ABSTRACT

Title of Document: THE LINK BETWEEN IMPULSIVITY,
                                      SUICIDE IDEATION, AND ILLEGAL
                                      BEHAVIOR IN COLLEGE STUDENTS

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Michael Gottfredson and Travis Hirschi's general theory of crime posits that persons with low self-control are more likely to engage in criminal, as well as, analogous behaviors. This thesis attempts to explore the relationship between low self-control, as measured by impulsivity, illegal behavior, and suicide ideation, an analogous behavior, in a college student population. Data are taken from the College Life Study, a longitudinal study that examines the health behaviors of one cohort of first-year college students. Using multinomial logistic regression, the results indicate that the more impulsive students are also those who show signs of suicide ideation and illegal behavior or just illegal behavior without suicide ideation. However, when examining suicide ideation alone, there is not a statistically significant relationship with impulsivity. Thus, Gottfredson and Hirschi's theory is only partially supported by this thesis.

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Chapter 1: Introduction

Suicide is a serious public health problem among adolescents and young adults in the United States. According to the Centers for Disease Control and Prevention, suicide is the third leading cause of death for Americans between the ages of 10 to 24 and the second leading cause of death for college-aged students (Centers for Disease Control and Prevention, 2009). Suicide is the end result of a continuum that begins with suicide ideation, which is the contemplation of committing suicide. Moreover, the most significant predictor of suicide is nonfatal suicidal behaviors, such as attempts and ideations (Battle, Battle, and Tolley, 1993; Marttunen, Aro, and Lonnqvist, 1992).

Suicide is a particular concern to college campuses. More than half of college students have contemplated suicide at some point in their lives (Drum, 2008). Moreover, the prevalence of suicidal thoughts in college students is far more widespread than it is among the general population, where only 15.3% of Americans have had thoughts about committing suicide (Kessler and Ustun, 2008). Adults aged 18 to 24 years, have the highest incidence of reported suicide ideation (Crosby, Cheltenham, and Sacks, 1999) and one fourth of persons aged 18 to 24 years are either full- or part-time college students (Davis, 2000).

Suicide is an innately violent act where the aggression is turned towards the self rather than directed outwards towards others. It is unsurprising then, that the risk factors that are associated with thoughts about committing violence

against oneself are highly correlated with other physically reckless and illicit behaviors, such as: engaging in threatening or criminal behavior, drinking and driving, weapons possession, and aggression against others (Barrios, Everett, Simon, and Brener, 2000). Thus, college students exhibiting physically reckless and illicit behaviors may also be at higher risk for having suicidal thoughts.

To date, few studies have explored the connection between suicide ideation and illegal behaviors among college students. This thesis presents empirical evidence of such a connection and proffers a potential theoretical explanation for the mechanism contributing to this relationship. According to Gottfredson and Hirschi's self-control theory, individuals with low self-control are easily enticed into carrying out acts that entail little commitment, are simple to complete, and provide immediate gratification (Gottfredson and Hirschi, 1990). Thus, since criminal acts typically require no long-term commitment, involve little skill, and afford immediate pleasure, individuals with low self-control are more likely to commit crimes. Moreover, if individuals with low self-control perform criminal acts because they are rash and insensitive to the repercussions of their actions, they should also be at a greater risk of involvement in analogous acts that are legal, but share the same characteristics as those acts which are illegal (Paternoster and Brame, 1998). Accordingly, Gottfredson and Hirschi's self-control theory should also apply to reckless behaviors leading to suicide, such as suicide ideation.

I advance the argument that low self-control, as measured by impulsivity, underlies both suicide ideation and illegal behavior. Further empirical support for

Gottfredson and Hirschi's self-control theory will be extended if both illegal

behavior and suicide ideation are associated with impulsivity. In this study, I seek

to understand whether impulsivity is a contributing factor to both suicide ideation

and illegal behavior.

Chapter 2: Literature Review

Research has shown that impulsivity, criminogenic behavior, and ineffective problem solving and coping skills have been associated with suicidal behaviors (Schaffer, Jeglic, and Stanley, 2008). Moreover, according to Gottfredson and Hirschi's self-control theory, criminal and analogous acts that are "short lived, immediately gratifying, easy, simple, and exciting" (Gottfredson and Hirschi, 1990: 14), are more likely to be completed by individuals with low self-control than those with high self-control. Therefore, the following review of the literature will guide the reader through the relationships between suicide ideation, illegal behavior, and impulsivity in a college population. I use self-control theory to explain these relationships.

Suicide Ideation in a College Population

Suicide is defined as "the act of intentionally ending one's own life" (Nock et al., 2008: 134). Moreover, nonfatal suicidal thoughts and behaviors can be categorized into three levels, increasing in severity: suicide ideation, suicide plan, and suicide attempt (Nock et al., 2008). Suicide ideation refers to "thoughts of engaging in behavior intended to end one's life" (Nock et al., 2008: 134). A suicide plan is "the formulation of a specific method through which one intends to

die" (Nock et al., 2008: 134). Finally, a suicide attempt is defined as "the engagement in potentially self-injurious behavior in which there is at least some intent to die" (Nock et al., 2008: 134).

Suicide ideation is one of the strongest predictors of subsequent suicidal behavior. Research has shown that 34 percent of those with lifetime suicidal ideation go on to make a suicide plan, that 72 percent of individuals with a suicide plan go on to make a suicide attempt, and that 26 percent of those with suicide ideation without a plan make an unplanned suicide attempt (Kessler, Borges, Walters, 1999). Furthermore, for the majority of people, this evolution occurs within the first year after the onset of suicide ideation (60 percent for planned first attempts and 90 percent for unplanned first attempts) (Kessler et al., 1999).

Studies have demonstrated that the onset of suicidal behavior increases considerably at the start of adolescence (age 12), peaks at 16 years, and stays elevated into early adulthood (Bolger, Downey, Walker, and Steininger, 1989; Kessler et al., 1999; Nock et al, 2008). Thus, adolescence and early adulthood present the greatest risk for the first onset of suicidal behavior. It is unsurprising then that suicide is the third leading cause of death for those aged 15 to 24 and the second leading cause of death for college students. Reports of suicide ideation in college students range from 32 percent to 70 percent across studies (Gutierres, Osman, Kopper, Barrios, and Bagge, 2000). For instance, Rudd (1989) found that 44% of the college students in his study had suicidal thoughts in the past year.

Crime

Research has shown an association between crime and suicidal behaviors (Evans, Hawton, and Rodham, 2004; Goldsmith, Pellmar, and Kleinman, 2002; Liebling, 1992). The majority of the research examining the link between delinquent and suicidal behaviors has been conducted with adolescents aged 14 to 17. These studies have found that suicidal behaviors are related to delinquent behaviors among adolescents (Evans, et al., 2004; Thompson, Kingree, and Ho, 2006). For instance, in a study of 1,508 high school students, conduct disordered problem behaviors were associated with both past and future suicide attempts (Lewinsohn, Rohde, and Seeley, 1994). In addition, studies have found that a significant portion of adjudicated adolescents had histories of suicide attempts and current suicidal behavior (Robertson and Husain, 2001; Shelton, 2000). The results of a study by Robertson and Husain (2001) showed that 31 percent of adjudicated adolescents self-reported a suicide attempt, and 9 percent were currently suicidal with either ideation and/or plan to act on suicidal thoughts. Furthermore, the suicide rate among adjudicated adolescents is estimated to be at least four times higher than the suicide rate among adolescents in the general population (Memory, 1989).

Studies examining the association between suicide ideation and illegal behavior in college students are sparse. One study by Langhinrichsen-Rohling et al. (2004) found that students with a history of suicide ideation were more likely to engage in delinquent behavior compared to their peers without histories of suicide ideation. In another study, results showed that college students with

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suicide ideation were more likely to report carrying a weapon and to have recently engaged in a physical fight than college students without suicide ideation (Barrios, Everett, Simon, and Brener, 2000).

College campuses are places where a variety of violent and/or delinquent behaviors can occur (Asagba, 1996; Nicholson et al, 1998). Moreover, the availability of alcohol and drugs may increase college students' risk to a variety of negative behaviors including self-harm, violence, and crime (Langhinrichsen-Rohling et al., 2004). In addition, evidence shows that self-destructive, delinquent, and violent behavior, such as date rape and binge drinking, have increased rates during college (Langhinrichsen-Rohling et al., 2004). According to the Federal Bureau of Investigation, Department of Justice, there were 2,207 violent crimes and 107,707 property crimes reported on college campuses in 2001. In 2003, the U.S. Department of Education reported 1,295 forcible sex offenses, 20 nonforcible sex offenses, 798 robberies, 1,327 aggravated assaults, 12,506 burglaries, 3,156 motor vehicle thefts, 563 cases of arson, and 9 murders on campuses.

Findings from this literature suggest that analogous causal mechanisms may underlie both suicidal and delinquent behaviors. In the next section, I review the role of low self-control in the development of both suicidal and illegal behaviors.

To date, no one has examined the effects of low self-control on suicide ideation. However, studies have demonstrated that impulsivity is a significant correlate of both illegal behaviors and suicide independently (Carroll et al., 2006; Horesh, Gothelf, Ofek, Weizman, and Apter, 1999; White et al., 1994; Zouk, Tousignant, Seguin, Lesage, and Turecki, 2006). Impulsivity may be conceptualized as a behavior that happens without reflection or contemplation for the consequences of such behavior (Turecki, 2005). Behaviors that are considered impulsive are usually risky or incongruous to the situation and often end in undesirable outcomes (Turecki, 2005). Studies have illustrated that suicide attempters and completers tend to have higher levels of impulsive behavior (e.g. Kausch, 2003; Mann, Waternaux, Haas, and Malone, 1999; Ramos-Brieva and Cordero-Villafafila, 1989). For instance, Mann et al., 1999 examined risk factors for suicide attempts in a sample of psychiatric patients and found that patients that scored high on impulsivity were more likely to have made past suicide attempts.

A significant percentage of suicide attempts are impulsive and unplanned (Wyder and Leo, 2007). Furthermore, "the progression from suicidal thoughts, to plans, to an attempt is not necessarily experienced as a continuous progression, but is more likely to be perceived as a fluctuating phenomenon" (Wyder and Leo, 2007: 168). A suicide attempt is classified as impulsive if there is an absence of overt or covert signs of planning. Impulsive attempters are characterized by an absence of depression, experience of suicidal ideation before their attempt, motivation to decrease stress, often attempt in the presence of others, and believe

that they will survive their attempt (Wyder and Leo, 2007). In addition, studies have found that impulsive attempters were statistically similar to non-impulsive attempters on race, gender, age, education, or marital status (Conner, 2004; Hjemeland et al., 2000; Simon et al., 2001).

Brent et al. (1994) assessed personality traits of 43 adolescent suicide completers against a control group. The control group consisted of adolescents who were demographically similar to the suicide completers, but who did not attempt/complete suicide in the past 2 years. The results showed that compared to the control group, the most common personality trait among completers was impulsivity. These findings were further supported in a study conducted with 92 hospital admission patients (Ramos-Brieva and Cordero-Villafafila, 1989). They concluded that patients who made a serious suicidal attempt were more impulsive and aggressive than patients who made no suicidal attempt.

One of the main propositions of self-control theory is that individuals with low self-control are impulsive. Thus, using Gottfredson and Hirschi's self-control theory to help explain the possible relationship between suicide ideation and illegal behavior is a logical extension. In their book, "A General Theory of Crime", Michael Gottredson and Travis Hirschi present the concept of self-control as a way to attribute individual differences in criminal behavior. Self-control theory stems from classical theories, which lay emphasis on the prevention of crime through costs painful to the person (Gottfredson and Hirschi, 1990). Gottfredson and Hirschi see classical theory as a theory of external or social control, where a person will choose to engage or not engage in criminal

acts depending on their bond to society. However, classical theory lacks an exact idea of self-control and fails to recognize that people "differ in the extent to which they are vulnerable to the temptations of the moment" (Gottfredson and Hirschi, 1990: 87; Longshore, 1998). Thus, levels of self-control amongst persons will influence their assessment of the repercussions of their deviant acts.

Self-control theory posits that people are different in the extent to which they refrain from committing ordinary crimes (Gottfredson and Hirschi, 1990). Gottfredson and Hirschi make several assertions about the characteristics of ordinary crimes and the characteristics of people who commit ordinary crimes. Ordinary crimes are acts that involve simple and immediate gratification of desires, are exciting and risky, require little skill or planning, have few long-term benefits, and cause pain and suffering for the victim (Gottfredson and Hirschi). People who commit ordinary crimes "will tend to be impulsive, insensitive, physical, risk-taking, short-sighted, and nonverbal" (Gottfredson and Hirschi, 1990: 90-91). Thus, those who commit ordinary crimes have lower self-control than those who abstain from crime (Wood, Pfefferbaum, and Arneklev, 1993). In addition, the main benefit of many crimes is not enjoyment, but respite from momentary irritation; people with low self-control have a tendency to have minimal forbearance for frustration and little ability to react to disagreements through verbal rather than physical means (Gottfredson and Hirschi, 1990).

There are many manifestations of low-self control. Low self-control can help explain the association between crime and other noncriminal analogous behaviors, such as smoking, alcohol abuse, and accidents (Arneklev, Grasmick,

Tittle, and Bursik, 1993). The variety of manifestations of low self-control allow for offender versatility. Thus, offenders can engage in a mixture of criminal and noncriminal, reckless, behaviors. Moreover, although ones level of self-control may adjust modestly over the life course in general, levels remain relatively stable. According to Gottfredson and Hirschi (1990: 94):

> There are four general elements of low self-control: 1) basic stability of individual differences over a long period of time; 2) great variability in the kinds of criminal acts engaged in; 3) conceptual or causal equivalence of criminal and noncriminal acts; and 4) inability to predict the specific forms of deviance engaged in, whether criminal or noncriminal.

Accordingly, their theory is built to explain a wide variety of deviant acts. In addition, variations in the rate at which individuals with low self-control commit crime or engage in other noncriminal behaviors, are a result of variations in opportunity (Longshore, 1998). Thus, both low self-control and opportunity are two conditions that underlie both criminal and analogous behaviors. It is unsurprising then that studies have shown that suicide and crime rates increase in adolescence and young adulthood. As children [with low self-control] get older, they are given more freedom, and therefore, more opportunities to participate in criminal and analogous behaviors. Opportunities to engage in both criminal and correlative behaviors are at a peak during college because young adults with low self-control are not under direct supervision and are exposed to a variety of illegal and legal risky behaviors.

The development (or lack of development) of self-control begins early in life. Gottfredson and Hirschi argue that after age eight, self-control is a relatively stable construct. Consequently, once an individual's level of self-control is developed, it is stable over their life span (Paternoster, Dean, Piquero, Mazerolle, and Brame, 1997). This assumption helps to explain stability in criminal offending; an individual who commits crime as a child is more likely to commit crime as an adolescent or adult compared to someone who did not commit crime at a young age (Kubrin, Stucky, Krohn, 2009).

Self-control theorists posit that the major cause of low self-control is ineffective child rearing, whether by the family and/or school (Cullen, Unnever, Wright, and Beaver, 2008; Hay, 2001). According to Gottfredson and Hirschi (1990: 97), the conditions necessary for effective child rearing and development of self-control are: 1) "monitor the child's behavior; 2) recognize deviant behavior when it occurs; and 3) punish such behavior". Other factors, such as parental criminality, family size, single-parent families, and mothers who work outside of the home, have an impact on child rearing and the development of self-control. The school is another place where children can learn to develop self-control. However, it plays a secondary role to the family because often times families with ineffective child rearing may not see to it that their child attends school. Nevertheless, schools are places where teachers: monitor children's behavior, have no difficulty in recognizing deviant behavior, and have the authority to punish deviant behavior.

The current study seeks to further explore the application of self-control theory to both illegal and analogous behaviors (i.e. suicide ideation) [1]. Thus, it is important to address the applicability of self-control theory as a general theory of crime. Pratt and Cullen (2000) conducted a meta-analysis to determine the empirical status of the general theory of crime. They discovered that self-control was one of the strongest correlates of crime, with a statistically significant effect size that exceeded .20. In addition, the type of sample was unrelated to the correlation recognized between self-control and deviant behavior. Moreover, the effect size remained stable even when studies took into account other theories and opportunity. Furthermore, the effect size was unaffected by the method of measuring self-control; attitudinal, behavioral, Graskmick, Tittle, Bursik, and Arneklev's (1993) scale, and scales developed by other scholars produced the same statistically significant effect size. Another important finding was that low self-control had a comparable effect size for crime and analogous behaviors. However, the effect size for self-control was lower in longitudinal studies compared to cross-sectional studies.

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[1] Gottfredson and Hirschi's self-control theory has generated considerable empirical research, and while empirical support has been found, other studies have criticized certain propositions in the theory (Marcus, 2004; Geis, 2000; Akers, 1991, Burt, Simons, and Simons, 2006). For instance, Akers (1991) discusses whether self-control theory is tautological since Gottfredson and Hirschi explain the tendency to commit crime by low self-control. To circumvent the tautology dilemma, independent measures of self-control are needed. Issues with the measurement of self-control are discussed later in this thesis. Another major criticism of self-control theory is with the issue of stability of self-control. Burt, Simons, and Simons (2006) did not find support for the stability of self-control. Less than half of the subjects remained in the same self-control group at wave 2 as in wave 1. Other criticisms include the use of the theory to explain analogous acts, the idea of opportunity, and it does not explain crime specialization (Geis, 2000).

Although Gottfredson and Hirschi do not explicitly mention suicide, due to the varying nature of behaviors exhibited by individuals with low self-control, it is probable that individuals who have serious thoughts about committing suicide also have low self-control. Suicide is a physically reckless behavior, and although, not illegal, it is violence perpetrated against oneself. Clarke and Mayhew (1988) found that suicide rates in England dramatically declined after an alternative household gas, which was no longer suitable for the purpose of suicide, was introduced. The researchers proposed that the earlier method of suicide was "readily available and needed little knowledge or preparation" (Clarke and Mayhew, 1988: 24); which is a statement that is consistent with Gottfredson and Hirschi's depiction of criminal acts and analogous behaviors. Individuals with low self-control are more likely to take advantage of an opportunity to commit suicide if the means are easily accessible. Thus, when the original household gas was removed, the opportunity to commit suicide was also removed. In addition, according to self-control theory, individuals refrain from committing crime or other noncriminal reckless behaviors because they care about the consequences of their behavior. Persons who commit suicide or attempt to commit suicide may not be taking into account how their behavior is going to affect others, just like an offender fails to consider how their criminal behavior is going to affect the victim of the crime.

This thesis examines the relationship between impulsivity, suicide ideation, and illegal behavior. The literature review has provided empirical evidence that impulsivity, as a measure of low self-control, is related to illegal behaviors. However, no studies have explored this relationship in a college-aged population. Thus, the first purpose of this thesis is to determine whether there is an association between impulsivity and illegal behavior in my sample of college students. My first hypothesis is that *impulsivity is positively related to illegal behavior*. Second, given the relationship between illegal behavior and analogous behaviors and the proposed association between impulsivity and illegal behavior, I seek to find a similar association between impulsivity and suicide ideation. My second hypothesis is that *impulsivity is positively related to suicide ideation*. Third, I examine the relationship between suicide ideation and illegal behavior. My third hypothesis is that *students who are suicidal are more likely to engage in illegal behavior and that students who engage in illegal behavior are more likely to have suicidal thoughts*. Finally, to better understand the role that impulsivity plays in illegal and suicidal behavior, I estimate the association between impulsivity and four outcomes: 1) not having suicidal thoughts or illegal behavior; 2) only engaging in illegal behavior; 3) only having suicidal thoughts and; 4) engaging in both suicidal thoughts and illegal behavior. If Gottfredson and Hirschi's low self-control theory is correct, that people with low self-control will engage in a variety of illegal and legal analogous behaviors, then there's reason to believe that those with low self-control will have both illegal behavior

and suicidal ideations. Thus, my fourth hypothesis is that *impulsivity will be most strongly related to those students who have both suicidal thoughts and engage in illegal behavior compared to those who have neither or either suicidal thoughts or illegal behavior*.

Through my research, I seek to understand whether impulsivity is a contributing factor to both illegal behavior and suicidal ideation. Moreover, because illegal behaviors are observable and suicide ideation is usually not, if both behaviors are related through impulsivity, then by gaining further insight into the possible contributing factors of suicidal behavior, mental health professionals and faculty/staff on college campuses can better screen for these behaviors in lawbreakers, so that they can receive treatment sooner. In sum, the four hypotheses tested in this thesis are:

H1: Impulsivity is positively related to illegal behavior.

H2: Impulsivity is positively related to suicide ideation.

H3: Students who are suicidal are more likely to engage in illegal behavior and students who engage in illegal behavior are more likely to have suicidal thoughts.

H4: Impulsivity will be most strongly related to those students who have both suicidal thoughts and engage in illegal behavior compared to those who have neither or either suicidal thoughts or illegal behavior.

Chapter 3: Methodology

Sample

The sample for this study was drawn from data collected by the College Life Study (Arria et al., 2008). The College Life study is an ongoing longitudinal study that examines the health behaviors of one cohort of first-time, first-year college students in a large, public university in the mid-Atlantic region of the United States. Sampling occurred at two stages. Figure 1 illustrates the overall design of the study. First, a screening questionnaire was administered to every student who attended new student orientation during the summer of 2004, who were between the ages of 17 to 19 years old. In addition, a questionnaire was also mailed to students who were unable to attend. The questionnaire included questions about demographic characteristics, drug and alcohol use, and parental monitoring. In total, 3,849 students (92.5% of the actual first-year class) received the questionnaire either at orientation or by mail (Arria et al., 2008). The response rate for the questionnaire was 88.7% (n=3,413). After excluding students who either did not complete the entire questionnaire or who did not consent to follow-up, the sample contained 3,291 students (79.1%). The characteristics of the screened sample were very similar to the first-year class. Some small, but statistically significant differences were found in regards to race, gender, students affiliated with an honors group, and students without an academic group affiliation. White students were slightly overrepresented (67.3% versus 64.8%), while Black/African America students were slightly

underrepresented (11.8% versus 13.5%). Females were slightly overrepresented (50.2% versus 49.2%), as were students affiliated with an honors group (37.1% versus 33.7%). Finally, students without an academic group affiliation were slightly underrepresented (45.3% versus 49.0%).

During the second stage of sampling the researchers stratified the sampling frame into three groups based on students' lifetime illicit drug use history obtained from the questionnaire (Arria et al., 2008). The three groups were: 1) prevalent cases; 2) high-risk cases; and 3) low-risk cases. Prevalent cases were defined as students who reported drug use other than marijuana (n=469; 14.3%). High-risk cases were defined as students who had used only marijuana (n=847; 25.7%) and low-risk cases were defined as students who did not use either marijuana or any other illegal drug (n=1975; 60%). Respondents in the prevalent and high-risk groups were sampled with 100% probability to ensure that a sufficient number of drug users were included in the study. Low-risk cases were sampled with 40% probability, after stratifying by race and gender to ensure accurate demographic representation. The final sample consisted of 2,106 students that were eligible to be contacted for a follow-up interview. Sampling weights were used during the analyses to readjust the sample to be representative of the incoming freshman cohort.

The 2,106 students were then contacted sometime during their freshman year of college to complete a 2-hour face-to-face baseline interview. Of the 2,106 eligible students, only 1,449 of them were actively recruited by multiple phone and email attempts before funding resources ran out. Out of those 1,449 students,

1,253 (86%) students completed the baseline interview. According to Arria et al. (2008) the characteristics of the participants in the study (n=1253) were very similar to those not selected for recruitment (n=853) and were indistinguishable demographically.

Every six months after the date of the participants' baseline interview, follow-up assessments were conducted for four years. Thus, at the 6-month follow-up, an online survey was administered, at the 12-month follow-up, a 2-hour face-to-face interview was conducted, at the 18-month follow-up an online survey was administered, at the 24-month follow-up a 2-hour face-to-face interview was conducted, at the 30-month follow-up an online survey was administered, and at the 36-month follow-up a 2-hour face-to-face interview was conducted. The current study's analyses will use data drawn from baseline, 12-month, and 24-month assessments in order to examine a young adult population in their beginning years of college.

Students were offered various monetary incentives throughout participation in the study and informed consent was obtained prior to participation. For more information regarding methods of recruitment and sampling see Arria et al. (2008).

Figure 1: Description of how sample was obtained

	3,849 Students Received the Questionnaire	
	3,291 Students Completed the Questionnaire and Consented to Follow-Up	
469 Prevalent Cases	847 High-Risk Cases	1975 Low-Risk Cases
		2,106 Student
	1,253 Students Complete Baseline Survey	
	1,022 Students Included in Study	
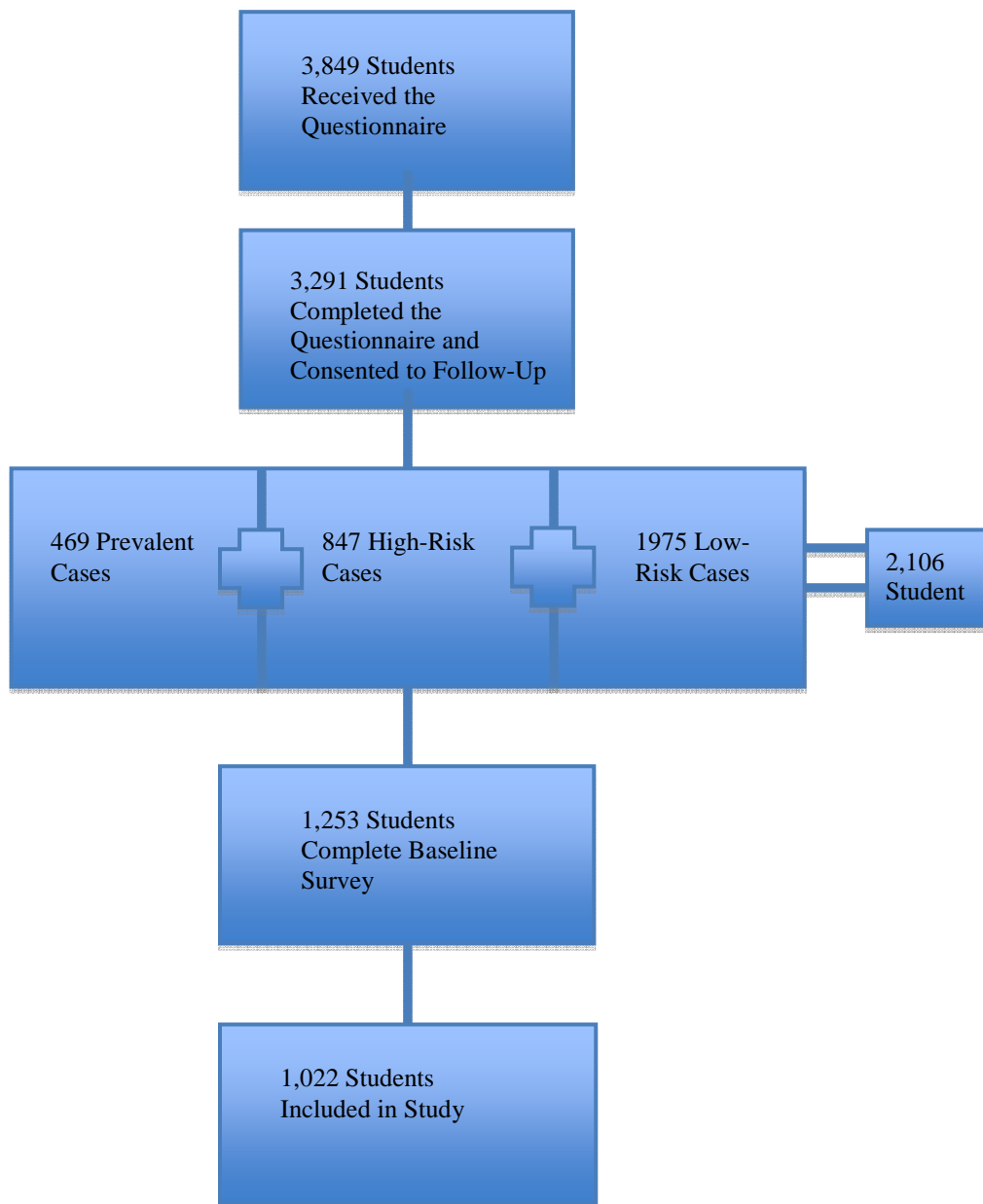
Sample Characteristics

   Although 1,253 students completed the baseline survey and were therefore

eligible to participate in the study, not every student answered the questions for

the variables being analyzed in this study. Therefore, participants who failed to

answer questions on the measures listed below were excluded from the study.

       The final set of participants includes 1,022 undergraduate students, 45.4%

(n=464) of which are male. The mean age of the sample is 18.18 (SD=.498) and

73.5% of the students are White. Table 1 compares the characteristics of the

participants included in the analyses versus the excluded sample for each of the

variables analyzed in the study. The variables male, age, and impulsivity are

significantly different at the p<.05 level. This finding is not entirely surprising

given that the more impulsive you are, the less likely you may be to return

interviewers' phone calls and attend interview sessions. The significance of these

variables limits the generalizability of the study. Further discussion of this

finding will be addressed in the limitations section of this thesis.

Table 1: Comparison of Means of the included sample versus the excluded sample

Variable	Included Sample (N=1022) Mean (Standard Deviation)	Excluded Sample (N=231) Mean (Standard Deviation)
Male*	0.45 (0.50)	0.62 (0.49)
Age*	18.18 (0.50)	18.34 (0.54)
White	0.73 (0.44)	0.71 (0.45)
Conduct Disorder Screener	6.51 (4.64)	7.67 (5.07)
High School Delinquency	0.98 (0.16)	0.97 (0.16)
Illegal Behavior 1	0.26 (0.44)	0.32 (0.47)
Aggression	3.02 (2.01)	3.13 (1.98)
Suicide Ideation 1	0.06 (0.24)	0.06 (0.24)
Impulsivity*	3.47 (2.17)	3.96 (2.11)

*$P<.05$

Suicide Ideation

The Beck Depression Inventory was designed to measure the existence and severity of depression in adolescents and adults in both clinical and research settings (Canals, Blade, Carbajo, and Domenech-LLaberia, 2001). The inventory consists of 21 questions that assess cognitive, emotional, and physical symptoms of depression (Beck, Rush, Shaw, Emery, 1979). For each question, respondents select one of four statements most accurately describing how he/she has been feeling over the past few days. Each statement is given a score of 0-3, with 3 indicating the highest level of severity. Total scores range from 0-63, with 0 indicating no depressive symptoms and 63 indicating the highest level of depressive symptoms across all 21 measures. Studies have reported the BDI to have high internal consistency in a sample of college students (Cronbach's alpha=0.89) (Beck, Steer, Garbin, 1988; Steer and Clark, 1997).

For the present study, only item nine of the BDI was analyzed. This item asks about suicidal thoughts. The item was coded as a binary variable indicating the presence or absence of suicide ideation. Respondents who indicated that they: 1) "have thoughts of killing myself, but I would not carry them out"; 2) "I would like to kill myself"; or 3) "I would kill myself if I had the chance", were coded as 1 for the presence of suicide ideation. Respondents who said: "I do not have thoughts of killing myself", were coded as 0 for the absence of suicide ideation.

[2] Appendices B-F contain a copy of the measures used in this thesis.

Table 2 shows the distribution of each of the response choices for item 9 for baseline, 12-month, and 24-month.

Data from item 9 were taken from baseline, 12-month, and 24-month questionnaires. In order to make prospective predictions on the likelihood of continuing to have suicidal thoughts, a variable for suicide ideation was created for baseline (wave 1) and a variable for suicide ideation was created combining responses from the 12-month and 24-month assessments (wave 2)[3]. The variable for suicide ideation from baseline (suicide 1) is used as a control variable. The variable for suicidal ideation from the 12-month and 24-month assessments (i.e. wave 2) serves as one of the dependent variables. The number of students who thought about committing suicide decreased over the three waves, with 6 percent of students contemplating committing suicide during wave one, 4.4 percent of students in wave two, and 3.7 percent of students in wave three. Table 3 shows the percent of students who endorsed suicide ideation during baseline and waves 2 and 3 compared to those who did not. 2.64% of students reported experiencing suicidal ideations in both periods of time. 3.33% of students who experienced suicidal ideations at baseline no longer reported experiencing them during the later interviews. More than 4% of students did not report experiencing suicidal ideations in baseline, but did indicate that they experience suicidal ideations in the 12-month and 24-month assessments. Finally, 89.6% of students did not report

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[3] Although it is typically unconventional to combine two time periods into one wave, it is the most parsimonious notation for the reader.

experiencing suicidal ideations in either baseline or 12-month and 24-month

assessments.

Table 2: Distribution of item nine of the Beck Depression Inventory

	I do not have thoughts of killing myself	I have thoughts of killing myself, but would not carry them out	I would like to kill myself	I would kill myself if I had the chance	Missing[a]	Total
Baseline	961 (94%)	58 (5.7%)	3 (0.3%)	0 (0%)	0	1022
12-Month	974 (95.3%)	44 (4.3%)	0 (0%)	1 (0.1%)	3	1022
24-Month	982 (96.1)	37 (3.6%)	1 (0.1%)	0 (0%)	2	1022

[a]Subjects with missing data were deleted before analyses

Table 3: Percent of students who endorsed suicide ideation in baseline and wave 2

		Wave 2	
		Yes	No
Baseline	Yes	2.64%	3.33%
	No	4.4%	89.63%

Illegal Behavior in College

Criminal behavior was operationalized by asking about several illegal behaviors common to college students. These illegal behaviors are assessed through seven questions given during baseline, 12-month, and 24-month assessments. These questions addressed: housing violation due to alcohol, housing violation due to drugs, citation, arrested, drove while drunk, drove while high, and/or drove after drinking. Respondents were asked to report how many times these illegal behaviors occurred in the past 6 months (don't know, never, 1-2 times, 3-6 times, 7-9 times, and 10 or more times). Figure 2 shows the distribution of each of the seven illegal behaviors addressed during baseline, 12-month, and 24-month assessments. Each question was then coded as a binary variable indicting engaged in at least one illegal behavior (1) or never engaged in any illegal behaviors (0). The number of illegal behaviors for each respondent is summed to produce a variety score of illegal behavior in college. In order to make prospective predictions on the likelihood of continuing illegal behavior, a variable for college illegal behavior was created for baseline (wave 1) and a variable for college illegal behavior was created combining responses from the 12-month and 24-month assessments (wave 2). The variable for illegal behavior from baseline (illegal 1) is used as a control variable. The variable for illegal behavior from the 12-month and 24-month assessments (i.e. wave 2) serves as one of the dependent variables.

Figure 2: Distribution of illegal behavior variable

Distribution of Illegal Behavior Variable
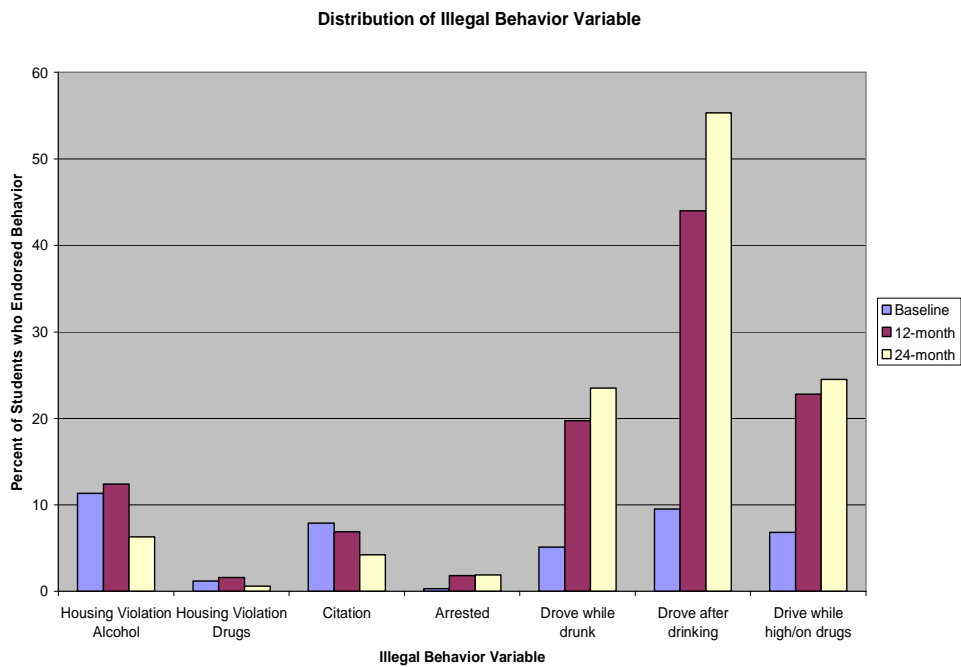
Impulsivity and Aggression

The Zuckerman-Kulhman Personality Questionnaire (ZKPQ) was developed as an attempt to define the basic personality and temperament factors (Zuckerman, 2002). The ZKPQ was given at baseline to assess impulsivity and aggression. The questionnaire is composed of 35 items, 7 items for each of the five factors (impulsive/sensation seeking, socialiability, neuroticism/anxiety, aggression/hostility, and activity). For the present study, only the items from the impulsive/sensation seeking and the aggression/hostility factors were used. The aggression/hostility factors served as a control variable. The impulsive/sensation seeking factors was the main independent variable. The impulsivity items "describe a lack of planning and a tendency to act quickly on impulse without thinking" (Zuckerman, 2002: 383). The aggression items ask about: verbal aggression, vengefulness, spitefulness, a quick temper, impatience with others, and rude, thoughtless or antisocial behaviors. Respondents were asked to answer seven true/false questions for each of these factors. A total score for each factor was calculated for each respondent.

The internal reliability for the ZKPQ in college students is 0.67 (Zuckerman, 2002). Moreover, the ZKPQ has high internal consistency, with Cronbach's Alphas ranging from 0.7 to 0.8 (Zuckerman, 2002).

The impulsivity measure of the ZKPQ is very similar to other validated attitudinal measures of self-control. For instance, Grasmick et al. (1993) developed a widely used 24-item scale representing six dimensions of self-control: impulsivity, the preference for simple tasks, risk seeking, physical

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activities, self-centeredness, and having a temper. Moreover, Pratt and Cullen (2000) conducted a review of the literature on self-control theory and identified 94 studies. They found that 82 of the 94 studies used an attitudinal measure of self-control. Support for attitudinal measures of self-control is drawn from the fact that these types of self-report measures ask about tendencies that are not tied to any one type of criminal behavior and are thus independent indicators of self-control (Kubrin et al., 2009).

Conduct Problems

The Conduct Disorder Screener, taken from Johnson et al. (1995), is used as a control variable to control for deviant behaviors in childhood. This screener was given during baseline assessment. The questions ask whether the respondent has ever taken and/or damaged property, bullied others, shoplifted, forged a signature, lied to avoid responsibility, hurt others physically, started fights, harmed animals, stayed out without permission, broke rules, skipped school, ran away, stole, used a weapon, forced sexual activity, broke into someone's property, and/or set fires. The respondents indicated how old they were when they engaged in the deviant behavior and how often they engaged in the behavior (never, once, twice, three times, more than three times). Each item was weighted based on the severity of the action and the number of times it was endorsed. For instance, used a weapon was weighted more heavily than skipped school since using a weapon is more serious than truancy. Then the items were summed to create a severity

scale. The Conduct Disorder Screener has high reliability in a college sample (Cronbach's alpha=0.79) (Johnson et al., 1995).

High School Crime

      To control for delinquent behavior in high school, a nine-question high school delinquency measure was given during the baseline assessment. These questions addressed: being late for school, skipping school, not following the rules, in-school suspension, out of school suspension, probation from school, transferred due to discipline reasons, arrested, and/or spent time in juvenile detention center. Respondents were asked to report how many times these delinquent behaviors occurred (don't know, never, 1-2 times, 3-6 times, 7-9 times, and 10 or more times). Each question was then coded as a binary variable indicting engaged in at least one delinquent behavior (1) or never engaged in any delinquent behaviors (0). The number of delinquent behaviors for each respondent was summed to produce a total score of high school crime.

Demographic Characteristics

      The variable, male, was recorded during the interview, as observed by the interviewer. Males are coded as one and females are coded as zero. Data on age was obtained from the participants' questionnaires and was measured by the actual age of the participant during the initial questionnaire. Finally, race was self-reported by the respondent. Respondents could select either white (1), black/African American (2), Asian (3), Native Hawaiian (4), Other Pacific Islander (5), American Indian/Alaska Native (6), other (7), multiracial (8), or

refused/don't know (9). Since over half of the participants were white, for purposes of analysis, race was coded as a dummy variable, white, which was equal to one if white and zero if otherwise.

All three demographic characteristic variables are used as control variables in the analyses.

The analyses for this study are conducted in four stages. First, descriptive statistics are run to determine the percent of students that were impulsive, engaged in illegal behaviors, and had suicidal thoughts.

Second, to evaluate the first and second hypotheses that impulsivity is positively related to illegal behavior and that impulsivity is positively related to suicide ideation, binary logistic regression models are run. The binary logistic regressions that are used to determine the association between illegal behavior and impulsivity and suicide ideation and impulsivity are as follows:

$Y_i = $ 1= Illegal Behavior
         2= Suicide Ideation

$$P(Y_i) = \frac{e^{(u)}}{1 + e^{(u)}}$$

where

$U = \beta_0 + \beta_1 Impulsivity + \beta_2 Male + \beta_3 Age + \beta_4 White + \beta_5 CD + \beta_6 HSDelinq + \beta_7 Agg + \beta_8 Suicide1 + \beta_9 Illegal1 + \varepsilon_i$

Both suicide ideation (suicide1) and illegal behavior (illegal1) are controlled for in the logistic regression models in order to test whether impulsivity contributes to a change in either suicide ideation or illegal behavior, as opposed to whether it predicts whether either of these outcomes are met (or level). Change was chosen over level to evaluate whether students' behaviors fluctuate in their first two years

of college, a time when new experiences and opportunities arise. Table 4 displays a description of the variables in the logistic regression equation.

Third, to address the third hypothesis, students who are suicidal are more likely to engage in illegal behavior and students who engage in illegal behavior are more likely to have suicidal thoughts, conditional probabilities are calculated to estimate the proportion of those with illegal behavior that had suicidal thoughts and the proportion of those with suicidal thoughts that also engaged in illegal behavior.

Finally, multinomial logistic regression models are used to test the fourth hypothesis that impulsivity will be most strongly related to those students who have both suicidal thoughts and engage in illegal behavior compared to those who have neither or either suicidal thoughts or illegal behavior. The estimates of the relative risk ratios (RRR) are used to compare the strength of the association between impulsivity and four outcomes: 1) neither illegal behavior nor suicide; 2) illegal behavior only; 3) suicide only; and 4) both illegal behavior and suicide, controlling for other confounding variables. The multinomial model used is as follows:

$$Y_i = \begin{cases} 0= \text{neither illegal behavior nor suicide} \\ 1= \text{illegal behavior only} \\ 2= \text{suicide only} \\ 3= \text{both suicide and illegal behavior} \end{cases}$$

$$\Pr(Y=k) = \frac{\exp(\mathbf{X}\beta_k)}{1+\sum\limits_{k=1}^{k}\exp(\mathbf{X}\beta_k)}, k=1,2,3$$

where

$$\mathbf{X}\beta_k = \beta_{ok} + \beta_{1k}\,\text{Impulsivity} + \beta_{2k}\,\text{Controls}$$

The variables for sex, age, race, the conduct disorder screener, high school crime, the aggression/hostility measure, suicide ideation in baseline, and illegal behavior in baseline were used as control variables during the analyses.

Table 4: Variables in the logistic regression equations

Abbreviation	Description	Wave Measured
Suicide Ideation	Suicide Ideation	2
Illegal Behavior	Illegal Behavior	2
Impulsivity	Measure of Self-Control	1
Male	Gender	1
Age	Age	1
White	Race	1
CD	Conduct Disorder Screener	1
HSDelinq	High School Delinquency	1
Agg	Aggression	1
Suicide1	Suicide Ideation	1
Illegal1	Illegal Behavior	1

Chapter 4: Results

Descriptive Statistics

Table 5 describes the key variables in this thesis. Since both suicide ideation and illegal behavior are dichotomous variables, their means give the proportion of students who meet these conditions. The results show that 82% of students were determined to exhibit illegal behavior, while only 7% of students thought about committing suicide. The main independent variable, impulsivity, had a mean of 3.47, which falls in the middle of the range from 0-7. Analysis of the control variables, White, Age, and Male revealed that over half of the sample is white (74%), less than half are male (45%), and the mean age of the sample is 18.18 years.

Table 5: Descriptive statistics

	Mean (SD) (n=1022)
Dependent Variables	
Suicide Ideation (wave 2)	0.07 (0.256)
Illegal Behavior (wave 2)	0.82 (0.385)
Suicide Ideation Only	0.006 (0.01)
Illegal Behavior Only	0.75 (0.02)
Independent Variables	
Impulsivity	3.47 (2.172)
High School Delinquency	0.98 (0.155)
Illegal Behavior 1	0.26 (0.438)
Suicide Ideation 1	0.06 0.237)
Aggression	3.02 (2.012)
Conduct Disorder	6.51 (4.635)
Control Variables	
Race White	0.74 (0.442)
Age	18.18 (0.498)
Sex Male	0.45 (0.498)

Hypothesis one, impulsivity is positively related to illegal behavior

and hypothesis two, impulsivity is positively related to suicide ideation are

addressed in the following paragraphs. Table 6 presents the odds ratios and

standard errors for the two logistical regression models that estimate the

association of impulsivity on illegal behavior and suicide ideation. The

results show that impulsivity is only statistically significantly associated with

illegal behavior. Impulsive people are 1.2 times more likely to engage in

illegal behavior compared to others. When examining the relationship

between impulsivity and suicide ideation, the results from model 2 are null

($p > .05$), suggesting no relationship between impulsivity and suicide ideation.

Since the regression model is assessing change in the dependent variable, it's

possible that there might not be enough variation in the dependent variable,

suicide ideation, when suicide ideation is controlled for at baseline (suicide

ideation 1). Since the results suggest that suicide ideation is time stable, I re-

ran the model without suicide ideation 1 in order to see if the relationship

between impulsivity and level of suicide ideation (as opposed to the change

in suicide ideation) becomes significant. The results of the suicide ideation

logistic regression model are the same when suicide ideation 1 is removed

from the model[4]. Hypothesis one, impulsivity is positively related to illegal

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[4] In addition, a model was run controlling for illegal behavior in the suicide
model to make sure that illegal behavior has no effect on the relationship
between impulsivity and suicide ideation. The results were the same when
controlling for illegal behavior.

behavior, is supported, while hypothesis two, impulsivity is positively related to suicide ideation, is not.

There are several control variables that are significant in the models. In model one, illegal behavior, high school delinquency, illegal behavior during baseline, aggression, and white are all positive and statistically significant (p<.05). Moreover, in model 2, suicide ideation, suicide ideation during baseline and conduct disorder are positive statistically significant (p<.01).

Table 6: Logistic odds ratios predicting suicide ideation and illegal behavior[5]

Variable	Illegal Behavior (N=1022)		Suicide Ideation (N=1022)	
	Odds Ratio	S.E.	Odds Ratio	S.E.
Impulsivity	1.235**	0.05	1.037	0.07
Control Variables				
High School Delinquency	2.796*	0.44	-	-
Illegal Behavior 1	4.786**	0.33	-	-
Suicide Ideation 1	-	-	14.111**	0.31
Aggression	1.110*	0.05	1.125	0.07
Conduct Disorder	1.121	0.03	1.096**	0.03
White	1.507 *	0.19	.767	0.29
Age	.738	0.18	.916	0.27
Male	1.113	0.19	.676	0.29

*P<.05, **p<.01

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[5] A model was run controlling for criminal behavior in the suicide model and the results were the same.

Hypothesis three, students who are suicidal are more likely to engage in illegal behavior and students who engage in illegal behavior are more likely to have suicidal thoughts is addressed in the following paragraph. Table 7 presents the conditional probabilities that estimate the proportion of those with illegal behavior who also experience suicidal thoughts and the proportion of those with suicidal thoughts who also engage in illegal behavior. The results show that 8% of those with illegal behavior have suicidal thoughts, while only 3% of those who do not exhibit illegal behavior have suicidal thoughts. Moreover, 91% of those with suicidal thoughts also engage in illegal behavior, while only 81% of those without suicidal thoughts exhibit illegal behavior. These differences are statistically significant, $p<0.05$. Hypothesis three, students who are suicidal are more likely to engage in illegal behavior and students who engage in illegal behavior are more likely to have suicidal thoughts, is supported.

Hypothesis four, impulsivity will be most strongly related to those students who have both suicidal thoughts and engage in illegal behavior compared to those who have neither or either suicidal thoughts or illegal behavior is addressed in the following paragraphs. Table 8 presents the relative risk ratios (RRR) and standard errors for a multinomial logistic regression that estimates the strength of the association between impulsivity and three outcomes: 1) illegal behavior only; 2) suicide only; and 3) both illegal behavior and suicide, with neither illegal behavior nor suicide as the reference category.

Table 7: The probability of suicide ideation and illegal behavior conditional on the other condition

N=1022	Illegal Behavior		Suicide Ideation	
	Yes	No	Yes	No
P(Suicide Ideation)*	.08	03	-	-
P(Illegal Behavior)*	-	-	.91	.81

All comparisons are statistically different with P<.05

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The results show that two of the three relationships shown in Table 8 are significantly positively related to illegal behavior, illegal behavior and both illegal behavior and suicide ideation. However, as impulsivity increases, the odds of engaging in illegal behavior as opposed to not engaging in illegal and suicidal behavior increases by 1.24. Similarly, as impulsivity increases, the odds of having suicidal thoughts and engaging in illegal behavior as opposed to not engaging in illegal and suicidal behavior increases by 1.25. Thus, impulsivity is significantly related to illegal behavior only and to illegal behavior and suicide ideation (p<.01) and their relative risk ratios are virtually the same.

There are several control variables that are significant. The only statistically significant predictor of suicide ideation is suicide ideation in baseline. Having suicidal ideations during baseline increases the odds of having suicidal ideations during wave 2 by 11.03 compared to having neither suicide ideation nor illegal behavior. Additionally, high school delinquency, illegal behavior in baseline, conduct disorder, and male are all statistically significant (p<.05) in the parameter estimate illegal behavior only compared to neither suicide ideation nor illegal behavior. Finally, illegal behavior in baseline, suicide ideation in baseline, aggression, and conduct disorder are all statistically significant (p<.01).

Table 8: Multinomial logistic regression model of illegal and suicidal behavior

	N=1022		N=1022		N=1022	
	Suicide Ideation vs. Neither		Illegal Behavior vs. Neither		Both vs. Neither	
	RRR	S.E.	RRR	S.E.	RRR	S.E.
Independent Variables						
Impulsivity	1.16	0.24	1.24**	0.06	1.25**	0.10
HS Delinquency	-^	-^	2.72*	1.19	-^	-^
Illegal Behavior 1	-^	-^	4.59**	1.52	5.28**	2.32
Suicide Ideation 1	11.03*	11.00^^	.98	0.47	13.90**	7.29
Aggression	0.84	0.21	1.10	0.06	1.25**	0.10
Conduct Disorder	1.23	0.11	1.13**	0.03	1.21**	0.05
White	1.37	1.25	1.57*	0.31	1.11	0.38
Age	0.39	0.35	.709	0.128	0.72	0.23
Male	0.74	0.69	1.122	0.223	0.74	0.26

*P<.05, **P<.01

^*Findings are unstable due to very few observations, when crosstabs were run, not all cells had observations*

^^ The standard error for Suicide Ideation 1 is so large because only 7 individuals endorsed suicide ideation only. In addition, the substantive results are the same when suicide ideation 1 is removed from the model.

Because there are so few students who exhibit suicide ideation without illegal behavior, a multinomial regression model was run with suicide only combined with both suicide ideation and illegal behavior. The results are presented in appendix A. Since both relative risk ratios are 1.24 and because the logistic regression model for illegal behavior is 1.235, I conclude that the binary logistic regression models presented in Table 6 are the more parsimonious and yet still informative model.

Table 9 presents the predicted probabilities of all outcomes for impulsive students and those who are not impulsive based on the results from Table 8; all other variables were set at their means. Both impulsive and non-impulsive students were most likely to exhibit illegal behavior without suicide ideation. The estimated probability of both impulsive and not impulsive students to have suicidal ideations is 0. Moreover, students who are not impulsive are more than twice as probable to exhibit neither illegal behavior nor suicidal ideation.

Table 9: Predicted probabilities for impulsivity

	Impulsive	Not Impulsive
Neither	0.08	0.19
Illegal Behavior Only	0.89	0.78
Suicide Only	0.00	0.00
Both	0.03	0.03

Chapter 5: Discussion

This study adds to the body of literature regarding the relationship between illegal behavior and suicide ideation in college students. When examining the demographic characteristics of the sample, it was found that more than half (51%) of the students scored in the impulsive range on the Zuckerman-Kulhman Personality Questionnaire (ZKPQ). In addition, a good majority (82%) of the students in the sample reported engaging in illegal behavior. Finally, a very small percentage (7%) of students indicated that they experience suicidal thoughts on item nine of the Beck Depression Inventory.

In general, most findings were consistent with the hypotheses proposed related to illegal behavior. The hypothesis that impulsivity is positively related to illegal behavior was supported by my analyses. People who scored as impulsive on the ZKPQ were three times more likely to engage in illegal behavior. Gottfredson and Hirschi define those with low self-control as being impulsive, thus this finding is consistent with Gottfredson and Hirschi's claim that those with low self-control are more likely to engage in illegal behavior.

However, the hypothesis that impulsivity is positively related to suicide ideation was unsupported by the study. This result shows that when examining suicide ideation and impulsivity independently of other variables, there is not a relationship. The null finding may be because a very small number of students (N=7) indicated that they have suicidal thoughts and do not engage in illegal

behavior. Consequently, with such a small number of students endorsing the presence of suicidal thoughts, it may not have been possible to draw accurate conclusions on the relationship between suicide ideation and impulsivity. In addition, it's possible that for college-aged students, impulsivity is actually unrelated to suicide ideation.

The hypothesis that students who have suicidal ideations are more likely to engage in illegal behavior and students who engage in illegal behavior are more likely to have suicidal thoughts was supported. Those with illegal behavior were more likely to have suicidal thoughts compared to those without illegal behavior (8% and 3% respectively). Furthermore, a large percentage of those with suicidal ideation were more likely to also have illegal behavior compared to those without suicide ideation (91% and 81% respectively).

The hypothesis that impulsivity will be most strongly related to those students who have both suicidal thoughts and engage in illegal behavior compared to those who have neither or either suicidal thoughts or illegal behavior was not supported. The results demonstrated that as impulsivity increases, students are more likely to engage in both suicidal thoughts and illegal behavior and illegal behavior only. The results from these two parameters were virtually identical (1.25 compared to 1.24). Thus, since the relative risk ratios for the illegal behavior only condition and the both condition were so similar, I cannot conclude that impulsivity is most strongly related to students who are have both suicidal ideations and illegal behavior. However, I can conclude that impulsivity is most strongly related to illegal behavior. This finding only partially supports

Gottfredson and Hirschi's general theory of crime. While, those who engage in illegal behavior are more likely to be impulsive, there is no relationship between impulsivity and suicidal ideation (an analogous behavior). Again, this may be due to the fact that the sample of students who indicated the presence of suicide ideations was so low.

Limitations

There are several limitations that need to be addressed regarding my thesis. First, although the hypotheses relating to illegal behavior were largely supported, the results can only be generalized to first and second year students attending a large university. The data from this study were collected from a group of freshman entering a large public university in the northeast portion of the United States. Moreover, data was only analyzed from freshman orientation (baseline), year one (12-month), and year two (24-month). Thus, in order to draw conclusions for the more general population about the relationship between impulsivity, suicide ideation, and illegal behavior, the study should be replicated with other populations.

A second major limitation with my study is the percent of students who indicated suicide ideation on the Beck Depression Inventory. Only seven percent (N=72) of the sample reported that they experience suicidal thoughts and of those people, only seven reported suicide ideation without also having illegal behavior. Consequently, because so many of those who endorsed suicide ideation also engaged in illegal behavior, it was not possible to disentangle the effects of impulsivity on suicide ideation from that on illegal behavior. Moreover, the Beck

Depression Inventory asks participants to rate how they have been feeling over the past few days. Therefore, it might be capturing a fleeting experience, rather than an ongoing condition. However, my results show that suicide ideation in wave 1 is a strong predictor of suicide ideation in wave 2, suggesting that it is not fleeting. In addition to the small percentage of students indicating the presence of suicidal thoughts, is the fact that this study is measuring how often students think about committing suicide, not suicide completions. Thus, there may have been a stronger relationship between suicide and impulsivity had the study measured suicidal ideation and suicide completions, as just thinking about suicide is not necessarily an impulsive act in and of itself. Moreover, since thinking about committing suicide is not necessarily an impulsive act, there may be other dimensions of low self-control besides impulsivity that are related to suicide ideation, such as self-centeredness. Gottfredson and Hirschi describe individuals with low self-control as being insensitive. Suicide is often portrayed as a selfish act because the people who are affected the most are the living relatives and friends of the person who died. In addition, studies have shown that suicide attempters are more self-centered than non-attempters (Litman and Farberow, 1965). Future research should explore how all aspects of suicide are related to impulsivity and illegal behavior.

A third limitation is that the questions that focused on illegal behavior asked about non-violent actions, as opposed to violent illegal behavior. For instance, the questions addressed illegal behavior such as housing violations due to alcohol, citations, and drove while drunk. Therefore, the current study is really

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only drawing conclusions based on petty illegal behaviors, rather than serious crimes. However, given that Gottfredson and Hirschi developed their self-control theory based on a general theory of crime, this study still supports their theory since impulsivity was positively related to the less serious crimes recorded. Future research should explore how both non-serious and serious crimes are related to impulsivity and suicide.

Finally, a fourth limitation is that the participants that were included in the analysis were statistically significantly different on several variables from the participants that were excluded from the analysis. The variables male, age, and impulsivity are significantly different at the $p<.05$ level. This finding is not entirely surprising given that the more impulsive you are, the less likely you may be to return interviewers' phone calls and attend interview sessions. In addition, studies have found that males are more impulsive than females (Gottfredson and Hirschi, 1990; LaGrange and Silverman, 1999; Nofziger, 2010). The significance of these variables suggests additional caution when generalizing the results of this study.

Chapter 6: Conclusion

The current study has found evidence that there is a link between impulsivity and illegal behavior.   It seems that those who are impulsive are more likely to exhibit illegal behavior. This study contributes to the body of research that examines the efficacy of applying self-control theory to study illegal, as well as, analogous behaviors. The results demonstrate that low self-control or impulsivity plays an important role in illegal behavior. Although, there was no relationship found between impulsivity and suicide ideation, the results did show that students who are impulsive are also likely to exhibit both suicidal ideations and illegal behavior. Accordingly, this thesis provides further empirical support for Gottfredson and Hirschi's claim that their theory accounts for all criminal acts, but does not explicitly provide support for acts that are similar to criminal activities, but are not illegal.

Although there were several limitations in this study, the results can still lend credence to possible policy implications. For instance, on college campuses, administrators should be aware that those students who engage in illegal behavior may also be more likely to exhibit suicidal behavior as well. Therefore, it may be necessary to screen those students in particular in order to prevent suicide attempts and completions. Moreover, when dealing with a population who engages in more serious illegal behaviors, it may be beneficial to also screen for suicidal behavior; studies have found that adjudicated young adults have higher

rates of suicide attempts and completions in prisons as compared to the general population (Liebling, 1992; Liebling and Krarup, 1993; Hatty and Walker 1986). Furthermore, research on young adult prison suicide attempts and completions has shown that they may be due to impulsive reactions to distress (Liebling, 1999). Thus, given that the results from the current study show that those who are impulsive are more likely to exhibit illegal behavior or illegal behavior and suicide ideation, and past research on young adults in prison shows that they are more likely to be suicidal because of impulsiveness, it would be beneficial for prisons to screen incoming inmates for possible suicidal behavior.

Through this thesis, I have attempted to illuminate the relationship between impulsivity, suicide ideation, and illegal behavior. Both suicide and illegal behavior are relevant social concerns. While not illegal, suicide is violence against oneself and is an act that's hurtful to those close to the attempter/completer. Illegal behaviors are acts that can be harmful to all members of society. Additional efforts should continue to explore how impulsivity is related to suicide ideation/suicide and illegal behavior in order to prevent and reduce their occurrence. "We cannot live fully without embracing suicide and crime, a pact made with relentless fire that requires that, while some live, others die." (Murder by Numbers, 2002).

Appendix A: **Multinomial Logistic Regression Model of Illegal and Suicidal Behavior**

| | N=1022 | | N=1022 | |
| | Illegal Behavior vs. Neither | | Both vs. Neither | |
	RRR	S.E.	RRR	S.E.
Independent Variables				
Impulsivity	1.24**	0.06	1.24**	0.10
HS Delinquency	2.72*	1.19	-^	-^
Illegal Behavior 1	4.58**	1.52	4.70**	2.04
Suicide Ideation 1	0.98	0.47	13.53**	6.99
Aggression	1.09	0.05	1.21*	0.10
Conduct Disorder	1.13**	0.03	1.22**	0.05
White	1.57*	0.31	1.13	0.38
Age	0.71	0.13	0.68	0.21
Male	1.12	0.22	0.74	0.25

*P<.05, **P<.01
^Findings are too small to report, when crosstabs were run due to zeros in some of the cells

Appendix B: **Item Nine of the Beck Depression Inventory**

BECK-(*Interviewer: Read paragraph below verbatim*)
I am going to give you a series of statements to read that describe how you have been feeling over the **past few days**. For each numbered set of statements, fill in the bubble that corresponds to the statement that best applies to you. Please select one statement in response to each group of statements. If more than one statement applies, select the one closest to the bottom of the group. If in doubt, make your best guess.

1	⓪ I do not feel sad. ① I feel sad. ② I am sad all the time and I can't snap out of it. ③ I am so sad or unhappy that I can't stand it.	**beckd1**
2	⓪ I am not particularly discouraged about the future. ① I feel discouraged about the future. ② I feel I have nothing to look forward to. ③ I feel that the future is hopeless and that things cannot improve.	**beckd2**
3	⓪ I do not feel like a failure. ① I feel I have failed more than the average person. ② As I look back on my life, all I can see is a lot of failures. ③ I feel I am a complete failure as a person.	**beckd3**
4	⓪ I get as much satisfaction out of things as I used to. ① I do not enjoy things the way I used to. ② I do not get any real satisfaction out of anything anymore. ③ I am dissatisfied or bored with everything.	**beckd4**
5	⓪ I do not feel particularly guilty. ① I feel guilty most of the time. ② I feel quite guilty most of time. ③ I feel guilty all of the time.	**beckd5**
6	⓪ I do not feel I am being punished. ① I feel I may be punished. ② I expect to be punished. ③ I feel I am being punished.	**beckd6**
7	⓪ I do not feel disappointed in myself. ① I am disappointed in myself. ② I am disgusted with myself. ③ I hate myself.	**beckd7**
8	⓪ I do not feel I am any worse than anybody else. ① I am critical of myself for my weaknesses or mistakes. ② I blame myself all the time for my faults. ③ I blame myself for everything bad that happens.	**beckd8**
9	⓪ I do not have thoughts of killing myself. ① I have thoughts of killing myself, but I would not carry them out. ② I would like to kill myself. ③ I would kill myself if I had the chance.	**beckd9**
10	⓪ I do not cry more than usual. ① I cry more than I used to. ② I cry all the time now. ③ I used to be able to cry, but now I cannot cry even though I want to.	**beckd10**
11	⓪ I am no more irritated by things than I ever am. ① I am slightly more irritated now than usual. ② I am quite annoyed or irritated a good deal of the time. ③ I feel irritated all the time now.	**beckd11**

(handwritten note next to item 9:) suicide ideation

Appendix C: **Measure of Illegal Behavior in College**

6

30.	How many times did the following things happen to you <u>during college</u>?					
→	SHOW CARD I: DEPORTMENT, COLLEGE	Never	1-2 times	3-6 times	7-9 times	10 times or more
30a.	You got into trouble for a housing violation due to <u>alcohol use</u>. **HOSTRBLA**	0	1	2	3	4
30b.	You got into trouble for a housing violation due to <u>drug use</u>. **HOSTRBLD**	0	1	2	3	4
30c.	You received a citation. **CITATION** Specify: **SPFCCIT**- string	0	1	2	3	4
30d.	You were arrested. **CLGAREST** Specify: **SPARST1 SPARST2 SPCFARST**- string	0	1	2	3	4
30e.	You drove while drunk on alcohol. **DRVDRUNK**	0	1	2	3	4
30f.	You drove after drinking alcohol. **DRVDRINK**	0	1	2	3	4
30g.	You drove while high on other drugs. **DRVHIGH** Specify: **SUBDRVHI**-string	0	1	2	3	4

	The next several questions relate to your general health.				
31.	**At the present time**, would you say your health is excellent, good, fair or poor? **HLTHRATE** Excellent: **1** Good: **2** Fair: **3** Poor: **4**			——	
32.	When did you last have a physical examination by a medical professional? IF R DOESN'T REMEMBER, WRITE "9999"	**PHYSEXAM/PHYSYEAR** MONTH			YEAR
32a.	Was routine blood work done at that time? **BLOODWRK**	DON'T KNOW **9**	YES **1**		NO **0**
33.	How tall are you without your shoes on? **HEIGHT**	_____ ft, _____ inches			
34.	How much do you weigh? **WEIGHT** OK FOR R TO WRITE RESPONSE.	_____ lbs			
35.	How often would you say you are very preoccupied with thinking about your body size? **BODYSIZE** Almost all the time Very often Sometimes Rarely or never **1** **2** **3** **4**			——	
36.	<u>During the last 12 months</u>, on how many days were you kept from your usual activities because of the following reasons: NUMBER OF DAYS (000 IF NEVER)				
36a.	An accident or an injury? **YNACTINJ**	**ACCTINJ**			
36b.	An illness or a physical condition? **YNILLPHY**	**ILLPHYS**			
36c.	An emotional problem or trouble with your nerves? **YNEMTPB**	**EMTPROB**			
36d.	An alcohol-related hangover? **YNALCHNG**	**ALCHANG**			
36e.	Any other drug effects? **YNDRGEFT**	**DRGEFFT**			

Appendix D: **Zukerman-Kuhlman Personality Questionnaire**[6]

	SSS		True	False
1	I am an impulsive person.	**impulsiv**	1	0
2	I often feel unsure of myself.	**unsure**	1	0
3	I can't help being a little rude to people I don't like.	**rude**	1	0
4	I like to keep busy all of the time.	**keepbusy**	1	0
5	I am a very sociable person.	**soclprsn**	1	0
6	I enjoy getting into new situations where you can't predict how things will turn out. **situaton**		1	0
7	I frequently get emotionally upset.	**emotion**	1	0
8	When I get mad I say ugly things.	**sayugly**	1	0
9	I like to wear myself out with hard work or exercise.	**wearout**	1	0
10	I tend to be uncomfortable at big parties.	**bigparty**	1	0
11	I prefer friends who are excitingly unpredictable.	**unprdfrd**	1	0
12	I tend to be oversensitive and easily hurt by thoughtless remarks and actions of others. **oversens**		1	0
13	I have a very strong temper.	**stemper**	1	0
14	When I do things I do them with lots of energy.	**doenergy**	1	0
15	I tend to start conversations at parties.	**convos**	1	0
16	I often get so carried away by new and exciting things that I don't think of possible complications. **carryawa**		1	0
17	I often think people are better than I am.	**betteri**	1	0
18	If people annoy me I do not hesitate to tell them so.	**annoy**	1	0
19	I like to be doing things all of the time.	**alloftim**	1	0
20	At parties, I enjoy mingling with people whether I already know them or not. **mingle**		1	0
21	I like "wild" and uninhibited parties.	**wildpart**	1	0
22	I often worry about things that other people think are unimportant. **unimport**		1	0
23	I am always patient with others, even when they are irritating.	**patient**	1	0
24	I lead a busier life than most people.	**busylife**	1	0
25	Generally, I like to be alone so I can do things I want to do without social distractions. **likalone**		1	0
26	I would like to live a life on the move, with lots of change and excitement. **onmove**		1	0
27	I don't let a lot of trivial things irritate me.	**trivial**	1	0
28	When people shout at me I shout back.	**shout**	1	0
29	I like complicated jobs that require a lot of effort and concentration. **compjobs**		1	0
30	I probably spend more time than I should socializing with friends. **socializ**		1	0
31	I often do things on impulse.	**thngimpl**	1	0
32	I often feel uncomfortable and ill at ease for no reason.	**uncmfrt**	1	0
33	When I am angry with people I do not try to hide it from them.	**angry**	1	0
34	I do not feel the need to be doing things all the time.	**doalltm**	1	0
35	I usually prefer to do things alone.	**prfalon**	1	0

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[6] Items 1, 6, 11, 16, 21, 26, and 31 assess impulsive/sensation seeking
Items 3, 8, 13, 18, 23, 28, and 33 assess aggression/hostility

Appendix E: **Conduct Disorder Screener**

55. The next set of questions asks about things you might have done before you turned 18 and how old you were the first time you might have done those things. [SHOW CARD W: DISPOSITION BEFORE AGE 18] This card shows all of the possible responses, or number of times that you might have done those things.

Before you turned 18, how many times did you...		NEVER	ONCE	TWICE	THREE TIMES	MORE THAN THREE TIMES	How old were you the first time you...
55a.	Take property belonging to others? **TAKEPROP**	0	1	2	3	4	AGEPROP __ __
55b.	Bully, threaten or tried to intimidate another person? **BULLY**	0	1	2	3	4	AGEBULLY __ __
55c.	Damage property on purpose? **DAMPROP**	0	1	2	3	4	ADAMPROP __ __
55d.	Shoplift? **SHOPLIFT**	0	1	2	3	4	AGESHOP __ __
55e.	Forge someone's signature? **FORGERY**	0	1	2	3	4	AGEFORGE __ __
55f.	Lie to get something or to avoid responsibility? **LIE**	0	1	2	3	4	AGELIE __ __
55g.	Hurt others physically? **HURTOTHR**	0	1	2	3	4	HURTAGE __ __
55h.	Start fights with other people? **FIGHTS**	0	1	2	3	4	FIGTAGE __ __
55i.	Cause physical harm to an animal? **ANIMAL**	0	1	2	3	4	AGEANIML __ __
55j.	Often stay out at night without parental permission before you were 13 years old? **STAYOUT**	0	1	2	3	4	AGEOUT __ __
55k.	Break rules? **BRAKRULE**	0	1	2	3	4	AGERULES __ __
55l.	Skip school before age 13? **SKIPSCHL**	0	1	2	3	4	AGESKIP __ __
55m.	Run away from home (overnight) at least twice while living at home or once without returning for a lengthy period? **RUNAWAY**	0	1	2	3	4	AGERUN __ __
55n.	Steal something from someone? **STEAL**	0	1	2	3	4	AGESTEAL __ __
55o.	Use a weapon in a fight? **WEAPON**	0	1	2	3	4	AGEWEAPN __ __
55p.	Force someone into sexual activity? **SEXACT**	0	1	2	3	4	AGESEXAC __ __
55q.	Break into someone else's house, building or car? **BREAKIN**	0	1	2	3	4	AGEBREAK __ __
55r.	Set fires on purpose? **SETFIRES**	0	1	2	3	4	AGEFIRES __ __

Appendix F: **Measure of High School Delinquency**

2

This section asks about your academic performance and participation in school/social activities during high school and college.

<table>
<tr>
<td>12.</td>
<td colspan="6">Did your high school have class ranks? PAUSE If so, what was your high school class rank?
(DEFINITION: Out of a class size of 100, how were you ranked in terms of your grade point average, compared to your fellow students?)

SHOW CARD B: HIGH SCHOOL CLASS RANK.   HCLSSRNK

Top 10%: 1   11-20%: 2   21-40%: 3   41-60%: 4   61-80%: 5   81-100%: 6

Did not have class ranks, so could not tell you: 9</td>
<td>—</td>
</tr>
<tr>
<td>13.</td>
<td colspan="6">What was your high school G.P.A.?
SPECIFY UNWEIGHTED IF R ASKS   HIGHGPA</td>
<td>_ . _ _</td>
</tr>
<tr>
<td>14.</td>
<td colspan="6">In your core courses, what kind of grades did you receive in high school?
                                           HSGRADES
Mostly A's:1 A's and B's:2 Mostly B's:3 B's and C's:4 Mostly C's:5 C's and D's:6</td>
<td>—</td>
</tr>
<tr>
<td>15.</td>
<td colspan="6">I'm going to read a list of activities that students participate in during high school. During <u>high school</u>, rate your level of involvement in the activity. We define "irregular" to mean occasional/some of the time, and "regular" as most of the time/kept to a schedule. This card will make it easier.</td>
<td></td>
</tr>
</table>

	SHOW CARD C: EXTRACURRICULAR INVOLVEMENT, HIGH SCHOOL SENIOR YEAR		**None**	**Irregular**	**Regular**
15a.	**Religious/church groups**	**RELCHRCH**	0	1	2
15b.	**School band/orchestra**	**SCHBND**	0	1	2
15c.	**Yearbook**	**YEARBOOK**	0	1	2
15d.	**Student Government**	**STDGOV**	0	1	2
15e.	**School Publications;** SPECIFY: **PUBBIES**, **PUBTYPE-string**	**SCHPUB**	0	1	2

16.	**Were there any other activities, clubs, or groups that you participated in during high school?** PAUSE				
16a.	Specify: **SPFACT1-string**	**HSACT1**	0	1	2
16b.	Specify: **SPFACT2-string**	**HSACT2**	0	1	2
16c.	Specify: **SPFACT3-string**	**HSACT3**	0	1	2

17. How many times did the following things happen to you <u>during high school</u>?

	SHOW CARD D: DEPORTMENT HIGH SCHOOL.	**Don't know**	**Never**	**1-2 times**	**3-6 times**	**7-9 times**	**10 times or more**
17a.	**Your were late for school LATSCHL**	8	0	1	2	3	4
17b.	**You cut or skipped classes SKPCLSS**	8	0	1	2	3	4
17c.	**You got in trouble for not following school rules** **NTFLRULS**	8	0	1	2	3	4
17d.	**You were put on an in-school suspension** **INSCSUSP**	8	0	1	2	3	4
17e.	**You were suspended** **SUSPENSI**	8	0	1	2	3	4
17f.	**You were put on probation from school** **PROBATIO**	8	0	1	2	3	4
17g.	**You were transferred to another school for discipline reasons TRSFSCH**	8	0	1	2	3	4
17h.	**You were arrested; specify: ARREST ARRTYP1, ARRTYP2, SPFCARST- string**	8	0	1	2	3	4
17i.	**You spent time in a juvenile detention center** **JUVDET**	8	0	1	2	3	4

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