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**RATE CHANGES IN RISKY BEHAVIOR & THE ROLE OF SIBLING
INFLUENCE**

Julian Alexander Bajczyk

A thesis

Submitted to the
Department of Psychology
College of Liberal Arts and Sciences
In partial fulfillment of the requirement
For the degree
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At
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Thesis advisors: Dr. Roberta Dihoff and Dr. John Klanderman

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Abstract

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RATE CHANGES IN RISKY BEHAVIORS & THE ROLE OF SIBLING INFLUENCE

2010/11

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Master of Arts in School Psychology

This study is based on research performed in 2006 by Laura Argys, Daniel Rees, Susan Averett, and Benjama Witoonchart. The 2006 study investigated relationship between the birth order and an adolescent's likelihood of engaging in certain risky behaviors. For the purpose of this study these behaviors include things like drug use, sexual activity and violent or antisocial offenses. The initial study found a trend implicating that adolescents with older siblings more likely to engage in certain risky behaviors than adolescents who did not have older siblings (eldest and only children). The Argys, et al. study used data collected from the first round of the National Longitudinal Survey of Youth (NLSY) '97, using responses from 9,000 participants aged 12- 17 years. The present study seeks to determine if this trend persists in the population as the participants age. Data was taken from the year 2000 of the NLSY '97 when the participants are 15-20 years of age. Responses were collected from 8,150 participants. An independent samples t-test was used to compare the average rates of engagement among boys and girls with and without older siblings between the two years. A chi squared test for independence was performed to identify the relatedness of the two samples.

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Chapter 1

Introduction

The current generation of American youth is at risk for participation in a number of highly risky behaviors. During adolescence, teens face increased pressure to engage in sexual activity, experiment with drugs and participate in delinquent activities (Steinberg, 2007). According to a 2007 survey from the Substance Abuse and Mental Health Services (SAMHS), 8% of adolescents, 12 years and older had reported using illicit drugs in the month prior to the survey. That figure remained consistent from 2002 to 2007. For 5 years the number of U.S. adolescents who had recently used illicit drugs has hovered around 19.9 million (SAMHS, 2007). In addition the number of adolescents engaging risky sexual behaviors is also a cause for concern. The National Center for Chronic Disease Prevention (CDC) reported that in 2009 46% of high school students had had sexual intercourse and that 14% of that population had four or more partners while in high school. 34% of those sexually active admitted to not having used protection during their last sexual encounter (CDC, 2009). The implications of this trend are serious and require both attention and intervention. In order to combat this problem, therapists need to be able to discern factors which contribute to participation in risky behaviors. One major source of interest has been the role siblings play in shaping risky behaviors. Recent studies have

shown that one's birth order among siblings can be a significant predictor participation in risky activities (McHale, Bissell & Kim, 2009; East & Khoo, 2005, Argys, Rees, Averett & Witoonchart, 2006).

1.1 Purpose

The current study sought to lend support to a study performed in 2006, which found a significant relationship between birth order and engagement in risky activities. The 2006 study highlighted a unique commonality (birth ordinance) among adolescents engaging in risky behaviors that can be used to predict the likelihood of another adolescent's participation. Argys, Rees, Arevett & Witoonchart used data from the National Longitudinal Survey of Youth 97 to determine which sibling group (only and eldest, or younger) was most likely to engage in risky activities such as unprotected sex, and drug use. The study reported highly significant results showing that younger children had the highest prevalence of engagement. Those younger siblings with older siblings who engaged in problem behaviors themselves were the most prevalent participants in risky activity (Argys, et al., 2006).

This study lends supports the findings of the 2006 study by determining which birth ordinance position showed increased rates of engagement between 1997 and 2000. A second statistic was used to determine if engagement is dependent upon the presence of older siblings. The researcher determined if there is a significant increase in the mean rates of engagement among children

with and without older siblings (eldest, and only, or younger) using the mean rates of participation between the data set used in the Argys et al., study (from 1997) and data taken from the same study three years later. A second analysis was used to determine if engagement is dependent on the presence of siblings by comparing the rates of participation between those with and without older siblings in 1997 and 2000.

1.2 Hypothesis

The researcher intended to lend support to the 2006 Argys, et al., study by demonstrating that the mean rates of engagement increase over time among the population of younger siblings. The researcher also determined if engagement is significantly dependent upon the presence of older siblings. It was predicted that the mean rates of participation of younger siblings in the risky behaviors outlined by Argys, et al. study, would have increased significantly from 1997 to 2000. In order to determine the effect the presence of older siblings (i.e. birth order) has on engagement in risky activities a chi squared test for independence was performed on activities that show significant relationships between 1997 and 2000. The null hypothesis predicted that participation in risky behaviors is independent of the presence of older siblings. The alternative hypothesis predicted that participation in risky behaviors is not independent of the presence of siblings.

1.3 Background

Birth order influences a number of auspicious factors in a child's life.

Being an only child means not having to share parental attention or investment.

However being one of multiples means having to share attention and resources

(Hertwig, David, Sulloway, 2002). Children who are born later experience the

most shared attention from their parents. The differential in time parents spend

with later born children can result in a greater opportunity for participation in

risky behaviors (Price, 2006; Argys, Averett, & Rees, 2009).

Birth order also contributes to the way in which siblings influence each

other. Older siblings have the power expose or buffer younger siblings from

engagement in risky activities (Pomery, et. al., 2005, East & Khoo, 2005). After

witnessing the attitudes of elder siblings toward risky activities, younger siblings

tend to form positive expectancies of those behaviors (D'Amico & Fromme, 1997,

Pomery, et al., 2005). Sibling attitude has the potential to outweigh peer influence

and has even proven comparable to the influence of parents (Windle, 2000).

Consistent with the findings from the 2006 study, this research suggests that

younger siblings have an increased exposure to risky behaviors (Argys et al.,

2006).

This study attempted to confirm the relationship between birth order and

engagement in risky behaviors. Based on existing theories of sibling influence

and exposure, as well as the findings of Argys, et al., the researcher expected that

the rates of engagement would increase in more behaviors among younger siblings three years in the future. It was also expected that participation would be significantly dependent on the presence of older siblings.

1.4 Definitions

For the purpose of this study the terms “risky behaviors” or “problem behaviors” refer to one of three types of hazardous activity outlined in the 2006 study. Risky behaviors include substance abuse (cigarette smoking, consumption of alcohol, marijuana smoking), ‘risky’ sexual activities (multiple partners, engagement without protection) and delinquent or criminal activity (engaged in assault, carried a handgun, stealing) (Argys, et al., 2006). Engagement in these activities can have significant implications for an adolescents’ mental and physical health. The behaviors are considered risky because participation in each of the behaviors increases the likelihood of an unpleasant or undesirable outcome but does not imply a definite consequence.

The World Health Organization defines the term drug as, “any substance with the potential to prevent or cure disease, or enhance physical or mental welfare, and in pharmacology, to any chemical agent that alters the biochemical, physiological process of tissues or organisms” (WHO). For the purpose of this study the researcher will look at the use of ‘illicit’ drugs, which differ from the traditional type of drug outlined above. Illicit drugs refer to “psychoactive

substances the production, sale or use of which is prohibited by law” (WHO).

The researcher will look at use of the illicit drug, marijuana.

1.5 Assumptions & Limitations

The sample data used was obtained from the data set used in the Argys, et al study performed in 2006. The Argys study used the data from the first year of the NLSY 97. The initial data set had almost nine thousand responses (NLSY 97, 1997). This study used the results from the 2000 data set which only had 8,080 responses. This study assumed that the remaining participants still represent a randomized sample of participants.

This study is limited by its ability to determine the existence of a relationship between the two variables. No causal information can be derived from the correlation, only a statistic that demonstrates whether or not participation in risky activities increased between sample years. The second statistic conveys the independence or dependence of an adolescent’s engagement in a risky behavior based on the presence of older siblings. It does not imply that birth order determines a given individual’s likelihood of exposure in every instance. There is no way to tell if respondents engaged in risky activity as a result of birth ordinance related circumstances, based on the data alone.

1.6 Summary

There are a number of theories contributing to the significance of birth order interaction and risky behaviors. The following chapter further outlines the

associated characteristics and traits surrounding birth ordinance. The researcher provides studies that demonstrate how factors surrounding the birth ordinance of younger siblings increase their likelihood of engaging in risky activities. The third chapter includes information on the participant sample and how the researcher measured the significance of the relationship between the variables. This section also discusses how the analysis demonstrates the prevalence of engagement in risky activities associated with each ordinal birth position.

Chapter 2

Literature Review

Previous studies have provided a clear distinction in the likelihood of participation in risky activities between adolescents who were only and eldest children and those who had elder siblings. The 2006 study performed by Argys, Rees, Averett, and Witoonchart found that younger siblings were far more likely to engage in risky activity than those other groups and were most likely to engage in the same habits as their elder siblings. These results suggested that rather than adhering to an Adlerian interpretation of birth order influence (engaging in activities based on personality traits associated with birth ordinance), the study produced results which were better explained by Bandura's Social Cognitive theory (engaging in risky activities based on modeling or opinions adopted from others) (Bandura,1989). There were also a number of other factors associated with birth order which influence younger siblings' decision to engage in risky behaviors.

Adolescence is a time of heightened risk in the lives of all people. Chemical and structural changes in the brain begin to occur with the onset of puberty. These changes contribute to the individual's transition into adulthood (Spear, 2000). However, a difference in the rate of maturation between the two areas of major development creates a unique dilemma. The limbic system, which

is associated with emotional processing, motivation, and sexual activity becomes fully mature shortly after puberty (Steinberg, 2008; Giedd, 2008). The second area is the prefrontal cortex which is associated with planning, logic and self regulation. Unlike the limbic system, this area does not mature until the individual is well into his or her twenties (Steinberg 2004, Yurgelun- Todd, 2007).

2.1 Background

During adolescence the prefrontal cortex begins a dramatic shift from high levels of grey matter to high levels of white matter (cite). This shift reflects the brain's shift from childlike thought processes to adult processing (Bengtsson, Nagy, Skare, Forsman, Forsberg & Ullen, 2005). This is achieved through two processes that begin around the onset of puberty. The first process, called synaptic pruning, involves the systematic destruction of unused connections in the brain. Synaptic pruning allows the brain to conserve the energy it would have expended to maintain excess connections (Giedd, Blumenthal, Jeffries, Castellanos, Liu, Zijdenbos, Paus, Evans, & Rapoport, 1999; Yurgelun-Todd, 2007).

The other process speeds the rate of processing by insulating electrical impulses as they pass down the axon to the next neuron. This process is called myelination. Myelin is a fatty white substance that prevents the electrical impulses in the brain from straying from the axon of commonly used neurons (Turken, Whitfield, Gabrieli, Bammer, Baldo, Dronkers, & Gabrieli, 2008).

Throughout adolescence myelin will wrap around connections that are solidified through repeated use (Giedd, Blumenthal, Jeffries, Rajapakse, Vaituzis, Liu, Berry, Tobin, Nelson, & Castellanos, 1999; Giedd, 2008). As connections become myelinated the brain tissue begins to appear white, reflecting the change from grey to white matter (Giedd, 2008).

The transition from predominantly grey matter to predominantly white is essential to achieve the speed of processing associated with the adult brain. Unfortunately the processes that contribute to this shift, particularly myelination, are not fully completed until individuals are well into their twenties (Craik, & Bialystok, 2006; Giedd, et al., 1999). Surprisingly, research has shown that adolescents are able to use logic and reason to interpret risk in the same way adults do around the age of 15 (Steinberg, 2004). Researchers are finding that teens are able to accurately determine the consequences of their actions prior to engagement (Steinberg, 2007). However, logic and reason are not the only factors that contribute to decision making.

2.2 Theory

Peer and sibling influence has a profound impact on an adolescent's choice to engage in a range of risky activities including sexual practices, delinquency and substance use (Windle, 2000, Trim, Leuthe, & Chassin, 2005). Researchers attribute the sensitivity to external suggestion in adolescence to the discrepancies in brain maturation outlined earlier. If presented with the option to

perform a high risk activity while alone, adolescents will choose a more conservative option. In the presences of peers, however, the prefrontal cortex's ability to consider the consequences are skewed by impulses from the limbic system. The adolescent may physical changes, such as a rise in blood pressure or heart rate, which are induced by the risk provoking situation (Steinber, 2004). In combination with heightened physical response, encouragement from peers has the potential to reduce the consequences of the behavior in light of the reward (Steinberg, 2007). When fully matured, the prefrontal cortex is able to inhibit the impulsive, and emotionally charged decisions proffered by the limbic areas (Peters, LaLumiere, & Kalivas, 2008; Casey, Tottenham, Liston, & Durston, 2005).

The benefit of delayed maturation is that adolescents are able to take in mass amounts of social and environmental data and adapt methods of interaction based on those experiences (Casey, Tottenham, Liston, & Durston, 2005). Myelination and synaptic pruning are highly influenced by experience and by observation (Spear, 2000; Steinberg, 2008; Casey, et al., 2005). Favorable outcomes lead to repetition in behavior. In this way adolescents change their behavior to meet new expectations and remain flexible to accommodate new circumstances in the environment.

The compromise for adaptability however, is social naïveté. Although an adolescent brain is capable of determining the consequences of a course of action,

the prefrontal cortex lacks experiential knowledge that would contribute to better decision making (Steinberg, 2007). In decision making the prefrontal area inhibits impulsive behaviors and determines which sources of input to trust. This is highly significant when considering adolescents are most likely to initiate risky behaviors in the presence of peers (Windle, 2000; Gardner & Steinberg, 2005).

One major contributor to studies in adolescent behavior, Dr. Laurence Steinberg, suggests that during adolescence the brain is subject to heightened emotionality, inexperience, and psychosocial influence (Steinberg, 2007). Experience causes the brain to grow and interpret environmental data into problem solving methods. Over time the individual will develop what Dr. Steinberg describes as 'psychosocial skills'. These skills are instrumental in moderating risk in decision making processes. Psychosocial competency involves impulse control, emotional regulation, delay of gratification, and resistance to peer influence (Steinberg 2007). These skills are localized in three areas in the prefrontal cortex, the dorsolateral prefrontal cortex, the ventromedial prefrontal cortex, and the orbitofrontal cortex. These areas are critical for an individual to parse essential information from extraneous input during decision making (Steinberg 2008).

The dorsolateral prefrontal cortex contributes to planning and controlling impulsive behavior. This allows an individual to ignore heightened emotional

response and be patient before investing in an activity. The delay created through impulse suppression can equate to time for reasoning (Casey, et al., 2005). The ventromedial prefrontal cortex is associated with intuitive decision making and gut level decisions. This portion of the prefrontal cortex is also known to have strong connections with the limbic system (Bechara, 2005). The third developing portion of the prefrontal cortex is the area directly behind the eye, the orbitofrontal cortex. This portion of the brain is essential for evaluating the risks and rewards associated with one's actions (May, Delgado, Dahl, Stenger, Ryan, Fiez, & Carter, 2004). These three areas of the frontal cortex collaboratively inhibit impulsive, and emotionally driven decisions. Unfortunately until the prefrontal cortex develops the ability to inhibit it, the limbic system rules the decision making process like a tyrant. The differential in development often results in a brain that is highly emotive and responsive to stress. It also contributes to the novelty seeking nature of the adolescent mind (Spear, 2000; Ernst, Nelson, Jazbec, McClure, Monk, Leibenluft, Blair, Pine, 2005).

In spite of their susceptibility, there are two major factors which effectively moderate an adolescent's engagement in risk provoking activities. Effective parenting and older sibling behaviors have shown tremendous influence on adolescent decision making (Pike, Coldwell, & Dunn, 2005; Tucker, McHale & Crouter, 2001; Barnes, Hoffman, Welte, Farrell, & Dintcheff, 2006).

Findings from investigations on these two factors are indicative of a specific population at risk. The population at risk is clearly defined by their ordinal birth position. Younger siblings have a significantly higher rate of engagement in risky activities and the risk increases with each successive child (Price, 2006; Barnes, et al., 2006).

2.3 History

The behaviors of older siblings are highly influential to younger siblings. The developing trends in youth participation are consistent with Bandura's Social Cognitive theory. This theory suggests that the developing brain integrates observed behaviors which take place in natural environment, into the individual's behavioral repertoire (Bandura, 1989). The behaviors younger siblings see others perform, they will in turn employ when faced with a similar situation. Younger siblings are learning how to behave from older siblings and often adopt their behaviors as acceptable conduct (Windle, 2000; Brody, Flor, Hollet-Wright, & McCoy, 1998).

Bandura's research found that through behavior modeling young children seeing, for example, an older sibling perform a behavior, will in turn be more likely to repeat that behavior independently (Bandura, 1989). Recent research has found the same type of passive transmission also applies to attitudes that older siblings hold. Regardless of direct observation of a behavior, expressing a sympathetic opinion towards engagement in a behavior imparts acceptance of

that behavior as valid conduct (Pomery, Gibbons, Brody, Gerrard, Cleveland, & Wills, 2005; Trim, Leuthe, & Chassin, & 2005; East, & Khoo, 2005). This phenomenon is described as 'attitude transference'. The term refers to the unidirectional transference of attitudes from older siblings to younger siblings regardless of older sibling participation and younger sibling observation (Windle, 2000).

This trend further reflects adolescent's malleability during the gap between limbic and prefrontal maturation. Younger siblings in adolescence often view older siblings as sources of advice or models of conduct. Whether implicit or explicit the attitudes and behaviors of older siblings have very serious implications for the behavior of younger siblings. Attitude transfer and behavior modeling provide convincing explanations for the results found in studies on smoking, substance use, violence, vandalism, sexual activity, and safe sex practices. The implications for these trends are vast and cannot afford to be overlooked. Birth ordinance has significant impact in determining one's risk in participation in risky activities.

2.4 Sibling Influence

Support for this theory is found in many studies concerning various high risk activities. Windle's 2000 study found that sibling influence often displayed the pattern predicted by Steinberg's theory on attitude transference among siblings. This study focused on the roles parenting, sibling, and peer influences

have on the development of adolescent substance and alcohol use. The results showed an interesting series of trends. Parental influence proved to be the weakest predictor and although peer engagement was the strongest predictor of alcohol and the use of illicit substances, sibling influence had other contributions. The study showed highly significant similarities between the reason for participation. Younger siblings engage in the same risky behaviors as their older siblings, regardless if the sibling was present during participation and for the same reasons.

Sibling substance use proved highly predictive of both younger sibling use and motives for substance and alcohol use (Windle, 2000). There is evidence that suggests this occurs when younger siblings see or hear older sibling attitudes and adopt expectations based on their perception of elder sibling enjoyment. D'Amico and Fromme's 1997 study showed that younger sibling's alcohol use was positively associated with their positive expectancies and inversely associated with their negative expectancies (D'Amico & Fromme, 1997). Further studies have also found evidence that these trends continue to be highly predictive of younger siblings' activities and attitudes into young adulthood (Shortt, Capalde, Disluon, Bank, & Lee, 2003).

Attitude transference occurs in much the same manner as behavior modeling. Adolescents are exposed to the attitudes and behaviors of older

siblings, whom are viewed as models of appropriate conduct. Younger adolescent in turn naturally adopt these behaviors and attitudes, as experiences occurring in the natural environment are thought to be highly conducive to human learning (Brody, et al., 1998; Bandura, 1989; Steinberg 2007). Younger siblings adopt positive expectancies based on the related experience and attitude of older siblings. Through direct or passive influence, older siblings are exposing younger siblings to those risky activities at a young age. As a result younger siblings become more likely to engage in the same activities at a much younger age (Harakeh, et al., 2007, D'Amico & Fromme, 1997; Windle, 2000).

This trend also appears in adolescent sexual activity. Sexual activity and safe sex practices are highly related among siblings, although highly dependent on additional factors, such as gender, age, and birth spacing between siblings there is a significant pattern that emerges when they are controlled. Researchers control for various familial constellations by matching unique family dyads and comparing the prevalence of a target behaviors, such as contraceptive use (McHale, Bissell, & Kim, 2009; Kowal, Blinn-Pike, 2004). Findings from this research follow the more traditional social cognitive predictions. Adolescents who shared close relationships with older siblings and viewed themselves as similar to that sibling were most likely to adopt and imitate his or her risky sexual practices (McHale, Bissell & Kim, 2009, East, Khoo, 2005).

Delinquent activity is highly influenced by both styles of conveyance. Unlike substance or alcohol use siblings readily engage in acts of violence and vandalism in the presence of younger siblings (Buist, 2010). This follows mode of transference expected from Bandura's behavior modeling theory; the adolescent views older sibling's behavior and he or she in turn emulates that behavior (Bandura, 1989). Research also suggests that siblings will encourage each other to participate in delinquent activities through verbal encouragement and positive reflection on delinquent activity (Buist, 2010; Scholte, Engles, de Kemp, Harakeh, 2007).

2.5 Parenting Differentials

While sibling attitude is a significant predictor of adolescent risk, there is another factor which mediates an adolescent likelihood to engage in any of these risky activities. Parental involvement is an essential buffer against an adolescent's practical ability to participate in delinquent or risky behaviors (Yang, Stanton, Li, Cottrel, Galbraith, & Kaljee, 2007; Hair, Moore, Garrett, Ling & Cleveland, 2008). Parents who remain involved are more aware of their child's activities, opinions and peer crowd. Monitoring these factors permits parents to remain abreast of their child's vulnerabilities or misconceptions. Parental monitoring mediates both adolescent opinion and opportunity to engage in risky activities (Barnes, et, al., 2005; Coley, Medeiros, & Schindler, 2008; Steinberg, Fletcher & Darling, 1994). Recent studies have found highly significant

differentials in the quality and the amount of time spent actively involved with children. These trends suggest that younger children are receiving significantly less involvement with their parents than older siblings (Dixon, Reyes, Leppert & Pappas, 2008).

Naturally as the number of children in a family increases, parental attention is further divided. Younger children experience the most divided attention, which means their time spent engaged and involved with parents is less than that of older siblings who experienced more parenting across their development (Hertwig, Sulloway, & Davis, 2002). In addition to the physical constraints which divide a parent's attention and monitoring, there is a significant differential in daily interaction between successive children. A 2006 study researching the parenting differentials that exist between siblings found that birth order was highly predictive of the amount of time parents spent with their children. This study found that in two sibling families the first born child received 20-25 minutes more quality attention from his or her mother than the second born child. Fathers spent 25-30 minutes more with first born children than with second borns (Price, 2006). Parental monitoring is an essential tool in preventing substance abuse. Awareness of activity mediates the impact of peer influence in engagement in both substance abuse and delinquent behaviors. Monitoring prevents opportunity for adolescents to engage in these behaviors

(Barnes, et al., 2006; Reyna, & Farley, 2006). There is also evidence that quality parental engagement contributes to the development of psychosocial mediation necessary to mute peer pressure (Schaffer, Bert, Obradovic, Herbers, & Masten, 2009; Steinberg, 2007).

2.6 Birth Order and Personality

There also exist new theories reminiscent of the Adlerian theories of birth order. Alfred Adler hypothesized that certain personality traits were associated with specific birth ordinance positions (Adler, 1989). Although evidence supporting this theory is weak there have been new interpretations of the way in which birth order contributes to personality. One theory offered by Frank Sulloway in his book *Born to Rebel*, is that family environment creates competition for the resources limited by the number of children in the family. According to this theory younger and especially youngest children show more extraversion in order to command attention amongst other siblings (Sulloway, 1987). Consistent with this younger children do tend to display more extraverted qualities Jefferson, Herbst, & McCrae, 1998; Shebolski, Conger, & Davis, 2005). In addition to the ability to assert themselves, this extraversion also carries other tendencies. Extraverts are more likely to act with the impulsivity and excitability that lends itself to engagement in risky behaviors (Cooper, Wood, Orcutt, & Albino, 2003; Jefferson, Herbst, & McCrae, 1998; de Leeuw, Sholte, Sargent, Vermulst, & Engels, 2010).

2.7 Summary

This study re-affirms the findings of a study performed by Argys, Rees, Averett, & Witoonchart in which the researchers used birth order to determine at risk groups among adolescents. The 2006 study produced highly significant results;

“adolescents with older siblings are more likely to have used tobacco, alcohol, and marijuana and are more likely to have had sex than their firstborn counterparts. In addition the evidence suggests that male adolescents are more likely to steal as compared to first-borns, and female adolescents with older siblings are more likely to destroy property. Having an older sibling is also associated with carrying a gun for both males and females” (Argys, et al., 2006).

Results concerning sibling influence on sexual activity were limited. However, it was also determined that similarity in age and gender were highly significant determinants of sibling influence. Older sibling sexual activity and practices were most significantly correlated with the behavior and attitudes of younger siblings who were close in age and of the same gender.

In the next chapter the researcher further outlines the statistical analysis used to determine the relationship between three distinct roles defined by birth order (only, eldest, and younger) and a series of risky behaviors. The researcher then discusses how the data was processed and any distinct patterns that were produced over the course of analysis.

Chapter 3

Methodology

This chapter provides information on the source of the data as well as the defining features of the populations included in the analyses. The analysis section discusses how the data is manipulated into the final statistics. This section also offers an interpretation of the results. The following chapters provide the results of the analyses and conclusions which can be drawn from any significant findings.

3.1 Data

The data used in this study was obtained from the National Longitudinal Survey 1997. The researcher sought to compare the results of a study performed in 2006 by Argys, Rees, Averett & Witoonchart with results produced from a later sample of the same survey. The 2006 study used data obtained from the first year of the NLSY 97. Participants in the first round of the NLSY were aged 12-16 years as of December 31, 1997. The data analyzed in the current study was taken from the 2000 sample in which the participants from the previous study were in late adolescence or emerging adulthood (15-22 years).

Both sample sets were taken from the National Longitudinal Survey of Youth which was performed by the US Department of Labor. The Bureau of Labor Statistics collected data to enable researchers to define “the transition that today’s youths make from school to the labor market and into adulthood.” In

addition to education and labor market the study also collected information on family demographics, personal characteristics and habits. Included in the survey are a number of questions regarding risky or delinquent behaviors.

The initial round of the survey included the results from approximately 9,000 respondents. The sample represents the U.S. population of adolescents, between 12-16 years of age. The first sample contained responses from 4,599 male and 4,385 female participants. The current study uses data from the NLSY 97's 2000 sample in which there were a total of 8,080 respondents; 4,096 male and 3,984 female.

Questions pertaining to sensitive material including tobacco, marijuana and alcohol use; sexual activity; birth control; and delinquent behaviors were collected using ACASI (Audio Computer Assisted Self- Interview) technology. This allowed respondents to read and respond with privacy. The automated self-interview minimized any potential influence from family members or interviewers during response. Questions pertaining to sexual activity and contraceptive use were only presented to respondents 14 and older.

3.2 Analysis

In order to compare the rates of participation in each risky behavior, the data was subjected to two types of analysis; an independent sample t-test and a chi squared test for independence. The first test was used to determine if a significant relationship existed between the rates of engagement for the 1997 and

2000 data sets, among the populations outlined in the 2006 Argys et al. study. In order to compare the rates of engagement, the data was divided into two populations; those with older siblings and those without. The rate of participation was determined by dividing the number of participators in a given activity by the total number of respondents to the question within each subgroup. These rates were then used to compare the rate of participation between the two sample years. This test was used to determine if the rate of engagement increased from 1997-2000. It also demonstrated which subgroup experienced the most increases.

The second test, the chi squared test for independence, was used to determine if engagement activities are dependent on the presence of older siblings. The researcher compared the mean rate of engagement among each subgroup, for each predetermined risky behavior from the selected sample years. The outcome of this test indicates if the presence of older sibling influences the younger sibling's participation in a particular risky behavior. If the results were not significant then the rate of engagement in that particular behavior is independent of the presence of siblings. If the result were significant then the rate of engagement is not independent of the presence of siblings. This test was only performed on those variables that showed significant relationships in the first analysis.

3.3 Summary

After reproducing the means from the 1997 sample, the means from the 2000 sample were included for comparison. Two types of analysis, an independent samples t-test and a chi squared test for independence were applied to these means. The first test was used to determine if a significant relationship existed between the two year's average rates of engagement in each risky behavior among each subgroup. The chi squared test was used to implicate birth order (eldest or only vs. younger siblings) as a source of influence on engagement in risky behaviors.

In the next section the researcher discusses the results of the analysis. Graphs are provided for visual comparison of levels of participation between each year. The data analysis is followed by a discussion of the results and implications from the findings. The conclusion includes limitations and suggestions for future studies.

Chapter 4

Findings

In this section the researcher discusses the results of the analysis performed on the data. Tables and graphs are provided for a visual comparison of the results. The first table displays the mean rates of participation among respondents with and without siblings, for each of the risky behaviors. The subsequent graphs display the variables that produced significant relationships between the first year of the survey and the sample taken three years later. The following chapter provides a discussion of the results and offers conclusions that can be drawn from the results of this study.

4.1 Results

The first analysis performed was an independent samples t-test. This was used to compare the mean rates of engagement in each risky behavior among respondents with and without older siblings. The first sample in each case consisted of respondents either with or without older siblings from 1997. The second sample consisted of the mean rates of engagement among the same respondents from the first sample, within the same subgroups, three years later.

The independent sample t-test produced several significant relationships. The subgroup with older siblings showed significant relationships in the rates of engagement in the variables measuring ever having smoked cigarettes, smoking cigarettes in the past 30 days, ever having drunk alcohol, drinking alcohol in the

past 30 days, smoking marijuana in the past 30 days, having sex in the past year, using birth control during first intercourse, ever having destroyed property, and ever having stolen. Among the variables that produced significant results, smoking in the past 30 days, ever having drunk alcohol, drinking alcohol in the past 30 days, smoking marijuana in the past 30 days and having sex in the past year showed increased rates of engagement during the three year span. Variables measuring the use of birth control during first intercourse, ever having destroyed property and ever having stolen showed a negative relationship over the three year span.

The subgroup of respondents without older siblings produced fewer significant results. The variables measuring smoking cigarettes in the past 30 days, ever having drunk alcohol, drinking alcohol in the past 30 days, smoking marijuana in the past 30 days, use of birth control during first intercourse, and ever having stolen produced statistically significant relationships. The variables measuring smoking cigarettes in the past 30 days, ever having drunk alcohol, drinking alcohol in the past 30 days, and smoking marijuana in the past 30 days showed a positive relationship between the 1997 sample and the 2000 sample. The variables measuring the rate of use of birth control during first intercourse and ever having stolen showed a decreased relationship between the two sample years.

Table A shows the mean rates of participation for risky behaviors which were significantly related to those means produced in the 2000 sample as indicated by the t-test. This table includes the means rates of engagement for

Table A

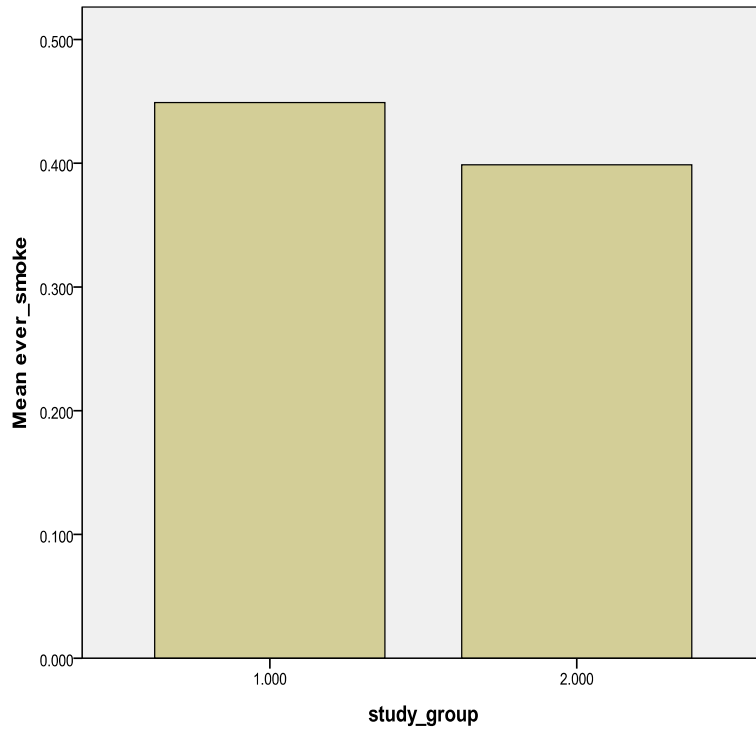
	1997 Sample Means			2000 Sample Means		
	Total mean	With Siblings	Without Siblings	Total mean	With Siblings	Without Siblings
Ever smoked cigarettes	.439	.457	N/A	.398	.399	N/A
Smoked last 30 days	.234	.243	.225	.820	.827	.816
Ever drank alcohol	.523	.525	.522	.593	.635	.560
Drank Alcohol last 30 days	.286	.291	.279	.778	.784	.774
Smoked Marijuana last 30 days	.114	.116	.113	.714	.672	.746
Ever had sexual intercourse	.368	.371	.365	.581	.610	.560
Sexually active in last year	.305	.307	N/A	.581	.683	N/A
Used contraceptive 1 st intercourse	.797	.799	.796	.709	.714	.706
Ever assaulted someone	.222	.223	.220	.084	.088	.082
Ever destroyed property	.309	.310	N/A	.068	.072	N/A
Ever stolen anything	.366	.366	.366	.117	.121	.230

*Not included are risky behaviors which did not have a significant relationship between 1997 and 2000. These behaviors include ever smoking marijuana, use of contraceptives in the past year, carrying a handgun, carrying a handgun in the past year, assaulting anyone in the past year, belonging to a gang, belonging to a gang in the past year, destroying property in the past year and stealing items worth more than \$50.00 in the past year.

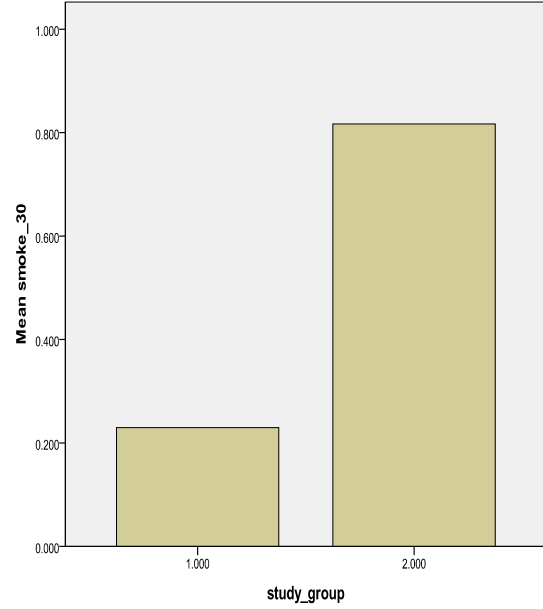
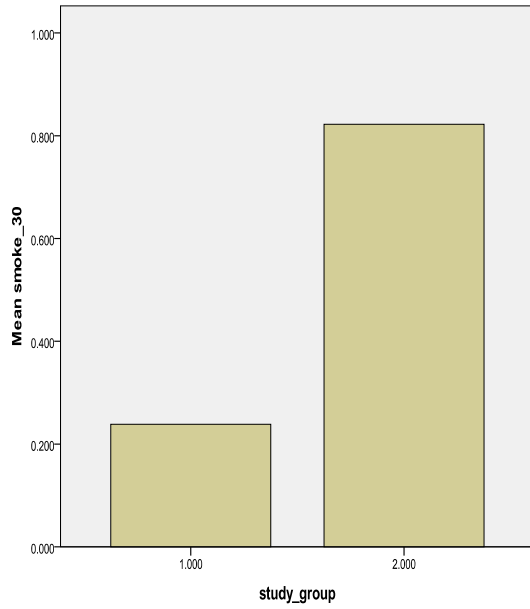
respondents with and without siblings. The total sample average for each year is also included to provide comparison. Graphs A- O show the difference between

the means of the two sample years and demonstrate the increase or decrease in average rates of engagement between the two sample years. The tables are displayed so that the results of the subgroup with older siblings are next to the results of the subgroup without older siblings. In each of the graphs the variables designated study group 1 & 2 represent the sample year. Study group 1 indicates results taken from the 1997 sample. Study group 2 indicates results taken from the 2000 sample.

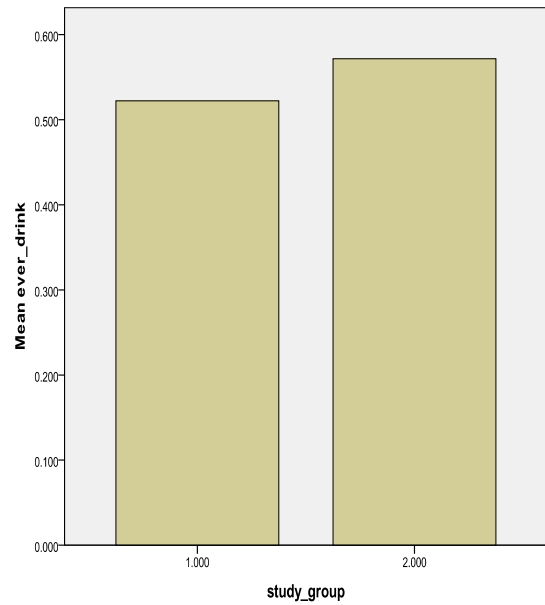
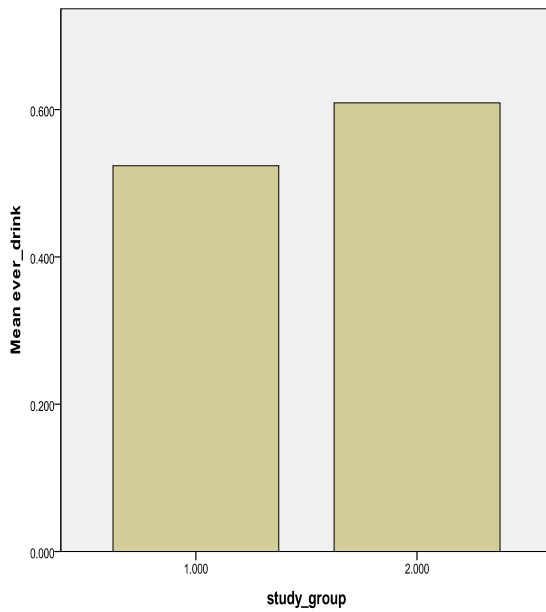
Graph A (with) Average rate of participation in smoking among younger siblings



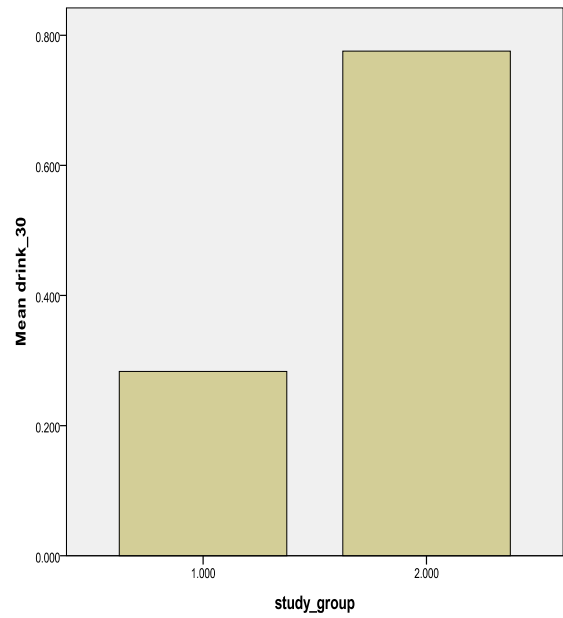
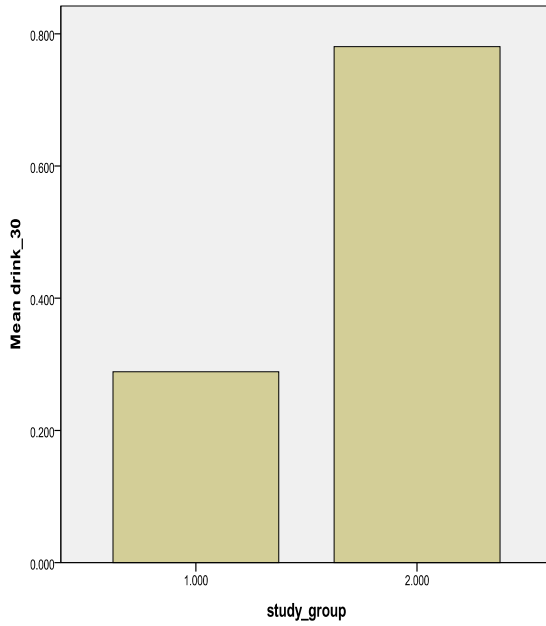
Graphs B (with) & C (without) Average rate of smoking in 30 days prior to survey



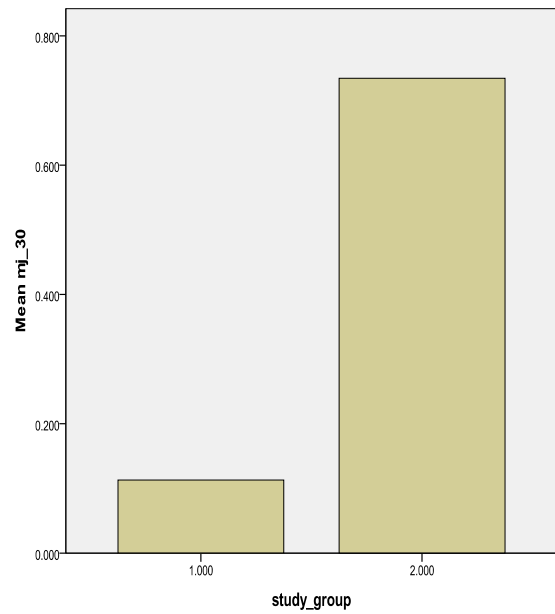
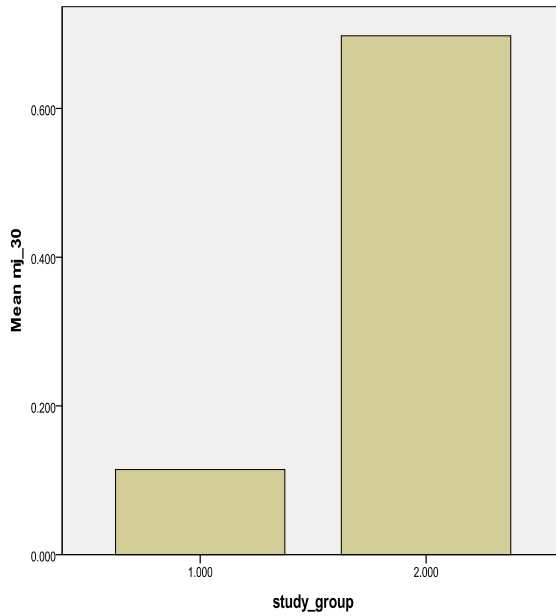
Graphs D (with) & E (without) Average rates of experience with drinking



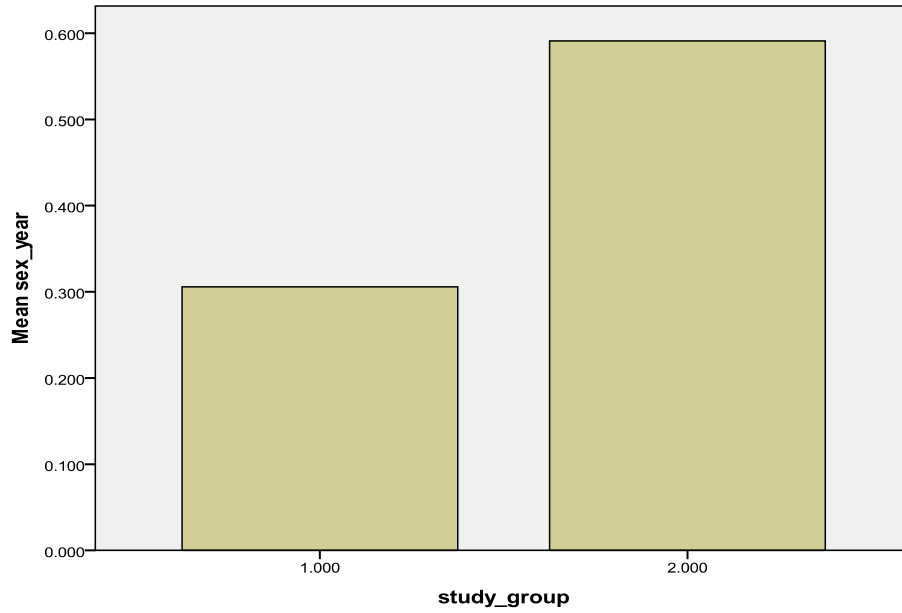
Graphs F (with) & G (without) Average rate of participation in drinking 30 days prior to survey.



Graphs H (with) & I (without) Average rate of participation in marijuana smoking 30 days prior to survey.



Graph J (with) Average rate of participants who engaged sexual activity in the year prior to the survey



Graphs K (with) & L (without) Average rate of respondents who used birth control during first sexual intercourse.

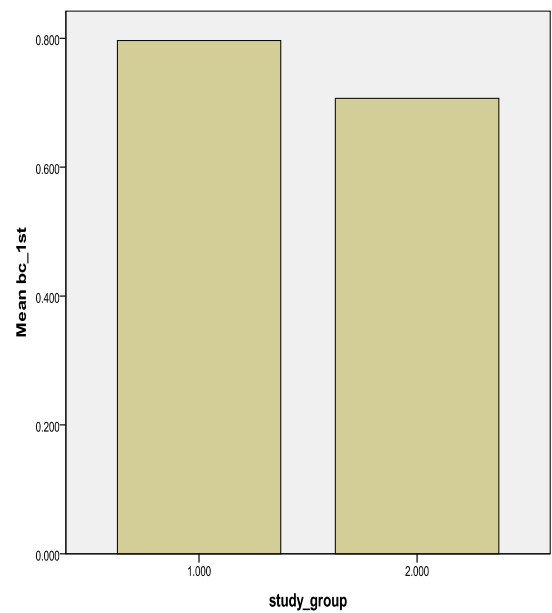
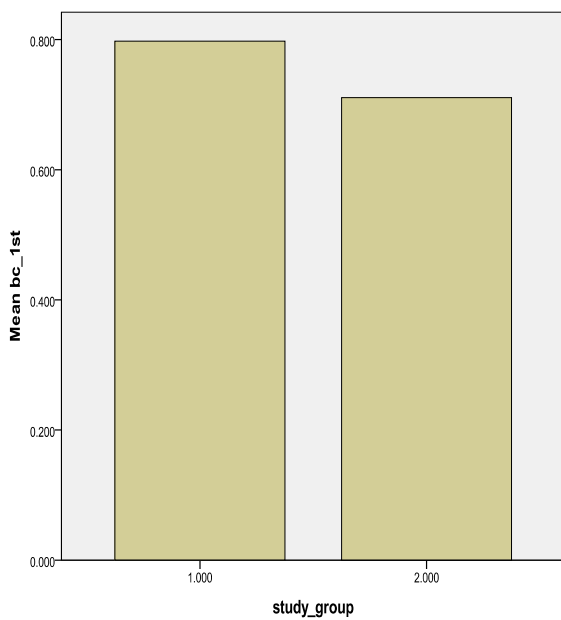
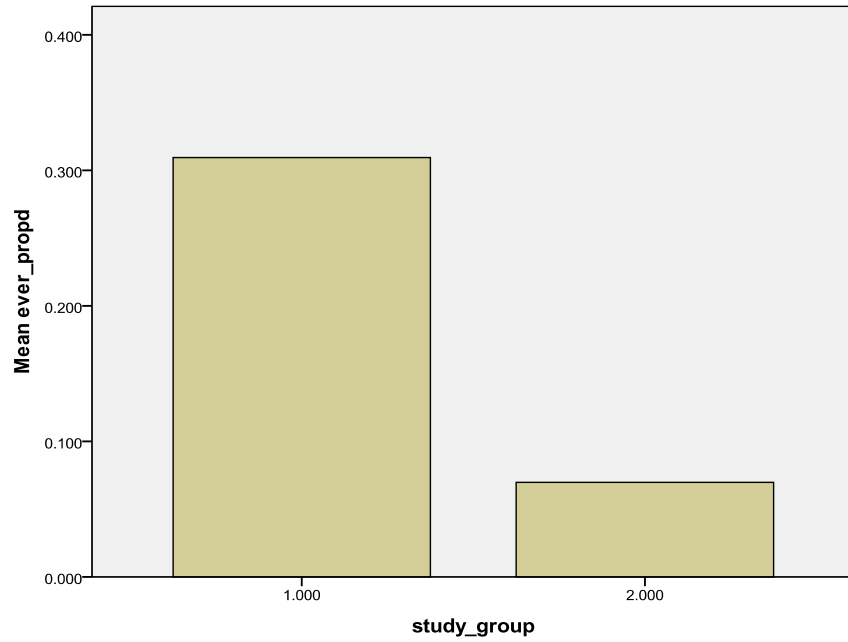
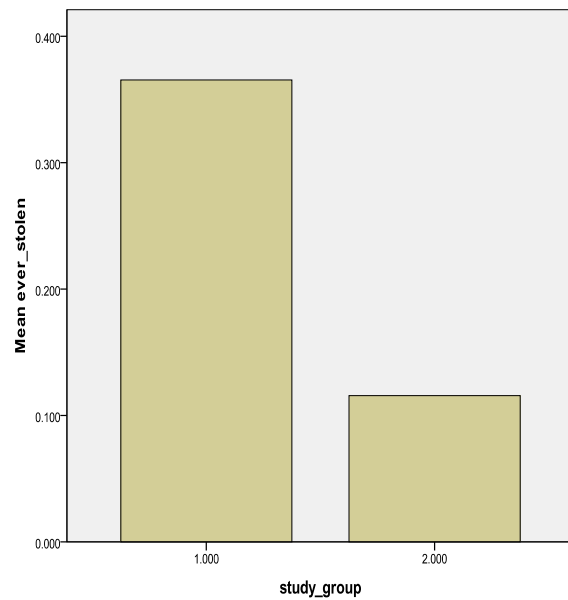
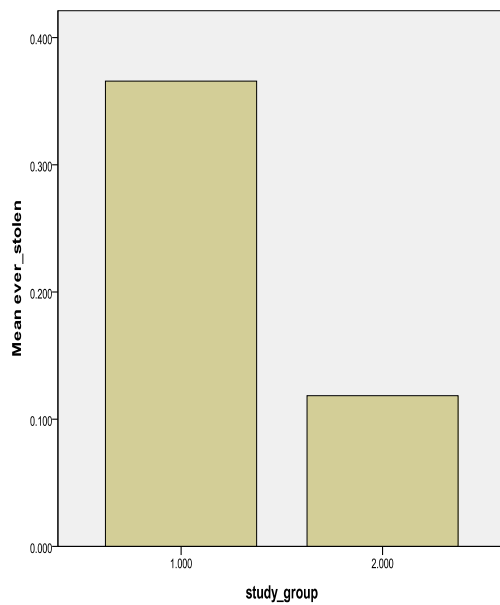


Table M (with) Average rate of respondents who ever engaged in property destruction.



Graphs N (with) & O (without) Average rate of respondents who have ever stolen.



In order to assess the dependence of participation in a given risky behavior on the presence of older siblings, a chi squared test for independence was performed. The null hypothesis predicted that the participation in the activity occurred independently of the presence of siblings. The alternative hypothesis predicted that the participation in the activity did not occur independently of the presence of siblings. After creating a table for expected values, the observed values and the expected results were compared using the formula

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

. With two degrees of freedom the critical value for statistical significance was 5.991. Despite the high number of significant relationships produced by the t-test, the chi squared test failed to produce any significant results. All chi squared analyses resulted in scores of approximately .001 in every case. From this analysis the researcher was failed to reject the null hypothesis.

4.2 Summary

In this chapter the researcher highlighted the variables that produced significant results. Several variables produced significant positive relationships between the first sample year and the second sample year in both subgroups. The subgroup with older siblings showed the most increasing relationships between samples years, supporting the hypothesis that those with older siblings would show the most increases of engagement in target behaviors. The second analysis showed no significant results whatsoever, forcing the researcher to fail

to reject the null hypothesis that engagement in risky behaviors occurred independently of the presence of older siblings. In the next chapter the researcher discusses any conclusions that can be drawn from the results. This section includes an interpretation of the results, limitations of the study and suggestions for future studies.

Chapter 5

Discussion

The final section of this study includes the conclusions the researcher has derived as a result of this study. The next section outlines the researcher's interpretation of the findings. This is followed by an account of the limitations that accrued over the course of the study or as a result of the data constraints. The third section includes a conclusion section and is followed by a section with suggestions and proposals for future studies.

5.1 Interpretation of Findings

Using two sample years from the National Longitudinal Survey of Youth, the researcher was able to determine which variables experienced a significant increase and those that showed significant decreases. By categorizing the respondents by birth position the analysis were manipulated to demonstrate which subgroup experienced the most increases three years after the initial sample. Confirming the hypothesis, respondents with older siblings showed increased engagement in more risky activities than those without older siblings. As a result of this analysis, a number of activities were shown to have increased relationships during the three year span between samples. Both subgroups experienced significant increases in the rates of engagement of cigarette smoking in the past 30 days, smoking marijuana in the past 30 days, ever drinking alcohol

and drinking alcohol in the past 30 days. These results however are subject to severe limitations as noted in a later section.

Despite the significant results produced in the initial study the second analysis failed to produce any significant results. In this instance the researcher was unable to confirm the hypothesis that engagement in a given risky behavior was dependent upon the presence of older siblings. This supports the possibility that the rates of engagement occur independently of one's birth ordinance position. Although there are significant implications in the results produced from the chi squared analysis this analysis was also subject to some severe limitations as noted in the next section.

5.2 Limitations

There were several limitations in the outcome of the analysis. The data used for analysis was heavily impacted by non-response biases. The biases were evident in responses to questions such as, "have you ever assaulted anyone?". Logically this number should not have decreased, however some of the same respondents who admitted to engaging in assault 1997 answered falsely or declined to answer in the 2000 sample. Responses were also suspect in the cases where despite responding to never have smoked marijuana a large proportion of the respondents responded affirmatively to having smoked it in the past 30 days.

The study was also limited by its use of mean rates of participation rather than using aggregate data from the NLSY '97. This was done because the researcher was unable to access un-coded, paired data from the data set. Use of mean rates of participation also allowed the researcher to use the mean rates of engagement provided in the 2006 Argys, et al. study. The use of means prevented the researcher from performing analysis to determine trends in engagement and may have impacted the significance of the chi squared test result.

5.3 Conclusions

It is clear that the prevalence of engagement in risky activity is on the rise. In the short span between the sample years, this study highlighted several activities that had increased significantly if not dramatically. The activities that increased among both populations implicate weaknesses in current measures being used to stop or prevent those activities in the age group represented by the sample. Smoking cigarettes and marijuana, and drinking alcohol are major areas of concern in adolescents who are still developing. Results also showed that the risky behaviors took place regardless of the existence of older siblings. Despite this finding it is possible that birth order effects do influence the rate of risky activity among younger siblings. A number of other factors such as parental

attention or investment may also contribute to the higher number of increased risky behavior engagement seen in younger siblings.

5.4 Implications for Future Studies

Limitations resulting from the use of sample means lend caution to future researchers hoping to perform similar analysis. Raw responses from the survey would have been able to provide more opportunity for manipulation. Using raw linked data would have allowed the researcher to look at trends in the participation of certain risky behaviors. Access to a data set with raw scores may also provide more significant results in a chi squared analysis.

The researcher also discovered limitations in the response rate after the initial year of the survey. Future studies may benefit from the use of longitudinal surveys with more consistent responsiveness. Future surveys may also benefit from indicating more clearly that the responses on the survey are confidential and therefore avoid non-response biases produced by questions like, 'have you ever smoked marijuana?'.

The National Longitudinal Survey of Youth also provides a great deal of quantitative and qualitative data on a large population. Future studies have the opportunity to examine a wide range of factors impacting youth engagement in risky activities. In order to find a significant source of influence the NLSY 97 offers data on the respondent's socioeconomic status, ethnicity and gender.

Further stratification of subgroups may provide evidence implicating a major contributor to the engagement of risky behaviors.

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