation, impulsivity, and deviance. The study also tested the effects by different domains of future orientation (education, life, and marriage) as well as developmental changes (early/middle versus late adolescence) in the links between future orientation, impulsivity, and deviance. Findings provided evidence of a negative longitudinal relationship between future orientation and deviance, net any

effects by background variables and impulsivity. In addition, future orientation moderated the effect by impulsivity on deviance. Future orientation in the education and life domains had a stronger relationship with deviance than marriage future orientation, and only education future orientation moderated the link between impulsivity and deviance. Finally, no developmental differences were found in the relationships between future orientation, impulsivity, and deviance. The second study investigated the independent longitudinal effects by future orientation and school context (school size, school location, school SES, and school-level future orientation) on adolescent deviance as well as potential moderation effects by school context on the future orientation-deviance link using a multilevel modeling strategy. Again, the effects by impulsivity were considered, although in this study, the variable was conceptualized as a control variable. Individual-level future orientation had a negative relationship with deviance, net any effects by control variables or level-2 school context constructs. In addition, the study provided evidence that school size and school-level future orientation predicted individual-level deviance. Finally, school-level future orientation moderated the relationship between individual-level future orientation and deviance. In conclusion, findings from the current work not only provided novel insights about the longitudinal relationship between future orientation and deviance, but also highlighted the importance of taking impulsivity into account in future work on future orientation. In addition, the findings also provided a number of insights into the effects by the school context on deviance, and therefore the ongoing debate regarding school effects.

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Chapter 1

A Review of Previous Work

I. Introduction

Adolescent deviance, namely behaviors that violate social norms, is a significant social and personal problem that threatens the well-being of youth, families, and communities. Over the past several decades, many resources have been invested in the prevention and treatment of problem behaviors, with particular focus on adolescents (e.g., CDC, 1998; CDC, 2004). Extremely maladaptive behaviors by adolescents, such as deviant or criminal behaviors, appear to reflect an individual's tendency to discount future consequences in favor of present gratification (Gottfredson & Hirschi, 1990). Young people may risk their future more than adults do as adolescent development represents a journey of self-discovery; some have suggested that missing access to needed resources and developmental opportunities may hinder the "construction" of an adolescent's identity (Ferrer-Wreder, Lorente, Kurtimes, Briones, Bussell, et al., 2004). One of the important facets of identity development includes adolescents' expectations of who they might be in the future (Kerpelman & Pittman, 2001). These future expectations are one important element of Jessor's (1991, 2003) multi-dimensional risk and protective factor model which has been widely used to explain adolescent problem behaviors. Consistent with Jessor's conceptual work, Trommsdorff (1983) and Nurmi (1991, 1993)

introduced the concept of future orientation and provided evidence for its association with deviance.

The decision making process of deviant behaviors could be explained by the concept “hedonic calculus” (Bentham, 1970), namely that crimes and similar behaviors will be committed by individuals if pleasurable consequences of acts exceed painful ones. Therefore, people with a more positive future orientation are generally less likely to engage in deviant behaviors, as they are more sensitive to the future consequences of their present behavior (Routledge & Arndt, 2005). Thus, future orientation is an important construct worth investigating in order to better understand the etiology of adolescent deviant behaviors.

Research has provided evidence of a negative relationship between future orientation and a variety of problem behaviors, including alcohol use (Robins & Bryan, 2004), drug use (Bolland, 2003; Bolland, Bryant, Lian, McCallum, Vazsonyi et al., 2007; Keough, Zimbardo & Boyd, 1999; Robins & Bryan, 2004; Trommsdorff, 1986;), theft (Oyserman & Saltz, 1993), risky sexual behaviors (Gilchrist & Schinke, 1987; Morris, Baker, & Valentine, 1998; Robins & Bryan, 2004; Whitaker, Miller & Clark, 2000), and school misconduct (Caldwell, Wiebe & Cleveland, 2006; Skorikov & Vondracek, 2007). The association between future orientation and deviant behaviors has been found among institutionalized youth (e.g., Trommsdorff, 1986; Trommsdorff & Lamm, 1980; Robins & Bryan, 2004) as well as general population of adolescents (e.g., Bolland, 2003; Bolland et al., 2007; Gilchrist & Schinke, 1987; Skorikov & Vondracek, 2007; Whitaker et al., 2000).

However, although substantial empirical support exists for the relationship between future orientation and deviance, the relationship has not been thoroughly tested. First, despite the fact that conceptual work has provided directional hypothesis, it remains largely unknown whether a low-level or pessimistic future orientation increases the likelihood of problem behaviors and deviance or vice versa, as only a limited number of longitudinal studies have been conducted in this research area. Second, the relative effect by future orientation on deviance while controlling for impulsivity remains unclear, as this issue has not been widely tested and generalizable conclusions could not be drawn based on existing studies. The decision making process involved in engaging in deviant behaviors is driven by both immediate gratification and a calculation of future rewards/costs. Therefore, it is important to test whether future orientation predicts adolescent deviance while controlling for the effects by impulsivity and how impulsivity interacts with future orientation to influence adolescent deviant behaviors. Third, few studies have tested or compared the effects by domain-specific future orientation (e.g., education, marriage, and life future orientation) on deviance as well as their potential moderation effects on the impulsivity-deviance link. In addition, it is also important to study developmental differences in the effects by future orientation and impulsivity on adolescent deviance as the evidence suggests that younger adolescents demonstrate weaker future orientation than older adolescents (Steinberg, Graham, O'Brien, Woolard, Cauffman et al., 2009). Therefore, future orientation might have different amounts of influence on deviant behaviors for younger adolescents in comparison to older ones. Finally, little research has considered contextual influences by schools on the link

between future orientation and adolescent deviance, despite Bronfenbrenner's (1979) seminal conceptual work on this issue. Youth spend nearly half of their waking hours at school; therefore, it is an important developmental context in which future orientation and associated behaviors develop. Given the potential effects by the school context on both adolescent future orientation and deviance as suggested by previous empirical studies (e.g., Ayalon & Yuchtman-Yaar, 1989; Felson, Liska, South, & McNulty, 1994; Kasen, Johnson, & Cohen, 1999; Shavit & Williams, 1985), research must consider and thoroughly test potential school context effects when examining the link between future orientation and deviance.

The current work consists of two interrelated and complimentary studies. The aim of the first study was to test the longitudinal associations between future orientation and deviance, while considering the effects by impulsivity. The second study aimed to examine the longitudinal links between future orientation and adolescent deviance, while considering the effects by the school context. Data for both studies were drawn from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative sample that examines the causes and consequences of health related behaviors in adolescents (grades 7 through 12) and in young adults (around age 19 to 24). The unmatched features of the Add Health study are the nested data structure and that it is longitudinal, following a large national sample of youth from early adolescence through young adulthood, thus permitting comprehensive tests of the proposed research questions.

The importance of the current studies lies in the fact that the longitudinal effects by future orientation on adolescent deviance have not been studied. Given how theoretical work and previous, largely cross-sectional empirical work has supported this link, gaining insights about these longitudinal relationships will provide new insights into this research area. In addition, the current work also aids in the understanding of the etiology of adolescent deviance by examining the effects of future orientation and impulsivity on deviance simultaneously. As future orientation and impulsivity both play important roles in the decision making process, it is important to investigate their relative as well as potentially interactive effects on deviance. Additionally, it was paramount to study these questions using an appropriately developmental framework, namely one which tested for potential developmental differences in the links between future orientation, impulsivity, and deviance, because previous studies have suggested developmental differences in the level of future orientation. This work also contributes to our understanding of how school contextual effects impact adolescent development by addressing and testing specific individual characteristics and school-level effects on adolescent deviance simultaneously. Although the school has been widely recognized as an important developmental context, it remains unclear whether school contextual effects on deviance are spurious and become nonsignificant once individual level characteristics known to affect deviance are considered. The current work provides insights into the ongoing debate on school effects; in addition, it highlights the importance of using appropriate analytic tools (i.e., multi-level method) in research that focuses on studying contextual effects, and therefore, provides important directions for future research.

II. Literature Review

The association between future orientation and deviance has received extensive empirical attention (e.g., Bolland, 2003; Gilchrist & Schinke, 1987; Robins & Bryan, 2004; Trommsdorff & Lamm, 1980; Whitaker et al., 2000), but few studies have tested the longitudinal associations between future orientation and adolescent deviance (cf., Skorikov & Vondracek, 2007). In addition, it remains unclear that to what extent future orientation predicts adolescent deviance while controlling for the effect of impulsivity, and whether future orientation interacts with impulsivity to impact adolescent deviance. Third, few studies have tested whether future orientation from different domains (e.g., education, marriage, and life domains) differ in their effects on deviance and/or interact differently with impulsivity to influence deviance. It is also unknown whether the relationship between future orientation, impulsivity, and deviance change developmentally, namely for early/middle adolescents versus late adolescents. Finally, no research has considered school contextual effects on the link between future orientation and adolescent deviance, despite the possible influence of school context on both adolescent future orientation and deviance. Therefore, in order to thoroughly test the relationship between future orientation and adolescent deviance, longitudinal studies need to consider potential effects by impulsivity and the school context. The subsequent literature review has the following objectives. First, following a brief introduction of the concept of future orientation, empirical findings regarding the relationship between future orientation and deviance is reviewed. Secondly, the importance of conducting a longitudinal study as well as the importance of taking impulsivity into account when

examining the relationship between future orientation and deviance is discussed. Next, the rationale for investigating the effects by domain-specific future orientation on deviance is examined. In addition, potential developmental differences in the effects by future orientation and impulsivity on adolescent deviance are discussed. Finally, studies that have tested school contextual effects on adolescent future orientation or deviance are reviewed; this also includes a general discussion of the debate surrounding contextual effects.

The Concept of Future Orientation

A key characteristic of the human mind is thinking about and acting upon the future (Nurmi, 2005). Numerous conceptualizations exist that describe this fundamental human trait. Lewin (1942) developed the future-time perspective which identifies the importance a person attaches to the future. Other conceptualizations include time orientation (i.e., to what extent a person orients to past, present, and future in his/her thinking; Hoornaert, 1973), temporal extension (i.e., how far into the future an individual's thinking and interests are projected; Lessing, 1972), or possible selves (i.e., elements of the self-concept that represent the individual's goals, motives, fears and anxieties or conceptions of one's self in future states and circumstances; Oyserman & Markus, 1990). However, the term most widely used to describe a person's expectations about and actions related to the future is future orientation (Nurmi, 2005). Future orientation has been defined as consciously self-constructed and represented images of the future, which consists of cognitive (e.g., anticipating and estimating the likelihood of future events), motivational (i.e., future-oriented goals, interests, as well as concerns,

doubts, and fears), and affective dimensions (e.g., optimism, pessimism; Nurmi, 1991; Trommsdorff, Burger, & Fuchsle, 1982). Based on a person's future orientation, individuals direct their development in certain ways and purposefully select a variety of life trajectories (Nurmi, 1993). Thus, future orientation is responsible for future-oriented behaviors (or a lack thereof), such as delay of gratification or planning and achieving future goals (Trommsdorff, Lamm & Schmidt, 1979).

Most research on future orientation has focused on the adolescent age group. This is not surprising, given that adolescence is a critical period for the development of an individual's future orientation. The future for youth is more wide open than for adults; therefore, an important task for adolescents is to develop their expectations for the future and launching her- or himself into their adult roles (Seginer, 2005). The importance of future orientation for adolescent development was initially discussed by Lewin (1939). Because adolescence is a period during which individuals are given more autonomy, youth can actively prepare for the future. It is a critical stage during which individuals continue to develop cognitive skills that allow adolescents to establish their expectations for the future. The developed future orientation then serves as the foundation for setting goals, planning, exploring, and making commitments, and consequently, guides an adolescent's developmental course (Bandura, 2001; Nurmi, 1991; Seginer, 2005; Trommsdorff, 1986).

Future Orientation and Deviant Behaviors

Based on a person's future orientation, individuals direct their development in certain ways and purposefully select a variety of life trajectories (Nurmi, 1993). Thus,

future orientation is responsible for future-oriented behaviors (or a lack thereof), such as delay of gratification or planning and achieving future goals (Trommsdorff et al., 1979). The decision making process of engaging in deviant behaviors can be described by the process known as “hedonic calculus,” an idea originally developed by Bentham (1776) in the late 18th century. He postulated that crimes and similar behaviors will be committed by individuals if pleasurable consequences of acts exceed painful ones. Thus, the future consequences of current behaviors (i.e., the influence of current behaviors on one’s future) play an important role in this calculus. Therefore, deviance appears to reflect an individual’s tendency to discount future consequences in favor of present gratification. Related to this, future-oriented individuals are more likely to consider the future consequences of their current behaviors during the decision making process, and individuals with a more positive future orientation are generally more sensitive to future consequences of their present acts (Routledge & Arndt, 2005). Consequently, individuals with more a positive future orientation are less likely to engage in deviance behaviors, as these behaviors may risk their future.

The link between future orientation and deviance was also suggested by Problem Behavior Theory (Jessor, Turbin, Costa, Dong, Zhang et al., 2003). According to this theory, low expectations for success or a sense of hopelessness about the future is a key vulnerability risk factor that increases the likelihood of engaging in problem and deviant behaviors. Specifically, youth with pessimistic future expectations in the family, education, or work domains have a greater personal vulnerability for involvement in such behaviors. This is consistent with Nurmi’s (1991) prediction that adolescents who are not

oriented toward the future are more likely to engage in a variety of problem behaviors, including delinquency, problems in school, or drug use.

The Empirical Evidence for the Future Orientation-Deviance Link

Research has provided fairly consistent evidence of a negative relationship between future orientation and a variety of problem behaviors and deviance. Several studies have examined the cross-sectional relationship between future orientation and deviance by comparing the level of future orientation between officially delinquent youth (i.e., institutionalized or incarcerated adolescents) and non-delinquent adolescents or by investigating the association between future orientation and deviance, both with samples of institutionalized or incarcerated adolescents and normally developing youth. Based on a sample of 240 male institutionalized and noninstitutionalized adolescents, Trommsdorff and Lamm (1980) found that delinquent youth have a shortened and less structured future orientation in comparison to non-institutionalized adolescents. In addition, institutionalized adolescents expect their future to be more negative than non-delinquent youth in most areas of life; related to this, their general optimism was found to be lower than that of non-delinquents. However, these findings were based on cross-sectional data, and therefore, the study was unable to address the directionality of the relationships. Trommsdorff and Lamm themselves called for longitudinal work to further address this question.

Other studies based on incarcerated adolescents have also provided support for the negative relationship between future orientation and deviance, again based on cross-sectional data. Oyserman and Saltz (1993) investigated the relationship between the

content of future-oriented self-concept and delinquency using a sample of 230 inner-city high school and incarcerated boys. They found that compared with non-delinquents, officially delinquent adolescents were less future-oriented (i.e., they were less likely to view future-oriented selves as important; in addition, they were less likely to make efforts to achieve future-oriented selves). Another study by Peters and colleagues (2005) tested the relationship between future orientation and substance use in a sample of 963 alternative school students in grades 7 to 12. They found a negative relationship between future orientation and a measure of recent substance use as well as lifetime substance use. Robins and Bryan (2004) also examined the link between future orientation and a variety of risk behaviors in a sample of 300 adjudicated adolescents; they found that adjudicated youth with a more positive future orientation were less likely to use drugs and to have sex when drinking alcohol. These adolescents also reported fewer alcohol problems, lower levels of alcohol use, and perceived these behaviors as more risky than their peers.

Similar relationships between future orientation and problem behaviors or deviance have also been documented in samples of normally developing adolescents. Hill and colleagues (1997) tested the relationship between future unpredictability beliefs and risk-taking using a small sample of community college students (N=107) and found that the frequency of risk-taking was higher for those with higher future unpredictability beliefs and shorter lifespan estimates. The relationship between future uncertainty and deviance was also supported by evidence found by Caldwell and colleagues (2006) in a study based on 2,984 African American adolescents from the National Longitudinal Study of Adolescent Health. Furthermore, Bolland (2003) tested the relationship between

hopelessness and deviance in a sample of 2,468 inner-city, African American adolescents and found a link between hopelessness and violence, substance use, risky sexual behaviors, and even accidental injury (see also DuRant, Cadenhead, Pendergrast, Slavens, & Linder, 1994). Studies on time perspective (i.e., the cognitive processes partitioning human experience into past, present, and future temporal frames; Zimbardo & Boyd, 1999) also provided evidence supporting the relationship between future time perspective and measures of problem behaviors, including substance use (Keough et al., 1999; Wills, Sandy, & Yaeger, 2001), risky driving (Zimbardo, Keough, & Boyd, 1997), and risky sexual behaviors (Agnew & Loving, 1998; Rothspan & Read, 1996). Samples in these studies were largely convenience samples of elementary students (Wills et al., 2001) or college students (Agnew & Loving, 1998; Keough et al., 1999; Rothspan & Read, 1996; Zimbardo et al., 1997), with a sample sizes ranging from N=188 (Rothspan & Read, 1996) to N=2,627 (Keough et al., 1999).

Similar to studies conducted on institutionalized adolescents, findings from normally developing adolescents were based largely on cross-sectional data. As a matter of fact, all the studies reviewed utilized a cross-sectional design. Only one study by Skorikov and Vondracek (2007) has examined the relationship between future orientation and deviance using longitudinal data; they examined the longitudinal association between career orientation and adolescent problem behaviors in a sample of 234 junior-high and high-school students. Their study offered empirical support for the hypothesis that positive career orientation in effect inhibits the development of problem behaviors during adolescence.

Cross-sectional associations between future orientation and deviance in the literature range from about $r = -.10$ to $r = -.20$ (e.g., Caldwell et al., 2006; DuRant et al., 1994; Hill et al., 1997; Keough et al., 1999; Robbins and Bryan, 2004; Wills et al., 2001), and are thus weak to moderate in size. It is important to note that the relationship between future orientation and deviance holds up even after controlling for background variables, such as age, sex, ethnicity, and measures of the family and neighborhood contexts, including family structure, SES, and neighborhood disadvantages (e.g., Caldwell et al., 2006; Peters et al., 2005; Robbins & Bryan, 2004). Thus, in conclusion, future orientation is an important factor that should be taken into consideration when investigating the etiology of adolescent deviance.

Limitation of Previous Studies

The current study seeks to build on previous work by overcoming some of its limitations. First, although the cross-sectional relationship between future orientation and deviance has been consistently established, it remains largely unknown whether a low or pessimistic future orientation increases the likelihood of deviant behaviors over time. Again, this is so because few longitudinal studies have been completed in this area. Second, no generalized conclusions can be drawn for the future orientation-deviance link as studies in this area focused exclusively on local or small samples. Although the sample used by Caldwell and colleagues (2006) was based on a nationally representative sample (the Add Health study), the fact that they only included a subsample of African American adolescents makes it impossible to generalize the findings to adolescents of other ethnic or racial backgrounds. Third, few studies have provided generalizable findings regarding

the relative effects by future orientation on adolescent deviance while also considering potential effects by impulsivity, or while considering potential synergistic effects between future orientation and impulsivity, despite the fact that the decision making process involved in engaging in deviant behaviors is driven by both immediate gratification and a calculation of future rewards/costs (Greene, Sommerville, Nystrom, Dariey, & Cohen, 2001; McClure, Laibson, Loewenstein, & Cohen, 2004; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). In addition, few studies tested whether future orientation from different domains (education, marriage, and life) differs in its effects on deviance and/or interacts differently with impulsivity to influence deviance. It is also unknown whether future orientation and impulsivity function differently or similarly for early and middle adolescents versus late adolescents, although it has been recognized that younger adolescents are more impulsive and have a weaker future orientation than older adolescents. Finally, almost no work has considered or tested the salience of contextual influences (e.g., the school) on the link between future orientation and deviance; this is so despite Bronfenbrenner's seminal conceptual work on Ecological System Theory developed over three decades ago.

The Importance of Conducting Longitudinal Studies

Despite the fact that conceptual work has provided directional hypotheses, it remains largely unknown whether a pessimistic future orientation increases the likelihood of deviant behaviors over time as essentially no longitudinal work has been completed in this area. Yet, much research in the area describes the association between future orientation and deviance in causal terms and makes directional prediction and hypotheses

despite the fact that directional hypotheses in non-experimental research can only be tested with longitudinal data, as the “causal” variable must temporally precede the “effect.” Even though Skorikov and Vondracek (2007) tested the longitudinal association between career orientation and adolescent problem behaviors, their study focused exclusively on career orientation, and thus, it remains unknown whether general future orientation or future orientation in specific domains has longitudinal influences on adolescent deviance as well. In addition, the size of their sample used in their study was modest (234 junior-high and high-school students), not representative, and drawn from a single, small geographical area with limited ethnic diversity (Skorikov & Vondracek, 2007). Therefore, it is unclear that to what extent their findings can be generalized. In conclusion, new longitudinal research based on representative samples is needed to bring further clarity to scholarship in this area.

A Consideration of Impulsivity

Future orientation does not operate alone in the decision making process of committing deviant behaviors, as the performance on delay discounting tasks activates two different brain systems which reflects a combination of both impulsivity and future orientation (Steinberg et al., 2009). Research based on brain activity assessed by functional magnetic resonance imaging (fMRI) supports that short-run impatience is driven by the limbic system, which responds preferentially to immediate rewards/costs and is less sensitive to the future rewards/costs, whereas the lateral prefrontal cortex and associated structures supporting higher cognitive functions mediates the deliberative and

abstract reasoning presumed to under gird future orientation (Greene et al., 2001; McClure et al., 2004; Sanfey et al., 2003).

This is consistent with the time-perspective theory which proposes that an orientation toward the present versus the future (the present time perspective versus the future time perspective) is a dispositional construct underlying various types of risky behaviors. Future orientation works when individuals take long-term consequences of their behaviors into account, whereas impulsivity makes individuals focus on the immediate gratifications. Therefore both future orientation and impulsivity appear to play important roles in the decision making process preceding risky behaviors and need to be considered simultaneously when studying deviant behaviors. One potential model for understanding delay discounting behavior is that of competing processes between impulsivity and future orientation, in which the predominance of the former leads to a preference for immediate rewards, while a predominance of the latter leads to preference for delayed ones (Steinberg et al., 2009). Impulsivity has been consistently found to have a positive relationship with deviance (e.g., Moffitt, Caspi, Harrington, & Milne, 2002; White et al., 1994), which is different from the association between future orientation and deviance in direction. Therefore, in addition to the relative effects of future orientation and impulsivity on deviance, the current study also aims to investigate whether future orientation interacts with impulsivity to influence deviant behaviors over time.

Studies on time perspective provide some implications for the relative effects of future orientation and impulsivity on deviance. It has been found that future time perspective, a measure of future orientation, and risky behaviors are significantly

correlated, controlling for the present time perspective, a measure for impulsive personality traits (e.g., Keough, et al., 1999; Wills et al., 1999; Zimbardo, et al., 1997). Robbins and Bryan's (2004) study more closely tested the relationship between future orientation and impulsivity. Based on a sample of 300 adjudicated adolescents, they examined the relationship between both future orientation and impulsivity on several risky behaviors. In their study, future orientation was conceptualized and measured as the degree to which individuals process positive attitudes toward the future. They found that levels of future orientation were significantly related to having sex while using alcohol, alcohol use, problems related to alcohol use, and substance use, net any effects by impulsive sensation seeking. Interestingly, they also found that future orientation was more strongly related to the outcomes than was impulsive sensation seeking. Furthermore, they found that the interaction between future orientation and impulsivity was significantly associated with alcohol use problems.

In conclusion, previous studies provide evidence for the relative effect of future orientation on deviance, net the effect by impulsivity and/or the interaction effect between future orientation and impulsivity. Again, the samples in these studies are not diverse enough for making generalizable conclusions. While samples for the time perspective studies have been predominantly based on college students, Robbins and Bryan's (2004) sample focused exclusively on adjudicated adolescents. In addition, the data used in this work has been cross-sectional; therefore, inferences about causality cannot be made. Again, this calls for new work which uses longitudinal samples as well as more representative samples to test whether future orientation is likely to influence

deviant behaviors above and beyond the effects by impulsivity, and whether future orientation interacts with impulsivity to impact deviant behaviors.

Effects by Domain-Specific Future Orientation

In order to thoroughly test the effect by future orientation on deviance, different domains of future orientation (education, marriage, and life future orientation) were also examined, whether these have differential effects on deviance and/or they interact with impulsivity in the prediction of deviance. Trommsdorff and Lamm (1980) have suggested that the cognitive and affective aspects of future orientation have to be studied with respect to the content of the concerns. In other words, the thematic focus of future orientation, namely future orientation in different life domains, needs to be differentiated and tested separately. The majority work in this area has tested future orientation effects on deviance without considering domain-specific features and without focusing on multiple domains (e.g., Bolland, 2003; Bolland et al., 2007; Hill et al., 1996; Peters et al., 2005; Robins & Bryan, 2004; Skorikov & Vondracek, 2007). In addition, no studies to date have tested whether future orientation in different domains has similar or different effects on the impulsivity-deviance link. The most relevant study by Caldwell and colleagues (2006) focused exclusively on African American adolescents from Wave I of the Add Health study; it tested the effects by domain-specific future orientation (college, marriage, and basic life future certainty) on deviance. They found that marriage future orientation had no effect on deviance, while college and basic life future orientation predicted deviance. However, their work did not test the longitudinal associations

between domain-specific future orientation and deviance. Finally, they also did not consider impulsivity and only focused on the future orientation-deviance link.

Developmental Differences in the Future Orientation-Deviance Link

Studies of future orientation have also examined developmental changes and differences. Empirical work has shown that adolescents become more future-oriented as they get older (Furby & Beyth-Marom, 1992; Greene, 1986; Nurmi, 1991; Steinberg et al., 2009). Therefore, in order to thoroughly test the effect by future orientation, it is also important to investigate whether the magnitude of the effects by future orientation and impulsivity on deviance differs for adolescents at different age groups. Using functional magnetic resonance imaging (fMRI) techniques, it was found that future orientation is driven by the lateral prefrontal cortex and associated structures (Green et al., 2001; McClure et al., 2004; Sanfey et al., 2003). As the prefrontal cortex, the area involved in reasoning, decision making, and future orientation, hasn't completely developed during the early adolescent developmental period, young adolescents are more impulsive and less capable at taking the future consequences of their behaviors into account than older adolescents or adults (Steinberg et al., 2009).

For instance, Grisso et al.'s (2003) study examined age differences in legal decision-making in which individuals were presented with hypothetical dilemmas (e.g., how to respond to a police interrogation when one has committed a crime). By comparing the decision-making abilities of 927 adolescents with those of 466 young adults, Grisso and colleagues (2003) found that younger adolescents were significantly less likely to recognize the long-term consequences of their decisions than older ones. This is

consistent with what Steinberg and colleagues (2009) have found in their recent study. Based on a sample of 935 individuals between the ages of 10 and 30, Steinberg and colleagues compared levels of self-reported future orientation across seven different age groups (i.e., 10-11, 12-13, 14-15, 16-17, 18-21, 22-25, and 26-30) and found that younger adolescents consistently demonstrated a weaker future orientation than older individuals. Specifically, younger adolescents in their study were less concerned about the future and less likely to anticipate the consequences of their decisions. Based on the findings from Steinberg et al.'s study, we might expect that future orientation as a different influence on deviant behaviors for early/middle adolescents in comparison to late adolescents (adolescents 18 years and older). In fact, the findings imply that future orientation, as measured in the current study (adolescent expectations about their future), might have a weaker effect on deviance for younger adolescents as they are less likely to think about future consequences of their actions. In other words, younger adolescents might be less concerned about whether their place their future at risk, even if they have a positive outlook on future.

The finding that older adolescents are more future-oriented than younger ones could be explained by the timing of brain development. Decision driven by impulsivity activates the limbic system of brain whereas the lateral prefrontal cortex and associated structures are activated by future-oriented decision (McClure et al., 2004). Research based on brain activity assessed by functional magnetic resonance imaging (fMRI) provided evidence that behavioral choice is directly associated with the relative engagement of the two systems (McClure et al., 2004). Younger adolescents are likely to

be more influenced by functionally mature limbic regions as these mature earlier than prefrontal control regions (Casey, Getz, & Galvan, 2008). Therefore, the behavioral choices by younger adolescents, compared with the ones by older adolescents, might depend to a lesser extent on future orientation which is mediated by the prefrontal control system, a system that is less mature in younger adolescents.

Older adolescents think more and report planning more about their future (Nurmi, 1991; Steinberg et al., 2009) because of increases in higher-order cognitive capacities, which has been described as dependent on maturation of the prefrontal cortex (Rubia, Overmeyer, Taylor, Brammer, Williams, et al., 2000; Tamm, Menon, & Reiss, 2002). Thus, the prefrontal cortex system appears to play a more important role in the decision making process for older adolescents than for younger ones, simply due to additional maturation. As the deliberative and abstract reasoning presumed to under gird future orientation is mediated by prefrontal cortex system and associated structures (McClure, et al., 2004; Steinberg et al., 2009), we would expect a stronger influences by future orientation on decision making processes for older adolescents. On the other hand, we would also expect a weaker influence by younger adolescents, and thus a stronger one by measures of the limbic system, such as impulsivity.

A competing view about the developmental differences in the future orientation-deviance and impulsivity-deviance links is that the relationships between future orientation, impulsivity and deviance will remain unchanged developmentally, despite described mean level differences in future orientation. Although no studies to date tested specifically the developmental differences or similarities in the links between future

orientation, impulsivity, and deviance, insights from other work provides important implications for this competing view. A number of studies by Vazsonyi and colleagues tested for developmental similarities or differences in the relationships between low self-control, family processes, and deviance (early/middle adolescent versus late adolescent) and found no differences in these links, despite described mean level differences in predictors and outcomes (e.g., Vazsonyi, Pickering, & Bolland, 2006; Vazsonyi, Pickering, Junger, & Hessing, 2001). These findings show that mean level differences and patterns of associations are independent. Thus, these findings imply that the relationships between future orientation, impulsivity, and deviance might remain unchanged developmentally. Therefore, one of the goals of the current work is to test these competing predictions about potential developmental changes in the links between the future orientation, impulsivity, and deviance.

The Salience of School Context

Considering the salience of “context” is consistent with Bronfenbrenner’s (1979) seminal ecological perspective on human development. The school context is one of the multiple contexts within which children develop, and this context becomes increasingly important as young people mature (Jurkovic & Ulrici, 1985). In the United States, adolescents spend nearly half of their waking hours at school (Smith, Boutte, Zigler, & Finn-Stevenson, 2004; U.S. DHHS, 2001); therefore it is an important context to consider in the development of adolescents. The potential influences by the school context on both future orientation and deviance are obvious and have been supported by research in the literature (e.g., Ayalon & Yuchtman-Yaar, 1989; Buchmann & Dalton, 2002; Felson,

Liska, South, & McNulty, 1994; Gottfredson, 2001; Kasen, Johnson, & Cohen, 1990; Shavit & Williams, 1985), which highlights the importance of considering school influences on adolescent development.

Future Orientation in Context

The development of future orientation is likely a “multi-level process” that is influenced by a multitude of contextual factors. Future orientation develops in institutional and cultural contexts, where normative expectations and knowledge provide a basis for future oriented interests and plans (Nurmi, 1991). In addition, beliefs concerning the future are also learned through social interactions with other people, such as parents and peers (Kandel & Lesser, 1969). Most studies to date have focused on two contextual domains, namely the family and culture, although it is important to note that they have not been able to rigorously test contextual effects which is only possible with recent data analytic techniques, such as multi-level modeling. The family has been shown to be the most important developmental context (Jurkovic & Ulrici, 1985). Young people seek their parents' advice and opinions for longer-term, important, and difficult decisions (Wilks, 1985). Research has shown that adolescents hold more optimistic views about their future when they receive more parental support (Kenny, Blustein, Chaves, Grossman, & Gallagher, 2003), that positive family interactions and marital happiness of parents encourage adolescents to actively plan for their own future marriage and family (Nurmi, 1988), and that perceived parental acceptance is positively related to adolescent future orientation (Nurmi & Pulliainen, 1991; Seginer, Vermulst, & Shoyer, 2004).

Based on mean level comparisons across contexts, findings have also provided evidence that adolescents from different cultures vary in their domains of interest regarding future-oriented goals (Seginer, 2001). Such differences have been found in comparisons of youth from “modern” versus more traditional societies (Sundberg, Poole, & Tyler, 1983), between adolescents from developing and developed countries (Seginer, 2001), and between adolescents from different ethnic groups located in the same country (Lamm, Schmidt, & Trommsdorff, 1976).

Previous studies provide some “simple” evidence for contextual influences on adolescent future orientation – like the family or culture. Researchers have also examined and acknowledged contextual school effects in one specific domain of adolescent future orientation, namely educational expectations. It has been suggested that aggregated school-level educational expectations as well as the mean level academic ability both have an influence on the development of educational expectations of students (Khattab, 2005). The influence of other school constructs, such as school type (college-preparatory schools and vocational schools) and school SES has also been empirically supported (Ayalon & Yuchtman-Yaar, 1989; Buchmann & Dalton, 2002; Shavit & Williams, 1985). School effects on educational expectations provide implications for possible school effects on other domains of future orientation. Some findings have provided evidence for distinct future-oriented goals based on different types of schools. For example, it was found that college-preparatory students’ future-oriented goals focused on career preparation whereas the ones for students in vocational schools focused on preparation for adult roles (Klacznski & Reese, 1991). Thus, the school may work as a basis from

which an adolescent's specific future orientation develops. In fact, Nurmi (1991) proposed that the school climate provides incentives for thinking about current life-tasks as well as for opportunities to compare one's own behavior with that of others. These empirically supported contextual effects on the development of future orientation imply that in order to rigorously test the relationship between future orientation and deviance, potential contextual effects by the school must be considered.

School Context and Deviance

Contextual theories highlight developmental effects by the school on deviance. It is one of multiple social contexts that is salient in the ecology of daily adolescent life as suggested by Problem Behavior Theory (Jessor, 1991). Attachment and commitment to school are central to Hirschi's (1969) social control theory, where individuals with strong bonds to conventional institutions are less likely to engage in delinquent behaviors. He identified the school as the second most important socializing agent after the family in understanding variability in deviance and crime.

Empirically, school effects on adolescent deviance have been well documented. Based on multi-level modeling, it has been found that between school variability in student outcomes ranges between 8% and 15% (8% to 15% variability exists between schools, while 85% to 92% exists between individuals); this translates into an effect size between .58 and .85 standard deviation (Reynolds & Cuttance, 1992; Gottfredson, 2001). Controlling for individual propensity and background variables, such as age, sex, and socioeconomic status, school-level variables have been found to explain up to 11% in problem behaviors (e.g., Felson et al., 1994; Kasen et al., 1990; Gottfredson, 2001).

Specifically, attachment and commitment to school have been shown to be moderately related to deviance (e.g., Costello, Anderson, & Stein, 2006; Smith & Fogg, 1978; Gottfredson & Koper, 1996; Dornbusch, Erickson, & Laird, 2001). It has also been found that a school climate of connectedness serves as a protective factor for student violent behaviors (Brookmeyer, Fanti, & Henrich, 2006), for instance. In addition, other dimensions of school climate such as conflict, academic focus, and social facilitation have also been found to significantly predict adolescent problem behaviors and deviance (Kasen et al., 1990).

The Importance of School Demographic Characteristics

A number of studies have provided evidence of effects by school demographic characteristics on deviance (e.g., Anderman, 2002; Anderman & Kimweli, 1997; Brookmeyer et al., 2006; Crosnoe, Johnson, & Elder, 2004; Pearson, Sweeting, West, Young, Gordon et al., 2006; Welsh, Stokes, & Greene, 2000). For instance, the location of the school, its demographic composition, or its student diversity each appear to influence student developmental outcomes; this was found while holding student demographic and educational backgrounds constant (Gottfredson, 2001). School location, school size, and average school SES are generally considered externally determined school features as they are not under the control of school staff, but largely the result of the community in which the school is located (Gottfredson, 2001). In fact, these externally determined school features are likely to constrain the effectiveness of schools and have more substantial effects on non-cognitive outcomes, such as deviant behaviors, than cognitive ones (Gottfredson, 2001).

School location matters, as it determines the demographic composition of the school; therefore, students in urban, rural, and suburban schools may have quite distinct school experiences. Students in urban schools report higher rates of victimization and perceive their school as more unsafe (Anderman & Kimweli, 1997) in comparison to suburban or rural schools; these youth also exhibited higher levels of violent behavior (Brookmeyer et al., 2006) and report a lower sense of belonging (Anderman, 2002). It is fairly well known and accepted that it is more difficult to monitor and regulate student behaviors in larger schools; larger school size in effect weakens the bond between students, teachers, and schools (Crosnoe et al., 2004). In fact, larger schools may also facilitate a culture of anonymity, powerlessness, and impersonality (Welsh et al., 2000). Finally, average school SES has been linked to lower levels of student achievement (Konstantopoulos, 2006; Lee & Bryk, 1989; Young, 1998) and other behavioral outcomes (Bryk & Driscoll, 1988; Gottfredson, 2001; Goldschmidt & Wang, 1999; Pearson et al., 2006; Vieno, Perkins, Smith, & Santinello, 2005). Schools with lower average SES have been found to have higher drop-out rates (Goldschmidt & Wang, 1999) and higher victimization rates (Gottfredson, 2001). Students in schools with lower level SES reported lower level of academic achievement (Konstantopoulos, 2006; Lee & Bryk, 1989; Young, 1998), higher rates of alcohol use and substance use (Pearson et al., 2006), and a lower sense of community (Vieno et al., , 2005). Each of these school-level characteristics appears to be closely related to deviant behaviors and thus was examined in the current work.

Debates on Potential School Context Effects

Although it has been recognized that the school is an important developmental context for youth, a debate continues to exist on whether contextual effects exist for adolescent deviance. Self-control theory (Gottfredson & Hirschi, 1990), which largely explains deviance from an intra-personal perspective, de-emphasizes school effects on self-control or deviance. It proposes that the relationships between the school context and deviance are largely spurious as they both covary with self-control. This implies that potential effects by individual traits on deviance, such as future orientation or impulsivity, must be addressed when investigating school effects on deviance. On the other hand, in order to thoroughly test the influence of personal future orientation on deviant behaviors, school effects need to be considered as well.

A number of studies have tested school effects by simply using “single” level analyses which focused exclusively on individual-level differences (Costello et al., 2006; Dornbusch et al., 2001; Gottfredson et al., 1996; Kasen et al., 1990; Pearson, et al., 2006; Smith et al., 1978) or school-level (Welsh et al., 2000). Focusing exclusively on either makes it impossible to isolate and identify individual difference effects versus contextual ones. The multi-level analytic strategy has been used in previous work to separate individual-level versus school-level effects; however, very few studies have employed nationally representative samples (e.g., Bryk et al., 1988; Vieno et al., 2005), thus severely limiting their generalizability. The multilevel studies that have been based on nationally representative samples, such as the Add Health or the National Educational Longitudinal Study, have not focused on deviance (Add Health: Anderman, 2002;

Brookmeyer, et al., 2006; Costello, et al., 2004; National Education Longitudinal Study: Anderman et al., 1997) but on interpersonal process (Costello, et al., 2004), victimization (Anderman et al., 1997), sense of belonging (Anderman, 2002), or violence (Brookmeyer et al., 2006). Most of this work tested school effects and individual-level demographic factors, such as age, sex, and SES, and did not take other individual-level characteristics (Anderman et al., 1997; Costello et al., 2004) or between-level interactions (Anderman, 2002; Anderman et al., 1997; Costello et al., 2004) into account.

In conclusion, although empirical studies provide substantial evidence for school effects on deviance, no generalizable conclusions can be drawn. School effects on adolescent deviance must be more thoroughly tested using representative samples and appropriate analytical tools (i.e., multilevel modeling that tests school context along with individual-level characteristics and considers between-level interactions). Finally, the effects by future orientation and the school context (including school-level future orientation) on deviance have seldom been studied simultaneously.

Only one study was found that tested this issue. Based on a sample of 551 adolescents from a suburban high school, Somer and Gizzi (2001) examined the effects by school attachment, school involvement, and future education orientation on risky behaviors measured by substance use, alcohol use, and getting into a fight at school. They found that both future education orientation and the school context contributed to the explanation of the risky behaviors (Somer & Gizzi, 2001). However, although the findings of this study provide implication for the independent effects by school context and future orientation on deviance, the generalizability of the findings are low due to the

small adolescent sample from only one high school. In addition, the study did not provide a precise estimation of the effects by future orientation versus school context as multi-level analyses were not used. Instead, the authors simply used regular hierarchical regression technique which relies exclusively on individual-level analyses. Therefore, no conclusions can be drawn about independent effects by each on deviance.

In summary, previous work has not tested for or distinguished between effects by individual traits versus context; they have also not availed themselves of nationally representative samples that would permit adequate generalization. Therefore, scholarship must consider and rigorously test potential school contextual effects using an appropriate sample as well as analytic tools (multi-level analyses).

III. Research Questions/Hypotheses

The current project includes two separate, but related studies. The aim of the first study is to test the longitudinal associations between future orientation and deviance, while considering the effect by impulsivity. The second study aims to examine the independent effects by school context and future orientation on deviance. Data for both studies were drawn from the National Longitudinal Study of Adolescent Health (Add Health). Future orientation was measured by adolescent expectations of their future. Therefore, a higher level of future orientation represented a more positive or optimistic view of their future. The following specific research questions and hypotheses were tested in each study:

Research Questions and Hypotheses for Study 1

1) Is there a longitudinal association between future orientation and deviance?

Hypothesis 1: It was hypothesized that there would be a negative longitudinal relationship between future orientation and adolescent deviance.

2) Is there a longitudinal association between future orientation and deviance, net any effects by impulsivity?

Hypothesis 2: It was hypothesized that the longitudinal relationship between future orientation and deviance would remain significant, even after controlling for impulsivity effects.

3) Does future orientation condition the impulsivity-deviance relationship?

Hypothesis 3: It was hypothesized that future orientation would moderate the relationship between impulsivity and deviance. Specifically, it was hypothesized that the magnitude of the relationship between impulsivity and deviance would be weaker for adolescents with higher levels of (i.e., more positive) future orientation.

4) Does future orientation from different domains (i.e., education future orientation, marriage future orientation, and life future orientation) have different effects on deviance and does it interact differently with impulsivity?

Hypothesis 4: Based on the work by Caldwell and colleagues (2006), it was hypothesized that education future orientation and life future orientation would be stronger predictors of deviance than marriage future orientation. It was also hypothesized that education future orientation and life future orientation would have stronger moderation effects on the impulsivity-deviance link.

5) Does the longitudinal association between future orientation and deviance as well as the longitudinal association between impulsivity and deviance differ developmentally (early/middle adolescents versus late adolescents)?

Hypothesis 5: Two competing hypotheses about developmental processes were tested in the current study. From the developmental difference view, it was hypothesized that future orientation would have a weaker association and impulsivity a stronger one with deviance for early/middle adolescents (i.e., adolescents younger than 18), while future orientation would have a stronger association and impulsivity a weaker one with deviance for late adolescents (i.e., adolescents 18 and older). It was also hypothesized that the moderation effect by future orientation on impulsivity-deviance link would be stronger for late adolescents than for early/middle adolescents. Alternatively, the competing viewpoint predicted that the relationships between future orientation, impulsivity and deviance as well as the moderation effect by future orientation would remain unchanged for early/middle versus late adolescents.

Research Questions and Hypotheses for Study 2

1) Is there a longitudinal association between future orientation (level 1) and deviance, while controlling for school context (school size, school location, school SES, and school-level future orientation) (level 2)?

Hypothesis 1: It was hypothesized that there would exist a longitudinal association between future orientation and deviance, while controlling for (level 2) school context effects. Specifically, a negative relationship was expected between the level of

future orientation and adolescent deviance, while controlling for schools contextual effects.

2) Is there a longitudinal association between school context (school size, school location, school SES, and school-level future orientation) (level 2) and adolescent deviance, while controlling for individual-level predictors (level 1).

Hypothesis 2: It was expected that both school demographic characteristics and school-level future orientation (level 2) would be associated with adolescent deviant behaviors, while controlling for individual-level covariates (level 1). Specifically, it was expected that 2a) students in smaller schools would report lower levels of deviance than students in larger schools, that 2b) students in rural schools would report lower levels of deviance than students in urban schools, and that 2c) students from higher-SES schools would report lower levels of deviance than students in lower-SES schools. It was also expected that 2d) there would be a negative relationship between school-level future orientation and deviance (i.e., adolescents in schools with higher school-level future orientation are less likely to engage in deviant behaviors).

3) Does the longitudinal association between future orientation and deviance vary as a function of school context (school-level future orientation and other school demographic characteristics)?

Hypothesis 3: As no previous studies have examined a potential “moderation effect” by school contextual characteristics on the relationship between future orientation and adolescent deviance, this research question was largely exploratory in nature.

However, given the consistent findings of the effects by future orientation on deviance, it

was expected that the direction of the relationship between future orientation and deviance would not vary across schools. It was expected that a consistently negative relationship between future orientation and adolescent deviance would be found across schools. At the same time, given the school effects on both future orientation and adolescent deviance, it was expected that the magnitude of the relationship between future orientation and deviance would vary as a function of school contextual characteristics. Specifically, it was hypothesized that 3a) the relationship between future orientation and deviance will be stronger for students in smaller schools, that 3b) future orientation will have a stronger effect on deviance for students in rural schools, and that 3c) the future orientation-deviance link will be stronger for students in higher-SES schools. It was also hypothesized that 3d) school-level future orientation will strength the relationship between individual-level future orientation and deviance.

Chapter 2

Future Orientation, Impulsivity, and Deviance:

A Longitudinal Moderation Model

Abstract

The current study tested the longitudinal relationship between future orientation and deviance while considering the effect by impulsivity. Using a sample of N=14,599 adolescents from the National Longitudinal Study of Adolescent Health (Add Health), the following research questions were addressed: (1) whether there is a longitudinal association between future orientation and deviance net the effect by impulsivity; (2) whether future orientation moderates the relationship between impulsivity and deviance longitudinally; (3) whether future orientation of education, life, and marriage domains have different effects on deviance and/or interact in different ways with impulsivity; and (4) whether there are developmental differences in the links between future orientation, impulsivity, and deviance over time. Findings provide evidence that future orientation predicts deviance longitudinally, net the effects by control variables and impulsivity. In addition, future orientation moderates the impulsivity-deviance link longitudinally. It was also found that future orientation of education, life, and marriage domains function differently. Finally, no developmental differences were found for the links between future orientation, impulsivity, and deviance.

I. Introduction

Adolescent deviance, namely behaviors that violate social norms, is a significant social and personal problem that threatens the well-being of youth, families, and communities. According to Problem Behavior Theory (Jessor, Turbin, Costa, Dong, Zhang et al., 2003), low expectations for success or a sense of hopelessness for the future is a key vulnerability risk factor that increases the likelihood of engaging in deviant behaviors. Specifically, youth with pessimistic future expectations in the family, education, or work domains have a greater personal vulnerability for involvement in deviant behaviors. Consistent with this idea, Nurmi (1991) pointed out that adolescents who are not oriented toward the future may engage in a variety of problem behaviors, such as delinquency, problems in school, or drug use. The term most widely used to describe a person's expectations about and actions related to the future is future orientation (Nurmi, 2005), a concept introduced by Trommsdorff (1983) and Nurmi (1991, 1993).

Future Orientation and Its Association with Deviant Behaviors

Future orientation has been generally defined as consciously self-constructed and represented images of the future, which consists of cognitive (e.g., anticipating and estimating the likelihood of future events), motivational (i.e., future-oriented goals, interests, as well as concerns, doubts, and fears), and affective dimensions (e.g., optimism, pessimism; Nurmi, 1991; Trommsdorff, Burger, & Fuchsle, 1982). Based on a person's future orientation, individuals direct their development in certain ways and purposefully select a variety of life trajectories (Nurmi, 1993). Thus, future orientation is

responsible for future-oriented behaviors (or a lack thereof), and may be related to delay of gratification or planning and achieving future goals (Trommsdorff et al., 1979).

Bentham (1970) postulated that that deviant acts and crimes will be committed by individuals if pleasurable consequences of acts exceed painful ones. Therefore, deviance appears to reflect an individual's tendency to discount future consequences in favor of present gratification. Future oriented individuals are more likely to consider the future consequences of their current behaviors during the decision making process, and individuals with a more positive future orientation are generally more sensitive to future consequences of their present behavior (Routledge & Arndt, 2005). Consequently, individuals with more positive future orientation are less likely to engage in deviant behaviors, as these behaviors may risk their future.

Research has provided evidence of a negative relationship between future orientation and a variety of problem behavior, including alcohol use (Robins & Bryan, 2004), drug use (Bolland, 2003; Bolland, Bryant, Lian, McCallum, Vazsonyi et al., 2007; Keough, Zimbardo & Boyd, 1999; Robins & Bryan, 2004; Trommsdorff, 1986;), theft (Oyserman & Saltz, 1993), risky sexual behaviors (Gilchrist & Schinke, 1987; Morris, Baker, & Valentine, 1998; Robins & Bryan, 2004; Whitaker, Miller & Clark, 2000), and school misconduct (Caldwell, Wiebe & Cleveland, 2006; Skorikov & Vondracek, 2007). The association between future orientation and deviant behaviors has been found among institutionalized youth (e.g., Trommsdorff, 1986; Trommsdorff & Lamm, 1980; Robins & Bryan, 2004) as well as samples of "normal" adolescents (e.g., Bolland, 2003; Bolland et al., 2007; Gilchrist & Schinke, 1987; Skorikov & Vondracek, 2007; Whitaker et al.,

2000). It is worth noting that the majority work reviewed was based on cross-sectional data, with only one exception by Skorikov and colleagues who tested the longitudinal relationship between career orientation and deviance.

Limitations of Previous Studies

Although substantial empirical support exists for the relationship between future orientation and deviance, the relationship has not been thoroughly tested. First, although the cross-sectional relationship between future orientation and deviance has been consistently established, it remains largely unknown whether a low or pessimistic future orientation increases the likelihood of deviant behaviors over time as few longitudinal studies have been completed in this area. Second, the relative effect by future orientation while controlling for impulsivity as well as the moderation effect by future orientation on impulsivity-deviance link remains unclear, despite the fact that the decision making process involved in engaging in deviant behaviors is driven by both immediate gratification and a calculation of future rewards/costs (Greene, Sommerville, Nystrom, Dariey, & Cohen, 2001; McClure, Laibson, Loewenstein, & Cohen, 2004; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). Third, limited studies tested whether future orientation at different domains (e.g., education, marriage, and life domains) differ in their effects on deviance and/or interact differently with impulsivity to influence deviance. Finally, it is also unknown whether future orientation and impulsivity function differentially or similarly for early/middle adolescents versus late adolescents, although it has been recognized that younger and older adolescents differ in their levels of impulsivity and future orientation. In conclusion, the current study sought to build on

previous work by focusing on the longitudinal relationship between future orientation and deviance while considering impulsivity. In addition, it also examined the effects by future orientation from different domains (i.e., education, marriage, and life domains) on deviance and the impulsivity-deviance link, and it tested for potential developmental changes in the relationships between future orientation, impulsivity, and deviance in early/middle adolescents versus late adolescents.

A Consideration of Impulsivity

Steinberg and colleagues (2009) have proposed that performance on delay discounting tasks activates two different brain systems which reflect a combination of both impulsivity and future orientation. Research based on brain activity assessed by functional magnetic resonance imaging (fMRI) supports that the short-run impatience is driven by the limbic system, which responds preferentially to immediate rewards/costs and is less sensitive to the future rewards/costs, whereas the lateral prefrontal cortex and associated structures supporting higher cognitive functions mediates the deliberative and abstract reasoning presumed to under gird future orientation (Greene et al., 2001; McClure et al., 2004; Sanfey et al., 2003). A future orientation permits individuals to take the long-term consequences of their behaviors into account, whereas impulsivity does not support this view; instead, individuals focus on immediate gratification. Therefore, both future orientation and impulsivity appear to play important roles in the decision making process preceding risky or deviant behaviors and need to be considered simultaneously when studying the etiology of deviant behaviors. One potential model for understanding delay discounting behavior is that of a competition between impulsivity and future

orientation, in which the predominance of the former leads to a preference for immediate rewards, while a predominance of the latter leads to preference for delayed ones (Steinberg et al., 2009). Impulsivity has been consistently found to have a positive relationship with deviance (e.g., Moffitt, Caspi, Harrington, & Milne, 2002; White et al., 1994), different and separate from the association between future orientation and deviance in direction. Therefore, in addition to the relative effects of future orientation and impulsivity on deviance, the current study also aimed to investigate whether future orientation interacts with impulsivity to influence deviant behaviors over time. In other words, does future orientation moderate the impulsivity-deviance link.

Effects by Domain-Specific Future Orientation

In order to thoroughly test the effect by future orientation on deviance, we explored whether different domains of future orientation (education, marriage, and life future orientation) have differential effects on deviance and/or these interact differently with impulsivity in the prediction of deviance. Trommsdorff and Lamm (1980) have suggested that the cognitive and affective aspects of future orientation have to be studied with respect to the content of the concerns. In other words, the thematic focuses of future orientation (i.e., future orientation in different life areas) need to be differentiated and tested separately. The majority work in this area has tested future orientation effects on deviance without considering domain-specific features and without focusing on multiple domains (e.g., Bolland, 2003; Bolland et al., 2007; Hill et al., 1996; Peters et al., 2005; Robins & Bryan, 2004; Skorikov & Vondracek, 2007). In addition, no studies to date have tested whether future orientation in different domains has similar or different effects

on the impulsivity-deviance link. The most relevant study by Caldwell and colleagues (2006) focused on a sub-sample of African American adolescents from Wave I Add Health dataset; it tested the effects by domain-specific future orientation on deviance (i.e., college, marriage, and basic life future certainty). They found that marriage future orientation had no effect on deviance, while college and basic life future orientation predicted deviance. However, their work did not test the longitudinal associations between domain-specific future orientation and deviance, and they exclusively focused on African American youth; thus, findings can not be generalized to adolescents from other racial/ethnic groups. Finally, they also did not consider impulsivity and only focused on the future orientation-deviance link.

Developmental Differences in the Future Orientation-Deviance Link

Studies of future orientation have also examined developmental differences in levels of future orientation. Empirical work has shown that adolescents become more future-oriented as they age (Furby & Beyth-Marom, 1992; Greene, 1986; Nurmi, 1991; Steinberg et al., 2009). Therefore, in order to thoroughly test the effect by future orientation on deviance, it is also important to investigate whether the magnitude of these effects differ developmentally for adolescents at different times during the second decade of life. The prefrontal cortex, the area involved in reasoning, decision making, and future orientation, hasn't completely developed during the early adolescence, and therefore younger adolescents are likely to be more influenced by a functionally mature limbic region that precedes the development of prefrontal control regions (Casey, Gett, & Galvan, 2008; Furby & Beyth-Marom, 1992; Greene, 1986; Steinberg et al., 2009). Thus,

the behavioral choices by younger adolescents, compared to the ones by older adolescents, appears to depend less on future orientation, a process related to the development of the prefrontal control system. Therefore, we would expect a stronger influence by future orientation on decision making processes in late adolescents. On the other hand, we would also expect a weaker influence during early/middle adolescence, and thus a stronger one by the limbic system, operationalized by impulsivity.

A competing view about the developmental differences in the future orientation-deviance and impulsivity-deviance links is that the relationships between future orientation, impulsivity and deviance will remain unchanged developmentally, despite described mean level differences in future orientation. Although no studies to date tested specifically the developmental differences or similarities in the links between future orientation, impulsivity, and deviance, insights from other work provides important implications for this competing view. A number of studies by Vazsonyi and colleagues tested for developmental similarities or differences in the relationships between low self-control, family processes, and deviance (early/middle adolescent versus late adolescent) and found no differences in these links, despite described mean level differences in predictors and outcomes (e.g., Vazsonyi, Pickering, & Bolland, 2006; Vazsonyi, Pickering, Junger, & Hessing, 2001). These findings show that mean level differences and patterns of associations are independent. Thus, these findings imply that the relationships between future orientation, impulsivity, and deviance might remain unchanged developmentally. Therefore, the current work tested these competing

predictions about potential developmental changes in the links between the future orientation, impulsivity, and deviance.

II. Research Questions and Hypotheses

The aim of the current study was to test the longitudinal associations between future orientation and deviance, while considering the effects by impulsivity. The following specific research questions and hypotheses were tested:

1) Is there a longitudinal association between future orientation and deviance?

Hypothesis 1: It was hypothesized that there would be a negative longitudinal relationship between future orientation and adolescent deviance.

2) Is there a longitudinal association between future orientation and deviance, net any effects by impulsivity?

Hypothesis 2: It was hypothesized that the longitudinal relationship between future orientation and deviance would remain significant, even after controlling for impulsivity effects.

3) Does future orientation conditions the impulsivity-deviance relationship?

Hypothesis 3: It was hypothesized that future orientation would moderate the relationship between impulsivity and deviance. Specifically, it was hypothesized that the magnitude of the relationship between impulsivity and deviance would be weaker for adolescents with more positive future orientation.

4) Does future orientation from different domains (i.e., education future orientation, marriage future orientation, and life future orientation) have different effects on deviance and does it interact differently with impulsivity?

Hypothesis 4: Based on the work by Caldwell and colleagues (2006), it was hypothesized that education future orientation and life future orientation would be stronger predictors of deviance than marriage future orientation. It was also hypothesized that education future orientation and life future orientation would have stronger moderation effects on the impulsivity-deviance link.

5) Does the longitudinal association between future orientation and deviance as well as the longitudinal association between impulsivity and deviance differ developmentally (early/middle adolescents versus late adolescents)?

Hypothesis 5: The two competing hypotheses about the developmental process were tested in the current study. From the developmental difference view, it was hypothesized that future orientation would have a weaker association and impulsivity a stronger association with deviance for early/middle adolescents (i.e., adolescents younger than 18), while future orientation would have a stronger association and impulsivity a weaker one with deviance for late adolescents (i.e., adolescents 18 and older). It was also hypothesized that the moderation effect by future orientation on impulsivity-deviance link would be stronger for late adolescents than for early/middle adolescents.

Alternatively, the competing viewpoint predicted that the relationship between future orientation, impulsivity and deviance as well as the moderation effect by future orientation would remain unchanged for early/middle versus late adolescents.

III. Methods

Sample

Data for this study came from the first two waves of the Add-Health restricted-use, contractual dataset¹. The National Longitudinal Study of Adolescent Health (also known as Add Health, the Add Health Study, and the Add Health Survey) is a nationally representative study originally designed to examine how social contexts influence teens' health and risk behaviors (Harris, Halpern, Entzel, Tabor, Bearman, & Udry, 2008). Beginning in 1994 (September 1994 – December 1995, Wave I), researchers selected a random sample of 7th to 12th grade students from schools across the country. About 90,000 young people participated by filling out a brief questionnaire at school. Then, researchers conducted in-depth, at-home interviews with the sampled students and their parents ($N = 20,745$). The students were interviewed again in their homes one year later (1996, Wave II). Adolescents who completed both Wave I and Wave II Add Health surveys were selected for the purpose of analyses of the current study ($N=14,738$ youth). Missing data resulted in a final study sample of $N=14,599$ youth who were between 11 to 22 years old at Wave I (mean age = 15.81; 51.2% females). The analyses in the current study were done by total sample as well as by developmental period (early/middle adolescence versus late adolescence). Of the 14,599 adolescents, 13,419 of them were

¹ This research uses data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by a grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Persons interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516-2524 (addhealth@unc.edu). No direct support was received from grant P01-HD31921 for this analysis.

younger than 18 years old and therefore were categorized into early/middle adolescent group; 1,180 of them were late adolescents who were 18 and older.

Measures

Measures of age, sex, race, family structure were included in the current study for control purpose. In addition, adolescents' reports of future orientation and impulsivity at Wave I as well as their reports of deviance at Wave II were assessed.

Age. Participants were asked to indicate the month and year in which they were born. The 15th day of each respective month was used to calculate subjects' specific ages.

Sex. Participants were asked to indicate their gender on single items: "What sex are you?" Responses were given as 1 = male and 2 = female.

Race. Adolescent reports of their race were used in the current study. Five racial groups were identified based on this information for data analyses, namely African American, Asian American, European American, Native American, and Others. To control for race, dummy-coded variables were developed for African American, Asian American, Native American, and Others, using European Americans as the reference or comparison group.

Family Structure. Family structure was developed using household roster information provided in the in-home interview. The household roster information captures both the biological and legal relationships between the adolescent and all co-resident parent figures, as reported by the adolescent. For the control purpose, family structure was classified as traditional or nontraditional (two biological parents and others).

Future Orientation (Wave I). Seven-items were used to assess future orientation. Five-items assessed adolescents' perception of the likelihood of future event (e.g., going to college). One item assessed how much adolescents wanted to go to college, and one item assessed whether adolescents felt hopeful about the future. The responses for the first five items were in a 5-point Likert-type scale ranging from 1 (little or no change) to 5 (very likely or almost certain). Response for the item that measured desire of going to college was given on a 5-point scale, ranging from 1 to 5 where 1 is low and 5 is high. Response for the item that measures hopefulness was given on a 4-point Likert-type scale ranging from 0 (never or rarely) to 3 (most of the time or all of the time). A total scale score were computed using the standardized scores of each item as the metric scale for the item that assessed hopefulness was different from the ones of the other items ($\alpha = .58$). The responses for the items that assessed adolescents' perception of the likelihood of being killed by age 21 and getting HIV or AIDS were reverse coded so that a higher score reflects higher-level future orientation. Based on an examination of the face validity of the items, we found this scale an appropriate measure of future orientation as it taps into different dimensions of future orientation. The items assess adolescents' anticipation of the likelihood of future events (cognitive dimension), their future oriented interests and fears (motivational), as well as their pessimism and optimism (affective dimension).

Domain-Specific Future Orientation (Wave I). Six of the seven items that assessed adolescents' future orientation asked adolescents' perception and motivation of future event in different domains (i.e., perception of the likelihood of going to college, getting married by age 25, living to the age of 35, being killed by age 21, getting HIV or

AIDS, and how much adolescents wanted to go to college). Exploratory factor analyses conducted on the six items indicated three underlying factors. The two items that assessed adolescents' perception of the likelihood of going to college and how much they wanted to go to college loaded together on the first factor and therefore were averaged to create a score for education future orientation ($\alpha = .82$). The responses for the three items that assessed adolescents' perception of the likelihood of living to the age of 35, being killed by age 21, and getting HIV or AIDS were averaged to create a score for life future orientation as they loaded on the second factor ($\alpha = .58$). In addition, the one item that measured adolescent perceptions of the likelihood of getting married by age 25 loaded alone on the third factor, and thus it was used as the indicator of marriage future orientation.

Impulsivity (Wave I). Impulsivity was measured by the mean of four items from the in-home interview (Thompson, Ho, & Kingree, 2007; Vazsonyi, Cleveland, & Wiebe, 2006). Items asked respondents to indicate on a 5-point scale ranging from 1 (strongly agree) to 5 (strongly disagree) whether they agreed with four different statements (e.g., "When you have a problem to solve, one of the first things you do is get as many facts about the problem as possible"). A scale score was computed by averaging the responses of all four items ($\alpha = .74$). This scale is an appropriate measure of impulsivity as the items assess a lack of deliberate thinking/planning, an inability to delay gratification, an unwillingness to weigh different consequences of a decision or a behavior, and a "here and now" orientation.

Deviance (Wave II). Deviance was measured with seventeen items. Fourteen of the seventeen items assessed a broad range of deviant behaviors within the past 12 months, ranging from minor actors, such as dishonesty to parent about whereabouts, to more serious offenses, such as being in a serious fight and selling drugs (e.g., in the past 12 months, how often did you lie to your parents or guardians about where you had been or who you were with; Vazsonyi, Cleveland, & Wiebe, 2006). Responses were given on a 3-point scale, ranging from 0 = never to 3 = five. Two of the seventeen items assessed adolescents' alcohol use during the past 12 months. Responses range from 0 = never to 6 = every day or almost every day. In addition, one item asked adolescents whether they tried or used marijuana since they completed Wave I Add Health survey. The responses were given as 0 = no and 1 = yes. A deviance scale score was computed by averaging the standardized scores of the seventeen items due to the differences in the metric scales of the items ($\alpha = .84$).

Analytic Plan

Hierarchical regression analyses were employed to investigate the effects by Wave I future orientation and impulsivity on Wave II deviance. A series of five models were specified which tested main effects by future orientation on deviance as well as its moderation effect on the impulsivity-deviance link. In the first step, a model with only control variables was specified (Model 1). Next, effects by future orientation and impulsivity on deviance were tested separately, net the effects by the control variables (Model 2: future orientation; Model 3: impulsivity). Model 4 included both future orientation and impulsivity simultaneously in addition to control variables. Finally,

Model 5 included the interaction effect between future orientation and impulsivity to test whether future orientation moderated the impulsivity-deviance link. All five models were tested using both total sample and developmental periods (early/middle versus late adolescence)². Standardized regression coefficients for early/middle adolescent sample and late adolescent sample were compared using follow-up z test³ (Cohen & Cohen, 1983).

In a next step, two additional regression models were tested that included individual domain-specific future orientation measures as well as their potential moderation effects on the impulsivity-deviance link. The effects by education, marriage, and life future orientation on deviance were tested controlling for impulsivity and background variables in Model 6. Then, the interaction terms between domain-specific future orientation and impulsivity were tested in separate models. As only the interaction between education future orientation and impulsivity was statistically significant, it is the only interaction term reported in Model 7.

IV. Results

Demographic and Scale Information

Table 2.1 includes descriptive information on key demographic variables in current study, while Table 2.2 includes descriptive statistics on the main study scales, including reliability estimates, namely measures of future orientation, impulsivity, and

² The models were also tested using three developmental periods (i.e., early adolescence, middle adolescence, and late adolescence). The results were consistent with the findings based on the two group comparison and indicated no differences.

³ To be conservative and thorough, all between-group differences were also tested using unstandardized regression coefficients. The results were consistent with the findings based on standardized coefficients.

Table 2.1. Descriptive Information for Background Variables (N=14,599)

	N	Percentage
Sex		
Female	7,477	51.2%
Male	7,122	48.8%
Developmental period		
Early/Middle Adolescents	13,419	91.9%
Late Adolescents	1,180	8.1%
Family Structure		
Two Biological Parents	7,567	51.8%
Others	7,032	48.2%
Race		
African American	3,250	22.3%
Asian American	998	6.8%
European American	8,884	60.9%
Native American	248	1.7%
Others	1,219	8.3%

Table 2.2. Information for Deviance, Impulsivity, and Future Orientation Measures (N=14,599)

Scales	# of items	Total Sample				Early and Middle Adolescents				Late Adolescents			
		α	Mean	SD	Skewness	α	Mean	SD	Skewness	α	Mean	SD	Skewness
Deviance	17	.84	.00	.78	1.52	.85	.00	.79	1.55	.84	.05	.77	1.17
Impulsivity	4	.74	2.21	.63	.43	.74	2.21	.63	.43	.76	2.11	.61	.38
FO	7	.58	.00	.53	-.80	.58	.02	.53	-.82	.56	-.14	.57	-.52
Education FO	2	.82	4.28	1.00	-1.63	.82	4.31	.98	-1.68	.82	3.95	1.22	-1.08
Life FO	3	.58	4.39	.60	-1.05	.58	4.40	.60	-1.07	.55	4.32	.60	-.80
Marriage FO	1	—	3.22	1.12	-.30	—	3.23	1.11	-.30	—	3.11	1.19	-.17

Note. FO: Future Orientation. Mean-level comparisons indicate statistically significant between-group differences for all constructs in the table.

measures of deviance. The mean-level comparison of the study constructs by developmental period indicated that on average, late adolescent reported higher level of deviance as well lower level of impulsivity and future orientation (i.e., less positive future orientation, which was unexpected), including the three domain-specific future orientation, than early and middle adolescents.

Table 2.3 exhibits the correlation statistics between Wave I impulsivity, future orientation, domain-specific future orientation, and Wave II deviance by total sample as well as by developmental period. The correlation statistics provided evidence of statistically significant positive relationship between impulsivity and problem behaviors as well as statistically significant negative relationships between future orientation, domain-specific future orientation, and deviance for total sample as well as by developmental period.

Effect by Future Orientation and Impulsivity

In the next step, a series regression models that predicting Wave II deviance using Wave I future orientation and impulsivity were tested as previously outlined. Table 2.4 includes the findings from these analyses. Model 2 and Model 3 separately considered the effects by future orientation and impulsivity, net the effects by control variables. Findings from these analyses were consistent with previous work; there was a negative relationship between future orientation and deviance ($\beta = -.16, p < .001$) and a positive relationship between impulsivity and deviance ($\beta = .11, p < .001$). In the next step, the effects by future orientation and impulsivity were tested simultaneously. The results of Model 4 indicated that the effects by future orientation and impulsivity on deviance remained

Table 2.3. Correlation between Deviance, Impulsivity, and Future Orientation
(N=14,599)

	Deviance (Total Sample)	Deviance (Early/Mid Adolescent)	Deviance (Late Adolescent)
Impulsivity	.11***	.12***	.11***
Future Orientation	-.18***	-.18***	-.20***
Education FO	-.15***	-.15***	-.15***
Life FO	-.12***	-.12***	-.14***
Marriage FO	-.04***	-.04***	-.10***

Note. *** $p < .001$. FO = Future Orientation

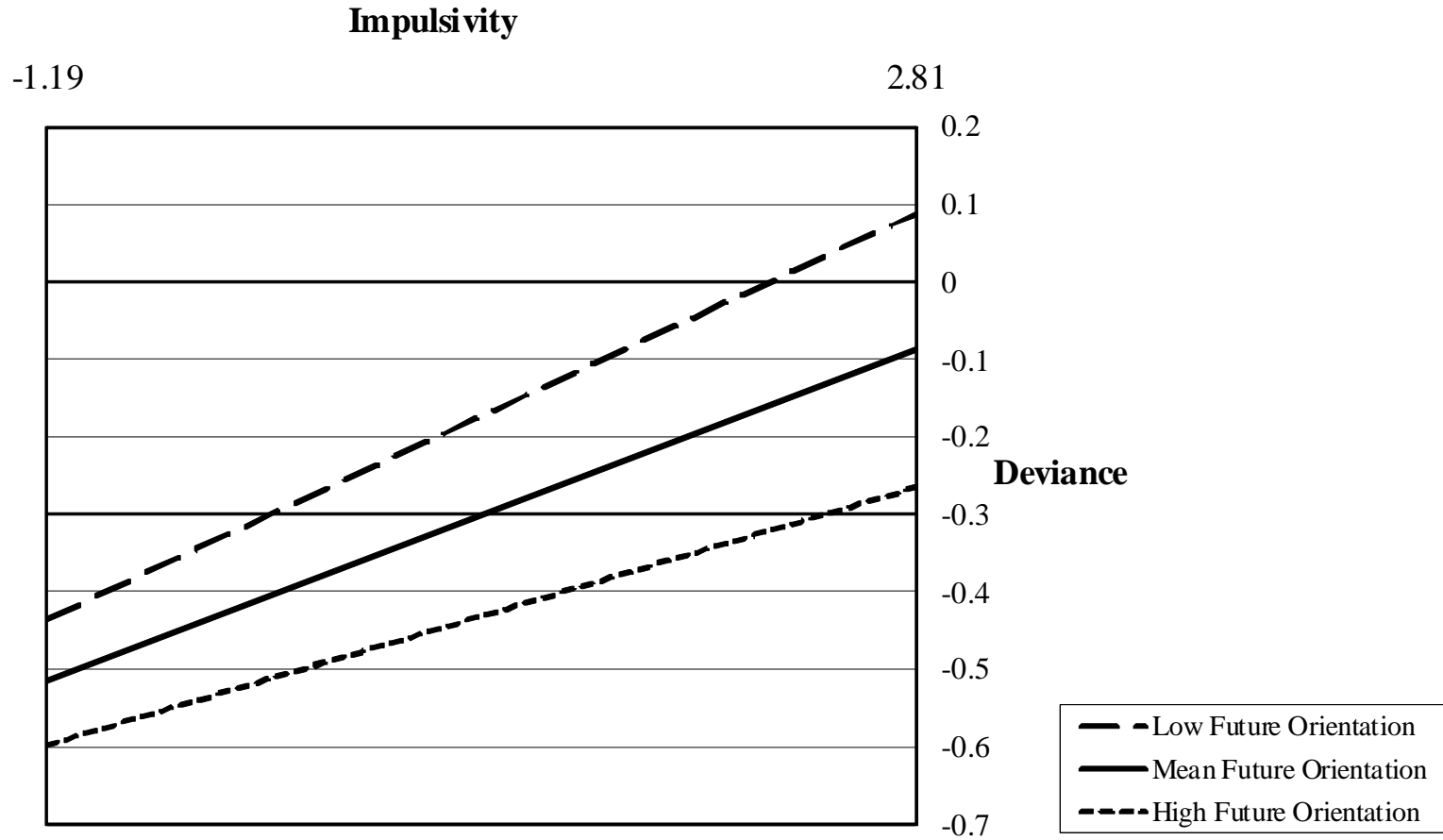
Table 2.4. Multiple Regression Predicting Wave II Deviance by Wave I Impulsivity and Future Orientation (N=14,599)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	β	b	β	b	β	b	β	b	β
Intercept	-.45***		-.32***		-.83***		-.62***		-.39***	
Age	.05***	.10	.04***	.08	.05***	.11	.04***	.09	.04***	.09
Sex	-.13***	-.08	-.11***	-.07	-.13***	-.08	-.11***	-.07	-.11***	-.07
Family Structure	-.14***	-.09	-.11***	-.07	-.14***	-.09	-.11***	-.07	-.11***	-.07
African American	-.20***	-.11	-.21***	-.11	-.18***	-.10	-.20***	-.10	-.20***	-.10
Indian American	.09	.02	.03	.00	.09	.02	.04	.01	.03	.01
Asian American	-.17***	-.56	-.17***	-.06	-.16***	-.05	-.16***	-.05	-.16***	-.05
Other Race	-.01	-.00	-.04	-.01	.00	.00	-.03	-.01	-.03	-.01
Future Orientation			-.23***	-.16			-.21***	-.14	-.21***	-.14
Impulsivity					.14***	.11	.11***	.09	.11***	.09
FO X Impulsivity									-.05**	-.02
Model R ²		3.6%		6%		4.8%		6.7%		6.7%

Note. ** $p < .01$, *** $p < .001$. FO = Future Orientation.

statistically significant when tested together (future orientation: $\beta = -.14, p < .001$; impulsivity: $\beta = .09, p < .001$). The comparison of the standardized regression coefficients for future orientation and impulsivity in Model 4 indicated that the relationship between future orientation and deviance was stronger than the one between impulsivity and deviance. In addition, future orientation explained more variance in deviance than impulsivity (future orientation: 1.9%; impulsivity: .7%). Finally, the interaction effect between general future orientation and deviance was tested in Model 5. Results indicated a statistically significant interaction between future orientation and deviance ($\beta = -.02, p < .01$). Figure 2.1 includes the prototypical plot of this moderation effect following the approach, method, and online computational plotting utility provided by Preacher, Curran, and Bauer (2006). Both impulsivity and deviance were centered using the sample mean for the purpose of plotting. The simple slopes for impulsivity (regression coefficients for impulsivity at conditional values of future orientation) were calculated for adolescents with a mean level future orientation (i.e., whose scores were at the sample mean), for adolescents with a high level future orientation (i.e., whose scores were one standard deviation above the sample mean), and for adolescents with a low level future orientation (i.e., whose scores were one standard deviation below the sample mean). Using the online computational plotting utility (Preacher, et al., 2006), the simple slopes were calculated with the regression coefficients obtained from SPSS. Then, the regression lines that represent the relationships between impulsivity and deviance were plotted at the three levels of future orientation based on the calculated regression coefficients. As centered scores of impulsivity ranged from -1.19 to 2.81, the plot was

Figure 2.1. Prototypical Plot for Moderation Effect by Future Orientation on Impulsivity-Deviance Link



generated within this range. The plot illustrates that the relationship between impulsivity and deviance was weaker in individuals with more positive future orientation; thus, future orientation buffers impulsivity effect on deviance.

Developmental Differences in the Effects by Future Orientation and Impulsivity

The effects by future orientation and impulsivity on deviance were also tested by developmental period. The results are reported in Table 2.5. Findings by developmental period were consistent with findings from the total sample; in both groups, a statistically significant negative relationship between future orientation and deviance was found, net any impulsivity or control variable effects (early/middle adolescent group: $\beta = -.14, p < .001$; late adolescent group: $\beta = -.16, p < .001$). In addition a statistically significant positive relationship was found between impulsivity and deviance, while controlling for future orientation and background variables effects (early/middle adolescent group: $\beta = .09, p < .001$; late adolescent group: $\beta = .07, p < .01$). The interaction between future orientation and impulsivity was also significant in both developmental periods (early/middle adolescent group: $\beta = -.02, p < .05$; late adolescent group: $\beta = -.06, p < .05$). The standardized regression coefficients of the main effects by future orientation and impulsivity in Model 4 and the standardized regression coefficient of the interaction term in Model 5 appear to suggest a stronger relationship between future orientation and deviance, a weaker relationship between impulsivity and deviance, and a stronger moderation effect by future orientation on impulsivity-deviance link for late adolescent group. However, a follow-up z test indicated that the observed difference was not statistically significant. Nevertheless, impulsivity explained slightly more variance in

Table 2.5. Multiple Regression Predicting Wave II Deviance by Wave I Impulsivity and Future Orientation by Developmental Period (N=14,599)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	EA/MA	LA	EA/MA	LA	EA/MA	LA	EA/MA	LA	EA/MA	LA
Age	.12***	-.07**	.10***	-.08**	.12***	-.07**	.10***	-.08**	.10***	-.08**
Sex	-.07***	-.20***	-.06***	-.17***	-.07***	-.20***	-.06***	-.17***	-.06***	-.17***
Family Structure	-.09***	-.09**	-.07***	-.06*	-.09***	-.08**	-.07***	-.06*	-.07***	-.06*
African American	-.11***	-.12***	-.11***	-.12***	-.09***	-.11***	-.10***	-.12***	-.10***	-.12***
Indian American	.01	.03	.00	.02	.01	.03	.01	.02	.01	.02
Asian American	-.05***	-.08**	-.05***	-.08**	-.05***	-.08**	-.05***	-.08**	-.05***	-.08**
Other Racial Groups	.01	-.10***	-.00	-.10***	.12	-.10***	.00	-.10***	.00	-.11***
Future Orientation			-.16***	-.17***			-.14***	-.16***	-.14***	-.16***
Impulsivity					.11***	.10***	.09***	.07**	.09***	.06*
FO X Impulsivity									-.02*	-.06*
Model R ²	3.8%	7%	6.1%	9.8%	5%	8.1%	6.8%	10.3%	6.9%	10.6%

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. EA/MA: Early Adolescents/Middle Adolescents; LA: Late Adolescents. Numbers in the table are standardized regression coefficients. Follow-up z tests indicate no statistically significant between-group differences

deviance for early/middle adolescents (early/middle adolescent: .7%; late adolescent: .5%), and future orientation explained more variance in late adolescents (early/middle adolescent: 1.8% variance; late adolescent: 2.2%).

Effects by Domain-Specific Future Orientation

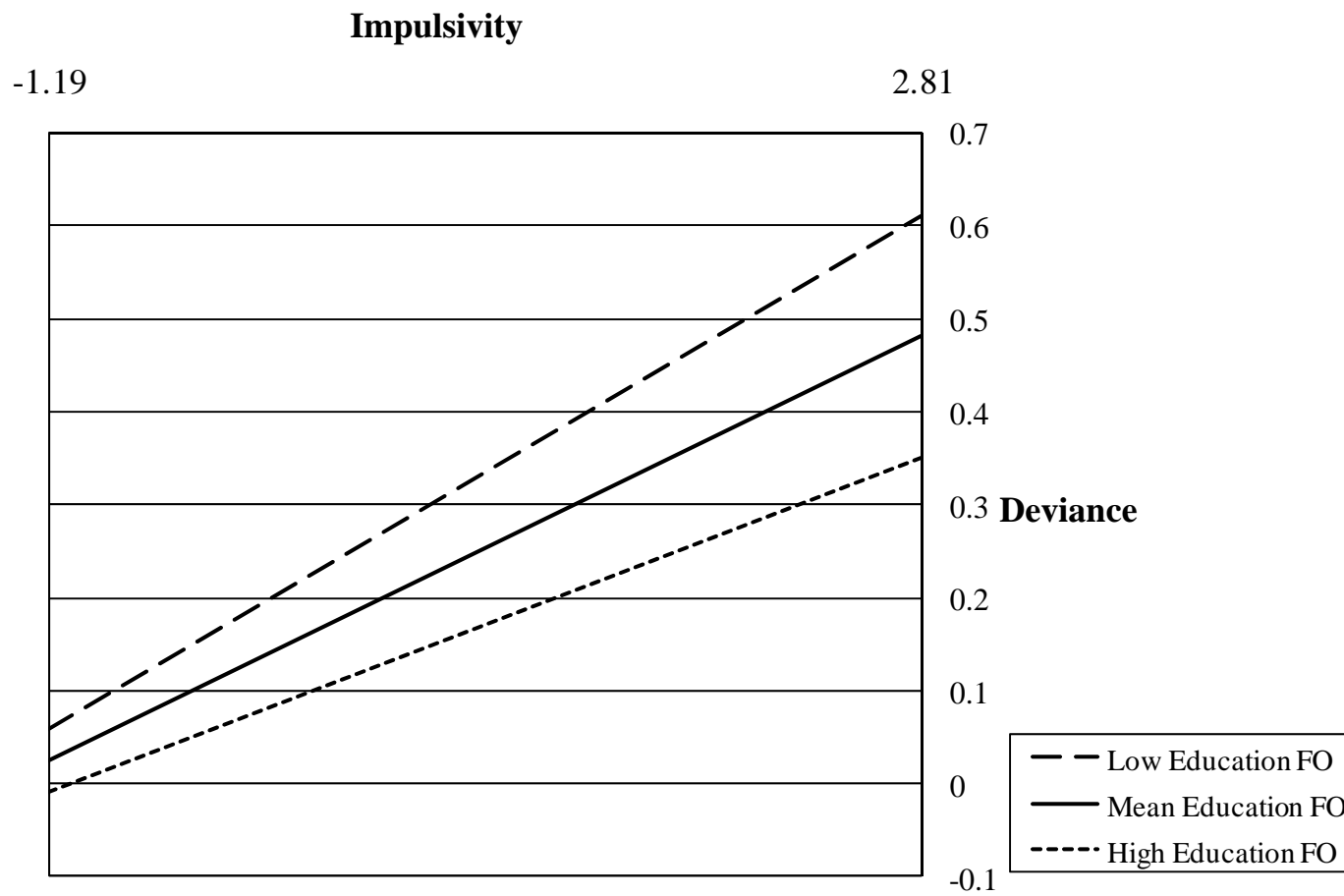
In order to test whether future orientation from different domains differs in their effects on deviance and impulsivity-deviance link, two additional models were specified and tested. Model 6 predicted Wave II deviance using Wave I education, marriage, and life future orientation measures, while controlling for impulsivity and other background variables. Model 7 tested the interaction effect between education future orientation and impulsivity. The results are reported in Table 2.6. Findings indicated that future orientation in all three domains had statistically significant negative effects on deviance, while controlling for impulsivity and background variables (education future orientation: $\beta = -.08, p < .001$; life future orientation: $\beta = -.09, p < .001$; marriage future orientation: ($\beta = -.03, p < .001$). Comparisons of standardized coefficients from Model 6 indicated that education and life future orientation were stronger predictors of deviance than marriage future orientation. In the next step, the interaction terms between the three domain-specific future orientation measures and impulsivity were tested separately. As only the interaction between education future orientation and impulsivity was statistically significant, it is the only interaction term reported in Model 7 ($\beta = -.02, p < .01$). Figure 2.2 includes a plot of the moderation effect by education future orientation on the impulsivity-deviance link (Preacher et al., 2006). The moderation effect by education future orientation was plotted using the same procedure as previously described.

Table 2.6. Multiple Regression Predicting Wave II Deviance by Wave I Impulsivity and Types of Future Orientation (N=14,599)

	Model 3		Model 6		Model 7	
	b	β	b	β	b	β
Intercept	.83***		.19*		.16	
Age	.05***	.11	.04***	.09	.04***	.09
Sex	-.13***	-.08	-.11***	-.07	-.11***	-.07
Family Structure	-.14***	-.09	-.11***	-.07	-.11***	-.07
African American	-.18***	-.10	-.19***	-.10	-.19***	-.10
Native American	.09	.02	.05	.01	.05	.01
Asian American	-.16***	-.05	-.15***	-.05	-.15***	-.05
Other Race	.00	.00	.02	-.01	.03	-.01
Impulsivity	.14***	.11	.12***	.09	.11***	.09
Education FO			-.07***	-.08	-.06***	-.08
Life FO			-.11***	-.09	-.11***	-.09
Marriage FO			-.02***	-.03	-.02***	-.03
Impulsivity X Education FO					-.02**	-.02
Model R ²		4.8%		6.6%		6.6%

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. FO = Future Orientation

Figure 2.2. Prototypical Plot for Moderation Effect by Education Future Orientation on Impulsivity-Deviance Link



Consistent with the moderation effects by general future orientation, education future orientation buffered the effect by impulsivity on deviance. Specifically, the association between impulsivity and deviance was weaker for individuals with more positive education future orientation. Both Model 6 and Model 7 were tested by developmental period as well. Results by developmental period were shown in Table 2.7. The findings remained consistent with the ones based on the total sample. In both groups, a negative relationship was found between the three domain-specific future orientation and deviance, controlling for impulsivity and background variables. In addition, education and life future orientation were stronger predictors of deviance than marriage future orientation in both groups. There were also some observed between-group differences based on standardized regression coefficients. The main effect by life and marriage future orientation on deviance as well as the moderation effect by education future orientation on impulsivity-deviance link appear to be larger for late adolescent sample. But again, follow-up z tests indicated no statistically significant differences across groups. However, the three domain-specific future orientation explained slightly more variance in deviance in late adolescents, net the effects by impulsivity and background variables (early/middle adolescent: 1.7%; late adolescent: 2.8%).

V. Discussion

The association between future orientation and deviance has received extensive empirical attention (e.g., Bolland, 2003; Gilchrist & Schinke, 1987; Robins & Bryan, 2004; Trommsdorff & Lamm, 1980; Whitaker et al., 2000), but few studies have tested

Table 2.7. Multiple Regression Predicting Wave II Deviance by Wave I Impulsivity and Types of Future Orientation by Developmental period (N=14,599)

	Model 3		Model 6		Model 7	
	EA/MA	LA	EA/MA	LA	EA/MA	LA
Age	.12***	-.07**	.10***	-.07**	.10***	-.07**
Sex	-.07***	-.20***	-.06***	-.17***	-.06***	-.17***
Family Structure	-.09***	-.08**	-.07***	-.06	-.07***	-.06*
African American	-.09***	-.11***	-.10***	-.13***	-.10***	-.13***
Indian American	.01	.03	.01	.03	.01	.03
Asian American	-.05***	-.08**	-.05***	-.09**	-.05***	-.09**
Other Racial Groups	.12	-.10***	.00	-.10***	.00	-.10***
Impulsivity	.12***	-.07**	.09***	.08**	.09***	.07*
Education FO			-.09***	-.08**	-.08***	-.08**
Life FO			-.08***	-.11***	-.08***	-.11***
Marriage FO			-.02**	-.07*	-.02**	-.07*
Impulsivity X Education FO					-.02*	-.06*
Model R ²	5%	8.1%	6.7%	10.9%	6.7%	11.2%

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. EA/MA: Early Adolescents/Middle Adolescents; LA: Late Adolescents. Numbers in the table are standardized regression coefficients. Follow-up z tests indicate no statistically significant between-group differences.

the longitudinal associations between future orientation and adolescent deviance (cf., Skorikov & Vondracek, 2007). In addition, it remains unclear to what extent future orientation predicts adolescent deviance while also considering the effects by impulsivity, and whether future orientation conditions the relationship between impulsivity and deviance. This is important as future orientation does not operate alone in the decision making process of deviant behaviors; the performance on delay discounting tasks activates two different brain systems which reflects a combination of both impulsivity and future orientation (Greene et al., 2001; McClure et al., 2004; Sanfey et al., 2003). Related to this, Steinberg and colleagues (2009) proposed that one potential model for understanding delay discounting behavior is that of a competition between future orientation and impulsivity. Therefore, the current study aimed to test the longitudinal links between future orientation and deviance while taking impulsivity into account. It also examined the effects by domain-specific future orientation as well as the potential developmental similarities or differences in the relationships between future orientation, impulsivity, and deviance.

Longitudinal Association between Future Orientation and Deviance

Perhaps the most important finding was that future orientation negatively predicted deviance longitudinally, net the effects by age, sex, race, and family structure (Hypothesis 1). In addition, this longitudinal link was maintained even after considering impulsivity (Hypothesis 2). Therefore, adolescents with more positive future orientation were less likely to engage in deviant behaviors. Findings also indicated that the magnitude of the relationship between future orientation and deviance, as measured in the

current effort, was stronger than the one between impulsivity and deviance, and related, future orientation explained more variance in deviance than impulsivity. Cross-sectional associations between future orientation and deviance in the literature range from about $r = -.10$ to $r = -.20$ (e.g., Caldwell et al., 2006; DuRant et al., 1994; Hill et al., 1997; Keough et al., 1999; Robbins and Bryan, 2004; Wills et al., 2001), thus weak to moderate in size. Not surprisingly, consistent with these findings, the current study provided evidence that future orientation explained 1.9% variance in deviance over time.

In addition to the main effect by future orientation on deviance, future orientation also moderated the relationship between impulsivity and deviance (Hypothesis 3). Specifically, future orientation buffered the effect by impulsivity on deviance as the relationship between impulsivity and deviance was weaker for individuals with more positive future orientation. Therefore, future orientation as a protective factor apparently reduces the effect by impulsivity, a risk factor, on deviance.

Effects by Domain-Specific Future Orientation

Second, factor analyses provided evidence that future orientation measures in the current study were composed of three different dimensions, namely education future orientation, life future orientation, and marriage future orientation. Consistent with Caldwell et al.'s (2006) study, education future orientation and life future orientation had a similar amount of influence on deviance and were stronger predictors of deviance than marriage future orientation (Hypothesis 4). The finding that life future orientation had similar amount of influence on deviance as education future orientation is especially important as adolescents' expectation about their health and life remains understudied in

the literature. This is so because it has been suggested previously that fears related to health are rare during adolescence and become more frequent during middle adulthood (Nurmi, 2006). However the findings from the current study indicated that adolescents who have low expectations about their health and life are more likely to risk their future despite the fact that youth generally have more positive life expectations. Therefore, future research needs to pay more attention to adolescent perceptions about their future in the life domain.

Different from Caldwell et al.'s (2006) study, marriage future orientation did have significant effect on deviance, controlling for the background variables and impulsivity. However, the magnitude of the relationship between marriage future orientation and deviance was weak. In addition, future orientation of marriage did not moderate the impulsivity-deviance link. This is not surprising as previous findings by Caldwell et al. (2006) and the current findings suggest that marriage future orientation is not influential in understanding deviance. Previous work has shown that adolescent future orientation focused more on future careers as opposed to future relationships (e.g., McCabe & Barnett, 2000).

Another interesting finding is that although education future orientation and life future orientation were both stronger predictors of deviance compared to marriage future orientation, only education future orientation moderated the relationship between impulsivity and deviance. The finding again highlights the importance of education future orientation for adolescent development. The finding that life future orientation did not moderate the effect by impulsivity on deviance is inconsistent with part of Hypothesis 4.

Candidate explanations for this include potential measurement issue of how this construct was assessed. Life future orientation as measured in the current effort seems more consistent with a measure of a person's pessimism about their health and life (i.e., asked people about their perception of likelihood that some negative events that will happen in this domain), and therefore is a measure of risk. Since risk and protective factors are not polar opposites, higher scores in life future orientation as measured in the current study indicated lower scores in risk factors instead of higher scores in protective factors. Thus, the lack of moderation effects by life future orientation seems consistent with assumptions by Problem Behavior Theory (Jessor, 1991), namely that only protective factors can moderate the relationship between risk factors and deviance. It is worth noting that the finding regarding the moderation effect by life future orientation should be generalized with cautions as it only indicates that life future orientation as measured in the current effort does not have a moderation effect on the impulsivity-deviance link. Future research should further test the moderation effect by life future orientation using different measures of life future orientation (ones that capture a person's optimism about their health and life). In addition, the finding also suggests that pessimism and optimism should be considered and tested as different dimensions of future orientation in future work.

Developmental Differences

Finally, analyses testing the links between the study constructs by developmental period indicated that the relationships between future orientation (both general and domain-specific), impulsivity, and deviance remained largely unchanged

developmentally (hypothesis 5), although there was some hint at differences. Both regression coefficients and the amount of variance explained by the study constructs differed for adolescents from the different developmental periods; however, follow-up tests did not support this. Therefore, the findings support the view that emphasizes similarities in developmental processes across different developmental periods. In fact, this evidence of similarity is particularly compelling given the findings by Steinberg and colleagues (2009). Based on a sample of 935 individuals between the ages of 10 and 30, Steinberg and colleagues compared levels of self-reported future orientation across seven different age groups (i.e., 10-11, 12-13, 14-15, 16-17, 18-21, 22-25, and 26-30) and found that younger adolescents consistently demonstrated a weaker future orientation than older ones. Specifically, younger adolescents in their study were less concerned about the future and less likely to anticipate the consequences of their decisions.

The findings imply that future orientation, as measured in the current study (i.e., adolescent expectations about their future), might have weaker influence on deviance for younger adolescents as they are less likely to think about the future consequences of their current behavior. In other words, younger adolescents might be less concerned about whether their deviance behaviors will risk their future, even if they have a positive view of their future. However the findings from the current study indicate that despite the fact that younger adolescents think less about their future than older adolescents, the link between future orientation and deviance is similar for adolescents from different developmental periods. It is worth noting that sample and measurement differences exist between the current study and the study by Steinberg and colleagues (2009). First,

participants of the Steinberg et al. (2009) study included both adolescents and adults, while the current study exclusively focused on adolescents. In addition, Steinberg and colleagues measured future orientation as the extent to which people think about and plan for the future, whereas in the current study, it was framed as optimism and pessimism about future events. Therefore, findings from the current effort and the fact that they differ from Steinberg et al.'s study related to developmental changes, may also simply be related to sampling and measurement differences. Future work testing the question of developmental changes in the model proposed by Steinberg and colleagues will provide important insights. In conclusion, future orientation, as measured in the current effort, has a similar amount of influence on deviance for early/middle and late adolescents, and therefore should be considered as a protective factor for adolescents from different developmental periods.

Limitations

A number of study limitations require mention. First, the measure of future orientation was limited. The scale had low reliability, one of the disadvantages of working with a secondary data set. In addition, the measure of future orientation did not capture the cognitive dimension, for instance, such as items that assessed locus of control (whether people think they have a control over their future and their current behavior will influence their future), extension of future orientation (how far away people think about their future), or the intensity of future orientation (how often they think about their future). In addition, given some of the developmental questions that were tested, it also did not address to what extent the same items were appropriate to use for the different age

groups part of the study. In other words, assessing future orientation for early adolescents might require different questions or even a slightly different approach to capture to what extent youth think about the future. Therefore, the relationship between future orientation and deviance might be attenuated in the current study; this might partially explains some of the modest associations observed, although there were quite consistent with previous cross-sectional work. Future research needs to test the longitudinal links between future orientation and deviance using a more nuanced and comprehensive measure that captures different dimensions of future orientation and that addresses how to assess future orientation at different ages. Related to that it is also important to test whether different dimensions of future orientation have a similar or different impact on deviance and whether they interact with each other. In addition, although the current study tested the longitudinal relationship between future orientation and deviance, it did not address the more appropriate longitudinal question whether future orientation predicts the developmental trajectory of deviance (requiring multiple assessments of the same constructs for each participant).

Another limitation of the current study as well as the one by Steinberg and colleagues (2009) is that both studies tested the developmental differences by dividing individuals into different age groups instead of following the developmental process of the same people over time. Thus, findings about potential developmental changes in both studies must be interpreted with caution. In order to thoroughly test the developmental changes in the links between future orientation, impulsivity and deviance, future longitudinal work need to follow the development course of the same group of

individuals over time (i.e., from early adolescent years until late adolescence) and test true changes of the longitudinal effects by future orientation and impulsivity on deviance.

Finally, the modest effect by future orientation on deviance implies quite limited practical utility in term of attempting to address this construct in prevention and intervention programs with youth. However, it is worth noting that due to the limitations of the future orientation measure as well as the correlational design of the current study, no conclusion can be reached regarding the potential utility of intervention and prevention efforts that focus on future orientation, an issue that should be investigated more fully using a stronger measure of future orientation as well as in an experimental design to reach more definitive conclusions related to causality and effect sizes. At the same time, the focus of the current study was not on developing prevention and intervention strategies, but rather to test a basic research question, informed by previous empirical and conceptual work.

Chapter 3

Future Orientation and Deviance: A Multilevel Study

Abstract

The current study tested the school contextual influences on the longitudinal relationship between future orientation and deviance. Using a sample of N=14,266 adolescents from N=145 schools of Nationally Longitudinal Study of Adolescent Health (Add Health), the following research questions were addressed: (1) whether there is a longitudinal association between future orientation and deviance net the effects by school context and control variables; (2) whether there is a longitudinal association between school context (school size, school location, school SES, and school-level future orientation) and adolescent deviance, while controlling for individual-level covariates; and (3) whether the longitudinal association between future orientation and deviance varies as a function of school context. Findings provide support for the longitudinal relationship between future orientation and deviance, net the effects by school context and controls. In addition, controlling for the effects by individual-level covariates, school size and school-level future orientation predicted individual-level deviance. Finally, school-level future orientation moderated the relationship between individual-level future orientation and deviance.

I. Introduction

Adolescent deviance is a significant social and personal problem that threatens the well-being of youth, families, and communities. According to Problem Behavior Theory (Jessor, Turbin, Costa, Dong, Zhang et al., 2003), low expectations for success or a sense of hopelessness for the future is a key vulnerability risk factor that increases the likelihood of engaging in deviant behaviors. Specifically, youth with pessimistic future expectations in the family, education, or work domains possess a greater personal vulnerability for involvement in deviant behaviors. Nurmi (1991) also identified adolescents who are not oriented toward the future may engage in a variety of problem behaviors, such as delinquency, problems in school, or drug use. The term most widely used to describe a person's expectations about and actions related to the future is future orientation (Nurmi, 2005), a concept originally introduced by Trommsdorff (1983) and Nurmi (1991, 1993) in the developmental literature.

The Association between Future Orientation and Deviant Behaviors

Future orientation has been generally defined as consciously self-constructed and represented images of the future (Nurmi, 1991; Trommsdorff, Burger, & Fuchsle, 1982). Based on a person's future orientation, individuals direct their development in certain ways and purposefully select a variety of life trajectories (Nurmi, 1993). Thus, future orientation is responsible for future-oriented behaviors (or a lack thereof) and may be related to delay of gratification or planning and achieving future goals (Trommsdorff et al., 1979). Future oriented individuals are more likely to consider the future consequences

of their current behaviors during the decision making process, and individuals with a more positive future orientation are generally more sensitive to future consequences of their present behavior (Routledge & Arndt, 2005). Consequently, individuals with more positive future orientation are less likely to engage in deviant behaviors, as these behaviors may risk their future.

Research has provided evidence of a negative relationship between future orientation and a variety of problem behaviors, including alcohol use (Robins & Bryan, 2004), drug use (Bolland, 2003; Bolland, Bryant, Lian, McCallum, Vazsonyi et al., 2007; Keough, Zimbardo & Boyd, 1999; Robins & Bryan, 2004; Trommsdorff, 1986;), theft (Oyserman & Saltz, 1993), risky sexual behaviors (Gilchrist & Schinke, 1987; Morris, Baker, & Valentine, 1998; Robins & Bryan, 2004; Whitaker, Miller & Clark, 2000), and school misconduct (Caldwell, Wiebe & Cleveland, 2006; Skorikov & Vondracek, 2007). The association between future orientation and deviant behaviors has been found among institutionalized youth (e.g., Trommsdorff, 1986; Trommsdorff & Lamm, 1980; Robins & Bryan, 2004) as well as in general samples of adolescents (e.g., Bolland, 2003; Bolland et al., 2007; Gilchrist & Schinke, 1987; Skorikov & Vondracek, 2007; Whitaker et al., 2000).

Despite the fact that conceptual work has provided directional hypotheses, it remains largely unknown whether a low or pessimistic of future orientation increases the likelihood of deviant behaviors over time; this is so because essentially no longitudinal work has been completed in this area. The majority of previous work has been cross-sectional, although Skorikov and colleagues (2007) did test the longitudinal relationship

between career orientation and deviance. In addition, almost no work has considered or tested the salience of contextual influences (e.g., the school) on the link between future orientation and deviance; this is so despite Bronfenbrenner's (1979) seminal conceptual work on Ecological Systems Theory developed over three decades ago. Given the potential effects by the school context on both adolescent future orientation and deviance as suggested by previous empirical studies, research must consider and thoroughly test potential school contextual effects when examining the link between future orientation and deviance. Therefore, the current study aimed to examine the longitudinal links between future orientation and deviance, while considering school contextual effects, operationalized by school location, school size, school SES, and school-level future orientation.

Future Orientation in Context

The development of future orientation is likely a “multi-level process” that is influenced by a multitude of contextual factors. Future orientation develops in institutional and cultural contexts, where normative expectations and knowledge provide a basis for future oriented interests and plans (Nurmi, 1991). In addition, beliefs concerning the future are also learned through social interactions with other people, such as parents and peers (Kandel & Lesser, 1969). Previous studies provide some evidence for contextual influences on adolescent future orientation, such as by the family or culture (e.g., Jurkovic & Ulrici, 1985; Kenny, Blustein, Chaves, Grossman, & Gallagher, 2003; Nurmi & Pulliainen, 1991; Seginer, 2001). Researchers have also examined and acknowledged contextual school effects in one specific domain of adolescent future

orientation, namely educational expectations. It has been suggested that the aggregated school-level educational expectations as well as the mean level academic ability both influence the development of educational expectations of students (Khatab, 2005). The influence of other school constructs, such as school type and school SES, has also been suggested and empirically supported (Ayalon & Yuchtman-Yaar, 1989; Buchmann & Dalton, 2002; Shavit & Williams, 1985). School-level effects on educational expectations also provide important implications for potential similar effects on other domains of future orientation. Some findings have provided evidence for distinct future-oriented goals based on different types of schools. For example, it was found that college-preparatory students' future-oriented goals focused on career preparation whereas the ones for students in vocational schools focused on preparation for adult roles (Klacznski & Reese, 1991). Thus, the school may work as a basis from which an adolescent's specific future orientation develops. In fact, Nurmi (1991) proposed that the school climate provides incentives for thinking about current life-tasks as well as for opportunities to compare one's own behavior with that of others. These empirically supported contextual effects on the development of future orientation imply that in order to rigorously test the relationship between future orientation and deviance, potential school contextual effects must be carefully considered.

School Context and Deviance

Contextual theories highlight developmental effects by the school on deviance. It is one of multiple social contexts suggested by Problem Behavior Theory (Jessor, 1991) to be salient in the ecology of daily life among adolescents. Similarly, Hirschi (1969)

proposes that attachment and commitment to school are central tenets of social control theory; individuals with strong bonds to conventional institutions are less likely to engage in deviant behaviors. He identified the school as the second most important socializing agent after the family in understanding variability in deviance and crime. Empirically, school effects on adolescent deviance have been well documented. Based on multi-level modeling, it has been found that between school variability in student outcomes ranges between 8% and 15% (i.e., 8% to 15% exists between schools, while 85% to 92% exists between individuals); this translates into substantial effect sizes between .58 and .85 standard deviations (Reynolds & Cuttance, 1992; Gottfredson, 2001). Controlling for individual propensity, such as age, sex, and socioeconomic status, school-level variables have been found to explain up to 11% in a variety of deviance measures (e.g., Felson et al., 1994; Kasen et al., 1990; Gottfredson, 2001). Specifically, attachment and commitment to school have been shown to be moderately related to deviance (e.g., Costello, Anderson, & Stein, 2006; Smith & Fogg, 1978; Gottfredson & Koper, 1996; Dornbusch, Erickson, & Laird, 2001). Studies have also provided evidence that school climate of connectedness serves as a protective factor against violent behaviors among students (Brookmeyer, Fanti, & Henrich, 2006). In addition, other dimensions of school climate, such as conflict, academic focus, and social facilitation, have also been found to significantly predict adolescent problem behaviors and deviance (Kasen et al., 1990).

The Importance of School Demographic Characteristics

A number of studies have provided evidence of effects by school demographic characteristics on deviance (e.g., Anderman, 2002; Anderman & Kimweli, 1997;

Brookmeyer et al., 2006; Crosnoe, Johnson, & Elder, 2004; Welsh, Stokes, & Greene, 2000; Pearson, Sweeting, West, Young, Gordon et al., 2006). For instance, the location of the school, its demographic composition, or its student diversity each appear to influence student developmental outcomes; this was found while holding student demographic and educational backgrounds constant (Gottfredson, 2001). School location, school size, and average school SES are generally considered externally determined school features as they are not under the control of school staff, but largely the result of the community in which the school is located (Gottfredson, 2001). In fact, these externally determined school features are likely to constrain the effectiveness of schools and have more substantial effects on non-cognitive outcomes, such as deviant behaviors, than cognitive ones (Gottfredson, 2001).

School location matters, as it determines the demographic composition of the school; therefore, students in urban, rural, and suburban schools may have quite distinct school experiences. Students in urban schools report higher rates of victimization and perceive their school as more unsafe (Anderman & Kimweli, 1997) in comparison to suburban or rural schools; these youth also exhibited higher levels of violent behavior (Brookmeyer et al., 2006) and report a lower sense of belonging (Anderman, 2002). It is fairly well known and accepted that it is more difficult to monitor and regulate student behaviors in larger schools; larger school size in effect weakens the bond between students, teachers, and schools (Crosnoe et al., 2004). In fact, larger schools may also facilitate a culture of anonymity, powerlessness, and impersonality (Welsh et al., 2000). Finally, average school SES has been linked to lower levels of student achievement

(Konstantopoulos, 2006; Lee & Bryk, 1989; Young, 1998) and other behavioral outcomes (Bryk & Driscoll, 1988; Gottfredson, 2001; Goldschmidt & Wang, 1999; Pearson et al., 2006; Vieno, Perkins, Smith, & Santinello, 2005). Schools with lower average SES have been found to have higher drop-out rates (Goldschmidt & Wang, 1999) and higher victimization rates (Gottfredson, 2001). Students in schools with lower level SES reported lower level of academic achievement (Konstantopoulos, 2006; Lee & Bryk, 1989; Young, 1998), higher rates of alcohol use and substance use (Pearson et al., 2006), and a lower sense of community (Vieno et al., , 2005). Each of these school-level characteristics appears to be closely related to deviant behaviors and thus will be examined in the current study.

Debates on Potential School Context Effects

Although it has been recognized that the school is an important developmental context for youth, a debate continues to exist on whether contextual effects exist, particularly for adolescent deviance. Self-control theory (Gottfredson & Hirschi, 1990), which largely explains deviance from an intra-personal perspective, de-emphasizes school effects on deviance. It proposes that the relationships between the school context and deviance are largely spurious as they both covary with low self-control. This implies that potential effects by individual traits on deviance, such as future orientation or impulsivity, must be addressed when investigating potential school effects on deviance. On the other hand, in order to thoroughly test the influence of personal future orientation on deviant behaviors, school effects need to be considered as well.

A number of studies have tested school effects by focusing exclusively on either individual-level (e.g., Costello et al., 2006; Dornbusch et al., 2001; Pearson, et al., 2006) or school-level (Welsh et al., 2000) data. The multi-level analytic strategy has been used in some previous work to differentiate between individual-level and school-level effects; however, very few studies have employed nationally representative samples, thus severely limiting their generalizability. The multilevel studies that have been based on nationally representative samples, such as the Add Health (Anderman, 2002; Brookmeyer, et al., 2006; Costello, et al., 2004) or the National Educational Longitudinal Study (Anderman et al., 1997) have not focused on deviance but on interpersonal process (Costello, et al., 2004), victimization (Anderman et al., 1997), sense of belonging (Anderman, 2002), or violence (Brookmeyer et al., 2006).

Finally, the effects by future orientation and the school context (including school-level future orientation) on deviance have seldomly been studied simultaneously. Only one study was found that tested this issue. Somer and Gizzi (2001) examined the effects by school attachment, school involvement, and future education orientation on risky behaviors and found that both future education orientation and the school context contributed to the explanation of the risky behaviors. However, the generalizability of the findings are low due to the small adolescent sample ($N = 551$) from only one high school. In addition, the study did not provide a precise estimation of the effects by future orientation versus school context as the authors simply used regular hierarchical regression technique which relies exclusively on individual-level analyses.

In conclusion, the longitudinal association between future orientation and deviance remains unclear. In addition, no generalizable conclusions can be drawn as to the potential school-contextual effects on deviance. Finally, the independent effects by future orientation and school contexts on deviance controlling for the effects by each other need to be rigorously tested. Therefore, the longitudinal association between future orientation and deviance must be more thoroughly tested while taking school context into account and using representative samples as well appropriate analytical tools (i.e., multilevel modeling). The school context characteristics that were tested in the current study included school demographic characteristics (i.e., school size, school location, and school SES) as well as school-level future orientation.

II. Research Questions and Hypotheses

The current study sought to build on previous work by focusing on the longitudinal relationship between future orientation and deviance, while considering the effects by school context. The following specific research questions and hypotheses were tested:

1) Is there a longitudinal association between future orientation (level 1) and deviance, while controlling for school context (school size, school location, school SES, and school-level future orientation) (level 2)?

Hypothesis 1: It was hypothesized that there would exist a longitudinal association between future orientation and deviance, while controlling for (level 2) school context effects. Specifically, a negative relationship was expected between the level of

future orientation and adolescent deviance, while controlling for schools contextual effects.

2) Is there a longitudinal association between school context (school size, school location, school SES, and school-level future orientation) (level 2) and adolescent deviance, while controlling for individual-level predictors (level 1).

Hypothesis 2: It was expected that both school demographic characteristics and school-level future orientation (level 2) would be associated with adolescent deviant behaviors, while controlling for individual-level predictors (level 1). Specifically, it was expected that 2a) students in smaller schools would report lower levels of deviance than students in larger schools, that 2b) students in rural schools would report lower levels of deviance than students in urban schools, and that 2c) students from higher-SES schools would report lower levels of deviance than students in lower-SES schools. It was also expected that 2d) there would be a negative relationship between school-level future orientation and deviance (i.e., adolescents in schools with more positive school-level future orientation are less likely to engage in deviant behaviors).

3) Does the longitudinal association between future orientation and deviance vary as a function of school context (school-level future orientation and other school demographic characteristics)?

Hypothesis 3: As no previous studies have examined a potential “moderation effect” by school contextual characteristics on the relationship between future orientation and adolescent deviance, this research question was largely exploratory in nature.

However, given the consistent findings of the effects by future orientation on deviance, it

was expected that the direction of the relationship between future orientation and deviance would not vary across schools. It was expected that a consistently negative relationship between future orientation and adolescent deviance would be found across schools. At the same time, given the school effects on both future orientation and adolescent deviance, it was expected that the magnitude of the relationship between future orientation and deviance would vary as a function of school contextual characteristics. Specifically, it was hypothesized that 3a) the relationship between future orientation and deviance will be stronger for students in smaller schools, that 3b) future orientation will have a stronger effect on deviance for students in rural schools, and that 3c) the future orientation-deviance link will be stronger for students in higher-SES schools. It was also hypothesized that 3d) school-level future orientation will strength the relationship between individual-level future orientation and deviance.

III. Methods

Sample

Data for this study came from the first two waves of the Add-Health restricted-use, contractual dataset¹. The National Longitudinal Study of Adolescent Health (also known as Add Health, the Add Health Study, and the Add Health Survey) is a nationally representative study originally designed to examine how social contexts influence teens'

¹ This research uses data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by a grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Persons interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516-2524 (addhealth@unc.edu). No direct support was received from grant P01-HD31921 for this analysis.

health and risk behaviors (Harris, Halpern, Entzel, Tabor, Bearman, & Udry, 2008). Beginning in 1994 (September 1994 – December 1995, Wave I), researchers selected a random sample of 7th to 12th grade students from schools across the country. The School sample of Add-Health dataset is stratified, random sample of all high schools in the United States. During the course of data collection, administrators from participating schools completed self-administered questionnaires dealing with school policies and procedures, teacher characteristics, health-service provision or referral, and student body characteristics. In addition, about 90,000 students filled out a brief questionnaire at school. Then, researchers conducted in-depth, at-home interviews with the sampled students and their parents ($N = 20,745$). The students were interviewed again in their homes one year later (1996, Wave II). Adolescents who completed both Wave I and Wave II Add Health surveys were selected for the purpose of analyses of the current study ($N=14,738$ youth). Missing data (both school-level and individual-level) resulted in a final study sample of $N=14,266$ youth from 145 schools who were between 11.39 to 21.24 years old at Wave I (mean age = 15.82; 51.1% females).

Measures

Measures of age, sex, race, family structure, and impulsivity were included in the current study as controls. As the majority of the schools in the Add Health dataset are public schools (91%), school type was also included as a control variable. In addition, adolescent reports of future orientation at Wave I as well as their reports of deviance at Wave II were assessed. School demographic information at Wave I was assessed by the

school administrator questionnaire which was an independent data source from school administrators.

Age. Participants were asked to indicate the month and year in which they were born. The 15th day of each respective month was used to calculate a participant's age.

Sex. Participants were asked to indicate their sex on a single item: "What sex are you?" Responses were given as 1= male and 2 = female.

Race. Adolescent reports of their race were used in the current study. Five racial groups were identified based on this information for data analyses, namely African American, Asian American, European American, Native American, and Others. To control for race, dummy-coded variables were developed for African American, Asian American, Native American, and Others, using European Americans as the reference or comparison group.

Family Structure. Family structure was developed using household roster information provided in the in-home interview. The household roster information captures both the biological and legal relationships between the adolescent and all co-resident parent figures, as reported by the adolescent. For control purposes, family structure was classified as two biological parents and other.

Impulsivity (Wave I). Impulsivity was measured by the mean of four items from the in-home interview (Thompson, Ho, & Kingree, 2007; Vazsonyi, Cleveland, & Wiebe, 2006). Items asked respondents to indicate on a 5-point scale ranging from 1 (strongly agree) to 5 (strongly disagree) whether they agreed with four different statements (e.g., "When you have a problem to solve, one of the first things you do is get as many facts

about the problem as possible”). A scale score was computed by averaging the responses of all four items ($\alpha = .74$). This scale assesses impulsivity as the items measure a lack of deliberate thinking/planning, an inability to delay gratification, an unwillingness to weigh different consequences of a decision or a behavior, and a “here and now” orientation.

School Type (Wave I). School type was provided by school administrator survey (1 = public school, 2 = private school).

Future Orientation (Wave I). Seven-items were used to assess future orientation. Five-items assessed an adolescent’s perceptions of the likelihood of future events (e.g., going to college). One item assessed how much adolescents wanted to go to college, and one item assessed whether adolescents felt hopeful about the future. The responses for the first five items were in a 5-point Likert-type scale ranging from 1 (little or no change) to 5 (very likely or almost certain). Response for the item that measured desire of going to college was given on a 5-point scale, ranging from 1 to 5 where 1 is low and 5 is high. Response for the item that measures hopefulness was given on a 4-point Likert-type scale ranging from 0 (never or rarely) to 3 (most of the time or all of the time). A total scale score were computed using the standardized scores of each item to address the different response scales for items ($\alpha = .58$). The responses for the items that assessed an adolescent’s perception of the likelihood of being killed by age 21 and getting HIV or AIDS were reverse coded so that a higher score reflected a higher-level of future orientation. Based on an examination of the face validity of the items, this scale taps into different dimensions of future orientation. Items include an adolescent’s anticipation of the likelihood of future events (cognitive dimension), their future oriented interests and

fears (motivational), as well as their levels of pessimism and optimism (affective dimension).

Deviance (Wave II). Deviance was measured with seventeen items. Fourteen of the seventeen items assessed a broad range of deviant behaviors within the past 12 months, ranging from minor actors, such as dishonesty to parent about whereabouts, to more serious offenses, such as being in a serious fight and selling drugs (e.g., in the past 12 months, how often did you lie to your parents or guardians about where you had been or who you were with; Vazsonyi, Cleveland, & Wiebe, 2006). Responses were given on a 3-point scale, ranging from 0 = never to 3 = five. Two of the seventeen items assessed adolescents' alcohol use during the past 12 months. Responses range from 0 = never to 6 = every day or almost every day. In addition, one item asked adolescents whether they tried or used marijuana since they completed Wave I Add Health survey. The responses were given as 0 = no and 1 = yes. A deviance scale score was computed by averaging the standardized scores of the seventeen items due to the differences in the metric scales of the items ($\alpha = .84$).

School Size and Location (Wave I). School size and location information were provided by school administrators. School location was recoded into two dummy-code variable (urban school: 1 = urban and 0 = rural; suburban school: 1 = suburban and 0 = rural). Two dummy-code variables were developed for school size using small-size school as the comparison group (i.e., large school: 1 = large school, 0 = small-size school; medium-size school: 1 = medium-size school, 0 = small-size school).

School SES (Wave I). The level-2 school SES scores were computed by averaging the SES (assessed by parents' report of annual household income in thousand unit) of all participants in each respective school.

Level-2 Future Orientation (Wave I). Level 2 future orientation was computed based on the averaged student scores from each school.

Descriptive information for each of the study variables used in current study are included in Tables 3.1 and 3.2; this includes number of participants as well as number of study schools.

Plan of Analyses

The effects of the individual-level or level 1 variables (e.g., future orientation) as well as the school-level or level 2 variables (school SES, school size, school location, and school-level future orientation) on deviance were examined using a multi-level hierarchical regression analysis in SPSS (Peugh & Enders, 2005). A number of individual-level variables (age, sex, race, family structure, and impulsivity) and a school-level variable (school type) were used as control variables in the analyses to rule out a number of competing explanations and to reduce the likelihood of spurious findings. The effects by Wave I individual-level future orientation and school contexts (level 2: school SES, school size, school location, school-level future orientation) on Wave II deviance were examined using a eight-step multilevel modeling approach.

Step 1. An unconditional means model was fitted to compute the proportion of variability in deviance that existed between individuals and schools (Model 1).

Table 3.1. Descriptive Information for Categorical Variables (N=14,266; School N=145)

	N	Percentage
Sex		
Female	7290	51.1%
Male	6976	48.9%
Family Structure		
Two Biological Parents	7479	52.4%
Other	6787	47.6%
Race		
African American	3139	22.0%
Asian American	984	6.9%
European American	8731	61.2%
Native American	240	1.7%
Other	1172	8.2%
	School N	Percentage
School Type		
Public School	132	91.0%
Private School	13	9.0%
School Size		
Large School	32	22.1%
Medium-size School	69	47.6%
Small School	44	30.3%
School Location		
Urban School	46	31.7%
Suburban School	80	55.2%
Rural School	19	13.1%

Table 3.2. Descriptive Information for continuous variables (N=14,266; School N=145)

	Mean	Min.	Max.	SD
Individual –Level				
Age	15.82	11.39	21.24	1.58
Impulsivity	2.20	1.00	5.00	.63
Future Orientation	.01	-2.85	1.22	.53
Deviance	.00	-.71	8.94	.78
School-Level				
School SES	45.38	19.75	72.27	7.40
School-Level FO	.04	-.37	.61	.17

Note. FO = Future Orientation

Step 2. School-level covariates (school type, school SES, school size, school location, and school-level future orientation) were added simultaneously to test for level 2 school-level effects on deviance (Model 2).

Step 3. Level 1, individual-level covariates (age, sex, family structure, race, impulsivity, and future orientation) were added to the individual-level model (Model 3). In Model 3, individual-level future orientation was only specified to have a fixed effect on deviance.

Step 4. The random effect by individual-level future orientation was tested in Model 4 to examine whether the effect by individual-level future orientation varied across school contexts (Model 4). Model fit of Models 3 and 4 were compared to examine whether adding the random effect of individual-level future orientation improved fit (significance test).

Step 5. All level 1 individual- and level 2 school-level variables were simultaneously tested in this step. Interaction terms between school-level variables and individual-level future orientation were tested (i.e., school SES X individual future orientation, school size X individual future orientation, school location X individual future orientation, and school future orientation X individual future orientation). Variables with either a significant main effect or a significant interaction effect were retained for further analyses (level 1, individual-level variables: age, sex, family structure, race, impulsivity, and future orientation; level 2, school-level variables: school size and school-level future orientation).

Step 6. Based on the variables retained from the model tested in step 5, a control model (Model 5) was tested (only control variables).

Step 7. Individual-level future orientation, school size, and school-level future orientation were simultaneously added into the control model (Model 6). Level 1, individual-level future orientation was included as both a fixed and a random effect.

Step 8. The interaction term between individual-level future orientation and school-level future orientation were tested in a final model (Model 7); this was the only significant cross-level interaction term found. The effect by the interaction term would reveal whether the effect by future orientation on deviance varied as a function of level 2, school-level future orientation.

The explained variance of the dependent variable as well as the explained slope variance of future orientation were examined use the residual ICC (intra-class correlations). The models were compared using delta chi-square tests (comparison between nested models).

IV. Results

Unconditional model

The results of the unconditional model are reported in Table 3.3. The variance components suggest statistically significant variability between schools ($\tau_{00} = .027, p < .001$) and within schools ($\sigma^2 = .589, p < .001$). The intra-class correlation coefficient was .044, which indicated that 4.4% variance in deviance existed between schools.

Table 3.3. Longitudinal Level 2 Covariate Model Predicting Deviance

Parameters	Model 1 (Baseline Model)		Model 2	
	Estimate	SE	Estimate	SE
Fixed Effects				
Intercept	-.019	.016	-.286	.128
School Type			.120*	.056
School-Level SES			.002	.002
Large School			.206***	.044
Medium-Size School			.088*	.040
Urban School			-.012	.049
Suburban School			.065	.045
School-Level FO			-.225*	.109
Random Effects				
Residual	.589***	.007	.588***	.007
Intercept	.027***	.004	.020***	.003
ICC		.044		
-2LL		33249.336		33149.330
Comparison Model				1
-2LL				100.006***
Δ df				7
Variance Explained				
Level 2				26.1%

Note. * $p < .05$, *** $p < .001$. FO = Future Orientation. Reference groups are as follows: school type (0 = public school); school size (0 = small-size school); school location (0 = rural school).

School-level Models (Level 2)

The examination of the results of school-level models (i.e., Model 2; see Table 3.3) revealed that school size and school-level future orientation had significant effects on adolescent deviance while controlling for school type; effects by school-level SES and school location were not statistically significant. All the variables in Model 2 reduced the between-school variance of deviance by 26.1%; in addition, the change in model fit as compared to the baseline model was statistically significant ($\Delta\chi^2 = 100.006$, $\Delta df = 7$, $p < .001$). Although school-level SES and school location did not have statistically significant effects on adolescent deviance, they were retained for further analyses as the current study also aimed to test whether school-level variables moderated the effect by individual-level future orientation.

Individual-level Models (Level 1)

The results from individual-level (level 1) models (Model 3 and Model 4) are shown in Table 3.4. Individual-level future orientation had a significant fixed effect on deviance, net the effects by control variables. The findings of Model 3 indicated that the fixed effect by individual-level future orientation on deviance was statistically significant, controlling for everything else in the model. There was a statistically significant difference in model fit, where Model 3 had a significant better fit than the baseline model ($\Delta\chi^2 = 932.26$, $\Delta df = 9$, $p < .001$). In the next step, the random effect by individual-level future orientation was tested. The results of Model 4 indicated that adding the random effect of individual-level future orientation as well as the covariance between the intercept and future orientation helped to improve the fit of Model 3; this

Table 3.4. Longitudinal Level 1 Covariate Model Predicting Deviance

Parameters	Model 1 (Baseline Model)		Model 3		Model 4	
	Estimate	SE	Estimate	SE	Estimate	SE
Fixed Effects						
Intercept	-.019	.016	-.502***	.088	-.509***	.087
Age			.034***	.005	.035***	.005
Sex			-.108***	.013	-.108***	.013
Family Structure			-.107***	.013	-.105***	.013
African American			-.161***	.019	-.159***	.019
Native American			.022	.052	.019	.052
Asian American			-.202***	.029	-.203***	.029
Other Race			-.013	.026	-.014	.026
Impulsivity			.010***	.010	.099***	.010
Future Orientation			-.215***	.012	-.211***	.016
Random Effects						
Residual	.589***	.007	.557***	.007	.554***	.007
Intercept	.027***	.004	.019***	.003	.020***	.003
Future Orientation					.010**	.004
Covariance					-.009***	.003
ICC		.044				
-2LL	33249.336		32317.076		32292.385	
Comparison Model			1		3	
Δ -2LL			932.26***		24.691***	
Δ df			9		2	
Variance Explained						
Level 1						5.9%

Note. ** $p < .01$, *** $p < .001$. Reference groups are as follows: sex (0 = male); family structure (0 = non-traditional family); race (0 = European American).

change was statistically significant ($\Delta\chi^2 = 24.691$, $\Delta df = 2$, $p < .001$). Therefore, the effect by individual-level future orientation on deviance varied across schools. All the variables in Model 4 reduced the within-school variance of deviance by 5.9%.

Level-1 and Level-2 Main Effect Model

In the next step, all the level-1 and level-2 were tested simultaneously to examine the independent effects by school context and individual-level future orientation. In addition, the interactions between school-level predictors and individual-level future orientation were tested to examine whether school contexts moderated the effects by individual-level future orientation on adolescent deviance. Results indicated that individual-level future orientation predicted adolescent deviance, while controlling for everything else in the model. In addition, the main effect by school-size was statistically significant, net the effects by all the other variables. Finally, although school-level future orientation did not have significant main effect on deviance, it had a statistically significant moderation effect on the relationship between individual-level future orientation and deviance. Therefore, individual-level future orientation, school size, and school-level future orientation as well as the level-1 control variables were retained for a final set of analyses (school type was excluded as a control variable in the final models as its effect on deviance was not significant net the effects by the individual-level covariates).

For comparison purposes, a control model was estimated that only include control variables (Model 5). Model 6 added the main effects. The results revealed that once considered together with the individual-level covariates, the effect by school-level future orientation was no longer statistically significant (see Table 3.5). However, the effect by

Table 3.5. Longitudinal Level 1 and Level 2 Covariate Model Predicting Deviance

Parameters	Model 5		Model 6		Model 7	
	Estimate	SE	Estimate	SE	Estimate	SE
Fixed Effects						
Intercept	-.708***	.087	-.540***	.091	-.537***	.091
Age	.045***	.005	.031***	.005	.032***	.005
Sex	-.124***	.013	-.108***	.013	-.108***	.013
Family Structure	-.134***	.013	-.106***	.013	-.105***	.013
African American	-.149***	.020	-.160***	.019	-.160***	.019
Native American	.078	.052	.021	.052	.021	.052
Asian American	-.206***	.029	-.208***	.029	-.209***	.029
Other Race/Ethnicity	.010	.026	-.019	.026	-.020	.026
Impulsivity	.131***	.010	.099***	.010	.098***	.010
Large School			.138***	.037	.136***	.037
Medium-Size School			.079*	.034	.079*	.034
School-Level FO			.058	.096	.127	.100
Individual-Level FO			-.214***	.016	-.215***	.016
School X Individual FO					-.267*	.116
Random Effects						
Residual	.568***	.007	.554***	.007	.554***	.007
Intercept	.019***	.003	.018***	.003	.018***	.003
Future Orientation			.010**	.004	.008*	.003
Covariance			-.007**	.003	.006**	.002
-2LL	32610.104		32279.506		32274.365	
Comparison Model			5		6	
Δ -2LL			330.598***		5.141*	
Δ df			6		1	
Variance Explained						
Level 1			2.5%		2.5%	
Level 2			5%		5.7%	
FO Random Effect					14.4%	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. FO = Future Orientation. Reference groups are as follows: sex (0 = male); family structure (0 = non-traditional family); race (0 = European American); school size (0=small-size school).

school size was statistically significant controlling for all the individual-level covariates. In addition, the effect by individual-level future orientation on deviance was statistically significant, net the effects by the control variables and school-level variables. Model 6 had a significantly better model fit than the control model ($\Delta\chi^2 = 330.598$, $\Delta df = 6$, $p < .001$). Therefore, net the effects by the control variables, individual-level future orientation, school size, and school-level future orientation had statistically significant effects on deviance.

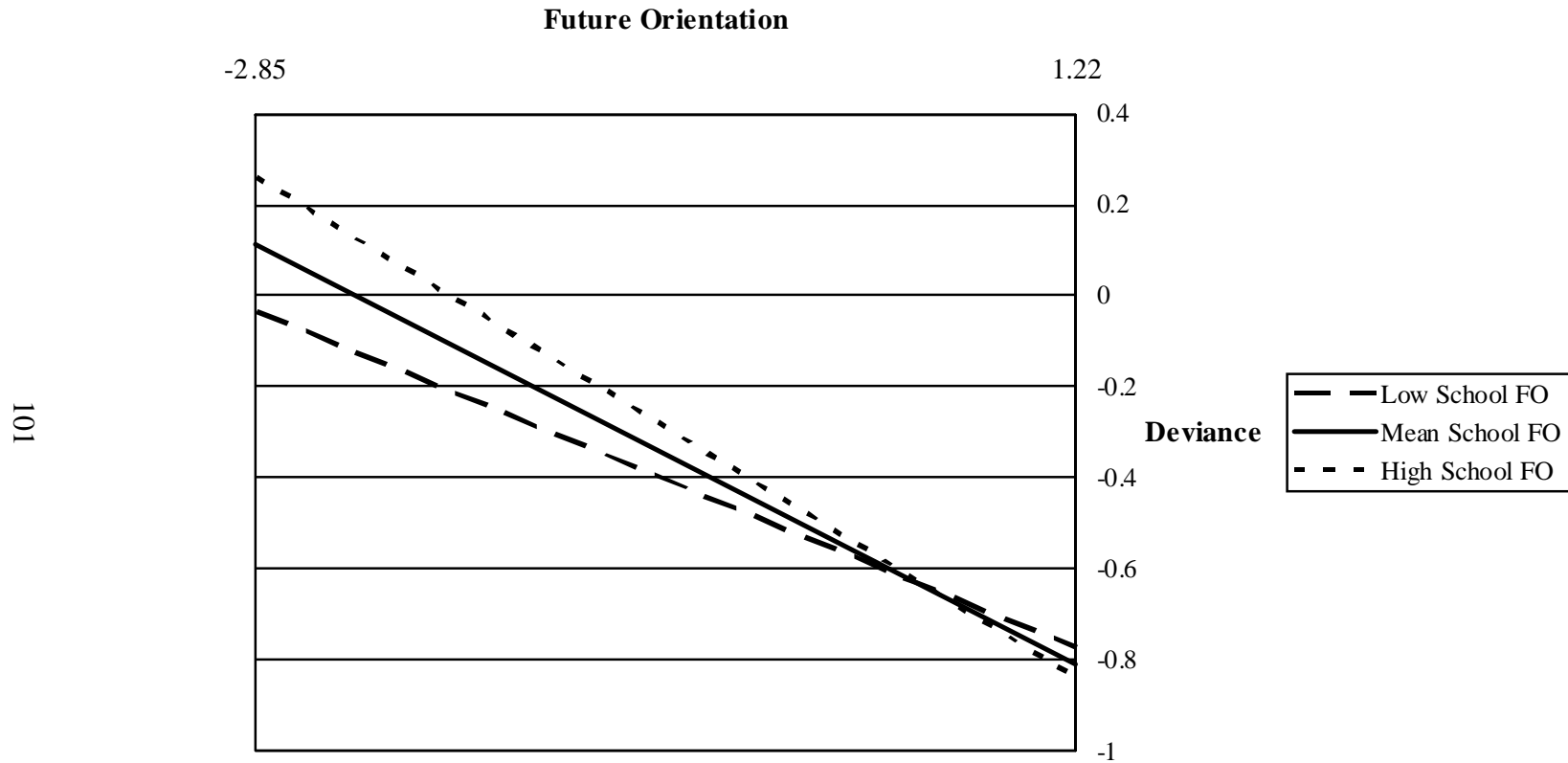
Interaction Effect between Individual-Level and School-Level Future Orientation

As findings of previous models indicated a significant random effect by individual-level future orientation on deviance, it was important to examine whether some of the school-level variables tested in the current study moderated the association between individual-level future orientation and deviance. As only the interaction between individual-level future orientation and school-level future orientation was statistically significant, a final model (Model 7) was tested by adding this interaction term along with the main effects tested in Model 6. The addition of the interaction term between individual-level future orientation and school-level future orientation significantly improved model fit from Model 6 ($\Delta\chi^2 = 5.141$, $\Delta df = 1$, $p < .05$). Together, variables in Model 7 reduced the within-school variance by 2.5% and the between-school variance by 5.7%, net the effects by the control variables. In addition, the interaction term explained 14.5% of the random effect by individual-level future orientation.

Interpretation of the Final Model

The results from Model 7 (see Table 3.5) indicated that there was a statistically significant positive relationship between school size and deviance, controlling for everything else in the model. Specifically, students in larger schools as well as students in medium sized schools were more likely to engage in deviant behaviors than students in small-size schools. The interpretation of the effects by individual-level future orientation and by school-level future orientation was less straightforward, in part due to the interaction effect between the two variables. Therefore, the significance regions of the slope coefficients as well as the effects by these two variables were examined and plotted following the approach, method, and online computational plotting utility provided by Preacher, Curran, and Bauer (2006). The main effect by individual-level future orientation and the moderation effect by school-level future orientation were plotted in Figure 3.1. The simple slopes for individual-level future orientation (i.e., the regression coefficients for individual-level future orientation at conditional values of school-level future orientation) were calculated for schools with a mean school-level future orientation (i.e., the school sample mean), for schools with a high school-level future orientation (i.e., one standard deviation above the school sample mean), and for schools with a low school-level future orientation (i.e., one standard deviation below the school sample mean). Using the online computational plotting utility (Preacher, et al., 2006), the simple slopes were calculated with the regression coefficients obtained from SPSS. Then, the regression lines that represent the relationships between individual-level future orientation and deviance were plotted at the three levels of school-level future orientation

Figure 3.1. Prototypical Plot for Moderation Effect by School Level FO on Individual-Level FO-Deviance Link.



Note: FO= Future Orientation. Region of Significance on Effect of level-1 Future Orientation: lower bound of region = -6.0137, upper bound of region = -0.4224. Simple slopes are significant outside this region.

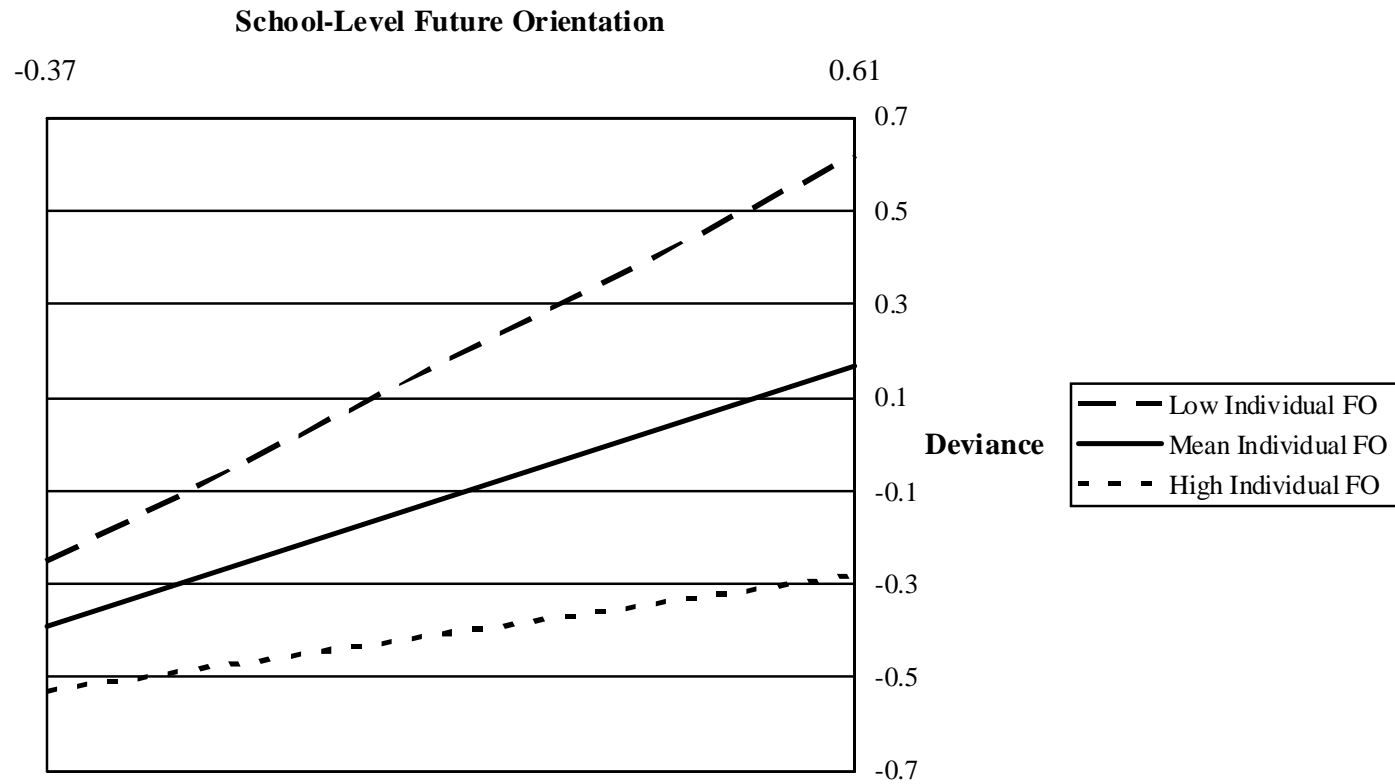
based on the calculated regression coefficients. As individual-level future orientation scores in the current study ranged from -2.85 to 1.22, the plot was generated within this range of individual-level future orientation.

A negative relationship between individual-level future orientation and deviance was found; this relationship was significant when the school-level future orientation score was below -6.01 or above $-.42$. As the school-level future orientation score in the current study ranged from $-.37$ to $.61$, the negative relationship between individual-level future orientation and deviance was statistically significant in all schools part of the current study. As to the moderation effect by school-level future orientation on the relationship between individual-level future orientation and deviance, findings indicated that the relationship was stronger for adolescents in schools with higher levels of (i.e., more positive) school-level future orientation. In other words, and consistent with expectations, school-level future orientation strengthened the relationship between individual-level future orientation and deviance. Finally, although the main effect by school-level future orientation in the final model was not statistically significant, interaction between individual-level future orientation and school-level future orientation was. Additional follow-up analyses were conducted to further contextualize this finding. Specifically, school-level future orientation was treated as the focal variable, while individual-level future orientation was examined as the moderator. This analysis was done as it had the ability to reveal whether school-level future orientation had a significant effect on deviance across the distribution of individual-level future orientation or whether this was only the case at certain levels of individual-level future orientation. The results from

these analyses are plotted in Figure 3.2. As findings indicated that the relationship between school-level future orientation and deviance was only significant for adolescents whose individual-level future orientation scores were between -2.85 to $-.47$ in the current study, the low individual-level future orientation was represented using the value of -2.85 , the high individual-level future orientation was represented using the value of $-.47$, and the mean individual-level future orientation was represented using the value of -1.66 (i.e., the value at the middle of -2.85 and $-.47$). The simple slopes for school-level future orientation (regression coefficients for school-level future orientation at conditional values of individual-level future orientation) were calculated using the three values of individual-level future orientation mentioned above. Again, the simple slopes were calculated using the online computational plotting utility with the regression coefficients obtained from SPSS (Preacher et al., 2006). Then, the regression lines that represent the relationship between school-level future orientation and deviance were plotted at the three levels of individual-level future orientation based on the calculated regression coefficients. Since school-level future orientation scores ranged from $-.37$ to $.61$ in the current study, the plot was generated within this range of school-level future orientation.

Results indicated that there was a positive relationship between school-level future orientation and deviance. However, this positive relationship was only significant for adolescents with an individual-level future orientation score lower than $-.47$ or greater than 2.71 . As the individual-level future orientation score in the current study ranged

Figure 3.2. Prototypical Plot for Moderation Effect by Individual-Level FO on School-Level FO-Deviance Link



Note: FO = Future Orientation. Region of Significance on Effect of level-2 Future Orientation: lower bound of region = -0.4734, upper bound of region = 2.71. Simple slopes are significant outside this region.

from -2.85 to 1.22 , the positive effect by school-level future orientation on deviance was significant only for adolescents whose future orientation scores were between -2.85 to $-.47$. In other words, the main effect by school-level future orientation only worked for adolescents with relatively low levels of (pessimistic) future orientation (individual-level future orientation had a mean of $.01$ and a standard deviation of $.53$). The plot also implies that the relationship between school-level future orientation and deviance was weaker for adolescents with more positive individual future orientation. Therefore, individual future orientation buffers the relationship between school-level future orientation and deviance for adolescents with a pessimistic future orientation.

V. Discussion

The association between future orientation and deviance has received extensive empirical attention (e.g., Bolland, 2003; Gilchrist & Schinke, 1987; Robins & Bryan, 2004; Trommsdorff & Lamm, 1980; Whitaker et al., 2000); however, few studies have tested the longitudinal links between future orientation and adolescent deviance (cf., Skorikov & Vondracek, 2007). An additional limitation in the literature is that almost no work has considered or tested the salience of contextual influences on the link between future orientation and deviance, such as the effects by the school context. Considering the salience of “context” is consistent with Bronfenbrenner’s (1979) seminal ecological perspective on human development. The school environment is one of the multiple interrelated contexts within which children develop (Bronfenbrenner, 1979) and this context becomes increasingly important as young people mature (Jurkovic & Ulrici, 1985). In the United States, adolescents spend nearly half of their waking hours at school

(Smith, Boutte, Zigler, & Finn-Stevenson, 2004; U.S. DHHS, 2001), and therefore it is an important developmental context in which a variety of adolescent behaviors develop. The potential influences by the school context on both future orientation and deviance have been supported by the literature, which highlight the importance of considering school influences on adolescent development (e.g., Ayalon & Yuchtman-Yaar, 1989; Felson, Liska, South, & McNulty, 1994; Kasen, Johnson, & Cohen, 1999; Shavit & Williams, 1985). However, definitive conclusion could not be reached as to the effects by school context. This is so as existing studies on deviance have generally not addressed individual trait effects and school influences together in the same analysis; they have also generally used small or local samples to test questions about the relationships between school context and deviance, and thus, did not yield generalizable findings. Therefore, it remains unclear whether the effects by school context on deviance are spurious or whether they are maintained once between-individual differences are taken into account, thus potentially supporting the competing view of contextual effects on deviance (or lack thereof). Thus, the current study aimed to contribute to these shortcomings by examining the longitudinal effects by future orientation as well as school contexts on adolescent deviance using a multi-level analytic approach.

Effects by Individual-Level Future Orientation

As hypothesized (Hypothesis 1), findings indicated that future orientation negatively predicted deviance over time, net the effects by control variables (age, sex, race, family structure, and impulsivity) and school context variables (school size and school-level future orientation); this provided evidence that adolescents with more

positive future orientation were less likely to engage in deviant behaviors. Findings also provided evidence that the longitudinal effects by individual-level future orientation varied across schools. This highlights the importance of testing for potential moderation effects by the school context on the future orientation-deviance link. The current study provided evidence that future orientation explained about 2.5% of individual-level variance in deviance over time, which is fairly consistent with previous cross-sectional evidence (*r range*: -.10 to -.20; Caldwell et al., 2006; DuRant et al., 1994; Hill et al., 1997; Keough et al., 1999; Robbins & Bryan, 2004; Wills et al., 2001).

Effects by School Size, School Location, and School-Level SES

School size, school location, and school-level SES were conceptualized as externally influenced or determined school context features. Gottfredson (2001) has suggested that these school features are likely to impact school effectiveness, and that they have a greater impact on non-cognitive developmental outcomes than cognitive ones. The current study provided some support for the importance of school level characteristics. Specifically, and consistent with Hypothesis 2a, school-size was predictive of deviance. This effect remained significant even after the addition of individual-level covariates (age, sex, race, family structure, impulsivity, and future orientation) to the model. The finding is consistent with previous work and theoretically, in that students are more likely to get involved in deviance in larger schools because increased school size weakens the bonds between students, teachers, and schools, and thus facilitate a culture of anonymity, powerlessness, and impersonality (Crosnoe, Johnson, & Elder, 2004; Welsh, Stokes, & Greene, 2000). Unexpectedly, the current

study did not find support for effects by school location or school-level SES on deviance (Hypotheses 2b and c). This was inconsistent with previous work which tested for school location and school-level SES effects using a multilevel analytic framework; however, these latter studies focused on measures of other behavior outcomes, such as academic achievement and sense of belonging, and not on deviance (e.g., Bryk et al., 1988; Vieno et al., 2005; Anderman, 2002; Anderman et al., 1997; Brookmeyer, et al., 2006). In addition, and consistent with the previous findings, results also indicated that school-level demographic variables did not moderate the effect by individual-level future orientation on deviance (Hypotheses 3a to c).

School-Level Future Orientation on Deviance

Perhaps the most interesting and novel set of findings was the effect by school-level future orientation on deviance as well as the moderation effect by school-level future orientation on the relationship between individual-level future orientation and deviance. It was hypothesized that school-level future orientation would have a significant effect on deviance. Specifically, we expected to find a negative relationship between school-level future orientation and deviance (Hypothesis 2d). This was not supported by the data. However, the interaction between school-level and individual-level future orientation was significant in predicting deviance. Follow-up analyses of this finding also suggested that school-level future orientation only had a significant effect on deviance for adolescents at low levels of future orientation. However, inconsistent with expectations, the school-level future orientation effect on deviance was positive.

A candidate explanation to address this latter finding includes insights from scholarship on student educational expectations. Some have suggested that the school context has a comparative effect on students' educational expectations (Nelson, 1972; Shavit & Williams, 1985; Khattab, 2005), where students compare their own academic performance with that of their peers. Therefore, it is possible that students establish lower levels of (more pessimistic) educational expectations when they are located in schools characterized by high levels of academic achievement because this milieu may generate a sense of incompetence for a number of adolescents, especially ones with low levels of achievement. Therefore, students with a low or pessimistic future orientation may feel even more hopeless when school-level future orientation is high due to the same comparative effect which results from comparing their own future orientation to the one of their peers. Thus, these youth might be more likely to risk their future by engaging in deviant behaviors. It is also possible that this finding is to some extent an artifact as it does seem contrary to expectations. Before considering the individual-level differences, findings indicated that school-level future orientation had a negative effect on individual-level deviance and this effect was significant for all individuals in the current study. However, once individual-level covariates were added to the model, the effect by school-level future orientation was only found to be significant for some youth (the ones with low-levels of future orientation), and the direction of the effect by school-level future orientation was unexpectedly positive.

It was also found that school-level future orientation moderated the effect by individual-level future orientation on deviance (Hypothesis 3d). The relationship between

individual-level future orientation and deviance was stronger for adolescents in schools with higher levels of (i.e., more positive) school-level future orientation. Put differently, school-level future orientation strengthened the protective effect by individual-level future orientation on deviance.

Debate on School Effects

The current study provides a number of insights into the ongoing debate on potential school effects in adolescent development and adjustment. Although the school has been widely recognized as an important developmental context theoretically, it remains unclear whether the school context directly impacts deviance, particularly once individual level traits known to affect deviance are considered. Findings from the current study provide support for both sides, so to speak. Significant variability in deviance was found at the school level which highlights the importance of the school context. Although school location and school SES were not significant predictors of adolescent deviance, school size and school-level future orientation (both level 2 predictors) did predict deviance, net any effects by individual covariates. In addition, school-level future orientation also moderated the relationship between individual-level future orientation and deviance. Therefore, the current study provides some support for the ecological lens and suggests a contextual framework for understanding adolescent deviance. On the other hand, it also provides evidence for the competing view presented earlier, namely that contextual effects are largely dependent on and the result of lower, individual-level processes. In fact, school-level future orientation effects were different before and after adding level 1 covariates to the models.

Study findings highlight the importance of simultaneously considering both individual-level effects as well as contextual ones on deviance. In sum, the study can not resolve the ongoing debate related to contextual effects on measures of adolescent adjustment; the evidence supported both contextual as well as individual-level explanations. At the same time, a large proportion of variance in deviance at both levels remained unexplained. Thus, future work must keep testing both school-level effects on deviance, including greater breadth in conceptualization of what constitutes context, but also individual-level predictors. In order to do so, future work must avail itself of rigorous multi-level analytic approaches and access to complex, nested data to be able to separate between effects by individual-level and between-school explanatory constructs.

Limitations

A number of study limitations require mention. First, the measure of future orientation was quite limited. The scale had low reliability, one of the disadvantages of working with a secondary data set. In addition, the measure of future orientation did not capture the cognitive dimension, for instance, such as items that assessed locus of control (whether people think they have a control over their future and their current behavior will influence their future), extension of future orientation (how far away people think about their future), or the intensity of future orientation (how often they think about their future). Therefore, the relationship between future orientation and deviance might be attenuated in the current study; this might partially explains some of the modest associations observed, although there were quite consistent with previous cross-sectional work. Secondly, the current study did not address the more appropriate longitudinal

questions whether the developmental trajectory of deviance (requiring multiple assessments of the same constructs for each participant) varied across schools and whether future orientation and school contexts predicted these developmental changes of deviant behaviors. Therefore, future work should address these important questions. In addition, the modest effect by future orientation on deviance implies quite limited practical utility in term of attempting to address this construct in prevention and intervention programs with youth. However, it is worth noting that due to the limitations of the future orientation measure as well as the correlational design of the current study, no conclusion can be reached regarding the potential utility of intervention and prevention efforts that focus on future orientation, an issue that should be investigated more fully using a stronger measure of future orientation as well as in an experimental design to reach more definitive conclusions related to causality and effect sizes. At the same time, the focus of the current study was not on developing prevention and intervention strategies, but rather to test a basic research question, informed by previous empirical and conceptual work. Finally, the school-level variables considered in the current study only explained 5.7% of the school-level variance of deviance and 14.4% of the random effect by individual-level future orientation. Thus, in order to thoroughly test the effects by school contexts on deviance as well as the moderation effects by school contexts on future orientation-deviance link, other school-level variables should be considered and tested in future work, such as school discipline and school attachment.

Chapter 4

Conclusions

Future orientation, as defined in the literature, is consciously self-constructed and represented images of the future composed by cognitive, motivational, and affective dimensions (Nurmi, 1991; Trommsdorff 1982). It was proposed that future orientation is responsible for future-oriented behaviors (or a lack thereof) and may be related to delay of gratification or planning and achieving future goals (Trommsdorff et al., 1979). Specifically, future oriented individuals are less likely to engage in deviant behaviors as they are more likely to consider the future consequences of their current behaviors during the decision making process, and therefore are generally more sensitive to future consequences of their present behavior (Routledge & Arndt, 2005). Thus, future orientation is an important construct worth investigating in order to better understand the etiology of adolescent deviant behaviors.

Cross-sectional research has provided evidence of a negative relationship between future orientation and a variety of problem behavior or deviance indicators, such as alcohol use (Robins & Bryan, 2004), drug use (Bolland, 2003; Bolland et al., 2007; Keough et al., 1999; Robins & Bryan, 2004; Trommsdorff, 1986;), theft (Oyserman & Saltz, 1993), risky sexual behaviors (Gilchrist & Schinke, 1987; Morris et al., 1998; Robins & Bryan, 2004; Whitaker et al., 2000), and school misconduct

(Caldwell et al., 2006). However, the longitudinal work on the link between future orientation and deviance is scarce. Based on the authors' knowledge, only one study by Skorikov and Vondracek (2007) has examined this relationship using longitudinal data. However, their study focused exclusively on career orientation. An additional limitation of previous work is the relative and interactive effects by future orientation and impulsivity on deviance remain unclear, as this issue has not been widely tested and generalizable conclusions could not be drawn based on existing studies. This is important as the performance on delay discounting tasks activates two different brain systems which reflects a combination of both impulsivity and future orientation. Specifically, Steinberg and colleagues (2009) proposed that one model for understanding delay discounting behavior is that of a competition between future orientation and impulsivity. This model is compelling as it is consistent with findings from research based on brain activity assessed by function magnetic resonance imaging (fMRI) (Greene et al., 2001; McClure et al., 2004; Sanfey et al., 2003). Finally, almost no work has considered or tested the salience of contextual influences (e.g., the school) on the link between future orientation and deviance; this is so despite Bronfenbrenner's (1979) seminal conceptual work on Ecological Systems Theory developed over three decades ago. Given the potential effects by the school context on both adolescent future orientation and deviance as suggested by previous empirical studies (e.g., Ayalon & Yuchtman-Yaar, 1989; Buchmann & Dalton, 2002; Felson et al., 1994; Kasen et al., 1990; Gottfredson, 2001), research must consider and thoroughly test potential school contextual effects when examining the link between future orientation and deviance.

Therefore, the two complimentary and related studies sought to build on previous work by testing the longitudinal relationship between future orientation and deviance, while considering the effects by impulsivity as well as the school context. The first study aimed to test the relative and interactive effects by future orientation and impulsivity on deviance. In addition, it examined the effects by future orientation from different domains (education, life, and marriage). Finally, developmental differences in the relationships between future orientation, impulsivity, and deviance were tested as empirical work has shown that adolescents become more future-oriented as they age (Furby & Beyth-Marom, 1992; Greene, 1986; Nurmi, 1991; Steinberg et al., 2009). The second study examined the longitudinal association between future orientation and deviance, while considering the effects by school context (school size, school location, school SES, and school-level future orientation). It tested the independent effects by school context and future orientation on deviance as well as moderation effects by school context on the link between future orientation and deviance. Again, impulsivity was considered, but as a control variable in the second study. Data for both studies were from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative sample that examines the causes and consequences of health related behaviors in adolescents and young adults.

Both studies provide novel insights about the longitudinal relationships between future orientation and deviance as well as the independent effect by future orientation on deviance controlling for the impacts by impulsivity and school context. Specifically, they provided evidence that future orientation negatively predicted deviance over time, net the

effects by age, sex, race, and family structure. In addition, this longitudinal link was maintained even after considering impulsivity or school contextual variables (school size, school location, school SES, and school-level future orientation). In general, they provided evidence that adolescents with more positive future orientation are less likely to engage in deviant behaviors. Future orientation also moderates the longitudinal relationship between impulsivity and deviance; put differently, future orientation buffers the effect by impulsivity on deviance. The finding that impulsivity and future orientation interacts to influence deviance provide support for the model proposed by Steinberg and Colleagues (2009) and suggests that future work on future orientation should take the effect of impulsivity into account.

Findings also provided evidence of significant effects by future orientation from each the education, life, and marriage domains; however, the effects by education and life domains were stronger and only education future orientation moderated the relationship between impulsivity and deviance. These findings together highlight the importance of education and life future orientation for adolescent development. Finally, no developmental changes in the relationships between future orientation (both general and domain-specific), impulsivity, and deviance were found in the current study; thus, future orientation, as measured in the current effort, has a similar amount of influence on deviance in early/middle and late adolescents. The findings support the view that emphasizes similarities in developmental processes across different developmental periods. In fact, this evidence of similarity is particularly compelling given the findings from the recent study by Steinberg and colleagues (2009) that younger adolescents

demonstrated a weaker future orientation than older ones. However, the fact that findings related to developmental changes from the current effort differ from the one by Steinberg and colleagues (2009) may simply be related to sampling and measurement differences. Therefore, future work is needed to provide more insights into the developmental model.

The current work also provided a number of insights into the effects by the school context on deviance, and therefore the ongoing debate regarding school effects. Although the school has been widely recognized as an important developmental context theoretically, a competing view exists on school effects particularly for adolescent deviance, namely that contextual effects are largely dependent on and the result of lower, individual-level processes. Findings from study 2 provided support for both views. There were evidence for the ecological perspective. A significant amount of variance in deviance was found between schools; both school size and school-level future orientation had a significant effect on deviance, while controlling for the individual-level background variables (age, sex, race, family structure) and traits (impulsivity and future orientation). They also indicated that no effects were found for school location and school SES. More specifically, students from large and medium-size schools reported higher levels of deviance than students from small-size schools. Unexpectedly, a positive relationship between school-level future orientation and adolescent deviance was found, although this effect was only significant for adolescents with low-levels of future orientation. The positive effect by school-level future orientation implies that school context might have a comparative effect on adolescent development.

In addition, findings from the current work also provided evidence for the competing view of school effects. Some support for this was found as school-level future orientation had a negative effect on deviance before individual-level covariates were added to model tests. In sum, findings highlight the importance of simultaneously considering both individual-level effects as well as contextual ones on deviance. Although the study did not resolve the ongoing debate related to contextual effects on measures of adolescent adjustment, findings suggest that future work must continue to employ rigorous multi-level analytic techniques based on complex, nested data that address individual-level and between-school differences.

A number of limitations exist in both studies. Related to the use of a secondary data set, the future orientation measure was quite limited in scope. Specifically, it had low reliability and did not capture all the dimensions of future orientation such as locus of control, extension of future orientation, and intensity of future orientation. Future research is needed to test the longitudinal link between future orientation and deviance using a more comprehensive measure of future orientation. In addition, neither study addressed whether future orientation predicted the developmental trajectory of deviance, an important question that needs to be addressed by future work. Another limitation of study 1 was that it tested developmental differences by dividing individuals into different age groups instead of following the developmental process of the same people over time. Finally, the school-level variables tested in study 2 only explained a small amount of school-level variance in deviance. Future work needs to keep exploring school level or contextual effects on deviance by examining more aspects of the school context, such as

school discipline or school attachment. It is worth noting that due to the limitations of the future orientation measure as well as the correlational design of the current studies, no conclusion can be reached regarding the potential utility of intervention and prevention efforts that focus on future orientation. Equally important, the current study did not seek to identify or develop prevention and intervention strategies with future orientation, but rather, to simply test a set of basic research questions, informed by previous empirical and conceptual work. To more fully address the potential utility of future orientation in preventative or intervention work, future work should consider developing broader and better measures of future orientation, but also, to establish causal links between future orientation and deviance through experimental study design.

Despite the limitations mentioned above, the current study contributes to the existing literature by providing insights about the longitudinal relationships between future orientation and deviance. In addition, the current work also helps in the understanding of the etiology of adolescent deviance by examining the independent and interactive effects by future orientation and impulsivity on deviance. It provides evidence that future orientation and impulsivity both play important roles in the decision making process and therefore highlights the importance to investigate their relative as well as interactive effects on deviance, a model proposed by Steinberg and colleagues (2009). Additionally, it is paramount to test developmental differences in the links between future orientation, impulsivity, and deviance, given the findings regarding developmental changes of future orientation and impulsivity from both fMRI study and the work by Steinberg and colleagues (2009). Although no developmental changes were found for the

relationships between future orientation, impulsivity, and deviance in the current study, there was a hint at some differences. Therefore, future study should test the developmental model more explicitly following the same individuals over time. This work also contributes to our understanding of how school contextual effects impact adolescent development by addressing and testing school effects on deviance as well as the moderation effects by school context on future orientation-deviance link. The findings regarding school effects were compelling as the school sample in the current study was national representative and multi-level analytical strategies were utilized. The current study provides further evidence for the ecological perspective as well as the competing view of school context and provides support for a framework that considers the multilevel impacts on adolescent deviant behaviors.

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Appendix 1. Future Orientation, Impulsivity, and Deviance Measures

Future Orientation (Wave I)

- 1) On a scale of 1 to 5, where 1 is low and 5 is high, how much do you want to go to college?
- 2) On a scale of 1 to 5, where 1 is low and 5 is high, how likely is it that you will go to college?

What do you think are the chances that each of the following things will happen to you?

- 3) You will live to age 35.
- 4) You will be married by age 25.
- 5) You will be killed by age 21.
- 6) You will get HIV or AIDS.

1 = almost no chance, 2 = some chance, but probably not, 3 = a 50-50 chance, 4 = a good chance, 5 = almost certain

How often was the following statement true during the past week?

- 7) You felt hopeful about the future.

0 = never or rarely, 1 = sometimes, 2 = a lot of the time, 3 = most of the time or all of the time

Impulsivity (Wave I)

Please tell me whether you agree or disagree with each of the following statements.

- 1) When you have a problem to solve, one of the first things you do is get as many facts about the problem as possible.
- 2) When you are attempting to find a solution to a problem, you usually try to think of as many different ways to approach the problem as possible.
- 3) When making decisions, you generally use a systematic method for judging and comparing alternatives
- 4) After carrying out a solution to a problem, you usually try to analyze what went right and what went wrong

1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree

Deviance (Wave II)

In the past 12 months, how often did you . . .

- 1) paint graffiti or signs on someone else's property or in a public place?
- 2) deliberately damage property that didn't belong to you?
- 3) lie to your parents or guardians about where you had been or whom you were with?
- 4) take something from a store without paying for it?
- 5) run away from home?
- 6) drive a car without its owner's permission?
- 7) steal something worth more than \$50?
- 8) go into a house or building to steal something?
- 9) use or threaten to use a weapon to get something from someone?
- 10) sell marijuana or other drugs?
- 11) steal something worth less than \$50?
- 12) act loud, rowdy, or unruly in a public place?
- 13) take part in a fight where a group of your friends was against another group?
- 14) get into a serious physical fight?

0 = never, 1 = 1 or 2 times, 2 = 3 or 4 times, 3 = 5 or more times

15) During the past 12 months, on how many days did you drink alcohol?

16) Over the past 12 months, on how many days have you gotten drunk or "very, very high" on alcohol?

0 = never, 1 = every day or almost every day, 2 = 3 to 5 days a week, 3 = 1 or 2 days a week, 4 = 2 or 3 days a month, 5 = once a month or less (3-12 times in the past 12 months), 6 = 1 or 2 days in the past 12 months

17) Since late interview, have you tried or used marijuana?

0 = no, 1 = yes