DOES A DIFFERENCE MAKE A DIFFERENCE? A CROSS-NATIONAL COMPARISON OF ADOLESCENT SUBSTANCE USE IN GERMANY AND THE UNITED STATES

by

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(Under the Direction of Dean Rojek)

ABSTRACT

The significance of cross-national comparison of adolescent substance use is grounded in an approach recognizing that different cultures and countries provide very distinct social environments for youths. Comparative research is a valuable way to conduct "natural experiments." Using data from two self-report surveys, the generalizability of the relationship between theoretically grounded measures and adolescent substance use was analyzed cross-nationally. Self-report data on adolescent substance use in the United States is provided by the 2003 wave of the *Monitoring the Future* (MTF) study. Data from the *European School Survey Project on Alcohol and Other Drugs* (ESPAD) study, designed to be directly comparable with the MTF survey, is used to analyze adolescent substance use in a sample of German adolescents. Findings and the usefulness of theoretical approaches to adolescent substance use in other cultures are discussed.

INDEX WORDS: Adolescent substance use, Cross-national, Germany, United States

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DEDICATION

To my mother, the strongest woman I know. You allowed me to come into this world and taught me that there is nothing more important in life than loving and being loved.

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CHAPTER 1

INTRODUCTION

Humans have used drugs for countless reasons and purposes, including religious ceremonies, medical treatments, and recreational activities (Goode, 2005). All societies, without exception, make use of intoxicating substances. Curiously, it was not until the beginning of 20th century that drug use was labeled a serious enough problem to warrant governmental regulation. One particular area of concern in relation to substance use today is the involvement of adolescents in this particular risk behavior. Confirming common knowledge, epidemiological data evince that drug use becomes increasingly prevalent during adolescence, particularly experimentation with tobacco, alcohol and marijuana (Johnston, O'Malley, and Bachman, 2000; NHSDA, 1998). Engagement in such behavior may lead to the disruption of healthy adjustment and development of adolescents (Erickson, Crosnoe, and Dornbusch, 2000). Adolescent substance use may also precede poor adjustment during adulthood, potentially leading to a dysfunctional and problem-ridden life (McCord, 1990). Identifying and understanding the factors leading up to and preventing adolescents from substance use therefore has been a central concern of criminologists (see e.g., Goode, 2005).

The growing concern for the welfare of minors in the United States has spawned a sizeable body of research examining the development of children and adolescents and the social contexts in which they learn their respective roles and responsibilities (Amato & Booth, 1997; Dryfoos, 1998; Furstenberg, Cool, Eccles, Elder, and Sameroff, 1999; National Research Council, 1996). Studies on adolescent health and risk behaviors remain an important research

concern (Elliott, 1993; Elster, 1997). Only a few decades ago, deaths of adolescents were most commonly related to natural causes (Harris, Duncan, and Boisjoly, 2002). Today, however, the major sources of adolescent morbidity and mortality can be traced to two general factors: risky social environments and preventable, personal behavior, such as substance use (Crockett and Petersen, 1993; Franzkowiak, 1987; Gans, Blyth, Elster, & Lundgren, 1990; Millstein, Petersen, & Nightingale, 1993). Research findings corroborate that this is true not only in the United States, but in countries around the world, including Germany (Boehnke and Bergs-Winkels, 2002; Vazsonyi, Pickering, Belliston, Hessing, & Junger, 2002). However, despite the fact that adolescent substance use is a global issue rather than one limited to certain countries or cultures, the paucity of cross-national comparative studies precludes confident generalizations about the causes and correlates of this type of problem behavior. Moreover, most previous attempts of cross-national comparative research were limited to descriptive and atheoretical accounts. While descriptive efforts serve the important function of advancing our knowledge about social behavior, empirical research driven by and grounded in theory is able to take us even further. Theoretically based research not only tests pre-established hypotheses, but also initiates, reformulates, refocuses, and clarifies the theories, concepts, and propositions about social behavior, and thus offers more insight into causal processes than simple descriptive research.

The present study tests the generalizability and applicability of prominent criminological perspectives in a country previously neglected by criminological research on adolescent substance use, Germany. The primary focus of this dissertation is to examine the explanatory power of commonly used theoretical indicators of adolescent substance use using self-report data from two nationally representative samples of adolescents. More specifically, I am interested in testing whether relationships between different types of explanatory indicators (conventional

bonds, peers, risk perceptions, and opportunity) and adolescent drinking, smoking, and marijuana use are similar or different by country. My intent is not to test competing theories, as these explanations are not necessarily in opposition to one another. Instead, as there is little current cross-national work on adolescent substance use, these approaches are used because they emphasize the effects of sociological and psycho-social factors on alcohol, cigarette, and marijuana use by teenagers. Together, these frameworks create a strong foundation upon which to explore these specific adolescent risk behaviors cross-nationally.

SIGNIFICANCE AND BENEFITS OF CROSS-NATIONAL RESEARCH

The benefits of comparative research in criminology are numerous, and have been discussed extensively (Archer and Gartner, 1984; Bennett, 2004; Derks, van Kalmthout, and Albrecht, 1999; Kohn, 1987, 1989; MacCoun and Reuter, 2001; Moore and Fields, 1996; Mueller and Adler, 1996). The importance of a cross-national comparison such as the present dissertation lies in the fact that different cultures and countries are like natural experiments—youth do not live the same way in different national contexts but oftentimes engage in the same risk behaviors. The comparative method thus provides an excellent medium to investigate whether theoretically established relationships, such as the effect of strong social bonds to conventional institutions on substance use, are applicable to these different cultural contexts. Take the debate regarding the legal drinking age, for example. To determine whether it would be wise to lower the current drinking age from 21 to 18 in the United States, researchers would not be able to artificially change the minimum drinking age for an empirical study. However, there are numerous other countries, including Germany, where the age limit for the consumption of alcohol is 16 or 18, and the implications and consequences of different drinking ages in adolescent populations can

be compared cross-nationally with adequate datasets stemming from the respective countries under study.

Our understanding of indicators and consequences of adolescent drug use in other countries is of utmost importance for a myriad of reasons. In her critical work on cross-cultural substance abuse, Adrian (2002) emphasizes the importance of the cultural context in which the behavior in question occurs. Specifically, she argues, "Whether a particular behavior is considered value-neutral or charged with positive or negative connotations, whether it is seen as utilitarian, normative, or deviant, is related to the cultural meaning system and the social structure within which the behavior occurs" (855).

Even though criminologists did not explicitly compare crime cross-nationally until the late 1960s (Clifford, 1978; DeFleur, 1969; Friday, 1971), comparative efforts have since produced a growing body of literature, with a renewed spike of interest noticeable in the past decade (Barber, Chadwick, and Oerter, 1992; Devereux, Bronfenbrenner, and Suci, 1962; Eisner, 2002; Greenberger, Chen, Beam, Whang, and Dong, 2000; LaFree and Birkbeck, 1991; Vazsonyi, Pickering, Junger, and Hessing, 2001; Vazsonyi et al., 2002; Vaszonyi and Pickering, 2003). This is certainly partially due to the availability of representative data in diverse contexts and more sophisticated methods and analytic techniques. Allison (1988) comments on the obvious importance of comparative research: "If the goal of science is to identify some understanding of cultural universalities […] of behavior, to develop theoretical insights which move beyond our immediate time and space, then comparative research should be a consistent part of any field" (26).

Cross-national comparative research has proven to be a vital tool in the study of human behavior (Vaszonyi et al., 2002). In fact, this type of work has the great advantage of providing

a ‘‘naturally’’ large degree of diversity and variability with regard to individual, social, or institutional indicators (Bennett, 2004; Howard, Newman, and Pridemore, 2000; Vaszonyi et al., 2001, 2002). Cross-national studies provide us with a much wider range of variation than is found by examining individual differences within a culture. One often-mentioned advantage of cross-national studies is that they allow the researcher to “unpack” the effect of culture or country on the behavior of interest (Van de Vijver and Leung, 1997).

Comparative studies offer enormous potential for increasing the explanatory power of existing criminological theories (Bennett, 2004; Kohn, 1987; Moore and Fields, 1996). Kohn (1987) went so far as to claim that the testing of the generalizability of theories is one of the greatest assets of comparative research:

> “I argue that cross-national research is valuable, even indispensable, for establishing the generality of findings and the validity of interpretations derived from single-nation studies. In no other way can we be certain that what we believe to be social-structural regularities are not merely particularities, the product of some limited set of historical or cultural or political circumstances. I also argue that cross-national research is valuable, perhaps even more valuable, for forcing us to revise our interpretations to take account of cross-national differences and inconsistencies that could never be uncovered in single-nation research” (713).

It is often argued that criminological theories of adolescent substance use, if empirically valid, need to apply to all youth, not just American (Cohen, 1959). To accomplish this, research needs to compare factors associated with this health risk behavior across cultures, groups, and nations so that the necessary groundwork can be laid for either culturally-specific or universal theories. In a recent review on the current state of comparative criminology, Howard and colleagues (2000: 183) acknowledged the value of cross-national self-report data for exploring potentially culture-free or ‘‘universal’’ patterns of delinquency. In much the same vein Bennett argued in his recent presidential address for the Academy of Criminal Justice Sciences that, “the comparative method affords researchers the opportunity to assess the power of a theory either by

determining its generalizability or, more importantly, by using comparison groups on the social system level to show what factors influence the strength of the key hypothesized relationships" (2004: 10). Longshore, Chang, Hsieh, and Messina (2004) contend that cross-national research can aid in the resolution of disparate conceptual approaches in criminology. The authors argue that cross-national inquiries help recognize central themes and principles shared by different countries and ultimately lead to richer and better predictive explanations than single-country studies are able to do.

Another much-cited benefit of comparative inquiry is that it increases the current international understanding and collaboration between different countries across the world (Bennett, 2004; Moore and Fields, 1996). Drug use in particular is an international phenomenon, and through comparative research we can gain an in-depth understanding of how other countries are affected by and react to this issue.

LIMITATIONS OF PAST RESEARCH

Although there is a plethora of regional and national data on adolescent substance use in the United States, our understanding of this issue in other cultural contexts is rather limited. Farrington (1999a, 1999b) notes that cross-national studies are very infrequent; nevertheless, they are perhaps one of the only tools to establish true generalizability of explanatory frameworks and theories across local conditions and contexts (for an empirical example, see Farrington and Loeber, 1999). As alluded to earlier, most tests of causal theory have been conducted with American samples, besides a smattering of such inquiries in the rest of the world (see, e.g., Gesseney and Maret, 1997; Junger and Marshall, 1997; Junger-Tas, Terlouw, and Klein, 1994; Skinner, 1986). Though these studies significantly improved our knowledge of adolescent substance use in various social contexts, none has directly examined and compared

the relationship between adolescent substance use and theoretically grounded measures of social bonds, peers, and risk perceptions in both the United States and Germany.

The lack of comparative theory-driven research can be traced to several factors. Cross-national research has to overcome several unique obstacles, especially when controversial or illicit behaviors such as substance use are being investigated. One frequently cited barrier is the concern that data used in comparative studies is often gathered with different methodologies and operationalization of key indicators and the finding thus should not be generalized (Babor, 1992; Helzer and Canino, 1992). For example, adolescent samples may have been drawn from different sampling frames and with different levels of rigor, and conceptually identical issues may be measured with different data collection instruments. In essence, comparisons become an attempt to weave together the reported findings from markedly different studies rather than a statistical analysis of a uniform set of data across multiple geographical locations. These methodological and conceptual challenges have made the documentation and understanding of variations across cities and countries difficult. Other problems relevant to cross-national comparisons relate to the size and representativeness of the samples. It is often the case that the samples utilized for cross-national comparisons are too small, or the individuals included in the study are not representative of the population studied, both of which are major impediments to the generalizability of findings.

Another limitation of past research is that cross-national studies have typically been descriptive and atheoretical (see Gibbs and Erickson, 1975; Kandel, 1980). Oftentimes, constructs important to various policy agendas are simply "thrown together" in analytical models without further consideration of the relationships among and between them. Likewise, it has been too uncommon to control for factors that may mediate or render spurious measures and

concepts incorporated in the analysis. In other words, existing comparative cross-national research tends to overlook the processes that underlie the constructs that are measured (Thompson, Smith-DiJulio, and Matthews, 1982).

Finally, cross-national studies often myopically concentrate on one specific substance or a single category of drugs (e.g., legal or illegal). However, adolescent substance use and its correlates have been shown to vary with the drugs' legal status and concomitantly its availability (Kandel, 1980; Tang, Wong, and Schwarzer, 1996). Notably, none of these issues that have potentially important implications for prevention, intervention, and treatment of adolescent substance use have been examined sufficiently, especially from a cross-national perspective.

Dane Archer and Rosemary Gartner make note of the fact that the lack of adequate comparative data has "created a ceiling on the scientific progress of the disciplines which address crime and violence" (1984: 6). The few existing cross-national comparative studies on juvenile delinquency have found some common factors associated with crime and delinquency among adolescents in other cultural contexts (e.g., Arnett and Jensen, 1994; Bennett, 1991; Ebbe, 1992: Hartjen and Kethineni, 1996; Hartjen and Priyadarsini, 1984, 2003; Junger-Tas, 1988). However, the question of the universality of existing etiological theories as explanations for adolescent substance use among the world's diverse cultures and social systems remains unanswered. In fact, there is practically no information available in English of the vast majority of the more than 200 countries identified by the United Nations Statistics Division (Hartjen and Priyadarsini, 2003). Empirical, theory-driven cross-national criminological research can be found in only a smattering of countries (Hartjen and Priyadarsini, 2003). Hence, any assertions about the generalizability or cross-national applicability of American-based criminological theories of adolescent substance use remain tentative at best. That is, it may very well be that the

lack of effective or proper social control (individually or in some combination), differential association with delinquent peers, or perception of the risks of drug use (legal or illegal) is the source of substance use everywhere and among all adolescents. But the modest number of studies examining these matters among the adolescent populations in different cultural contexts are simply too few and methodologically too restricted to provide a solid base for any such claims. More relevantly for the present research, no previous study has investigated and compared adolescent substance use in Germany and the United States.

CONTRIBUTIONS OF THE CURRENT STUDY

In an effort to promote the empirical assessment of juvenile delinquency in other countries, Albert K. Cohen long ago wrote: "There is a crying theoretical need for a comparative cross-cultural study of juvenile delinquency. The plausibility of our own speculations about juvenile delinquency in the United States rests upon the findings of similarly oriented studies in other societies" (1959:98). In response to Cohen's call and some of the above mentioned limitations, the present study attempts to advance existing research on adolescent substance use in a number of important ways.

To overcome the oftentimes descriptive and atheoretical nature of previous cross-national efforts, the current study is driven by theory. More specifically, the role of social bonds, deviant peers, and risk perceptions are analyzed with regard to adolescent drinking, smoking, and marijuana use cross-nationally. According to DeFleur (1969:1), "The basic argument against the uncritical application of theories which have been developed on the basis of observation of some segment of the U.S. population is that they are likely to be irrelevant, in the sense that they have little or no relationship with the underlying socio-cultural characteristics of the society into which they are incorporated." It is thus imperative that cross-national studies put much thought

into the cross-national differences that may render the application of some theoretical perspectives unsuitable. The present study follows a more appropriate strategy for the development of explanations of adolescent substance use in other cultures. Namely, a realistic description of the cultural processes and social and legal environments of the societies under consideration are provided. Next, cross-national hypotheses concerning the relationships between theoretical indicators and three forms of substance use are derived which are consistent with the basic differences between German and American society that are relevant for this inquiry. If these hypotheses survive empirical testing they may point to limitations in the applicability of existing criminological theories of adolescent substance use that need to be addressed by future cross-national research.

This extension of theory testing furthermore addresses to the criticism that most such tests have been restricted to American or English-speaking sample populations. More specifically, the current research effort is the first to directly examine and compare the relationship between adolescent substance use and theoretically grounded measures of social bonds, deviant peers, and risk perceptions among American and German adolescents.

Finally, rather than collapsing a number of legal and illicit substances to create a "drug use" index or including only a single substance like most existing cross-national research efforts, the current study focuses on the three substances most commonly used and abused by adolescents everywhere: alcohol, tobacco, and marijuana. The rationale for choosing these substances rests in the need to investigate both legal and illegal substance use, and to include both substances that meet the same as well as those that evoke different legal and cultural reactions in the countries under study. As will be discussed in length in chapter three, adolescent

alcohol and tobacco use is viewed and reacted to differently in Germany compared to the United States, while the use of marijuana is much more similar across both countries.

SUMMARY

The present study represents an important step in studying and understanding cross-national variations in prevalence of substance use among teenagers. The significance of such a comparison is grounded in an approach recognizing that different cultures and countries provide very distinct social environments for youths. Criminologists, like social scientists more generally, are typically not allowed to conduct experiments on social lives[1]. Comparative research is a valuable way to conduct "natural experiments." For example, we cannot lower the drinking age to 16 for one segment of the U.S. population and see how this affects alcohol-related behavior. Moreover, such an abrupt, artificial change would create much uncontrollable bias. However, meaningful research on the effects of having a lower drinking age can be conducted across countries with the help of cross-national analyses. The comparative method, then, provides not only an excellent medium to examine variations in social behavior across socio-cultural contexts, but also to assess the cross-national generalizability of criminological theories.

The current research holds the promise of uncovering similarities and differences between Germany and the United States that can suggest how national policy, differing social and economic contexts, and cross-cultural variation may influence the profile of adolescent substance use. Making such comparisons in a meaningful way is admittedly a difficult undertaking, since even variations in drug-related behaviors among adolescents across cities within the *same* country are often hard to attribute directly to more macro-level factors. For the

[1] See, however, Sherman's research for one of the few exceptions.

present study, data from two nationally representative surveys are analyzed. Self-report data on adolescent substance use in the United States is provided by the 2003 wave of the *Monitoring the Future* (MTF) study. Data from the 2003 *European School Survey Project on Alcohol and Other Drugs* (ESPAD) study, designed to be directly comparable with the MTF survey, is used to analyze adolescent substance use in a representative sample of German adolescents. The comparability of the two data sets allows for direct cross-national comparison of the correlates of adolescent substance use.

The present dissertation proceeds as follows. Chapter 2 introduces the theoretical framework. In an effort to provide the reader with the necessary background of adolescent life as it relates to substance use in both countries of interest, Chapter 3 shifts focus to similarities and differences in social and cultural contexts for the populations included in this study. Chapter 4 highlights research design and methodology, followed by the presentation of results in Chapter 5. The present study concludes with a discussion of the findings and suggestions for future cross-national research on adolescent substance use.

CHAPTER 2

THEORETICAL FRAMEWORK AND PREVIOUS RESEARCH

Although there is no archetypal substance-using adolescent, research has found certain socio-cultural factors to be associated consistently with drug use. A number of criminological theories offer explanations of adolescent substance use, identifying variables that predict the use of licit and illicit substances as well as those promoting abstinence. Among those, constructs identified by social bonding theory (Hirschi, 1969) and differential association/social learning theory (Sutherland, 1947) have been most successful in explaining adolescent substance using behaviors (Akers & Sellers, 2004; Aseltine, 1995; Cullen and Agnew, 1998; Erickson et al., 2000; Matsueda and Heimer, 1987). Recent studies (Erickson et al., 2000; Musher-Eizenman, Holub, and Arnett, 2003; Novak, Reardon, and Buka, 2002) have also suggested that theory and research on adolescent substance use would benefit from incorporating attitudinal measures to the traditional criminological approaches. These scholars maintain that attitudes contain information about the cultural messages adolescents receive and accept about the dangers and risks of substance use. Including indicators that convey cultural perceptions may be particularly fruitful for cross-national studies where much of the differences in behaviors may be traced back to culture-specific norms and values.

This chapter introduces the underlying perspectives that guide the present comparative analyses of adolescent drug use in Germany and the United States. Chapter 2 begins with an overview of Hirschi's (1969) social bonding theory. The literature on the elements of the bond is

reviewed. Second, an overview of the assumptions and research evidence of social learning theory is provided. The overlap and boundaries of social bonding and social learning theories are discussed. Third, the focus shifts to a précis of the rational choice paradigm and a review of the literature on measures of risk perception. Furthermore, hypotheses regarding the relationship between the components social bonding, social learning, and rational choice theories are offered. The next section clarifies the fit of this work within the broader area of cross-national theory testing, and briefly recaps the complete theoretical model tested here.

THE ROLE OF SOCIAL BONDS

Social bonding theory, the most prominent control theory, assumes that humans are inherently antisocial and naturally capable of committing criminal acts. With deviance assumed to be natural, it is conformity that requires explanation. The question, then, is not why individuals commit deviant acts, but rather what constrains them from acting on their instincts. Hirschi (1969) and other control theorists argue that behavioral conformity results from bonds developed between an individual and society. These bonds constrain individuals from rule violation by giving them a stake in conformity. Hirschi's theoretical approach has been recognized by criminologists as a major and very significant contribution to the study of crime and deviance (Massey and Krohn, 1986). Originally designed to explain juvenile delinquency, the theory has been applied widely to the use of licit and illicit substances (Aseltine, 1995; Collins and Ellickson, 2004; Coombs, 1988; Erickson et al., 2000; Gardner and Shoemaker, 1989; Marcos, Bahr, and Johnson, 1986; Massey and Krohn, 1986).

According to Hirschi's model (1969), an adolescent's social bond consists of four elements – attachment, commitment, involvement, and belief. None of these elements have a universally accepted definition, however, but are rather vaguely conceptualized (Marcos et al.,

1986). Nevertheless, in general terms, the four concepts can be explained as follows: *Attachment* refers to the youth's affective ties toward his or her family, school, and friends. An adolescent's attachment to parents is typically measured by the level of parental supervision and discipline, degree of communication, parent-child relationships quality, and affectional identification with parents (Akers and Sellers, 2004). *Commitment* refers to the adolescent's aspirations for, and behavior consistent with, conventional goals, such as getting a college education and pursuing a career. It is typically conceptualized as stakes in conformity or devotion to conventional lines of action (Nagin and Paternoster, 1994). Commitment is commonly measured via educational aspirations, subjective importance of school (Akers, 1994), or academic achievement in school (Akers and Sellers, 2004)[2]. *Involvement* means participation in conventional activities that lead to socially valued outcomes. Involvement in conventional activities is measured by asking about time spent with family and friends, doing homework, sports, recreation, hobbies, and part-time work (Akers and Sellers, 2004; Stewart, 2003). These last two elements of social bonding, namely commitment and involvement, overlap considerably, and are difficult to separate empirically (Conger, 1976; Hirschi, 1969; Kempf, 1993; Krohn, Massey, Skinner, and Lauer, 1983; Massey and Krohn, 1986). Finally, *belief* is understood as the respect for the dominant rules of society (Marcos et al., 1986). This concept is often measured by whether the respondent values the justice system and to which extent he respects and obeys the law (Akers, 2004).

Social bonding theory predicts that the stronger adolescents are attached, committed, involved, and believe in conventional goals and rules, the less likely they are to risk their stakes in conformity by using substances. In addition to their independent effects, Hirschi posits, each bond reinforces the other three. Hirschi (1969: 27) argues that this is due in a large part because,

[2] Academic achievement has also been used as an indicator of involvement, belief, and attachment (Akers, 2004).

"the more closely a person is tied to conventional society in any of these ways, the more closely he is likely to be tied in other ways."

Many empirical studies have verified the hypothesized relationships between social bonding elements and different types of delinquency and substance use[3]. Cochran and Akers (1989), Hadaway, Elifson, and Peterson (1984), and Marcos and Johnson (1988) all found that various social bonds were inversely associated with drug use. DeFronzo and Pawlak (2001) investigated the influence of social bonds on three different outcomes, namely smoking, drinking, and alcohol abuse. Their findings confirmed the significance of various social bonds elements, such as attachment and involvement on substance using behaviors. Erickson, Glasgow, and Crosnoe (2000) tested the hypotheses that social bonds indirectly reduce substance use by decreasing associations with deviant peers and by decreasing susceptibility to the negative influences of peers. The results of their path analytic models supported the conceptual model. In Conrad, Flay, and Hill's (1992) study, weak family and school bonds predicted the uptake of cigarette smoking.

Tests across different socio-demographic groups also provide support for the assumptions of Hirschi's (1969) theory. For example, in their analysis of the role of school bonds in delinquent involvement, including alcohol and substance use, of black youths, Cernkovich and Giordano (1992) revealed that blacks are at least as strongly bonded to school as whites. The model, based on a neighborhood sample of 942 adolescents, explained comparable amounts of variance in delinquency across race-sex subgroups, and the racial composition of the school was insignificant in conditioning the effect of school bonding on delinquency. Junger-Tas, Ribeaud,

[3] For example, see: Agnew, 1993; Akers, 2000; Akers and Cochran, 1985; Cernkovich and Giordano, 1992; Junger and Marshall, 1997; Krohn and Massey, 1980; Krohn et al., 1983; Liska and Reed, 1985; Paternoster, Saltzman, Waldo, & Chiricos, 1983; Simons, Johnson, Conger, and Elder, 1998; Thornberry, Lizotte, Krohn, Farnworth, and Jang, 1994; Wiatrowski and Anderson, 1987; Wiatrowski, Griswold, and Roberts, 1981; Wright, Caspi, Moffit, and Solva, 1999.

and Cruyff (2004) examined substance use and other types of adolescent delinquency in eleven European countries. Their results supported previous research regarding the role of social bonds for adolescent involvement in substance using behaviors. In Krohn and Massey's (1980) study, social bonds accounted for 29% of the variance in alcohol and marijuana use.

Several studies focused their efforts specifically on the relationship between social bonds and smoking. For example, Massey and Krohn (1986) found that several social bonding elements influenced cigarette smoking. Krohn, Massey, Skinner, and Lauer (1983) found that they account for 33% of the variance in smoking in their sample of adolescents. In a similar vein, Foshee and Bauman (1992) found support for the role of social bonds for smoking.

Attachment

Tests of the relationship between the specific social bonds of attachment and adolescent substance use are generally supportive[4]. The quality of the bond between parents and child has been shown to restrain the adolescent from engaging in substance use (Duncan, Duncan, and Hops, 1994; Andrews, Hops, Ary, Lichtenstein, and Tildesley, 1991). Conversly, parent-child interactions characterized by a lack of closeness (Brook, Lukoff, and Whiteman, 1980; Kandel et al., 1978) and lack of maternal involvement (Penning and Barnes, 1982) seem to be related to initiation of substance use. In Wade and Brannigan's (1998) study on the effects of attachment to family, school, and peers on drug use among Canadian adolescents, family attachment emerged as the most important predictor of risk-taking behavior. The closer the relationship between child and parents, the less likely the child was to report involvement in drug use or other delinquency. Their findings further confirmed that different elements of social bonding theory reinforce each other.

[4] For example, see: Cernkovich and Giordano, 1987; Costello and Vowell, 1999; Hindelang, 1973; Hirschi, 1969; Jensen, 1972; Junger and Marshall, 1997; Krohn and Massey, 1980; Marcos, Bahr, and Johnson, 1986; Rankin and Kern, 1994; Rankin and Wells, 1990; Sampson and Laub, 1993; Wiatrowski, Griswold, and Roberts, 1981.

Commitment/Involvement[5]

Past research provides moderate support for an inverse relationship between commitment and delinquency (Longshore et al., 2004). Various school-related measures have been linked consistently to substance use, including attendance (Jarjoura, 1993; Thornberry et al., 1985), school bonds (Cernkovich and Giordano, 1992: Jenkins, 1997), as well as commitment and involvement in school activities (Jenkins, 1995). In particular, both truancy and grade point average (GPA) have been found to be reliable correlates of adolescent substance use (Bryant and Zimmerman, 2002; Hallfors, Vevea, Iritani, Cho, Khatapoush, and Saxe, 2002; Miller and Plant, 1996; Pritchard, Cotton, and Cox, 1992; Swadi, 1989; Thomas and Hsiu, 1993). Poor performance and failure in school has been found to predict both frequency and levels of illicit substance use (Jessor, 1976; Smith and Fogg, 1978). In contrast, exceptional performance in school reduced the likelihood of substance use among ninth graders in a study by Hundleby and Mercer (1987).

A lack of or low levels of commitment to education in general also appears to be correlated with adolescent substance use. Findings from the Monitoring the Future survey consistently show that the use of illicit and prescription drugs among high school students is significantly lower for those expecting to go to college compared to those who do not plan on pursuing a college degree (Johnston, O'Malley, Bachman, and Schulenberg, 2004a). After controlling for parental education, delinquency, and ethnicity, Gottfredson (1988) showed that substance use was related to truancy for both girls and boys. Other factors found to be associated with different levels of substance use for teenagers are how much time respondents spent on homework (Friedman, 1983) and how much they liked school (Kelly and Balch, 1971). On the

[5] There is a considerable conceptual overlap between commitment and involvement that makes these two elements difficult to separate empirically (Conger, 1976; Hirschi, 1969; Kempf, 1993; Krohn et al., 1983; Massey and Krohn, 1986). I therefore combine them for the present study, as have others before me.

other hand, tests of the association between involvement and delinquency are generally less supportive (Agnew, 1993; Hirschi, 1969; Kempf, 1993). It should be noted, however, that the significance of this particular social bond is heavily dependant on its operationalization (Costello and Vowell, 1999).

Belief[6]

According to Hirschi (1969: 26), there is a single set of dominant values that even delinquents acknowledge, even though they may not act accordingly. The concept of belief is somewhat hard to operationalize, "because the process of developing beliefs is complex" (Wiatrowski, Griswold, and Roberts, 1981: 527). An adolescent with strong bonds to his parents is rewarded with their approval of his behavior. This, in turn, is followed by the youth's respect for "persons in position of authority, to belief that the rules of society are binding on one's conduct" (Hirschi, 1969: 203). Past research supports the role of beliefs in the bond-behavior relationship (Foshee and Bauman, 1992; Longshore et al., 2004; Wiatrowski et al., 1981). Foshee and Bauman (1992) found belief to be a significant predictor of adolescent smoking when parental smoking, attachment, and commitment were controlled. Conventional moral belief has emerged as a significant element of social bonds in adult populations (Longshore et al., 2004), non-offenders and juveniles (Kempf, 1993), with relation to drug use in general (Elliott and Menard, 1996), and adolescent marijuana use in particular (Burkett and Warren, 1987; Krohn et al., 1983; Marcos et al., 1986).

To summarize the previous paragraphs, there is strong support for the argument put forward by Hirschi (1969) that social bonds to conventional institutions serve as protective factors from substance use for adolescents. Therefore, it is predicted that:

[6] Unfortunately, the cross-national data used for the analyses do not have comparable measures that would allow including Hirschi's concept of belief.

Hypothesis 1*: The stronger the social bonds to conventional institutions in the adolescent's life, the less likely he or she is to use drugs.*

THE ROLE OF PEERS

One of the critical queries in the study of youthful deviance in general and drug use in particular is the effect of peers. The present study includes measures of perceived peer drug use in accordance with social learning theories (Akers, 1977, 1998; Bandura, 1977) to analyze the cross-national applicability and significance of this empirically supported construct. A consistent finding is that association with deviant peers is positively correlated with one's own delinquency (Erickson et al., 2000; Hindelang, 1973; Jensen, 1972; Johnson, 1979; Musher-Eizenman et al., 2003; Petraitis, Flay, and Miller, 1995; Warr and Stafford, 1991). Differential association theory takes into account the significant influence of peers on substance use related behavior among adolescents. First postulated by Sutherland (1947), differential association theory was initially developed as a theoretical framework to explain criminal behavior in general. However, it has been repeatedly and successfully applied in studies of juvenile delinquency and drug use (Aseltine, 1995; Elliott and Menard, 1996; Elliott, Huizinga, and Ageton, 1985; Erickson et al., 2000; Matsueda, 1982; Matsueda and Heimer, 1987; Smith and Brame, 1994).

In Sutherland's (1947) theory, the basic premise is that unconventional behaviors are learned through the interaction with deviant peers. Although social bonding theory posits that deviant motivation is stable across individuals, social learning theory rejects this assumption. It does not regard humans as inherently deviant, but rather assumes that the motivation to commit deviant acts is variable and dependent on social conditions that encourage deviance (Matsueda and Heimer, 1987). With respect to substance use, according to differential association theory, definitions, motivations, models, as well as using "instructions" are direct consequences from the

contact with deviant others. The central thrust of this theory is that teenage drug use is primarily influenced by the associations one has with definitions or behavior patterns that either reinforce or punish such behavior (Kobus, 2003), and that the acquisition of definitions favorable to law violations increases the likelihood of deviant conduct (Sutherland, 1947).

Research focusing specifically on substance use indicates that association with drug-using friends is positively correlated with one's own drug use (Jacquith, 1981; Kaplan, Martin, and Robbins, 1984; Lassey and Carlson, 1980; Newman, 1984; Winfree and Griffiths, 1983). In a recent study, Musher-Eizenman, Holub, and Arnett (2003) found support for the significance of peer drug use for both female and male adolescents across age groups for every type of substance examined in the study. In their review of studies on adolescent substance use, Bauman and Ennett (1994) found strong correlations between peer drug use and own use of drugs. Other empirical investigations also support the notion that peer use is one of the most significant predictors of adolescent substance use (Flannery, Vazsonyi, Torquatti, and Friedrich, 1994; Tolson and Urberg, 1993). There exists a sizeable body of literature confirming that smokers befriend smokers (Eiser, Morgan, Gammage, Brooks, and Kirby, 1991; Ennett, Flewelling, Lindrooth, and Norton, 1997; Michell, 1997; Urberg, Cheng, and Shyu, 1991). Non-smokers who belong to a peer group consisting of mainly smokers have been found to be more likely to start smoking than youths whose friends are also non-smokers (Ennett and Bauman, 1994; Flay, Hu, and Richardson, 1998; Urberg and Degirmencioglu, 1997; Urberg, Degirmencioglu, Tolson, and Halliday-Scher, 2000). Furthermore, higher levels of smoking have been linked to peer pressure and approval (Duncan, Tildesley, Duncan, and Hops, 1995; Flay et al., 1998).

An important argument stressed by social learning perspectives such as differential association theory is that those definitions or behavior patterns are primarily derived from one's

close personal acquaintances (Bauman and Ennett, 1996; Donaldson, 1995; Kobus, 2003). Past research indicates that peers strongly influence attitudes and behavior; this is especially pronounced during adolescence (Baumgaertner, 2004; Brown, 1990; Savin-Williams and Berndt, 1990; Steinberg, Brown, and Dornbusch, 1996). Put alternatively, the logic of this perspective is that those who use drugs will likely be those whose friends use drugs, because they pick up their friends' definitions or values conducive to drug use (see Jacquith, 1981; Matsueda, 1982). Thus, it is expected that:

> ***Hypothesis 2:*** *Peer substance use is positively related to the respondents' own substance use.*

Bonds versus Peers

Social bonding theory has been criticized for failing to endorse appropriately the role of peers in adolescent deviance (Massey and Krohn, 1986). The two theories described above make different predictions regarding this issue. While social bonding theory predicts that elements of the bond will have strong direct effects on deviance, regardless of peer associations, Sutherland's (1947) and Aker's (1977) learning theories argue that adolescent deviance will follow directly from the beliefs and patterns of behavior obtained through the association with substance using peers. In other words, the effects of social bonds on substance use will indirectly filter through the cultural messages that adolescents receive from their friends (Cullen and Agnew, 1998; Matsueda and Heimer, 1987).

A number of studies that compared the relative effects of parental attachment and deviant peers on various types of substance use have found that association with deviant peers mediate the influence of social bonds on substance use and delinquency (Akers, 1994; Cullen and

Agnew, 1998; Krohn et al., 1983; Longshore et al., 2004; Marcos et al., 1986; Matsueda and Heimer, 1987; Poole and Regoli, 1979). For example, Massey and Krohn (1986) found that association with deviant peers partially explained the effects of social bonds on adolescent smoking and drug use (see also Burkett and Warren, 1987; Hirschi, 1969; Marcos et al., 1986). Agnew (1993) showed that the relationship between social bonds and delinquency was mediated by deviant peers. Erickson et al. (2000) discovered that strong social bonds indirectly reduce levels of substance use by decreasing association with deviant friends. Their social process model of adolescent deviance revealed that deviant friendships and the susceptibility to negative peer influences linked social bonds to substance use.

> "The greater proximal influence of peers on adolescent behavior is not surprising given the importance of these associations during this developmental period. Adolescence is a time when youth exercise greater autonomy and independence from parents by spending more time with peers. However, this does not mean that parents have no effect on adolescents' social behavior. Rather, parental influence appears to operate indirectly by shaping adolescents' peer relationships. The strength of these ties to institutions like the family partially determine the opportunities available for affiliating with peers who either endorse or dismiss conventional goals" (Erickson et al., 2000: 399).

The idea behind the mediating effect of deviant peers is that when aspects of parental attachment and family management function successfully, adolescents have less freedom to associate with and learn from peers who engage in deviant acts (e.g., Agnew, 1992; Aseltine, 1995; Elliott, Huizinga, and Ageton, 1985; Marcos et al., 1986; Massey and Krohn, 1986). Parenthetically, one's conventional bonds are presumed to influence one's friends' level of drug use by affecting the kinds of peers that are chosen as friends, not by causing existing friends to alter their drug behavior. Based on evidence from existing research on the mediating effects between social bonds and deviant peers on substance use, it is predicted that:

Hypothesis 3: *Social bonds indirectly reduce substance use by decreasing affiliation with drug using peers.*

LIMITS OF SOCIAL LEARNING AND SOCIAL BONDING THEORIES

Of course, social bonding and social learning theory have both earned their share of criticism (see, for example: Greenberg, 1999). For example, social bonding theory asserts that adolescents are at risk for substance use if they lack ties to conventional values, are weakly committed to school, and detached from their parents and conventional role models. In contrast to its heavy emphasis on conventional commitment and social attachment, however, the theory does not differentiate between conventional and non-conventional attachments, and places little emphasis on the role of substance-specific attitudes.

Similarly, social learning theory leaves important issues unresolved as well. Although it makes predictions as to what happens after adolescents become involved with substance-using peers, it does not offer an adequate explanation to the important question of why some adolescents associate with these peers in the first place. Erickson and colleagues (2000:421) propose that "… other factors must be taken into account to fully understand adolescents' involvement in […] substance use." More specifically, they argue that research would profit from including measures of beliefs about the consequences of substance use. In support of this notion, research by Goldman and colleagues (1991) suggest that involvement with substance-using peers might only affect the use of illicit drugs *indirectly* through its effects on substance-specific beliefs and expectations. Moreover, cognitive-affective theories of adolescent substance use, such as the health belief model (Becker, 1974; Rosenstock, 1974), the theory of reasoned action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), Bandura's social cognitive theory (Bandura, 1977; 1986) and decision theory (Fischhoff and Quadrel, 1991; Raiffa, 1968; Yates,

1990) suggest that before adolescents use drugs, they will envision and evaluate the costs and benefits of substance using behavior, and only then decide whether to actually ingest them (Petraitis et al., 1995). In other words, although weak conventional ties and involvement with substance-using peers have been shown to account for a significant portion of the explained variance in adolescent substance use, existing literature suggests that the addition of substance-specific beliefs would improve the explanatory power of such a model.

THE ROLE OF PERCEIVED RISKS

In response to suggestions voiced in the literature, I include measures of perceived risk in the theoretical framework. More particularly, the current study examines risk perceptions from a rational choice perspective. According to rational choice theories, if for a given person the expected utility of substance use is greater than the expected utility of other alternatives, the person will engage in the substance-using behavior. Empirical research testing the assumptions of the rational choice paradigm has traditionally taken one of two approaches. The first strategy, more common in economic research, encompasses macro-level analyses of the relationship between aggregate crime rates and arrest, conviction, and imprisonment. The second approach, favored by sociologists and employed in this dissertation, focuses on micro-level analyses of the relationship between the criminal acts of individuals and their perceptions of the risks of those acts (Piliavin, Gartner, Thornton, and Matsueda, 1986). The basic notion regarding the relationship between perceived risk and delinquency or health risk behaviors, such as substance use, has been adopted by various micro-level theories that are rooted in or derived from the more general rational choice paradigm. Among them are several cognitive-affective theories of adolescent substance use, such as the health belief model (Becker, 1974; Rosenstock, 1974), the theory of reasoned action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), Bandura's

social cognitive theory (Bandura, 1977; 1986) and decision theory (Fischhoff and Quadrel, 1991; Raiffa, 1968; Yates, 1990). These theories are variations of the more general rational choice paradigm, and each of them suggests that before adolescents use drugs, they will envision and evaluate the costs and benefits of substance use, and only then decide whether to actually ingest them (Nagin and Paternoster, 1993; Piquero and Tibbetts, 1996; Petraitis et al., 1995). In other words, individuals base their decision to use alcohol, tobacco, or marijuana on the perceived levels of risk they associate with the respective substance.

Risk perceptions are individual beliefs about how likely substance use may lead to any given positive or negative consequences. This includes ideas about the physiological, psychological, and social effects of specific drug-related behaviors (Novak et al., 2002). The underlying principle of risk perceptions is that when people perceive a risk, the concern and unease linked to that risk will result in a change of both belief and attitude, which in turn will cause the individual to change his or her behavior (Baron & Byrne, 2003; Morgan, Hibbell, Andersson, Bjarnason, Kokkevi, and Narusk, 1999). Beliefs about potential risks and specific outcomes of substance use are formed as a result of both direct and indirect experience with the drug of interest (Humphrey, O'Malley, Johnston, and Bachman, 1988; Jones, Nagin, and Silbereisen, 2001), and simply have to be held in order to influence behavior; it is not important whether they are actually valid or validly derived (Jones et al., 2001).

The relationship between risk perceptions and adolescent drug use is supported by a substantial number of empirical studies (Andrews and Duncan, 1998; Danesco, Kingery, and Coggershall, 1999; Novak et al., 2002; Smith and Rosenthal, 1995). In a recent meta-analysis, perceived risk was found to be the fifth most important predictor among more than 20 factors that influenced marijuana use among adolescent respondents (Derzon and Lipsey, 1999a,

1999c).[7] It can further be noted that risk perceptions not only predicted smoking, but also smoking cessation (Norman, Conner, and Bell, 1999).

Teenagers who believe that drugs are not harmful are more likely to begin experimenting with marijuana, and nonusers tend to have higher levels of perceived risk compared with users (e.g., Duitsman and Colbry, 1995; Hecht and Driscoll, 1994; Johnston et al., 2004a; Szalay, Inn, Strohl, and Wilson, 1993). Adolescents are likely to link lower levels of risk to legal drugs than to illicit drugs (McMillan and Conner, 2003; Roberts, Fournet, and Penland, 1995; Spigner, Hawkins, and Loren, 1993). Regular use is perceived to be more harmful than occasional or experimental use (e.g. Johnston et al., 2004a; Lo and Globetti, 1995; Scott, 1994).

Perceived risk has been examined in a variety of ways. In some cases, respondents are asked 'how much *risk*' they associate with the use of a certain substance, while in others they are asked 'how much *harm*' or 'how *dangerous*' they think using a list of various substances entails, such as alcohol or marijuana might be. The questions addressed by past research range from expectations of specific individual outcomes from personal use to more macro-level effects of drug use on society in general. Some ask about short-term effects while others ask about long-term effects. The area of perceived risk most extensively studied is that of physical harm, or the negative effects of substances on the body. At the individual level, a common finding is that drug users rate substance use as less harmful than non-users and higher levels of use are linked with diminished risk perceptions (Szalay et al., 1993). Some research hints that males know more about illicit drugs than females (Raskin, Novacek, and Hogan, 1992; Sigelman, Woods, Lewin, Durazo, and Mukai, 1995), but that females have more negative expectancies about the effects of alcohol (Kraus, Smith, and Ratner, 1994). Others have failed to detect gender

[7] The authors and others also confirmed the role of risk perceptions as predictors of tobacco use (Chassin, Presson, Rose, and Sherman, 2001; Derzon and Lipsey, 1999b; Gillmore, Well, Simpson, Morrison, Hoppe, Wilsdon, and Murowchick, 2002; Godin, Valois, Lepage, and Desharnais, 1992; Hill, Boudreau, Amyot, Dery, and Godin, 1997).

differences in the perceived effects of alcohol (Gillmore, Wells, Simpson, Morrison, Hoppe, and Wilsdon, 1998; Miller, Smith, and Goldman, 1990; Johnson and Johnson, 1991).

Research has further established that perceived risk decreases with age and socio-economic status. For example, a study by Chassin, Presson, Pitts, and Sherman (2000) disclosed a general decline in perceived risk of cigarette smoking across age groups, with smokers exhibiting steeper declines than non-smokers between the middle school years and age thirty-seven. Some existing studies suggest African-American adolescents embrace more negative expectancies than Caucasian adolescents (Gillmore et al., 1998; Ringwalt and Palmer, 1990), but others reveal no ethnic differences (Reese, Chassin, and Molina, 1994).

Past studies with a more drug-specific focus have revealed that risk perceptions regarding the use of marijuana are a significant predictor of marijuana use (Ajzen 2005; Bachman, Johnston, O'Malley, and Humphrey, 1988; Bentler and Speckart, 1979; Conner and McMillan, 1999; Gonzalez and Haney, 1990). With respect to adolescent drinking and marijuana use, Armitage, Conner, Loach, and Willetts (1999) observed that alcohol attitudes were unrelated to intentions to drink, but that attitudes regarding marijuana were significant determinants of intentions to use marijuana. Their results support the utility of using attitudinal measures to predict adolescent health risk behavior, but more so for marijuana than alcohol (Armitage et al., 1999; see also Stacey, 1991). Schlegel, D'Avernas, Zanna, DeCourville, and Manske (1992) also found that alcohol-specific attitudes were significant in predicting intentions to drink which, in turn predicted the frequency of getting drunk in non-problem drinkers. In an earlier study, Schlegel et al. (1987) examined the utility of attitudes in distinguishing between regular (controlled) drinkers and uncontrolled drinking, and findings again supported the significance of risk perceptions. Umeh and Patel's (2004) analyses suggest both independent and additive

functions of attitudes on ecstasy use, thereby supporting and extending Conner and McMillan's (1999) earlier findings with respect to marijuana.

Studies examining whether an individual's evaluation of substance use-specific harm pinpoints to her general constellation of beliefs or varies depending on the type of substance and patterns of use have found support for the latter (Novak et al., 2002). In their factor analysis of ratings for 24 different substances, Myers, Vankirk, Gentry, and Wakefield (1994) found distinct dimensions related to medicinal and recreational use as well as separate categories for alcohol and hard drugs. A cross-sectional investigation of 108 adult respondents by Primavera and Pascal (1986) found that of a long list of substances, heroin, morphine and LSD were rated as most harmful. In contrast, cocaine, amphetamines, barbiturates, and nicotine were categorized by respondents as far less hazardous[8]. Elsewhere, Hittner (1997) found support for a hierarchy of risk perceptions regarding licit and illicit substances in a sample of college undergraduates. In addition to above mentioned findings, other research has supported the notion that attitudes and beliefs about different types of substances are highly correlated, particularly after the individual began to use drugs. For example, in a sample of 235 undergraduate college students, Fabricius and Wellman (1993) found that heavy drinking was significantly correlated with decreased risk perceptions toward drugs that had not been used by the individual.

Risk perceptions regarding substance use have also been tested in other cultural contexts. Rise and Wilhelmsen (1998) investigated respondents' intentions not to drink with a sample of adolescents in Norway. Results corroborate findings from studies using American samples regarding the usefulness of risk perceptions in predicting various types of behavior. In their study of undergraduates in Wales, Norman, Bennett, and Lewis (1998: 167) discovered that

[8] The most interesting and unexpected finding of this study was that marijuana was rated as the least harmful substance, even compared to caffeine.

males had more positive attitudes towards binge drinking and engaged in binge drinking more often than their female peers. Leeming, Hanley, and Lyttle (2002: 170) argue that it is reasonable to assume that perceptions of the consequences and risks involved in substances are culturally mediated. In support of this argument, Knibbe, Oostveen, and DeGoor (1991: 1425) stated that laws concerning legal drinking age and local norms about drinking all influence the frequency with which young people drink.

The generalizability of the findings reported above is limited in several ways. With a few notable exceptions, much of the research has examined only a single drug and employed small, non-representative samples. Furthermore, there is a definite lack of research comparing the relationship between perceived risk and adolescent substance use cross-nationally, and additional research is needed to better understand this issue (Novak et al., 2002). This research overcomes these particular limitations by investigating the perceived risk of the three most widely used substances by adolescents: alcohol, tobacco, and marijuana. It further extends existing literature by comparing the relationship between risk perceptions and adolescent substance use cross-nationally with large representative samples. In line with findings from previous research, it is predicted that:

Hypothesis 4: *Higher perceptions of risk are linked to lower levels of substance use.*

Peers and Perceived Risk

Sutherland (1947) is clear in noting that the effect of deviant peers is, in part, indirect through individuals' attitudes towards specific deviant behaviors (Akers & Sellers, 2004). Peer influence has been shown to increase during adolescence and to have vital effects on attitudes

and behaviors (Brown, 1990; Steinberg et al., 1996). Exposure to deviant attitudes and behaviors increases the likelihood that individuals will hold such attitudes for themselves. At the same time, it has been shown that peers who engage in unlawful acts provide alternative beliefs. Given that this study examines the role of friends' use of specific substances on the adolescents' attitudes toward the use of these substances, according to Sutherland's theory, the effect of drug using friends will be partially mediated by positive attitudes toward drug use. Hence, inverse reciprocal relationships are hypothesized between beliefs (risk perceptions) and peer association.

Hypothesis 5: *Affiliation with drug using peers indirectly increases substance use by decreasing risk perceptions.*

Social Bonds and Perceived Risk

In the same vein, social bonding theory suggests that attachment, commitment, and involvement with conventional others leads to positive attitudes towards conformity and negative attitudes towards deviant behaviors which would jeopardize their stakes in conformity (Benda and Corwyn, 1997; Matsueda, 1982). Based on social bonding theory, it is hypothesized that societal beliefs insulate young people from peer associations that would encourage unlawful behavior:

Hypothesis 6: *Strong social bonds indirectly reduce substance use by increasing risk perceptions of substance use.*

CROSS-NATIONAL RESEARCH ON ADOLESCENT SUBSTANCE USE

Cross-national research tends to occur in stages (Berry, Poortinga, Segall, & Dasen, 1999). The first such stage includes the 'transporting and testing' of theoretically driven models that have found empirical support in one culture to other cultures (Berry et al., 1999). After that, emic analyses are conducted to verify and extend the findings from stage one. The third and final stage contains additional cross-national analyses that builds on the knowledge acquired in the earlier steps (Berry et al., 1999). The empirical evidence in U.S. based studies for the direct and indirect relevance of social bonds, peer influences, and attitudes for adolescent substance use qualifies these constructs and processes for being 'transported and tested' into other cultures, in this case Germany. It follows, then, that the present study is part of stage one in the process of theoretical cross-national research on adolescent substance use.

Regrettably, evidence from past cross-national studies testing the applicability and generalizability of criminological theory is very limited. As mentioned in the introductory chapter, most cross-national comparative studies lack a focus on theory. To date, there is no study that tests criminological explanations of adolescent substance use in the two countries of interest here. However, there is some published work on risk and protective factors of adolescent substance use with non-American samples. For example, in recent years there has been some research in Europe evaluating the significance of contextual and cultural differences on the relationship between risk perceptions and substance use (Hibbell et al., 2004; Morgan et al., 1999). Bjarnason and Jonsson (2005) examined the contrast effects in perceived risk of substance use among European countries. Rasmussen, Damsgaard, Holstein, Poulsen, and Due (2005) tested whether an association between school connectedness and smoking exists among Danish school children, and if so, whether parental smoking attitude and parental smoking behavior influenced this association. An independent inverse association was found between

school connectedness and smoking among both boys and girls. Parents' attitude to their children's smoking significantly modified this association among boys in the sample. Veress, Wheeler, Ramsay, and McMichael (2004) examined drug-use patterns and risk factors among young Hungarian offenders. Poor family cohesion, failure of parental supervision, deviant peer influence, such as frequent going out, drinking and smoking, proved to be independently associated with becoming a user. Peretti-Watel (2003) used quantitative French data from the 1999 ESPAD to test the applicability of risk denial theory on marijuana use. Results pointed to three specific techniques of risk denial: scapegoating, self-confidence and comparison between risks. A very limited number of non-American studies have empirically tested Gottfredson and Hirschi's (1990) general theory of crime. Caspi et al. (1994) and Henry et al. (1996) investigated the self-control/delinquency relationship in a longitudinal study of New Zealanders, finding support for the role of self-control. Others tested the theory with samples of Finnish (Pulkkinen 1986) and Canadian youth (Forde and Kennedy, 1997) and findings supported earlier notions regarding the relationship between low self-control and delinquency. While existing studies provide important information regarding predictors and correlates of adolescent substance use in other countries, it is clear from this brief review of existing cross-national studies that there is a dire need for research that more specifically and systematically tests theories of adolescent substance use cross-nationally. Additional cross-national studies that have the necessary measures to test other theoretical frameworks are needed that include other countries, populations, and types or patterns of substance use.

SUMMARY

The hypothesized model tested in this dissertation represents an elaboration of social bonding theory using essential elements from social learning and rational choice theories.[9] The fundamental assumption underlying this model is that alcohol, cigarette, and marijuana use occurs among adolescents who have weak social bonds as a result of a lack of strong attachment to parents or society (Hirschi, 1969; Nye, 1958). Evidence indicates that a primary motivation for illegal behavior is social learning provided by differential association with peers who teach excuses or rationalizations for drug use (Akers, 1998; Benda and Whiteside, 1995). Insecurely attached people tend to drift into peer associations that reinforce deviant behaviors such as substance use (Patterson and Dishion, 1985) and impede the development of interpersonal skills that encourage friendships with peers who tend to shun illegal behavior (Simons, Whitbeck, Conger, and Conger, 1991). At the same time, it has been shown that peers who engage in unlawful acts provide alternative beliefs.

To summarize, this dissertation analyzes a model of adolescent drug use that utilizes key indicators derived from the most commonly tested criminological theories, in two adolescent populations with the purpose of comparing and assessing the cross-national generalizability of the underlying theoretical assumptions. Alongside socio-demographic variables, the analytic model includes measures of parental and educational attachment, conventional values, the influence of drug-using friends, risk perceptions and perceived availability of drugs as predictors for adolescent drinking, smoking, and marijuana use. The model attempts to determine whether essential elements of criminological perspectives that were developed by American scholars and

[9] The theoretical model is constructed using theoretical elaboration (Thornberry, 1989) rather than attempting to fully integrate (see Akers et al., 1979) the three theoretical perspectives discussed in the beginning of this chapter. A true integration of these theories necessitates the resolution of differences in assumptions (see Hirschi, 1969), whereas theoretical elaboration more simply requires that the main propositions of the hypothesized model be compatible (Thornberry, 1989).

have mainly been tested with American samples are generalizable to other cultural contexts. In other words, can the hypothesized relationships be found and supported in Germany? And, if so, does the relative strength of said relationships vary between the two countries?

The next chapter discusses the cultural differences and similarities between Germany and the United States in light of the theoretical perspectives introduced in the present chapter. Chapter 4 then moves into a discussion of the research design, analytic strategy, and operationalization of the study variables in an effort to explore the characteristics that are theoretically predictive of adolescent substance use in Germany and the United States.

CHAPTER 3

CROSS-NATIONAL DIFFERENCES AND SIMILARITIES IN ADOLESCENTS' SOCIAL ENVIRONMENTS

Adolescence is a time of exploration and opportunity to, among other things, engage in health risk behaviors (Millstein, Petersen, & Nightingale, 1993). Some propose that young people participate in irresponsible or health-risk behavior like substance use to mark their transition to adulthood (Jessor, 1987). Others contemplate that engaging in such high risk activities is one of the outcomes of increased self-centeredness and sensation seeking during adolescence (Elkind, 1985). Still others see adolescents as predisposed to risk-taking behaviors due to social and environmental factors such as peers, family, school, and cultural belief systems (Arnett, 1992; Dornbusch, 1989; Dryfoos, 1990; Jessor, 1987). The previous chapter discussed the importance of social bonds, peer influences, and attitudes in predicting adolescent substance use. As stated earlier, explanations of crime and deviance should be culture-free, and explanatory frameworks of adolescent substance use should hold up to cross-national comparisons (Farrington, 1999a, 1999b; Gottfredson and Hirschi, 1990; Vazsonyi et al., 2002). It follows from this argument that the relationships posited by the criminological theories guiding the present analysis should show similar patterns in Germany and the United States. However, past research also consistently confirms that contextual factors, which define the social environment of adolescents' lives, significantly affect behavior and decision-making. Likewise, the opportunities to engage in risky behaviors are influenced by key social, structural, and economic forces associated with their

demographic and socioeconomic background (Millstein, Petersen, & Nightingale, 1993; National Research Council, 1996; Ramirez-Valles, Zimmerman, & Newcomb, 1998), which in turn "influences adolescents' expectations for their future lifestyles and careers" (Harris, Duncan, and Boisjoly, 2002: 1006).

In the present chapter, the theories introduced earlier in light of the cultures of interest are discussed. The chapter begins with an evaluation of the legal and cultural positions of both countries regarding the substances included in the analyses, namely alcohol, cigarettes, and marijuana. The chapter continues with an assessment of similarities and differences for three of the most important institutions of adolescent socialization: the family, education, and peers. Based on this assessment, hypotheses focusing on cross-national differences are introduced. The chapter closes with a summary and outlook of what is to come in Chapter 4.

RESEARCH ON ADOLESCENCE

A wealth of research has highlighted the importance of the adolescents' socio-cultural environment in understanding and explaining the prevalence and patterns of the use of alcohol, cigarettes, and marijuana (e.g., Bauman and Phongsavan, 1999; Cernkovich and Giordano, 1992; Junger-Tas, 1992; Simons, Whitbeck, Conger, and Conger, 1994). Even though adolescent lives are marked by surprising similarities across the globe, there are still imporant differences that warrant our attention in the search for predictors and correlates of substance use. Cross-national studies on adolescence consistently report that this period is marked by significant transitions across adolescent life domains, such as school, family and peer relations (e.g., Cook and Furstenberg, 2002). Hence, in this chapter I will more closely examine those life domains as they apply to Germany and the United States.

Although different countries may show comparable overall trends and prevalence rates, the underlying forces leading youths to, or protecting them from, substance use are entrenched in a specific cultural environment that may be very different from one country to the next. It is essential, then, that one understands these culturally-specific contexts into which adolescents are socialized, because it is these contexts that directly and indirectly influence substance use by giving substances such as alcohol, tobacco, and marijuana their meanings and labels (Elder, Hagell, Rudkin, and Conger ,1994; Goode, 2005, 1997; Silbereisen and Todt, 1994). Explaining adolescent behavior necessitates an understanding of the behavioral norms and values dominant in the youth's socio-cultural environment, contemporary forces that convey messages about what is proper versus deviant, as well as historical factors that describe how the cultural meanings evolved. In support of this notion, Cook and Furstenberg assert that, "norms, meanings, and feelings are linked in complex ways, not just to each other, but also to demography, institutions, and structures. So, culture can never be totally separated from these other social forces" (2002: 260).

The respective socio-cultural environments indirectly shape substance-using behaviors by shaping the aspects associated with and manifested by such conduct. While specific cultural influences on drug use may take many forms, this study highlights those factors associated with the theoretical frameworks that guide the present analyses—social bonding, differential association, and rational choice theories. Before delineating the socio-cultural divergences between the United States and Germany, it is necessary to examine different aspects of German life and culture and highlight some of the similarities and differences in the social environments in which adolescent substance use typically takes place. Therefore, in the following sections, the

cultural and legal positions on substance use, as well as the educational system, family and peers as they relate to drinking, smoking, and using marijuana are introduced and discussed. Following this is an interpretation of the relevance of these differences for the use of alcohol, tobacco, and marijuana by adolescents in Germany and the United States and derived cross-national hypotheses that highlight the differences between the countries where appropriate.

CULTURAL AND LEGAL POSITIONS ON ALCOHOL

One of the areas most pertinent to adolescent consumption of alcohol, tobacco, and marijuana is the legal and cultural environment in which such behaviors take place. Laws are formal expressions of cultural beliefs and values, and thus differences in culture strongly affect the respective legal systems, and vice versa. Societal tolerance toward alcohol consumption and the accompanying social norms are maintained and changed through laws and regulations. Hawkins, Catalano, and Miller (1992) note that a reduction in alcohol use in any country can be traced directly to stricter laws and restrictions. State and communal influences are usually visible on three different levels: availability, regulations on sales, and price/taxation of substances such as alcohol and tobacco (Settertobulte, Jensen, and Hurrelmann, 2001). How strict or lenient laws and regulations are in a certain country is in a large part dependent on cultural and historical circumstances of the respective countries. Take the legal minimum age to purchase alcoholic beverages, for example. In the United States, individuals have to be 21 to drink, while German teenagers are able to purchase beer and wine legally when they turn sixteen. The marked difference in the legal drinking age is a consequence of many cultural and historic factors unique to each one of these two nations.

Room and Makela (2000) developed a typology of drinking cultures, ranging from cultures in which any use of alcohol is prohibited to those where drinking is considered a

normative behavior. Within this typology, the United States is categorized as an ambivalent drinking culture. This means that within American society, different norms and values (i.e., Puritan values vs. liberal values) regarding the use of alcohol lead to conflict. An ambivalent drinking culture is often marked by a high rate of abstinence and, at the same time, a high rate of alcohol abuse and addiction. Germany, on the other hand, falls somewhere in between the categories of a "permissive" and "dysfunctionally permissive" drinking culture. This means that within German society, the use of alcohol is expected and normative, but at the same time high rates of problem use are apparent.

A different way to categorize drinking cultures is to distinguish between 'wet' and 'dry' cultures. In wet cultures, alcohol is integrated into daily life and activities. For example, wine and beer are consumed with meals, at meetings, or when sitting together with teammates after a game of soccer or tennis. Here, prevalence rates are high, and total abstinence is very rare. Within this category of wet drinking cultures, there often is a distinction between wine drinking, beer drinking, and those cultures that prefer spirits. In dry cultures, on the other hand, drinking alcohol is not as common or tolerated during everyday activities. It is more common in these cultures to restrict access to alcohol for certain parts of the population. While abstinence is more typical, when drinking does occur, it is more likely to result in intoxication. According to this typology, Germany is considered a wet culture with a preference for beer, while the United States would be considered a dry culture due to its history of strong temperance efforts and laws governing the consumption of alcohol for young people.

Drinking patterns in Germany are marked by a variety of characteristics. Unlike the stereotypical drinker in the United States who mostly drinks on weekends or at social events and often does so until well intoxicated, drinkers in Germany prefer the consumption of low to

moderate amounts of alcohol on an almost daily basis with intoxication being an exception rather than the rule or goal (Bloomfield, 1998; Kraus, Kümmler, Jünger, Karlsson, and Österberg, 2002). A few studies have researched the prevalent drinking patterns across various European countries. Bloomfield, Greenfield, and Kraus (2002) and Hibbell et al. (2004; 2001) compared existing surveys with an emphasis on female drinking patterns in nine European countries[10] in connection with the EU BIOMED II program. Findings show that the rate of abstention was not dependent on the particular drinking culture. The frequency of drinking, on the other hand, was the highest in the south and lowest in the north, with Germany falling in the middle.

In another project, a Dutch research group analyzed data from the Eurobarometer on the 12 European Community countries in 1988[11]. Measures included to capture the different drinking habits of individuals were abstinence, frequencies of drinking wine and beer, and the context of wine and beer consumption (Hupkens, Knibbe, Roland, and Drop, 1993; Knibbe, Drop, and Hupkens, 1996). Results revealed that older people were more likely than young ones to choose wine as their beverage of choice, and to consume this beverage more often. Younger respondents, on the other hand, favored beer and the frequency of consumption was lower. In terms of sex, findings suggested men and women differed more in their drinking patterns when traditional beverages were consumed, and less when the drink consumed was a new type of alcoholic beverage (e.g., alcopops).

One of the more recent comparisons worth noting is the ECAS survey that included countries from different regions of Europe (Hemström, Leifman, and Ramstedt, 2002; Leifman, 2002). Findings confirmed earlier research in that regular drinking was most common in southern Europe and least common in northern Europe, while the quantity reported to be drunk

[10] Finland, Sweden Czech Republic, Germany, Scotland, Netherlands, Switzerland, France, and Italy
[11] Denmark, West Germany, Netherlands, UK, Ireland, Belgium, Luxembourg, France, Italy, Greece, Spain, and Portugal

per occasion was the highest in northern Europe and United Kingdom. The frequency of heavy drinking occasions was highest among young people (18-29) in all countries but Italy.

What these studies suggest is that there are noticeable differences between countries in alcohol and alcohol-related behaviors. Drinking is expected in Germany, and the use of alcohol is evaluated positively under most circumstances. In case a person declines a drink, the person offering typically expects an explanation or reason for this. In addition, large parts of German society do not only sanction moderate use of alcohol, but also getting drunk for specific circumstances and events. It follows, then, that in Germany not only those who abuse alcohol, but also those who abstain from drinking may be considered deviant, depending on the situation.

In summary, the consumption of alcoholic beverages is an integral part of public and private social events in Germany. Children are raised in a social environment where alcohol is a normative part of everyday culture. They learn the social meanings and positive effects of alcohol early, through observing the adults around them. In Germany, as in the majority of European countries, the use of alcohol is culturally accepted and is seen as a basic part of adolescent to adult development. By the time an adolescent turns 15 or 16, alcohol is a staple in their social repertoire. Drinking is typically associated with a feeling of maturation and belonging rather than rebellion or delinquency, as is the case in the United States.

CULTURAL AND LEGAL POSITIONS ON TOBACCO

While there is no official categorization of “smoking cultures” comparable to Room and Makela’s (2000) typology of drinking cultures, it is evident from policies regarding the sale and consumption of tobacco by adolescents that Germany is again more permissive than the United States. American law prohibits the purchase of cigarettes by persons under the age of 18 (19 in some States), whereas the age requirement in Germany is sixteen. The difference in cultural

norms towards smoking is evident in public places, such as restaurants and bars. For example, in the United States, more restrictions have been placed upon where and when tobacco can be smoked. In the past decade, smoking has been banned from most public places like restaurants, bars, malls, and airports. In Germany, on the other hand, smokers are still able to smoke during dinner or drinks without having to leave the bar or restaurant or sit in a dedicated smoking section tucked away next to the restrooms. Despite the fact that an increasing number of scientific studies are published each year that warn of the perils of tobacco, this risk has not yet translated into wide-ranging legal restrictions above and beyond higher taxation of tobacco products in Germany. Therefore, children grow up in a cultural environment where smoking may be frowned upon by health-conscious adults, but is nevertheless a widespread and accepted behavior.

CULTURAL AND LEGAL POSITIONS ON MARIJUANA

Germany declared its own "war on drugs" in 1991, and has consequently increased penalties for various drug offenses. The "war" metaphor and strategy, though ostensibly analogous to that in the United States, was much attenuated from the American form. As in the United States, threats of drug use were strategically used by the media to induce fear in the general population. In contrast to the United States, however, German government officials and the public acknowledged the apparent failure of the war on drugs as evinced by scientific research (Franzkowiak, 2002). In consequence, this public awareness has in the past decades brought to the forefront a paradigm centered on acceptance and harm reduction (Albrecht and van Kalmthout, 1989). Scientific research on drug use and abuse helped to debunk some of the prevailing myths, thereby increasing awareness of a need for change of direction among professionals in the health and the justice field. Underlying the legal changes that followed were

several notions: mainly, officials and professionals agreed that there *cannot and will not* be a completely drug-free society; that drugs *can* be used in a responsible and relatively harmless way; and that the war on drug showed that the benefits of repression efforts do not warrant its costs.

The official rationale and maxim of the German drug policy is and has been "supply reduction by harsh punishment and strict law enforcement, and demand reduction by therapy instead of punishment wherever possible" (Böllinger, 2004: 9). This is accomplished by the provision of (a) sentencing guidelines in Section 29 – 30c of the *BtMG*,[12] and (b) four models of (mandatory) treatment for convicted drug offenders: (1) forensic treatment in in-patient psychiatric hospitals; (2) drug treatment while on parole or probation; (3) treatment while imprisoned; and (4) deferral of criminal punishment for mandatory drug treatment. Germany's harm reduction approach to drugs is further symbolized by a four-pronged strategy: (1) primary prevention through drug education; (2) deterrence of large-scale drug operations through strict criminal statutes; (3) acceptance and social reintegration of drug users and addicts; and (4) accessible drug treatment for addicts and criminals (Franzkowiak, 2002). A recent study on drug laws and their implementation in 16 European Union (EU) member states, as well as a report commissioned by the EU in 1998, show a clear movement toward the decriminalization of certain types of drugs and drug-related behaviors not only in Germany but throughout Europe (Böllinger, 2000, 2002).

Two specific developments in Germany deserve mention. First, a decision by the *Bundesverfassungsgericht*[13] in 1994 stipulated that the possession of small amounts of drugs must not be prosecuted (Böllinger, 1994; Körner, 1997; Nestler, 1998). Secondly, Germany,

[12] Betäubungsmittelgesetz (Narcotic Law)
[13] Supreme Constitutional Court

much like other European countries, decreased penalties for both the purchase and possession of small amounts of illicit drugs by informally changing law enforcement practices to be more lenient in such cases (Dorn and Jamieson, 2000). One of the more noticeable consequences of these decriminalization efforts is that police less frequently engage in proactive enforcement, such as raids and searches, especially when the substance at issue is cannabis, even though the official procedural code does not grant them the discretion to do so.

The medicalization of drug use and abuse was first symbolically emphasized in Germany by the policy to provide therapy instead of punishment, which was added to the *BtMG* in Sections 35-38. The treatment paradigm was strengthened by a 1992 amendment to the *BtMG* that allowed swifter *nolle prosequi* procedures and easier access to treatment, as well as recognizing time in treatment as time served. In 1994, methadone treatment was added to the list of officially accepted treatment models. In the years since, courts have accepted other options as replacement for imprisonment, such as out-patient treatment, counseling, and psychotherapy in cases where it is applicable and considered helpful.

Contributing to the implementation of the medical approach were other developments throughout the 1990s and into the present. From 1993 to 1994, several German cities attempted to initiate heroin dispersion programs for addicts who could not be reached by the existing methadone treatment programs. After positive evaluation by researchers and legal analysts (Böllinger, 1991; Körner, 1997), Frankfurt a.M. was the first German city to open drug consumption rooms to its injection drug users in 1993. After a period of ambiguity as to the legality of such locations, a law regulating and allowing these consumption rooms was officially passed in 2000. In a similar vein, needle exchange programs were first started informally by

private organizations. Germany legalized these programs in 1992, and in 1998, two prisons adopted needle exchanges as part of a scientific research study.

Regulations regarding cannabis and marijuana changed with a 1994 decision of Germany's Supreme Court which ruled that the possession of "small amounts" of marijuana for occasional use was allowed.[14] How much exactly a "small amount" is was not defined however. As a result individual states set their own upper limits, which range from four grams in Berlin to 30 grams in Hessen.[15] One of the requirements for use to be acknowledged as "occasional" is that the defendant has not come to the attention of the criminal justice system in a drug-related case during the previous year. An additional factor that influences the decision not to prosecute is whether third parties or minors were endangered. In such cases pubic interest may dictate criminal prosecution.

Criminal procedures against young offenders are regulated in the *Jugendgerichtsgesetz*[16]. Germany chose a dual system for issues regarding minors, separating cases involving children in need of state attention because of neglect from those where education was needed due to criminal behavior. The Youth Court Act[17] applies to criminal offenders between 14 and 18 (§ 1 *JGG*). According to § 3 *JGG*, criminal responsibility has to be determined on a case-by-case basis, since mental capacity and the maturity of young people in this age group can vary dramatically. Therefore, only those deemed capable of guilt can be held criminally responsible for their actions, and only for those individuals does the Youth Court Act apply. Criminal responsibility according to § 3 *JGG* is established when the following conditions are present: (1) Maturity. The maturity of the young offender is judged according to her moral and mental

[14] Under German Narcotics Law, only the possession and sale of illegal substances are punishable, not the ingestion in and of itself
[15] The average amount is 6-10 grams, or 3-5 consumption units
[16] Youth Court Act; hereafter referred to as JGG

development. In this context, "§ 3 *JGG* is not concerned with the level of maturity of the young person in general but only in relation to its effects on his ability to understand the wrongfulness of the act and to act according to this understanding in the concrete situation" (Crofts, 2002: 136). (2) Ability to understand and control actions. To be criminally responsible, the young person has to be able to understand the wrongfulness of the act. This "requires a state of development which enables the young person to recognize that his act is not compatible with the orderly and peaceful coexistence of people and therefore cannot be tolerated by the legal order" (NStZ, 1996: 601).

The importance of these legal statutes and practices in Germany in comparison to the United States is three-fold: First, the possession of small amounts of marijuana or cannabis, albeit illegal, is not prosecuted in a court of law. Thus, while the threat of legal prosecution or even jail time is very real for American adolescents if caught smoking marijuana, the potential consequences German adolescents would face in the same situation are much less serious. Second, even if caught with more than the amount subject to discretion, regulations regarding juvenile offenders in Germany prohibit their prosecution as adults under any circumstance. So, no matter how serious the offense, offenders under the age of 18 will always be tried in Juvenile Court, and only punishments specifically designed for adolescents, which are significantly more lenient, can be administered. Thus, the legal risks resulting from marijuana use are considerably less severe for German than American youths.

The United States, on the other hand, is less willing to let youthful experimentation go unpunished, especially for the less privileged (Cook and Furstenberg, 2002; Zalkind and Simon, 2004). Curiously, there are few countries that can match the United States with respect to the number of opportunities for offenders to turn their lives around and get back on track. However,

just because a system of second choices is theoretically in place does not mean that those who most need such chances know of them and have the opportunity to take advantage of them. This becomes clear when we take a look at the young prisoner, who is disproportionately African American and from a poor, urban neighborhood. Americans are prone to incarcerate young drug offenders without seriously aiming at rehabilitation, a practice opposite to the one found in the German juvenile justice system.

According to the literature, recent developments in judicial sentencing practices will result in an even greater likelihood of incarceration, especially for young minority males (Urban, Cyr, and Decker, 2003). The majority of Americans appear to accept the tougher sentencing guidelines because they expect them to result in a significant decrease in crime. In contrast, German attitudes toward drug use and drug users, expressed by greater acceptance, attempts at social reintegration of drug users, as well as the greater leniency afforded to youthful offenders, seem to head in a different direction. The legal steps toward more lenient, accepting drug policies, particularly for alcohol, tobacco, and marijuana, are manifestations of Germans' attitudes toward drug use.

For the purpose of this study, I expect that these underlying notions of leniency and acceptance of adolescent substance use in Germany, as expressed by drug policies and legal statutes for juvenile offenders, influence adolescent use of marijuana in several ways. First, I expect that the perceived risks of marijuana will be less negative among Germans than Americans. Secondly, as manifested in more punitive laws in the United States, the use of certain substances (alcohol, tobacco, and marijuana) in Germany and their users are given meanings and labels that are less deviant than in the United States. This does not mean, however, that conventional norms are silent on the issue of adolescent substance use and users.

On the contrary, that Germany has recognized the failure of the "war on drugs," and is attempting to incorporate scientific research and innovative policies to ameliorate the problems associated with substance use, indicates Germans' concern with drug use. Nonetheless, compared with the policies and dominant attitudes toward substance use in the United States, German policies emerge and create a context that is certainly more understanding and less punitive.

The effects of these cultural and legal positions on adolescent consumption of alcohol, tobacco, and marijuana spill over into various domains central to the adolescent's life, namely the family, school, and peer group. In the following sections, I examine the theoretical indicators introduced in the previous chapter in light of the cultural differences found in the two countries as they relate to alcohol, tobacco, and marijuana use. Based on this assessment, I propose cross-national hypotheses were appropriate.

FAMILY

According to Hirschi's (1969) social bonding theory, the stronger the conventional ties between the child and his parents, the less likely substance use is to occur. The family as a central institution in adolescent life has always been of utmost importance, but in light of what has been termed "prolonged adolescence" has undergone considerable changes (Keller and Lamm, 2005). Adolescence in Germany and the United States today is marked by an extended economic dependence on parents, evoked by longer academic and vocational education and the lack of paid work. One of the consequences of this prolonged adolescence is that the transition out of the parents' home is occurring later. At the same time, however, adolescents very early develop a life-style independent from that of their parents, especially within the area of leisure time and consumption, which complicates this development even more (Petersen, Leffert, and

Hurrelmann, 1993). Similar developments have been found for the United States where a higher number of adolescents start college after high school rather than entering a paying job.

As far as family constellation, the two countries under study here have become very similar. In Germany, about 60% of the population live in family households with children, a significant decrease from 25 years ago, when this group constituted over 70% of the total population. In the short time period from 1991 to 1997, the percentage of married couples with children dropped considerably, while the percentage of single parents and couples without children experienced a significant increase (*Bundesinstitut fuer Bevoelkerungsforschung* (BiB), 2004). The traditional family constellation of father, mother, and children is no longer the norm, much like in the United States. Over the past 27 years, common law marriages and partnerships without a marriage certificate have increased tenfold. In West Germany, every 23rd household consists of unmarried partners; in Eastern Germany, this form of partnership accounts for over one quarter of all households. Twenty-two percent of the cohabitating Western couples have children under the age of 18; in the East, children are much more prevalent (48%) in this type of household (BiB, 2004). One major consequence of recent developments is that today, the German rate for youth experiencing parental divorce may be similar to that in the United States. Longitudinal research on demographic trends in Germany predicts a steady increase of alternative families in the years and decades to come, especially single parents, families with stepparents, and same-sex parents (BiB, 2004).

While families in Germany and the United States may resemble each other on the surface, there are cultural differences worth mentioning. One of the theories that guides the current analyses, social bonding theory, argues that the stronger the social bonds between parents and child, the less likely it is that he or she will use drugs (Hirschi, 1969). However, it is

questionable whether these assumptions apply in a culture like Germany, where drinking and smoking cigarettes is such an integral and normalized part of social life[18]. In Germany, the ideal of a harmonious, well-functioning family does not necessarily exclude the shared consumption of alcoholic beverages at the family table (Tlusty, 2004). Put differently, moderate drinking does not equal the erosion of family values or bonds. Rather, German adolescents are socialized into a culture that is very tolerant of alcohol use and they quickly learn how to enjoy alcohol as a social lubricant in social situations (Settertobulte et al., 2001). Tlusty (2004) argues that drinking that by American standards would be judged as excessive or abusive could be considered acceptable.

The fact that drinking is a legal and accepted behavior for 16-year olds has important implications for how parents view and react to adolescent alcohol use. Unlike American parents, Germans do not have to worry about the legal consequences of letting their teenager have alcohol. In addition, the fact that adolescents under the age of 18 are not allowed to drive certainly reduces parental concerns. In the United States, children are taught at a very early age that alcohol is dangerous if for no other reason than because it is illegal for persons under twenty-one. American parents have to be concerned about the potential consequences, and public perception supports the notion that people who begin to drink early are destined to be failures (even though so many do). Adolescents risk disappointing, worrying, or angering their parents if they drink because they are breaking the law and put their future in danger. In Germany, none of this is an issue.

Social bonding theory posits that the stronger the adolescent's conventional bonds to family, school, and peers, the less likely she is to engage in substance use. The association between social bonds and alcohol, cigarette, and marijuana use exists because engaging in

[18] For example, the significantly lower drinking age in Germany as compared to the U.S.

substance using behaviors violates social norms—and thus values, expectations, and stakes in conformity one shares with those to whom she is attached. Since alcohol and tobacco use is seen as a greater violation of conformity for American youth, and the importance of social bonds lies in the value and rewards they provide for adhering to conventional standards of behavior leads to the expectation that the inverse relationship between specific social bonds and substance use be significantly weaker for German youth. The relationship between family bonds and marijuana use, on the other hand, is expected to be similar across countries due to the stigma and potential consequences of engaging in this type of behavior. Specifically, it is predicted:

> ***Hypothesis 7***: *The inverse relationship between social bonds to family and alcohol and tobacco use will be stronger for American than German youths.*

EDUCATION

Another institution central to social bonding theory is adolescent commitment to educational goals. The more committed the adolescent is to educational success, the less likely he is to engage in substance using behavior that could put potential plans for the future at stake. It is evident from the plethora of research that school is an important institution in the adolescent's life (i.e., Petersen, Leffert, and Hurrelmann, 1993). In addition to dictating much of how adolescents spend their days, school also affects values and beliefs, and relationships with family; directs future vocational choices, and may influence delinquent behavior (Milotich and Mack, 2005). Research consistently points to the impact of school-related variables on adolescent behavior. Some studies show that school performance, especially in early adolescence, is strongly linked to characteristics of the educational environments to which

students are exposed (Eccles and Midgley, 1988; Eccles, Lord, and Midgley, 1991; Elder, 1976). Others found evidence that the type of secondary school the adolescent attends influences parental involvement in academic issues, which influences the student's educational attainment (Oswald, Baker, and Stevenson, 1988). As indicated in Chapter 2, low levels of educational attainment, truancy, and dropping out of school, in turn, have repeatedly been linked to substance use (Bryant and Zimmerman, 2002; Hallfors et al., 2002; Miller and Plant, 1999; Pritchard et al., 1992; Roebuck et al., 2004; Swadi, 1989; Thomas and Hsiu, 1993).

School in Germany

The structure of Germany's educational system differs from that of the United States, and in light of the link between academic achievement and adolescent substance use, a discussion of the German school system is appropriate (see Figure 1). The contemporary form of the German educational system was developed in 1948 and operates on the principle of federalism (Foraker, Patten, Lopez, Croghan, and Thomas, 2005). Most children attend public schools (Führ, 1989) and start compulsory elementary school (*Grundschule*) at age six. Everyone is taught the same subjects. After 4th grade, students are placed on different tracks in one of the four kinds of schools according to their academic ability and the educational aspirations of their families: *Hauptschule, Realschule, Gymnasium,* or *Gesamtschule*. The *Hauptschule* (grades 5-9 in most German states) provides the most basic compulsory education, and covers most of the same subjects as the *Realschule,* but it does so at a slower pace and with greater attention to the development of vocational skills. After graduation, adolescents typically pursue apprenticeship

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<tr><td>10</td><td colspan="2">Vocational Training
(full or part-time classes)</td><td></td><td></td><td>15</td></tr>
<tr><td colspan="5">Hauptschule students graduate after 9 years.
Realschule students graduate after 10 years.</td><td>16</td><td></td></tr>
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<tr><td></td><td colspan="4" rowspan="3">Kindergarten</td><td>5</td><td rowspan="3">Pre-School</td></tr>
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Figure 1: The German School System

training combined with part-time enrollment in a vocational school.[19] The *Realschule* (grades 5-10) leads to part-time vocational schools and higher vocational schools. It covers a mixed curriculum that focuses on expertise and techniques needed in skilled labor and business occupations.[20] It is now possible for students with high academic achievement in the *Realschule* to enter the last three years of the *Gymnasium* upon graduation and continue their education on this higher track. The *Gymnasium* (grades 5-13 in most states) is the elite form of secondary school and leads to a degree called *Abitur* that prepares students for entering the university system or for a dual academic and vocational credential. Standard *Gymnasia* offer a rigorous academic curriculum, including classical languages, modern languages, mathematics and natural sciences. Finally, the *Gesamtschule*, or comprehensive school, is a more recently developed type of school and exists only in some of the German states. It arose out of the egalitarian movements in the 1960s and takes the place of both the *Hauptschule* and *Realschule*. It enrolls students of all ability levels in the 5th through the 10th grades. Students who satisfactorily complete the *Gesamtschule* through the 9th grade receive the *Hauptschule* certificate, while those who complete schooling through 10th grade receive the *Realschule* certificate.

The track a student enters after elementary school is based on a decision made jointly by the parents and teachers of the child. As indicated above, this decision has clear occupational consequences. Young people who attend one of the lower track schools are blocked from entering professions that require a university degree. Graduates with an *Abitur* in hand, however, are able to get apprenticeships, even though this happens less frequently. In the late 1990s, one third of all apprenticeships went to students from *Hauptschulen*. […] two fifths went

[19] Typical professions that require only a Hauptschule degree and successful apprenticeship training are cooks, caretakers, auto mechanics, or cashier.
[20] Examples for professions that require at least a degree from the Realschule are: technical assistants, pharmaceutical assistants, social worker, or nurse.

to students from *Realschulen*, and only one fifth to ones from *Gymnasien* (Cook and Furstenberg, 2002).

The unification of East and West brought about many policy reforms that have, on one hand, improved educational opportunities for much of the population, especially in the former German Democratic Republic. On the other hand, the realization of individual life plans and trajectories has become much more complicated and difficult. Employment opportunities have become very limited over the past decades. As a result, the number of students on the lower educational track (*Hauptschule*) has decreased substantially, while the proportion of students attending the *Gymnasium* has more than doubled in the past fifty years. High unemployment rates, coupled with increasing international competition for vocational as well as professional jobs further substantiate the importance of a quality education that opens more opportunities for adolescents and young adults (Hurrelmann and Engel, 1988; Mansel and Hurrelmann, 1991).

Cross-national Comparison of Education

A comparison of the German and the American schools systems reveals differences that may be significant for the current analyses. First, even though the U.S. has no comparable system of tracking students into different types of schools, the student body at any given educational institution is typically homogeneous in terms of the socio-economic background of the student's family because of the local taxation systems to support public school budgets. Tracking in the American school system generally takes place within rather than between schools. One of the frequently mentioned consequences is the absence of equal opportunities across race, class, and locale (Petersen, Leffert, and Hurrelmann, 1993). In theory, graduates receive the same diploma no matter what high school they attend. However, those who obtain only a high school diploma

appear to come typically from markedly different socio-economic backgrounds than the students who go on to attend college or even graduate school (Oswald, Baker, and Stevenson, 1988). The American system seeks to delay institutional stratification to provide individuals with second and third chances should their motivation to get ahead come late or should they stumble at earlier points (Cook and Furstenberg, 2002). One implication of such early school tracking, then, is that the German educational system may ignore many students whose clear cognitive interests and gifts emerge only after sixth grade, which, as alluded to above, can have notable consequences for the adolescents' professional career (Cook and Furstenberg, 2002).

Another noteworthy divergence is the fact that secondary schools in Germany are strictly academic institutions (Petersen et al., 1993). This means that in German schools, sports activities, which are such a significant part of American schools, are limited. Sports and other leisure activities are restricted to local clubs after school and on weekends. To relate this information to the potential effects of substance use, it is important to see that adolescents who use substances in the United States may risk their membership on athletic teams that are so important in the American educational system, while there is no comparable threat to German teenagers.

It is clear from both the differentiated secondary school system and the dual system of vocational training that Germany is very committed to the belief that there is a societal responsibility for the intellectual and vocational preparation of its youth (Petersen et al., 1993). In contrast, "in the U.S., the main assumption is that individuals should get ahead by themselves by virtue of their own willpower and initiative, provided that the institutions are in place from which they can benefit, primarily schools and colleges" (Cook and Furstenberg, 2002: 283). Thus, it is each young person's responsibility to utilize existing opportunities. This requires

substantial general cultural knowledge or supportive others who know how the system works. The problem, Cook and Furstenberg (2002) argue, is that the access to such knowledge and networks is not equally distributed in the United States.

Cross-national data suggests that average educational attainment is higher in Germany (Petersen et al., 1993). Compared to the U.S., the German educational system offers a broader curriculum that results in higher levels of mathematical and language attainment, for a greater portion of the students (Lippman, 2002). One area these differences are particularly visible is at the lower half of the ability range, where the achievement level is higher in Germany. According to past studies, almost 80% of students in Germany obtain either an occupational certificate or an undergraduate degree, whereas less than 50% of all Americans reach the same benchmark (Cook and Furstenberg, 2002). Furthermore, the percentage of eighteen year-olds still in high school is lowest in the U.S., reflecting a higher drop-out rate.

As Cook and Furstenberg note, "the national differences […] are occurring against a backdrop of generally similar historical changes across western European and North American nations. One of these changes is the expansion of secondary and higher education. Young people are staying in education for longer, prompted by changes in school-leaving laws, expanding opportunities in higher education, increasing equality for women, and higher unemployment rates" (2002: 259). In other words, in both countries of interest, adolescent lives are marked by prolonged education and a delay in entering the labor force. This development signifies the growing importance of education itself, and the choices made (by parents, teachers, and students – especially within the German tracking system) along the way.

Despite the fact that the two educational systems are structured very differently, there is no reason to believe that the meaning of education and success in school differs between the two

countries. High levels of substance use, whether illegal or not, have been proven to interfere with academic performance and goals, and this relationship should work in the same direction in Germany as in the United States. However, for reasons alluded to above, occasional and moderate levels of drinking and smoking are not expected to threaten adolescent stakes in conformity as much in Germany as in the United States. In the United States, adolescent substance use has been established as both cause and effect of low GPA, truancy, etc. In Germany, these relationships are expected to operate differently for alcohol and cigarette use, since moderate drinking and smoking are not as much seen as "acting up" or risking one's place in society. Rather, these behaviors are accepted as part of being an adolescent. Due to the cultural and legal positions regarding alcohol and tobacco, the consumption of these substances is much more prevalent in Germany, and those who engage in them are not perceived as social outcasts or losers, but normal adolescents. In addition, there is no risk of getting expelled from school or athletic teams. Therefore, it is expected that:

> ***Hypothesis 8:*** *The inverse relationship between social bonds to school and alcohol and tobacco use will be stronger for American than for German youth.*

PEERS AND LEISURE TIME

In accordance with social learning theories, peers play a vital role in the adolescent's decision to use drugs. Supporters of this paradigm maintain that the association with substance-using friends significantly increases the likelihood of adolescent substance use. Acknowledging the importance of these relationships, it is imperative to know how and to what extent teenagers in the two countries of interest relate to their peers. How do German and American adolescents spend their leisure time? Are their daily lives similar, or are they marked by important

differences? In order to understand adolescent substance use and to explain differences in these behaviors between German and American youth, it is essential to be informed about the daily routines and relationships in the lives of these youths under study outside of school. Petersen and colleagues (1993) note that in the past decades, the function of the peer group as a noteworthy social reference group has deepened, and peers increasingly set the standards for various adolescent behaviors. The growing importance of the peer group has long ago resulted in its incorporation in theoretical explanations of juvenile delinquency and substance use (Sutherland 1947).

Comparative research on 'the adolescent experience' unfortunately is rare, with the exception of the Euronet project, a cross-cultural study on the daily lives of adolescents in Europe and North America (Alsakar and Flammer, 1999). Alsakar and Flammer (1999) suggest that cognizing the everyday experiences of adolescents is essential in that it displays important priorities and values of a society's youth, specifically and the culture more generally. In addition, prior research posits that leisure-time activities are considered central to an adolescent's self-definition (Alsakar and Flammer, 1999; Grob et al., 1996).

Of the leisure activities measured by the Euronet study, the most significant differences between American and German adolescents centered on average free time and peer relations. American youth have significantly more leisure time[21] in their normal daily lives than the German youth. Moreover, as for time spent with peers, the study found that American adolescents spend four times as much time with their peers as do German youths (Alsakar and Flammer, 1999). Interestingly, German teenagers significantly surpass their American counterparts in time spent with their romantic partners (i.e., boyfriends or girlfriends; Alsakar and Flammer, 1999).

[21] That is, time not spent on tasks such as working, homework, or chores.

It is important to note, however, that with regard to most day-to-day activities German and American youths showed similar patterns. The differences in leisure time and peer relations, however, may influence the substance use of these adolescents in several ways. First, in most cases, an a priori requirement of substance using behaviors is leisure time in which to consume the substances, experience the effects, and "come down" or sober up from the psychoactive states. A second implication concerns the role of peers in substance using behaviors. Thus, it seems logical that the more free time the adolescent has, the more opportunity there is to get high or drunk. In addition, most delinquent behaviors, including substance use by minors, are group activities; therefore, engagement in these behaviors presupposes membership in a group or association with peers (Warr, 2002). It is not a stretch, then, given that American youths spend four times as much of their leisure time with their peers than the German adolescents, that the relation between the substance using behaviors of their friends and their own drug use should be stronger for the American youth. This prediction is strengthened by the fact that German youth spend much more time with their opposite sex peers in "steady" relationships. Research has found, particularly for boys, that involvement with an opposite sex romantic partner decreases involvement in criminal activities, including substance use. Thus, while neither the magnitude nor the direction of the effects of these differences is obvious, it is clear that there are important differences in the daily lives of American and German adolescents. Whether these differences translate into different patterns of substance use and correlations with drug using behaviors is an empirical question. The analyses will address the influence of these cultural differences in the day-to-day lives of German and American adolescents on the relations between the sociological factors associated with substance use and how such divergences translate into different patterns of substance use.

In terms of the current analyses, the peer-related differences between the two nations under study are relevant in a number of ways. One of the main functions of peers with regard to substance use is their role in providing opportunity to drink and smoke through making said substances available to the adolescent. However, since German teenagers can purchase alcohol and cigarettes themselves, this function of the peer group is weakened. That is not to say that peers are less important to German teens, but in terms of their importance for creating opportunities to use and making substances available, they are less important for Germans compared to Americans. In terms of marijuana, however, the function of the peer group as a "provider" is expected to be the same for Germans and Americans.

To tie these cultural differences in peer relations to the assumption posited by social learning theories, it is important to note that proponents of this approach argue that those who use drugs will likely be those whose friends use drugs, and that these behavioral patterns are acquired through interaction with other users. It follows that the degree of unconventionality of a behavior should not affect the learning process. However, in considering the effect of substance using friends on behaviors across the two countries, we must consider the conventionality of the substances being used. In the United States, substance-using peers provide opportunities to learn about and have access to alcohol, tobacco, and marijuana. In Germany, this role is limited to marijuana, since alcohol and tobacco can be legally purchased by 16 year-olds. Thus, in terms of direct effects of friends' drug use, it is expected:

Hypothesis 9: *The association between peer alcohol and tobacco use and adolescent alcohol and tobacco use is stronger for American than German youth.*

SUMMARY

Even though the formula to a successful life may be similar in the United States and Germany, several cultural differences – some subtle, others quite obvious - have the potential to influence the decision to consume alcohol, tobacco, or marijuana in different ways. Very important to note is the legal status of alcohol and tobacco use for 16-year olds in Germany, and the cultural message sent by these lower age limits: drinking and smoking in and of itself is less deviant, resulting in a lower risk of negative (legal and personal) consequences. However, cross-cultural differences in attitudes toward drinking and smoking likely disappear when patterns of use become heavier. Similarly essential is the underlying notion of the decriminalized status of small amounts of marijuana. The approach chosen by the German population, visible in the laws and policies, stands in stark contrast to how the American system reacts to marijuana use, both formally and informally.

In addition to more lenient laws regarding marijuana use in Germany, it is imperative to understand the significance of the fact that, even if the adolescent faces consequences for smoking marijuana, the German juvenile justice system is much more "forgiving" and lenient with juvenile offenders. One should notice the cross-national differences in punishment of juvenile delinquency. In Germany, formal reactions are driven by a harm reduction philosophy, while in the United States, a punitive and repressive approach prevails. The potential punishment for substance use of any kind may very likely have an indirect effect on the adolescent's decision to use drugs.

Another law that is worth noting in relation to substance use is the age at which adolescents in Germany are able to get a driver's license. Teenagers in the U.S. impatiently await their 15th (or 16th, depending on the state) birthday, because it is then when they can obtain their very own "pass to freedom." In contrast, German adolescents have to wait until their 18th

birthday to do this. Since respondents in the present study are mostly sixteen, this fact of life poses a considerable difference between samples when we take into account the increased mobility of American teenagers, which results in decreased parental supervision, and in turn may lead more opportunity to engage in deviant behavior, including substance use.

One social sphere German and American adolescents seem to be more similar to each other on the surface is the family. Both cultures have been undergoing major changes in family trends, including steady increases in divorce rates, and a rise in alternative family constellations, especially single parents and blended families. In addition, the growing significance of education results in what is called prolonged adolescence, characterized by an elongated economic dependence of children on their parents. However, as shown in the present chapter, similarities in family constellation do not necessarily translate into similarities between family social bonds and substance use.

The following chapter turns to research design and operationalization of the variables in an effort to explore the characteristics that are theoretically predictive of adolescent substance use in Germany and the United States.

CHAPTER 4

DATA & METHODS

In the previous chapters, I explored the extent to which social bonds, affiliation with drug-using peers, and rational choice as indicated by risk perceptions decrease the likelihood of drug use for German and American adolescents, and whether this process is likely to differ between Germany and the United States. This chapter provides an overview of the data which are drawn from two nationally representative surveys, the European School Survey Project on Alcohol and Other Drugs (ESPAD) and the Monitoring the Future Survey (MTF). It further presents the measures used in this analysis and descriptive statistics.

DATA

(1) European School Survey Project on Alcohol and Other Drugs (ESPAD)

The prevalence of alcohol, tobacco and other drug use are matters of concern to public policy in most countries, since they are important factors related to the health and welfare of the population. Unfortunately, even though a wealth of data is routinely collected in countries around the world, comparing patterns and trends of substance use is rather complicated, mainly due to the differences in study designs and methodologies employed by researchers. The first attempts to standardize research studies on alcohol and other drugs in European countries occurred in the 1980s with the formation of a research team within the Pompidou Expert Committee on Drug Epidemiology (Council of Europe). The investigators were charged with the task of developing a standardized school-based survey instrument that would enable cross-

national comparisons of drug use trends and prevalence. Originally, seven European cities[22] participated in a comparative pilot study (Hartnoll et al., 1989). Despite collaborative efforts, the comparability of these initial studies was limited due to differences in sample size, age of respondents, and time of data collection (Hartnoll, 2003).

A second comparative research project, which focused on the health behavior of school aged children and teenagers ages 11-15, was initiated by the World Health Organization in 1983 and has since been repeated five times. While some of the questions ask about cigarette and alcohol use, the study does not cover other substances and is thus of limited use for creating a comprehensive comparison of drug use patterns in European countries. Recognizing the need for comparable data, the Swedish Council for Information on Alcohol and Other Drugs (CAN) convened in 1993 with the goal of initiating a cross-national longitudinal survey on adolescent substance use across European countries. Special attention was given to comparability, an issue previous studies failed to address adequately. The first wave of data collection for the European School Survey Project on Alcohol and Other Drugs (ESPAD) took place in 1995. Since then, the survey has been repeated twice, in 1999 and 2003. Each new data collection welcomed additional participating countries, among them Germany in 2003.

The basic rationale of the ESPAD study is to assemble and make available for analysis comparable data on alcohol, tobacco, and other drug use among students. The central goal is to monitor trends in alcohol and drug-use patterns over time among students in Europe and to compare trends between countries (Kraus et al., 2004). The study design plans for repetition of the surveys every four years.

[22] Amsterdam, Dublin, Hamburg, London, Paris, Rome and Stockholm.

The original study began in 1995 with 26 countries.[23] At the time of the second wave of data collection, 30 countries[24] participated (Hibell et al., 2001). In the most recent wave in 2003, 35 countries[25], including Germany, collected and provided data. The study is coordinated by the Swedish Council for Information on Alcohol and Other Drugs and supported by the Pompidou Group of the European Council whose objective is to combat drug abuse and illicit trafficking in drugs (Johnston et al., 2004a). To reach the goal of providing data that are cross-nationally comparable, the methodology of the ESPAD project is strictly standardized with respect to target age group, data collection instrument, field procedure, timing, and data format (Kraus et al., 2004).

The target population is students who are or will turn 16 years of age during the year of data collection. One reason for choosing this age group was the increased probability of being able to locate these students within the compulsory school system. Not included in the target population are individuals who are unable to understand or for other reasons cannot answer the questionnaire. Prior to participation, the respective countries have to submit a national project plan in which they provide essential background information about the population under study such as the number of students in the school system, grade distribution, and gender distribution (see also: Hibell et al., 2001). Because standardization for the purpose of cross-national comparability of data is a central issue of the ESPAD, countries are required to provide detailed information on sampling procedures and collection methodologies. In preparation for

[23] Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, Norway, Poland, Portugal, Slovak Republic, Slovenia, Sweden, Turkey, Ukraine, United Kingdom, Greece, USA

[24] Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, FYROM, Greece, Greenland, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Sweden, Ukraine, United Kingdom, The Netherlands

[25] Austria, Belarus, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, FYROM, Germany, Greece, Greenland, Hungary, Iceland, Ireland, Isle of Man, Italy, Latvia, Lithuania, Malta, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Sweden, Switzerland, Ukraine, United Kingdom, The Netherlands

participation and, again, to maximize standardization of research techniques, regional seminars are held on a regular basis with the investigators (Hibell et al., 2001).

The ESPAD methodology study

Following the first wave of data collection in 1995, one of the main concerns that arose focused on methodological issues. Hibbel et al. (2004) concluded that the cultural context of the participating countries may affect the way in which respondents answer the questions in ways that could bias the outcomes of the study. In response to this concern, a methodological study was conducted in 1998 to better understand the influence of cultural context on the validity and reliability of the survey (Hibbel et al., 2000). Seven countries from different parts of Europe were included in the study, and for practical reasons, data were collected mainly in the nations' capitols.[26] Classes in which the majority of students were born in 1982 were randomly selected by each country. First, students completed the official 1995 ESPAD core questionnaire. Three to five days later, the same students were surveyed again. This time, questions included how truthfully they answered the first survey, how easy or difficult the questionnaire was to understand, and how honest they thought their classmates were (Hibbel et al., 2004). Data collection procedures were identical in all seven countries and for both data collections.[27] Moreover, the follow-up survey included alcohol and drug related questions that were identical to the core survey. Since the studies were completely anonymous it was not possible to do a test-retest study limited only to those students who participated in both data collections. Nevertheless, no significant differences in the consumption patterns were found between the two

[26] In Denmark, data came from the second largest city, Aarhus, and in Malta, classes from the whole country participated.
[27] At the first data collection the survey leaders received a small questionnaire, which included questions about the number of present and absent students as well as questions about possible disturbances during the data collection. They were also asked to estimate whether the students worked seriously and if they thought that they gave valid answers.

data collections in any of the countries. This is true for alcohol consumption as well as drug use prevalence, which indicates that the reliability was very high in all seven ESPAD countries. Similar results with no important significant differences have also been reported from two repeated studies in Iceland and Hungary (Hibell et al., 1997).

The data collection instrument

The ESPAD survey contains a core set of questions used by all participating countries. Additionally, each country could add modules and questions of special interest to them, provided that the questions would not negatively influence the respondents' willingness to answer truthfully. The content of the survey instrument was heavily influenced by the "Monitoring The Future" project in the United States. Dr. Lloyd Johnston, who was the chair of the School Survey Subgroup, is also head of the group of researchers conducting the American study. The ESPAD project was launched as a continuation of the preparations made by the Pompidou School Survey Subgroup. Thus, the first ESPAD questionnaire was developed from a battery of questions, but every question was discussed and agreed upon by the large group of collaborating investigators. The majority of questions from the original 1995 questionnaire were kept in 1999 and 2003.[28] Each country translated the survey instrument into its native language, employing back-translation techniques to assure that the wording of questions was appropriate for the cultural context. Questionnaires were then tested in small pilot studies for the purpose of discovering and correcting any faults or discrepancies. Despite the tremendous efforts to standardize the data collection procedures and the questionnaire cross-nationally, there will always be some discrepancies between countries that are beyond the control of the researchers.

[28] The core questionnaire is presented in Appendix FHS.

Procedures for German data collection

Six Bundeslaender (federal states) participated in the German ESPAD: Bavaria, Berlin, Brandenburg, Hesse, Mecklenburg-Western Pomerania, and Thuringia. Because of structural differences in Germany's educational system, the survey instruments were administered separately for each participating federal state. The study is representative of adolescents in Germany born in 1987 in the participating states (Engels and Knibbe, 2000; Morgan et al., 1999; Kraus et al., 2004).

The sample was drawn as a multi-stage cluster sample where the sample units are classes. The purpose of this particular sampling procedure was to mirror adequately the distribution of students on the different levels within Germany's educational system. Another goal was to reach a representative sample of students regarding their spatial distribution in both urban and rural areas. The German sample included schools for university-bound students (*Gymnasium*) as well as schools specializing in vocational/technical training for students in apprenticeships (*Hauptschule, Gesamtschule,* and *Realschule*).

The head teachers of selected schools were contacted and informed of the planned study. They were asked to inform the teachers of the chosen classes, but not to inform the students in order to avoid discussions among them that could lead to biased data. The class teachers were then asked to schedule the survey for one class period, following the same procedure as for a written test. Materials preceding data collection also included a formal letter and active consent form to parents of the respondents that explained to them the purpose and procedures of the study and informed them of the confidentiality of the collected data. Parents were asked to sign the consent form and have it returned to their child's teacher by the day of data collection. A

total of 462 questionnaires (4%) were not included due to refusal by the respondent or missing consent form.

Table 1 shows the distribution of respondents according to grade and type of school for each participating federal state. Five hundred fifty six classes from 515 schools were randomly selected to participate in the study. The numbers of classes and schools were similar for Bavaria (91/89), Berlin (84/78), Brandenburg (85/78), Hesse (91/81), Mecklenburg-Western Pomerania (101/91), Thuringia (104/98) (Kraus et al., 2004).

The German version of the ESPAD is comprised of 46 items that explore various topics related to substance use and delinquency. The core module covers socio-demographic background, parental education, and leisure activities. In addition, respondents are asked about school-related issues, such as their grade point average and truancy. Next, the survey lists questions pertaining to legal substance use, namely tobacco and alcohol. Age of onset, frequency of use, and amount used are among the issues touched upon in the questionnaire. Following questions about alcohol and nicotine is a section on illicit substance use. Here, respondents answer a battery of items regarding the prevalence of use, availability, risk perceptions, and peer use. The survey concludes with a set of questions about the respondent's involvement in delinquency, and further asks whether the respondent had been a victim of such delinquent acts in the year preceding data collection.

The original version of the survey instrument was slightly modified for the German data collection. First, alcohol-specific answer categories for last month use were changed

Table 1: Students Distribution by grade and type of school for participating federal states (from: Kraus et al. 2004)

	Type of School[1]				
	Hauptschule	**Realschule**	**Gymnasium**	**Comprehensive School**	**Total**
Bavaria[2][3][4]					
9th grade	56,739	41,680	39,579		137,998
10th grade	5,500	45,915	35,030		86,445
Total	62,239	87,595	74,609		224,443
Berlin					
9th grade	4,432	7,554	12,236	10,166	34,388
10th grade	3,367	7,001	11,033	9,739	31,140
total	7,799	14,555	23,269	19,906	65,528
Brandenburg[2][5]					
9th grade		6,394	10,963	18,160	35,517
10th grade		5,793	10,784	19,134	35,711
Total		12,187	21,747	37,294	71,228
Hesse					
9th grade	12,172	19,043	21,121	11,224	63,560
10th grade	1,499	17,829	19,067	8,794	47,189
Total	13,671	36,872	40,188	20,018	110,749
Mecklenburg-Western Pomerania[2]					
9th grade	3,156	11,829	8,358	2,705	26,048
10th grade	3,665	12,506	7,590	2,349	26,110
Total	6,821	24,335	15,948	5,054	52,158
Thuringia[6]					
9th grade	5,626	12,623	9,991	1,814	30,054
10th grade	0	14,612	9,213	399	24,224
Total	5,626	27,235	19,204	2,213	54,278
Total Sample					
9th grade	82,125	99,123	102,248	44,069	327,565
10th grade	14,031	103,656	92,717	40,415	250,819
Total	96,156	202,779	194,965	84,484	578,384

1) Hesse, Mecklenburg-Western Pomerania, and Thuringia: Type of school means type of degree available.

2) Estimates based on number of students in 8th and 9th grade in 2001/2002

3) 10th grade Hauptschule: 10% of 9th grade students from 2001/2002.

4) Comprehensive and Waldorf schools excluded due to negligible numbers.

5) Students in Hauptschule are instructed within comprehensive schools.

6) There is no 10th grade Hauptschule in Thuringia.

into a numeric format to capture the exact number of alcohol units as well as the frequency of drinking episodes. Second, an additional measure of how many days the respondent consumed alcohol in the past week was added to replace the measure of drinking episodes. Data collection took place between March 31 and April 11, 2003. A total of 11,043 German students had completed the questionnaire. The response rate was 86.9 percent.

(2) Monitoring the Future Survey, 10th graders

Monitoring the Future, begun in 1975, is a long-term, nationally representative study of American adolescents (Johnston et al., 2004). It is conducted by the University of Michigan's Institute of Social Research and is supported under a series of investigator-initiated, competing research grants from the National Institute of Drug Abuse. A multi-stage, random sampling procedure is used to select the student sample at each grade level. Stage 1 involves the selection of specific geographical areas (often counties) that, collectively, should amount to a representative national sample of the entire general population in that particular age group. The geographical areas are chosen from census frames with stratification on such variables as region and population density to ensure proportional representation of these variables. In Stage 2, one or more schools are selected from each of these areas, with their probability of selection set to be proportional to the size of the school, as measured by the estimated number of students in the grade in question. Finally, Stage 3 entails the selection of students within the school in the grade level under study. In schools with more than 350 eligible students, a random sample of classrooms is taken, whereas in smaller schools, the entire grade is surveyed. The weighting of the resulting data corrects for unequal probabilities of being selected into the sample.

Beginning in 1991, the study was expanded to include comparable national samples of 10th graders each year. In 2003, a total of 16,300 10th graders were included in the study. Because multiple questionnaire forms are administered and not all questions are contained on all forms,[29] the number of cases upon which a particular statistic is based can be less than the total sample. Approximately 90% of the population between the ages of 11 and 18 can be accessed with school-based research, minus small proportions of absent students on the day of data collection and those no longer attending school (Bauman and Phongsavan, 1999).[30] If appropriate measures ensuring confidentiality or anonymity are taken, the response rates of school-based health surveys are typically around 85% (King et al., 1996; King and Coles, 1992).

The use of self-report surveys has been debated among scholars for decades, and questionnaires, whether used in a single country (i.e., MTF) or multiple countries (i.e., ESPAD), have inherent limitations and shortcomings. One of the central concerns of epidemiological studies on substance use relates to the reliability and validity of adolescents' self reports, especially when questioned about illegal behaviors (Johnston and O'Malley, 1985; Rosay, Najaka, and Herz, 2000). A resolution to this problem is complicated by the "absence of a self-reported 'gold standard' or criterion measurement, and the practical difficulties and high costs of administering biochemical validation tests in epidemiological surveys" (Bauman and Phongsavan, 1999:190).

At the same time, however, it should be noted that multiple studies have tested and found support for the validity and reliability of self-report assessment tools (e.g., Hallfors and Iritani, 2002; Hindelang et al., 1981; Junger-Tas and Marshall, 1999; Moffitt, 1988). For example,

[29] Of the four forms used in tenth grade all have two sections in common: the family background and demographics section and the self-reported substance use section.

[30] Compulsory education lasts until age 16 in both countries.

research on the validity of reported smoking has been repeatedly confirmed by salivary nicotine measurements. Other research on alcohol and illicit drugs suggest that self-reports of adolescents in substance use surveys are sufficiently valid (Campanelli et al., 1987; Harrison, Haaga, and Richards, 1993; Murray and Perry, 1987).

Another concern regarding adolescent self-reports involves issues of underreporting or misreporting (Vazsonyi et al., 2002). In response to this issue, studies have taken measures to ensure reliable reporting. For example, substance use questionnaires often include a fictitious drug to test the respondents' honesty and reliability. In an Australian school-based drug use survey, the inclusion of a bogus drug produced low responses, confirming that adolescents tend to respond truthfully to questions about substance use (Bauman et al., 1995). Longitudinal survey designs pose an additional chance to double-check responses. Studies such as the Monitoring the Future have further confirmed stability of students' responses over time (O'Malley et al., 1983).

Comparability of the ESPAD and MTF data

The ESPAD survey was designed to be comparable to the MTF survey. After extensive tests, Hibell et al. (1999) expressed confidence in the comparability of these two data sets. While there is no evidence that would suggest bias in either sample, there are some methodological considerations that need to be mentioned. First, the population in the German data consists of students born in 1987, whereas the American data include respondents who at the time of data collection are enrolled in 10^{th} grade. Most of the American students are 15 or 16 years old, thus born in 1987, but not all of them. However, it should be noted that there are no theoretical

reasons or empirical evidence that would suggest that the processes under study would be different for those born in 1987 or 1988.

A second methodological concern is that American students, unlike Germans, knew about the survey prior to the actual data collection. However, reliability and validity were found to be extremely high in this wave as well as in previous ones, and it appears as if this advance information has not caused any problems in the comparison with other participating countries. Finally, Hibell and colleagues (1999) argue that the major drug use questions are the same for both countries, providing further support that the data are quite comparable.

MEASURES

Measures were created from items in the student surveys. As previously mentioned, there have been debates in the literature regarding the relative merits of using adolescent reports of research deviant behavior. Evidence from various studies shows that the parental perceptions of the family environment or relationships between family members do not always match the perceptions of adolescent respondents (Collins, 1990; Paulson, 1994; Smetana, 1988). Despite this concern, there is a clear role for examining the perceptions of adolescents. According to Erickson et al. (2000: 403), "The ways in which adolescents socially construct and interpret events within their environments are important for understanding how they respond to those events." Also, the use of adolescent reports is justified on theoretical grounds, namely, that the hypotheses to be tested are derived from theories that were constructed from the perspective of the adolescent. As aforementioned, the two data sets used for the present analysis include identical measures that have been used in national panel studies for decades (O'Malley, Bachman, Johnston, 1983).

Dependent Variables

The present analysis examines three outcomes that cover conceptually different types of substance use. Table 2 presents their coding and distribution across the two samples.

Cigarette Use. In each survey, respondents reported how frequently they smoked cigarettes during the past 30 days. Not unexpectedly, more German respondents report having smoked in the past month than American youths (48.7% compared to 16.3%). Moreover, German students exhibit higher levels of smoking than American students.

Getting Drunk. Because the use of alcohol is considered normative behavior in Germany, occasional or moderate drinking may not be the most appropriate measure for testing the cross-national generalizability of criminological theories. Therefore, a measure of 'getting drunk' was included. Respondents were asked on how many occasions they had gotten drunk in the past month. A larger percentage of American than German adolescents report *not* having had alcohol in the past month (81.4% v. 63.4%). More than twice as many Germans reported getting drunk 1-2 times in the past month (26.1% v. 11.3%).

Marijuana Use. Respondents reported on how many occasions they had used marijuana or hashish during the previous 30 days. As displayed in table 2, slightly more German youths abstain from smoking marijuana than Americans (87.1% v. 83.2%). The percentage of American respondents who smoked marijuana three or more times in the past month is nearly double that of German adolescents.

Independent Variables

Descriptive statistics for the explanatory variables are also presented in Table 2. As shown, statistical tests of differences in mean were significant for all study variables except respondents' sex.

Social bonding measures

The following measures provide an indication of the levels of social bonds in the adolescent's life.

Parental bonds. Talking to parents about problems and issues is used as an indicator of parental attachment, with those who are more likely to seek their parents' advice or approval and those who share more of their lives with their parents considered to be more strongly attached than those who talk some or not at all. Respondents were asked if they talk to their mom and dad about problems. Response categories included 2= 'always,' 1= 'sometimes,' and 0 = 'never,' The two items were summed, divided by 2, and odd scores were rounded up. Then, three dummy variables were created with "always talk to about problems" as the reference category. For respondents with only one parent, the answer for that parent was taken.

School bonds. Social bonds to school are measured by three items. First, respondents were asked how many days over the past month they had missed school due to skipping school.

The vast majority of respondents reported not having missed school due to cutting class in the 30 days prior to the survey, but Germans were less likely to do so compared to Americans. In addition, students were asked about their grade point average. Higher scores indicate better GPA. About 29% of American respondents, but fewer than 3% of German respondents had a GPA of 4.0 in the past school year. Finally, a dichotomous item measures whether the

respondent is college-bound (1 = yes). The different indicators of school bonds were entered separately. Plans for pursuing a college education also varied between countries: 52% of Germans and 49% of U.S. students indicated they were going to college after graduating from high school.

Conventional activities. Social control theory posits that strong bonds to conventional values serve as protective factors from engagement in delinquent behavior. Two measures tap into the respondent's involvement in such conventional activities, namely playing sports and reading. Both surveys asked on how many days the adolescent engages in each of the two activities. Only 3.15% of Germans and 9.36% of Americans never engaged in physical activities. With regard to reading, 13.55% of the sample said they never read for pleasure, and the difference between the two nations was statistically significant.

Social learning measures

Propositions derived from social learning theories tap into the significance of deviant peers in adolescent substance use. All comparable peer variables available in both surveys were factor-analyzed. Varimax rotation produced the following four main factors. Response categories for all four categories were: 1 = none, 2 = few, 3 = some, 4 = most, 5 = all.

Perceived peer smoking. This one-item social learning measure explores respondents' estimate of prevalence of cigarette smoking by their peers. Thirteen percent of respondents indicated that none of their friends smoked (Germans: 2.44%; Americans: 24.86%), and only 3.94% of the overall sample said that all of their friends smoked (Germans: 5.72%; Americans: 2.02%).

Perceived peer alcohol use. This is a two item measure of the extent to which respondents perceive their peers' use of alcohol. Students were asked how many of their friends they

estimate drink alcohol and get drunk once a week. 11.23% of Americans said that none of their friends drink alcohol, compared to a mere 1.23% for Germans. The tables seem to turn at the opposite end of the scale: 9.14% of Americans, and 5.88% of Germans report that all of their friends consume alcohol.

Perceived peer marijuana use. For this one-item measure, respondents were asked to estimate how many of their friends smoked marijuana. Thirty-eight percent of the sample did not have any friends who smoked marijuana, while 20 percent had at least some friends who smoked pot. Among German respondents, the proportion of respondents who reported not having any friends who smoked marijuana was considerably higher than for Americans (44% vs.19%).

Rational choice measures

In line with propositions of rational choice perspectives, the study includes measures of perceived risk and perceived availability. Respondents rated how harmful and easily available tobacco, alcohol, and marijuana are. Specifically, for risk perceptions they were asked "How much do you think people risk harming themselves (physically or in other ways)" if they engaged in any of the listed substance-using behaviors. Items were further separated into usage patterns for peer alcohol and marijuana use.

Perceived risk of smoking cigarettes. This is a one-item measure, with response categories "no risk," "slight risk," "moderate risk," and "severe risk," so that high scorers indicate that they perceive smoking more than one pack a day a great risk for physical and other damages. Seventy-nine percent of adolescents thought smoking that much constituted a severe risk. The two samples are most divergent in their perception that cigarettes pose a moderate risk: 20.36% of the American adolescents chose this answer, compared to only 5.62% of Germans.

Perceived risk of drinking alcohol. This two-item additive scale measures the respondent's perception of drinking. Two questions were asked in reference to how risky "having 1-2 drinks per day" and "5 or more alcoholic drinks per weekend" were. Only 1.48% of German adolescents reported that drinking posed no risk at all to the consumer, while about five percent of Americans said so.

Perceived risk of smoking marijuana. The three-item measure on the perceived risks of using marijuana categorizes usage patterns into "using marijuana once or twice," "using marijuana occasionally," and "using marijuana regularly." A greater percentage of American than German teens perceived marijuana as no risk at all (5.69 % versus 1.83%) *and* a severe risk (19.76% versus .91%)

Perceived availability of cigarettes. Students rated how easy the acquisition of cigarettes was by answering the question "How easy is it for you to get cigarettes?" According to respondents' reports, getting cigarettes is easier for German adolescent, 91.2% of whom said it was very easy, compared to 70.48% of their American peers.

Perceived availability of alcohol. This is a one-item measure for which students rated how easy they thought it was to get alcohol. Curiously, significantly more American adolescents (72.3%) than German adolescents (68.71%) indicated that it was very easy for them to get alcohol.

Perceived availability of marijuana. For this one-item measure students rated how easy the acquisition of marijuana was. Intriguingly, despite the more lenient policies regarding marijuana use, only 19.46% of German adolescents indicated marijuana was very easy to come by, compared to 52.31% of American teens. Differences between the two samples were statistically significant.

Demographic Measures

Individual-level demographics have been consistently linked with adolescent substance use. Males consistently show higher involvement with licit and illicit substances than females (e.g., O'Malley, Johnston, and Bachman, 1999b). Previous studies of the relationship between age and substance use found peaks in mid to late adolescence and declines in the twenties (e.g., Johnston, O'Malley, and Bachman, 2000). Family structure has been established as an important factor in socializing adolescents and influencing their risk behaviors (e.g., Johnson, Hoffmann, and Gerstein, 1996; Thomas, Farrell, and Barnes, 1996). The following controls are included in the analyses: *(1) Nationality.* This measure indicates the respondents' nationality (1= German, 0=American). *(2) Age.* Students reported how old they were on their last birthday. *(3) Sex.* Respondent's sex is measured by a dichotomous variable (1=male, 0=female). Almost 52% of the sample was female. *(4) Parental education.* Students' reports of the highest level of education completed by either biological parent are used as indicators for the family's financial situation or social status. Possible responses included: 1= completed grade school or less, 2= some high school, 3= completed high school, 4= some college, 5=completed college, 6= graduate or professional school after college. Response categories were recoded to approximate years of schooling in order to make the items from both surveys comparable. A higher number of German parents have only a high school degree or less, and significantly more American parents have a postgraduate degree in hand. *(5) Living arrangement.* Students reported with which parent(s) or guardian(s) they live. The analysis includes a dummy variable for intact family (living with both parents) versus all other family forms. Seventy-six percent of respondents live with both parents.

DIFFERENCES BETWEEN GERMANY AND THE UNITED STATES

Dependent Variables

As mentioned previously, Table 2 present the dependent variables and their frequency distributions as well as the results of comparisons in their means between Germany and the United States for the final samples after listwise deletion. Both the prevalence and incidence of smoking cigarettes is greater for German adolescents than American ones. As indicated in the table, the difference between the mean counts of smoking between Germany and the United States is significant.

A similar picture can be seen with regard to adolescent drunkenness in the two countries. Both of these differences achieve statistical significance. In addition, comparative tests revealed that not only is the prevalence of getting drunk for German but also the differences in mean levels of drinking *among those who got drunk* is significantly higher for German youths. Turning to marijuana use, one can see that the prevalence and incidence trends are reversed. Interestingly, despite the more lenient laws and regulations regarding marijuana use, the comparison of the mean counts of marijuana use shows that German youths are significantly less involved in this type of drug use than are their American counterparts.

Independent Variables

Notable differences between the two countries are also visible for the independent variables included in the analysis. For example, more German adolescents either never or very rarely read for leisure (51.65%) compared to only about 32% of their American peers. As shown in Table 2, significantly more American adolescents are in a circle of friends where no one smokes cigarettes or drinks alcohol (24.86% vs. 2.44% for peer cigarette use; 11.72% vs. 1.23% for peer alcohol use). In line with this, more Germans are part of a peer network where most friends use

cigarettes or alcohol. Interestingly, the numbers are reversed for peer marijuana use, meaning that fewer American than German adolescents indicated that none of their friends smoked marijuana (31.45% vs. 43.95%), and more Americans said that most of their peers did (16.05% vs. 7.04%). Another remarkable difference is the perceived availability of marijuana. Despite the difference in cultural and legal norms, more American adolescents indicated that marijuana was fairly or very easy to get (79.81% vs. 45.72%).

SUMMARY

The present chapter outlined the samples of adolescents from *European School Survey Project on Alcohol and Other Drugs (ESPAD)* and the *Monitoring The Future (MTF)* surveys. In addition, this chapter sketched the operationalization of the variables included in the statistical models. Descriptive statistics for the dependent and independent variables were discussed, and significant differences between both countries were highlighted. The next phase of this dissertation is to discuss the multivariate models and their results. Chapter 5 will focus on discussing the results of the statistical analyses. The chapter begins with a brief discussion of the zero-order correlation and the analytic strategy. The first part of the analysis includes separate negative binomial regression analyses for the German and the American samples to investigate the predictive value of the theoretical indicators. Next, findings from the cross-national models including interaction terms are presented.

Table 2: Descriptives for Study Variables, by country

	U.S.		German	
	N	%	N	%
Respondent's nationality				
	16244	100	11043	100
DEPENDENT VARIABLES				
Cigarette Use				
None	13311	83.7	5658	51.3
Less than 1/day	1217	7.7	1200	10.9
1-5/day	724	4.5	1372	12.4
1/2 pack/day	382	2.4	1467	13.3
1 pack/day	180	1.1	928	8.4
More than 1 pack/day	105	0.7	396	3.6
Std.Dev.	0.84		1.56	
Mean***	0.32		1.27	
Getting Drunk				
Never	11985	81.4	6786	63.4
1-2 times	1666	11.3	2797	26.1
3-5 times	607	4.1	831	7.8
6-9 times	269	1.8	201	1.9
10-19 times	124	0.8	83	0.8
20-39 times	41	0.3	12	0.1
40 or more times	35	0.2	0	0
Std.Dev.	0.78		0.80	
Mean***	0.31		0.51	
Marijuana Use				
Never	13155	83.2	9482	87.1
1-2 times	99	6.3	634	5.8
3-5 times	460	2.9	288	2.6
6-9 times	329	2.1	146	1.3
10-19 times	317	2.0	128	1.2
20-39 times	246	1.6	103	0.9
40 or more times	315	2.0	103	0.9
Std.Dev.	1.26		0.98	
Mean***	0.46		0.3	

SOCIAL BONDING MEASURES				
Respondent's relationship with parents				
Not v. always talking about problems	3157	19.43	504	4.56
Std.Dev.	0.4		0.21	
Mean				
Sometimes v. always talking about problems	5672	34.92	2344	21.23
Std.Dev.	0.48		0.41	
Mean				
Days respondent cut class/skipped school in past month				
None	12969	84.41	9095	88.82
Once	1189	7.74	624	6.09
Two days	506	3.29	252	2.46
Three days	290	1.89	152	1.48
Four days	212	1.38	56	0.55
Seven or more days	199	1.3	61	0.6
Std.Dev.	0.91		0.7	
Mean***	0.32		0.21	
Respondent's GPA				
A	4582	28.9	4212	38.3
B	6908	43.57	5581	50.75
C	3866	24.38	1089	9.9
D	500	3.15	99	0.9
F	0	0	15	0.14
Std.Dev.	0.81		0.68	
Mean***	4.51		4.29	
College plans				
Respondent plans to go to college	7797	49.22	5739	51.97
Respondent has no plans for college	8044	50.78	5304	48.03
Std.Dev.	0.50		0.50	
Mean***	0.49		0.52	
Involvement in Sports				
Never plays sports	1510	9.36	347	3.15
Plays a few times per year	1774	11	596	5.42
Plays 1-2 a month	1546	9.58	1205	10.95
Plays once a week	3080	19.09	5085	46.22
Plays nearly daily	8220	50.96	3769	34.26
Std.Dev.	1.37		0.98	
Mean***	3.91		4.00	

Reading for Leisure				
Never reads leisurely	1382	8.62	2283	20.72
Reads a few times per year	3753	23.41	3407	30.93
Reads 1-2 a month	5812	36.27	2315	21.01
Reads once a week	4422	27.59	1527	13.86
Reads nearly daily	658	4.11	1484	13.47
Std.Dev.	1.00		1.31	
Mean***	3.19		2.68	

SOCIAL LEARNING MEASURES				
Perceived peer smoking				
None	2530	24.86	268	2.44
A few	3837	37.71	954	8.67
Some	2411	23.7	2697	24.5
Most	1191	11.71	6458	58.68
All	206	2.02	629	5.75
Std.Dev.	1.03		0.82	
Mean***	1.28		2.57	
Perceived peer alcohol use				
None	1187	11.72	134	1.23
A few	2283	22.55	1237	11.32
Some	2895	28.59	4558	41.74
Most	2835	28	4350	39.83
All	926	9.14	642	5.88
Std.Dev.	2.26		1.57	
Mean***	3.59		4.25	
Perceived peer marijuana use				
None	3188	31.45	4801	43.94
A few	2683	26.46	3202	29.3
Some	2103	20.74	2036	18.63
Most	1627	16.05	769	7.04
All	537	5.3	119	1.09
Std.Dev.	1.23		1.00	
Mean***	1.37		0.92	

RATIONAL CHOICE MEASURES				
Perceived Risk of Smoking Cigarettes				
No risk	459	2.92	98	0.89
Slight risk	732	4.66	503	4.55
Moderate risk	3200	20.36	621	5.62
Severe risk	11323	72.06	9821	88.93
Std.Dev.	0.71		0.54	
Mean***	2.62		2.83	
Perceived Risk of Drinking Alcohol				
No risk	795	5.09	163	1.48
Slight risk	1854	11.86	1040	9.42
Moderate risk	4764	30.48	4322	39.13
Severe risk	8216	52.57	5518	49.96
Std.Dev.	1.71		1.37	
Mean***	4.17		4.30	
Perceived Risk of Smoking Marijuana				
No risk	876	5.69	202	1.83
Slight risk	2455	15.94	1438	13.11
Moderate risk	5691	36.93	7164	64.87
Severe risk	6386	41.44	2229	20.81
Std.Dev.	2.64		1.81	
Mean***	5.77		5.29	
Perceived Availability of cigarettes				
Impossible to get	896	6.18	74	0.68
Very difficult to get	396	2.73	39	0.36
Fairly difficult to get	721	4.98	92	0.85
Fairly easy to get	2264	15.62	761	6.99
Very easy to get	10213	70.48	9916	91.12
Std.Dev.	1.12		0.48	
Mean***	3.41		3.88	
Perceived Availability of alcohol				
Impossible to get	726	4.96	66	0.62
Very difficult to get	336	2.3	87	0.82
Fairly difficult to get	705	4.82	446	4.18
Fairly easy to get	2287	15.62	2835	26.57
Very easy to get	10584	72.3	7234	67.71
Std.Dev.	1.04		0.67	
Mean***	3.48		3.6	

Perceived Availability of marijuana				
Impossible to get	1183	8.23	878	7.96
Very difficult to get	600	4.18	1166	10.58
Fairly difficult to get	1118	7.78	3940	35.74
Fairly easy to get	3951	27.5	2895	26.26
Very easy to get	7515	52.31	2416	19.46
Std.Dev.	1.22		1.15	
Mean***	3.11		2.39	

DEMOGRAPHIC MEASURES				
Respondent's sex				
Male	7640	48.23	5316	48.36
Female	8201	51.77	5676	51.64
Std.Dev.	0.50		0.50	
Mean	0.48		0.48	

Living Arrangement				
Respondent lives with both parents	12413	80.43	7803	70.66
Any other living situation	3021	19.57	3240	29.34
Std.Dev.	0.40		0.46	
Mean***	0.80		0.71	

Parent's education				
Less than High School	237	1.55	1090	11.17
HS degree	808	5.29	1725	17.67
Some college	3171	20.75	3737	38.29
College degree	2996	19.61	705	7.22
Postgraduate	8068	52.8	2504	25.65
Std.Dev.	1.03		1.30	
Mean***	4.17		3.19	

CHAPTER 5

RESULTS

Our focus now shifts to the plan of analysis and results of multivariate test of the hypotheses. The chapter begins with a brief recap of the bivariate correlations, and move quickly to explaining the analytic strategy upon which this analysis is based. Finally, the results are presented.

BIVARIATE CORRELATIONS

Table 3 displays the bivariate correlations among the variables included in the analyses. Correlations were computed to establish associations between variables and to check for multicollinearity. They indicate, for example, that, on average, German adolescents' parents have fewer years of education. Also, German adolescents' friends smoke more than the peers of American youths. Americans, on the other hand, have more perceived access to marijuana than Germans. Table 3 further shows that social bonds are correlated, but not so highly as to imply problems with statistical multicollinearity. Some variables, like perceived availability of cigarettes and of alcohol, are highly correlated (.736). However, it should be noted that these variables are not entered in the same models in the analysis.

Prior to presenting the multivariate results, several features of the analysis deserve mention. First, because the dependent variables represent counts of use in the past month, the statistical models are examined with negative binomial regression models (NBRM). The NBRM is a more

Table 3. Correlation Matrix

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1. German	1.000															
2. Cigarette use	0.368 *	1.000														
3. Getting drunk	0.124 *	0.386 *	1.000													
4. Marijuana use	-0.067 *	0.303 *	0.388 *	1.000												
5. Notalkparent	-0.214 *	-0.016 *	0.039 *	0.080 *	1.000											
6. Sometalkparent	-.148 *	-0.022 *	-0.010	0.000	-0.254 *	1.000										
7. Truancy	-0.067 *	0.162 *	0.222 *	0.258 *	0.079 *	0.002	1.000									
8. GPA	0.178 *	-0.142 *	-0.130 *	-0.189 *	-0.122 *	0.000	-0.210 *	1.000								
9. College bound	0.027 *	-0.114 *	-0.064 *	-0.076 *	-0.042 *	0.033 *	-0.095 *	0.249 *	1.000							
10. Sports	0.047 *	-0.082 *	0.004	-0.061 *	-0.081 *	0.009	-0.078 *	0.176 *	0.142 *	1.00						
11. Read	-0.213 *	-0.229 *	-0.125 *	-0.051 *	0.015	0.065 *	-0.046 *	0.094 *	0.128 *	0.10 *	1.00					
12. Peer smoking	0.568 *	0.502 *	0.277 *	0.169 *	-0.063 *	-0.050 *	0.091 *	-0.055 *	-0.111 *	-0.027 *	-0.220 *	1.000				
13. Peer drinking	0.169 *	0.249 *	0.397 *	0.220 *	0.025	0.008	0.151 *	-0.096 *	-0.059 *	0.048 *	-0.097 *	0.565 *	1.000			
14. Peer mj use	-0.199 *	0.195 *	0.267 *	0.476 *	0.133 *	0.047 *	0.212 *	-0.200 *	-0.031 *	-0.038 *	-0.009	0.266 *	0.480 *	1.000		
15. PR smoking	0.159 *	-0.059 *	-0.079 *	-0.102 *	-0.083 *	-0.013	-0.103 *	0.151 *	0.099 *	0.098 *	0.045 *	-0.000	-0.023 *	-0.074 *	1.000	
16. PR drinking	0.040 *	-0.140 *	-0.265 *	-0.200 *	-0.077 *	0.002	-0.136 *	0.160 *	0.098 *	0.035 *	0.067 *	-0.112 *	-0.224 *	-0.158 *	0.381 *	1.000
17. PR marijuana	-0.099 *	-0.260 *	-0.293 *	-0.394 *	-0.060 *	0.014	-0.165 *	0.124 *	0.042 *	0.043 *	0.075 *	-0.233 *	-0.264 *	-0.389 *	0.266 *	0.455 *
18. Availability cig	0.245 *	0.179 *	0.146 *	0.091 *	0.008	-0.004	0.034 *	0.023 *	0.022 *	0.036 *	-0.052 *	0.330 *	0.294 *	0.150 *	0.066 *	-0.082 *
19. Availability alc	0.066 *	0.123 *	0.150 *	0.094 *	0.039 *	0.023 *	0.056 *	0.013 *	0.038 *	0.050 *	-0.029 *	0.201 *	0.309 *	0.220 *	0.050 *	-0.103 *
20. Availability mj	-0.290 *	0.117 *	0.199 *	0.268 *	0.140 *	0.072 *	0.146 *	-0.140 *	0.011	0.120	0.013	0.057 *	0.279 *	0.536 *	-0.050 *	-0.147 *
21. Male	0.001 *	-0.002	0.067 *	0.084 *	0.001	-0.024 *	-0.007 *	-0.107 *	-0.050 *	0.139 *	-0.103 *	-0.025 *	-0.006 *	0.027 *	-0.058 *	-0.134 *
22. Living arrangement	-0.113 *	-0.137 *	-0.044 *	-0.055 *	-0.054 *	-0.057 *	-0.061 *	0.088 *	0.042 *	0.070 *	0.055 *	-0.114 *	-0.023 *	-0.052 *	0.023 *	0.007
23. Parents' education	-0.387 *	-0.223 *	-0.062 *	0.001	0.047 *	0.084 *	-0.041 *	0.108 *	0.211 *	0.103 *	0.200 *	-0.308 *	-0.090 *	0.074 *	0.013	0.038 *

	17	*18*	*19*	*20*	*21*	*22*	*23*
17. PR marijuana	1.000						
18. Availability cigarettes	-0.176 *	1.000					
19. Availability alcohol	-0.159 *	0.736 *	1.000				
20. Availability marijuana	-0.284 *	0.444 *	0.522 *	1.000			
21. Male	-0.093 *	-0.009 *	-0.007	0.043 *	1.000		
22. Living arrangement	0.074 *	-0.036 *	-0.004	-0.027 *	0.040 *	1.000	
23. Parents' education	0.045 *	-0.076 *	0.051	0.146 *	0.034 *	0.099 *	1.000

suitable model than ordinary least squares regression due to three limitations that constrain OLS models. First, OLS regression assumes that the dependent variable is continuous, whereas count data are inherently discrete. Also, count variables are by definition truncated at zero, and negative counts are thus not possible. Furthermore, count dependent variables have non-symmetric distributions that are oftentimes highly skewed, which violates the OLS assumption that the error terms approximate a normal distribution (Long & Freese, 2003).

Several different statistical models are able to deal with the specific characteristics of count outcomes. One of these is the Poisson regression model, on which the NBRM and related count models are based (Long, 1997). The probability of a count is estimated by a Poisson distribution, with the mean of the distribution as a function of the independent variables. The Poisson model is rarely applied due to the requirement of equidispersion (i.e., the conditional = the conditional variance). A violation of the equidispersion requirement leads to a downward bias of standard errors; that, in turn, leads to spuriously large z-values (Long, 1997). The NBRM was developed to deal with this problem, and while the Possion model and the NBRM have the same mean structure, the NBRM introduces unobserved heterogeneity allowing for overdispersion (Long & Freese, 2003).

Nonlinearity has implications for interpreting the effects of independent variables. When interpreting the effect of predictors in regressions, we focus on the change in Y due to the change in X, holding constant the other variables. In linear regression, a change in a predictor X is the same at all values of other independent variables. Interpreting the coefficients for nonlinear models, however, is a bit more complicated. The effect of a unit change in a predictor X depends on the values of other variables in the model and entails more than simply the parameter

of the model (Long, 1997). Unless otherwise noted, the effects of the independent variables are discussed holding the other predictors at their means.

An additional feature of the analysis is that, or the combined cross-national models, the models are nested for each outcome to facilitate cross-model comparisons. A final aspect of the analysis involves the use of interaction terms. A primary question this study seeks to answer is whether the predictors of substance use have differential effects for Germans and Americans. Examining this question requires interaction models that incorporate product terms between the theoretical variables and the binary measure of nationality. Following Aiken and West (1991: 40-47) the interaction terms are created by first centering each variable at its mean and then multiplying each centered value by the measure of nationality. This procedure has the advantage of mitigating the multicollinearity between the interaction term and its component parts. For example, Hypothesis 9 predicts that the influence of peers on getting drunk is greater for American than German youth. The statistical significance of these interaction terms represent the significance of differences in the effects of predictors on substance use based on nationality.

The results can be presented in a variety of ways. A common approach to express findings for negative binomial regression models is to present the expected count and percentage change in the expected count on the outcome variable. Another way to view the effects of the various determinants is to consider predicted probabilities on different levels of the outcome variables. Predicted probabilities are helpful due to their intuitive appeal and are typically used for direct comparison between categories among independent variables (Long, 1997). One advantage of expressing statistical relationships through predicted probabilities is that they put forward a way to more easily grasp the effect of independent variables on each of the response categories of the dependent measure. In order to understand the impact that certain factors have on the likelihood

of substance use, a series of predicted probabilities and compared specific subgroups were computed (e.g., German, gender..) where appropriate, holding all other variables constant at their mean values.[31]

Finally, it should be noted that the large sample size likely has an influence on the results in that even trivial effects may be statistically significant. It is necessary then to look cautiously at the magnitude of each coefficient to decide whether it is large enough to be substantively interesting. Because there are no objective cut-off points for substantive significance, the analysis relies on existing research to determine which effects are meaningful and worth reporting in this analysis.

PREDICTING SUBSTANCE USE AMONG AMERICAN ADOLESCENTS

Predicting Past Month Cigarette Use

Table 4 displays the results of the negative binomial regression models predicting substance use among American adolescents. The results show mixed support for social bonding theory. Specifically, three social bonding indicators, GPA, truancy, and involvement in sports were statistically significant predictors of past month smoking for the American sample. As predicted in hypothesis 1, adolescents' GPA was inversely associated with smoking, with a standard deviation increase in GPA reducing the expected count of smoking by roughly 20 percent. The predicted probability for a count of one was .15 for American adolescent with a D average compared to .08 for those who with a 4.0 GPA. Conversely, truancy was related to a higher expected count of substance use; a one standard deviation increase in this measure augmented cigarette smoking by a factor of .16 (e^b=1.180; p<.001).

[31] Bachman and Paternoster (1997) provide an excellent discussion on the computation of predicted probabilities for logistic models.

Table 4. Negative Binomial Regressions Predicting Past Month Substance Use among American Respondents

Independent Variables	*Model 1* Cigarette Use				*Model 2* Getting Drunk				*Model 3* Marijuana Use			
	b	***p***	**s.e.**	**e^b**	**b**	***p***	**s.e.**	**e^b**	**b**	***p***	**s.e.**	**e^b**
Social Bonds												
Notalkparents	.12		.08	1.13	.03		.07	1.08	.09		.06	1.10
Sometalkparents	.03		.07	1.03	.05		.06	1.06	.09		.05	1.09
Truancy	.17	***	.02	1.18	.18	***	.02	1.19	.16	***	.03	1.18
GPA	-.27	***	.04	.76	-.11	***	.04	.89	-.18	***	.03	.83
College bound	-.06		.07	.95	-.07		.06	.93	-.11	***	.05	.90
Daily Sports	-.05	*	.02	.95	.01		.02	1.03	.02		.02	.96
Read	-.05		.03	.96	.01		.03	1.01	-.04		.02	1.02
Social Learning												
Peer use	.90	***	.03	2.45	.48	***	.02	1.61	.67	***	.02	1.95
Rational Choice												
Perceived Risk	-.34	***	.04	.71	-.23	***	.02	.79	-.20	***	.01	.82
Perceived Availability	.32	***	.07	1.38	.18	***	.06	1.20	.49	***	.01	1.64
Socio-demographics												
Sex (1=Male)	.11		.06	1.12	.05		.06	1.05	.14	****	.05	1.15
Living Arrangement	-.10		.08	.91	-.07		.07	.93	-.09		.05	.91
Parents' Education	-.05		.03	.95	.11	***	.03	1.12	-.04		.02	.96
N	8828				7582				7817			
_cons	-1.992				-2.069				-1.755			

*** p <.001; ** p <.01; * p <.05; two-tailed tests.

Consistent with differential association theory and hypothesis 2, peer smoking proved to be the strongest predictor of adolescents' use of cigarettes. Illustratively, adolescents' predicted count of smoking was increased by more than 148% for each standard deviation increase in the peer use of cigarettes (b= .896, p<.000). The predicted probability of a count of one on the dependent variable (smoking 1 cigarette per day) is .03 for American adolescents without any smoking peers, .15 for those whose peer group consists of some smokers, and .23 for adolescents whose friends all smoke.

Lastly, the results for cigarette smoking show strong support for hypothesis 4. For American students, the expected count of cigarette use increased by more than 40% for every standard deviation increase in the measure of perceived availability. Put differently, among those who perceive cigarettes to be very easy to get, the predicted probability of a zero count is .86 compared to .12 for a count of one, and .02 for a count of two (smoking 1-5 cigarettes per day), holding all other measures at their means.

In addition, the perceived risk of smoking was inversely and significantly associated with cigarette use, in support of hypothesis 4. A standard deviation increase in the perceived risk of smoking decreased the expected count of cigarette use by approximately 20 percent. Holding all other variables at their means, the predicted probability of a count of one is .10 for those who perceive smoking to be a severe risk, and almost double (.18) for those who find smoking to pose no risk.

Predicting "Getting Drunk" in Past Month

Model 2 of Table 4 displays the results of the negative binomial regression of the frequency of "getting drunk" in the past month for the American sample. As with cigarette smoking, only a

few of the social bonding measures are significantly associated with past month inebriation, showing weak support for hypothesis 1. Having a higher GPA lowers the frequency of getting drunk. Specifically, the expected count of getting drunk decreases by 8.5% for every standard deviation increase in GPA, net of other factors. The only other significant social bonds indicator is truancy. Those respondents who skip school are more prone to get drunk. Instructively, the predicted probability of a count of one (getting drunk once) for American respondents is .11 for those who didn't skip class compared to .20 for those who skipped class seven or more days.

Analogous with the previous model and consonant with hypothesis 2, having peers who drink is positively associated with getting drunk. Holding all other variables at their means, the predicted probability of a count of zero (not getting drunk) for American adolescents who do not have any friends that drink is .98 compared to a predicted probability of .02 for a count of one (getting drunk once in the past month). Put differently, a standard deviation increase in the proportion of friends who drink alcohol increased the expected count of getting drunk by 185%, making this by far the strongest predictor in the model.

In line with hypothesis 4, both perceived availability of alcohol and perceived risk of drinking were significantly related to the dependent variable. More specifically, the expected count in getting drunk increased by about 20 percent with every standard deviation increase in the measure of perceived availability. On the other hand, the higher the perceived risks of drinking, the lower the likelihood of past month drunkenness. For every standard deviation increase in risk perceptions, the expected count for drinking to the point of inebriation was lowered by a factor of .23 ($p<.000$). The predicted probability for a count of one on the dependent variable is .22 for Americans who think drinking has no inherent risks compared to

.14 for those who perceive drinking as moderately risky and .08 for adolescents who think drinking poses a severe risk.

Among the socio-demographic measures, only parents' education was significantly associated with getting drunk. Each standard deviation increase in parent's education augmented the expected count of getting drunk by approximately 12 percent.

Predicting Past Month Marijuana Use

The third model in Table 4 displays the results for past month use of marijuana for the American sample. The findings were again mixed for hypothesis 1. Consistent with results for the other types of substance use investigated here, the bonds to education were strongest among the theory's indicators, providing some support for hypothesis one. A one standard deviation increase in GPA decreased the count of pot smoking by 13.5 percent. The association between cutting school and marijuana use was equally strong, with an increase of more than 15% for every standard deviation change. Finally, college-bound students had significantly lower counts of marijuana use compared to those not on a track to college.

Consistent with the other models and hypothesis 2, having friends who smoke marijuana is strongly associated with adolescent marijuana use. Holding other variables at their means, the predicted probability of a count of one on the dependent variable is .10 for American adolescents of whose friends nobody smokes marijuana compared to .25 for those who have a peer groups where most smoke marijuana. Expressed differently, for every standard deviation increase in the number of marijuana-smoking peers, the expected count skyrockets by almost 126 percent.

Last but not least, both rational choice indicators were significantly related to past month marijuana use. Their influence, while not quite as strong as deviant peers, was considerably

larger than that of the combined social bonding measures. For example, the expected count of smoking marijuana among American respondents increased by almost 80% for every standard deviation increase in perceived availability of marijuana. Showing a significant inverse relationship, every standard deviation increase in perceived risk of marijuana reduced the use of this substance by 40 percent. For Americans who perceive no risk in smoking marijuana the predicted probability of a count of one is .25 compared to .12 for those who think smoking marijuana is a severe risk.

Among the three socio-demographic controls, only sex mattered. Being male increased the expected frequency of past month marijuana use by more than 14% ($p<.005$).

SUMMARY

To summarize the findings for American adolescents, it can be noted that the support for hypothesis 1 predicting social bonds to be associated with adolescent substance use was weak at best. The only two social bonding measures consistently significant across the dependent variables were GPA and truancy, indicating that bonds to school were the only useful predictors for adolescent substance use, while parental bonds and conventional activities were not relevant. On the other hand, results showed strong support for hypothesis 2 predicting the relevance of substance using peers. Peer use was by far the strongest predictor of cigarette, alcohol, and marijuana use. Support was also found for hypothesis 4 predicting the significance of rational choice measures for adolescent substance use. The two rational choice measures of perceived availability and risk perceptions were strongly related in the expected direction to all three types of substance use tested here. Finally, only two of the socio-demographic measures included in the models reached statistical significance. Namely, parents' education was a significant

predictor of getting drunk. In addition, American males were significantly more likely than females to smoke marijuana.

PREDICTING SUBSTANCE USE AMONG GERMAN ADOLESCENTS

Predicting Current Cigarette Use

Table 5 presents the results of the NB regression models predicting the frequency count of cigarette use, getting drunk, and smoking marijuana, respectively, for Germans. The results show strong support for social bonding theory, consonant with hypothesis 1. Having plans to go to college, being active in physical activities, and reading for leisure all reduce the expected count of cigarette smoking among German adolescents. As expected, having a lower GPA and cutting school are positively associated with a higher count of cigarette smoking. Also consistent with hypothesis 1, the expected count of cigarette use is lower for adolescents who always talk with their parents about problems compared to those who never ($b= 0.155$, $p<0.01$) or just sometimes confide in their parents ($b= 0.094$, $p<0.01$).

Consistent with differential association/social learning predictions (hypothesis 2), this model shows that having more friends who smoke is positively related to respondent's use of tobacco. The predicted probability of a zero count is .9 among those Germans whose friends do not smoke compared to .17 among those whose peer group consist almost exclusively of smokers. For a one standard deviation increase in peer smoking, the expected count of cigarette use increases by more than 100 percent. Indeed, peer use of cigarettes has by far the strongest association with adolescent smoking in the model net of other factors.

Of the two rational choice measures only the perceived availability of cigarettes was significant. More specifically, a standard deviation increase in the opportunity to smoke

increased the expected count of smoking by almost 10% among German respondents. Holding other measures at their means, the predicted probability for a count of zero on the dependent variable is .5 among German adolescents who rank highest on the risk perceptions scale. Comparably, the predicted probability of a count of for them is .29 and .13 for a count of two. Perceived risk of smoking on the other hand does not significantly predict German adolescents' use of tobacco.

Predicting "Getting Drunk" in Past Month

Model 2 of Table 5 displays the results of getting drunk in the past month for German youths. Compared to the models for American youths, the results are somewhat different for Germans respondents. Turning to social bonds, most were significantly associated with getting drunk. Performance in school was negatively related to getting drunk. For every standard deviation increase in GPA, the expected count of getting drunk decreased by almost 15 percent. Cutting school was also significantly related to the dependent variable. For every standard deviation increase in skipping class, the expected count of adolescents' past month drunkenness decreased by a factor of .156 ($p<0.000$). College-bound respondents were significantly less likely to have gotten drunk than those who have no plans to attend college after high school ($b= -.110$, $p<0.005$). In a similar fashion, the expected count decreased for every standard deviation increase in reading. In contrast to the American results, attachment to parents achieved statistical significance. Compared to those who always talked to their parents, those who never talked to their parents about problems had a 20% higher expected count of getting drunk.

Table 5. Negative Binomial Regressions Predicting Past Month Substance Use Among German Respondents

Independent Variables	*Model 1* Cigarette Use				*Model 2* Getting Drunk				*Model 3* Marijuana Use			
	b	***p***	**s.e.**	**e^b**	**b**	***p***	**s.e.**	**e^b**	**b**	***p***	**s.e.**	**e^b**
Social Bonds												
Notalkparents	.15	**	.06	1.17	.18	*	.08	1.20	-.01		.10	.99
Sometalkparents	.09	**	.04	1.10	.00		.05	1.00	.09		.06	1.09
Truancy	.13	***	.02	1.14	.16	***	.02	1.17	.05	*	.03	1.06
GPA	-.28	***	.02	.75	-.16	***	.03	.09	-.19	***	.04	.83
College bound	-.15	***	.03	.86	-.110	***	.04	.90	.01		.05	1.01
Daily Sports	-.05	***	.02	.95	.05		.02	.91	-.02		.02	.99
Read	-.11	***	.01	.90	-.09	***	.02	1.02	-.012		.03	.98
Social Learning												
Peer use	.85	***	.03	2.34	.32	***	.01	1.38	.78	***	.03	2.19
Rational Choice												
Perceived Risk	-.02		.03	.98	-.08	***	.01	.93	-.20	***	.01	.82
Perceived Availability	.20	***	.05	1.22	.23	***	.04	1.26	.63	***	.04	1.88
Socio-demographics												
Sex (1=Male)	.03		.03	1.03	.14	***	.04	1.15	.24	***	.05	1.27
Living Arrangement	-.20	***	.03	.82	-.12	***	.04	.89	-.19	***	.05	.82
Parents' Education	.02		.01	1.02	.02		.01	1.02	.05	**	.02	1.05
N	8828				8472				7817			

*** p <.001; ** p <.01; * p <.05; two-tailed tests.

As with the American sample, peer drinking turned out to be the strongest predictor of drunkenness among German youths. The frequency of past month drunkenness increased by almost 65% with a one standard deviation increase in the number of friends who use alcohol. Finally, the rational choice measures fared well; both were statistically significant and in the predicted direction. For every standard deviation increase in the perceived availability of alcohol, the expected count of drunkenness increased by a factor of 0.227 ($p<0.000$). The predicted probability of a count of one is .15 for Germans who perceive alcohol to be impossible to get compared to .29 for those who say alcohol is very easily accessible. As expected, risk perceptions were negatively related to getting drunk. The higher the perception of risk of alcohol, the lower the expected count of drunkenness among German respondents ($b= -.077$, $p<0.000$).

In comparison to girls, males have an expected count that is 15.4 percent higher. The other significant socio-demographic variable is the adolescent's living arrangement. Those who live with both parents have an expected count of drunkenness that is 11 percent lower compared to adolescents in any other living situation.

Predicting Current Marijuana Use

The results of the NB regression predicting the count of marijuana use in the past month is shown in model 3 of Table 5. Hypothesis 1 received little support. Among the social bonding indicators, only GPA was significant. Every standard deviation increase in GPA decreased the expected count of the dependent variable by a factor of .185 ($p<0.000$).

Once again, friends' use of marijuana was the best predictor of adolescent marijuana use, increasing the expected count by almost 120 percent for a one standard deviation increase. The

predicted probability of smoking marijuana once in past month increases from .08 for those Germans who do not have any pot-smoking friends to .26 among those who report that most of their friends smoke marijuana.

Perceived availability was the second strongest indicator in the model, and higher levels of perceived risk of marijuana have a significant inverse relationship with smoking pot among German adolescents. Consistent with hypothesis 4, results show that among German adolescents who perceive smoking marijuana as a severe risk, the predicted probability of a zero count is .63, compared to .24 for smoking marijuana 1-2 times in past month, and .08 for smoking marijuana 3-5 times in past month.

The three socio-demographic measures were all significant. Female respondents had a 27% lower expected count of smoking marijuana than males. Adolescents living with both parents as well as those with more highly educated parents had a lower count of marijuana use.

Summary

Several patterns were evident in the models examining correlates of German adolescents' use of substances. First, with exception of marijuana use, results showed a fair amount of support for hypothesis 1 as social bonds fairly consistently predicted cigarette use and getting drunk. Bonds to school and education turned out to be most relevant of the social bonding measures. Second, as found in the analysis of American adolescents, hypothesis 2 was supported across the board. Having friends who use cigarettes, drink, or smoke marijuana played an important role in predicting substance use. Hypothesis 4 found support only in the model predicting marijuana use. Perceived availability, however, was a strong predictor for use of all three substances. In addition, a sex gap was evident for both getting drunk and marijuana use, with German males

significantly more likely to report involvement in such substance use. Also, living with both parents made a difference across models for German youths in that it consistently decreased incidence of substance use. Thus, the results described above suggest a somewhat different picture of adolescent substance use among German adolescents than the one shown for American youths. Therefore, an examination of the ostensible differences follows.

EXAMINING DIFFERENCES IN PREDICTORS CROSS-NATIONALLY

The second part of the analysis compares the varying effects of theoretically derived indicators cross-nationally. For this step, the two data sets were merged and a measure for country was incorporated (German=1). Negative Binomial Regression models estimated the empirical validity and explanatory power of the theoretically derived predictors. The analyses proceeded through several stages.

In the first stage, the constructs indicating levels of bonds to conventional social institutions in the adolescent's life are entered simultaneously. Then, the measures of affiliation with drug-using peers are added to the model, and attention is given not only to the effect of this measure, but also whether the social bonds measures are attenuated by the incorporation of drug-using peers. Next, risk perceptions and opportunity measures are incorporated into the models to gauge the impact of the rational choice perspective. As with the previous step, the interest in this last model is not only to focus on the effect of the measures but also to consider how the other predictors are affected by risk perceptions and opportunities. In the next step, socio-demographic background variables as well as the measure for nationality (German) are added.

The final models, which are the primary focus, evaluate the significance of national context in the relationship of individual-level predictors and adolescent substance use. These

models use interaction terms generated between each of the theoretical predictors of substance use and nationality. As stated earlier, interaction terms were created following a procedure developed by Aiken and West (1991: 40-47). Namely, each variable was first centered and then the centered values were multiplied together. If only the variable representing Germany contributed significantly to the equation, then both countries differ in the level of consumption, but not in the relation between the predictors and outcome variables. However, if the interaction terms contribute significantly, then the relation between the predictors and the dependent variable varies by country. As cultural differences may emerge in all aspects of the relationship, interaction terms for all of the theoretical constructs are examined.

Predicting Current Cigarette Use

Table 6 shows the results of the NB regression for past month cigarette use. Model 1 investigates the role of social bonding measures, and shows modest support for hypothesis 1. Adolescents who always talk to their parents about problems had a lower expected count of cigarette use than those who confide in their parents only sometimes ($b=.12$, $p<0.01$) or never ($b=.21$, $p<0.000$). GPA, being college-bound, reading, and sports are all inversely related to cigarette smoking. Furthermore, a one standard deviation in truancy increases the expected count of smoking by a factor of .23 ($p<0.000$), holding constant the other variables in the model.

Model 2 incorporates the measure of peer smoking. As predicted, peer smoking is positive and significant, both substantively and statistically. A one standard deviation increase in peer smoking augments the expected count of past month cigarette use among German and American adolescents by roughly 224 percent. In support of hypothesis 3, incorporating peer smoking attenuated the social bonding coefficients on average by 88%, ranging from minimum to

Table 6. NB Regressions Predicting Past Month Cigarette Use (n=16,922)

Independent Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	b	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*
Social Bonds															
Notalkparents	-.21	***	.81	-.02		.98	-.05		.95	0.16	**	1.18	.15	**	1.16
Sometalkparents	-.12	**	.89	.01		1.01	.01		1.01	0.08	*	1.09	.07		1.07
Truancy	.23	***	1.26	.14	***	1.15	.13	***	1.14	0.14	***	1.15	.14	***	1.15
GPA	-.27	***	.77	-.22	***	.8	-.22	***	.80	-.276	***	.76	-.28	***	.76
College bound	-.29	***	.74	.10	**	.91	-.10	***	.91	-.123	***	.88	-.10	**	.90
Sports	-.06	***	.94	-.03	*	.97	-.03	**	.97	-.054	***	.95	-.08	***	.92
Read	-.26	***	.77	-.13	***	0.88	-.13	***	.88	-.093	***	.91	-.05	***	.95
Social Learning															
Peer smoke				1.08	***	2.93	1.03	***	2.81	0.88	***	2.42	.87	***	2.39
Rational Choice															
Perceived risk							-.08	***	.92	-.151	***	.86	-.17	***	.84
Perceived availability							.31	***	1.36	0.27	***	1.31	.26	***	1.30
Socio-demographics															
German										0.69	***	2.00	.76	***	2.14
Sex (1=Male)										0.06	*	1.06	.05		1.05
Living arrangement										-.177	***	.84	-.18	***	.83
Parents' education										0.01		1.01	0.01		1.01
German*notalk													.05		1.05
German*sometalk													.07		1.07
German*truancy													-.02		.98
German*GPA													-.02		.98
German*college bound													-.08		.92
German*sports													-.06		.94
German*read													-.00		1.00
German*peer smoke													-.02		.98
German*risk													.31	***	1.37
German*availability													-.125		.88

* p <.05; ** p <.01; *** p <.001; two-tailed tests.

maximum. As expected, stronger bonds continued to significantly decrease cigarette use; that is, social bonds had both a direct effect as well as an indirect influence on smoking through using peers.

Model 3 estimates the effect of rational choice measures were added to the model. Supporting hypothesis 4, results confirm the significance of perceived availability and perceived risk for adolescent smoking. More specifically, every standard deviation increase in the perceived availability of cigarettes increased the expected count of adolescents' own smoking by a factor of 0.31 (*e^b*= 1.36, p<.000). Perceiving smoking as a risk to one's health and well-being decreased the expected count of cigarette use among youths by a factor .08 (e^b= .92, p<.000). The inclusion of these two rational choice indicators did not noticeably alter the influence of the other variables in the model, which is inconsistent with hypotheses 5 and 6.

Model 4 includes the dummy variable for country as well as the socio-demographic background variables. Instructively, Germans have an expected count of past month smoking that is roughly 100 percent higher than that for Americans, net of other variables in the model. As for the other demographics, only living with both parents is inversely and significantly related to adolescent smoking.

At this point in the cross-national analysis, predicted probabilities were computed for those variables that reached statistical significance. For example, the predicted probability of not smoking cigarettes in the past month is .79 for American female adolescents compared to .78 for American males, .65 for German females, and .63 for German males, holding all other variables at their means. The predicted probability of smoking 1-5 cigarettes per day in the past month is 0.03 American males, compared to 0.08 for German males, holding all other variables at their means. With regard to truancy, Americans who did not skip class have a predicted probability of

.79 for not smoking, .17 for smoking less than one cigarette per day, and .03 for smoking 1-5 cigarettes per day. Similarly, German adolescents who attend every class have a predicted probability of .65 for not smoking, .24 for smoking less than one cigarette per day, and .07 for smoking 1-5 cigarettes per day.

Further, the predicted probability of a zero count (not smoking cigarettes in the past month) is 0.96 for American adolescents that have only non-smoking friends compared to .78 about half of whose friends smoke, .92 for German adolescents that have only non-smoking friends, and .63 for German adolescents whose peer group includes a fair number of smokers, holding all other variables at their means. In terms of perceived availability, the predicted probability of not smoking cigarettes in the past month is .91 for American adolescents for whom it is impossible to get cigarettes compared to .78 who perceive the acquisition of cigarettes to be very easy. For German adolescents that have no access to cigarettes, the predicted probability of not smoking in the past month is .83 compared to .62 for those Germans who can very easily get cigarettes.

The final model in Table 6 incorporates interaction terms to test for cross-national differences in relationships between theoretical indicators and cigarette use. Findings show no support for hypotheses 7 through 9 predicting cross-national differences. Only one of the interaction terms was significant, indicating that with the exception of perceptions of risk, the influence of the indicators on cigarette use does not differ significantly for German and American adolescents. It suggests that higher perceptions of risk have a steeper negative slope for American adolescents than German ones. Phrased alternatively, high levels of risk perceptions have a stronger negative relationship with the expected count of smoking for American than German adolescents, holding constant other variables. [32]

[32] Interaction terms were also entered individually. However, the results remained the same.

Predicting 'Getting Drunk' in Past Month

A series of NB regression models were computed to test the significance of theoretical measures with regard to adolescent drunkenness cross-nationally. Findings are displayed in Table 7. Model 1 includes the indicators of social bonding theory. As expected, GPA, college bound, and reading significantly lower the frequency of past month inebriation. Illustratively, a one standard deviation increase in GPA lowers the expected count of getting drunk by 15.3 percent. Similarly, adolescents who plan to go to college have a lower expected count of getting drunk than those not on a track to college. Further, adolescents who skip school are significantly more likely to get drunk. Every standard deviation increase in truancy increased the expected count of getting drunk by almost 25 percent, net of other factors.

Model 2 adds the measure of peer drinking. Resembling the results of the other models, peer alcohol use has a strong, positive association with the youths' own consumption. For a one standard deviation increase in the number of friends who use alcohol, the expected count jumps by almost 130 percent. In support of Hypothesis 3, peer use also serves as a mediator for social bonds, reducing their coefficients on average by 39 percent. Interestingly, participation in sports experiences the largest mediation effect as its coefficient was reduced by roughly 50%, whereas the binary indicators of parental attachment were most weakly reduced by the inclusion of peer use in the model.

Model 3 of Table 7 adds the rational choice indicators. Both perceived availability of alcohol and alcohol-related risk perceptions are statistically and substantively significant. Illustratively, a one standard deviation increase in perceived availability of alcohol augments the expected count by 18.5 percent. The inverse relationship between risk perceptions and drunkenness is

Table 7. NB Regressions Predicting Past Month Getting Drunk (n=16,054)

Independent Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	b	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*
Social Bonds															
Notalkparents	.02		1.02	-.05		.98	-.11	*	.90	.13	*	1.14	.14	**	1.15
Sometalkparents	-.08	*	.93	-.07		.97	-.08	*	.92	.03		1.03	.04		1.04
Truancy	.29	***	1.34	.18	***	1.19	.16	***	1.18	.16	***	1.17	.16	***	1.18
GPA	-.22	***	.80	.12	***	.89	-.09	***	.91	-.145	***	.87	-.13	***	.88
College bound	-.16	***	.85	.10	**	.91	-.08	**	.92	-.102	*	.90	-10	**	.91
Sports	.08	***	1.08	.04	***	1.05	.04	**	1.04	.02		1.02	.02		1.02
Read	-.19	***	.83	-.14	***	.87	-.13	***	.88	-.068	***	.93	.05	**	.95
Social Learning															
Peer drinking				.43	***	2.28	.39	***	1.47	.39	***	1.48	.39	***	1.48
Rational Choice															
Perceived risk of							-.12	***	.88	-.136	***	.87	-.14	***	.87
Perceived availability							.21	***	1.23	.21	***	1.24	.21	***	1.23
Socio-demographics															
German										.63	***	1.87	.88	***	2.41
Sex (1=Male)										.12	***	1.12	.11	***	1.12
Living arrangement										-.096	*	.91	.10	**	.91
Parents' education										.04	**	1.04	.04	***	1.04
German*notalk													.10		1.10
German*sometalk													-.08		.92
German*truancy													.01		1.01
German*GPA													.09	*	.91
German*college bound													-.07		.93
German*sports													.01		.99
German*read													-.11	***	.89
German*peer smoke													-.13	***	.88
German*risk													.14	***	1.45
German*availability													.04		1.04

* p <.05; ** p <.01; *** p <.001; two-tailed tests.

such that every standard deviation increase in the adolescent's perception of alcohol as potentially harmful lowers the expected count by a factor of .12 (e^b= 0.88, p<.000). It should also be noted that the remaining predictors in the model were only slightly influenced by the addition of these rational choice measures, which suggests that social bonds and peer use are not influencing adolescents' drinking through opportunities or risk perceptions. Thus, hypotheses 5 and 6 receive no support in this model.

The fourth model incorporates socio-demographic measures, and all reach statistical significance. Males have a more than 12% higher expected count of drinking too much compared to females. Most importantly, being German increases the expected count of getting drunk by more than 87%, net of the other variables.

The predicted probability of getting drunk once in the past month is .15 for Americans who did not skip class compared to .19 for those who skipped class three days, and .26 for those who missed more than 7 days. For Germans, the predicted probability of getting drunk once in the past month is .23 for those who attended every day of class compared to .30 for those who missed three days, and .33 for those who skipped seven or more days. The predicted probability of getting drunk once in the past month increases continuously with perceived peer use of alcohol. For example, if German adolescents do not have any friends who drink or get drunk, their predicted probability of getting drunk at least once is .07 compared to .29 for those whose friends all drink. The predicted probability of getting drunk once in the past month is .23 for Americans who believe that drinking or binge drinking does not carry risks compared to .13 for those who believe such behavior is very risky. In comparison, the predicted probabilities for Germans are .31 and .20, respectively.

Finally, Model 5 adds the interaction terms for the cross-cultural comparison. As can be seen, four interaction terms achieve statistical significance, and each was plotted for ease of interpretation.[33] Focusing first on the varying influence of social bonds, two interactions are significant, and both are in the direction opposite to that predicted in Hypothesis 8. That is, having a higher GPA (Graph 2) and reading more often (Graph 3) have a steeper negative slope in predicting getting drunk for German than American youth. Put differently, the two social bonding measures decrease the expected number of times the youth has gotten drunk more for Germans than Americans. In support of Hypothesis 9, the interaction term between peer drinking and the adolescents' frequency of getting drunk in the past month (e^b=.8795; p<.000) shows that the influence of peer use differs significantly by country. Specifically, the influence of peer use on adolescents' own frequency of getting drunk is stronger for American than German youth (Graph 4). Finally, the results indicate that the association between perceptions of risk and getting drunk differ significantly between the two nations. The association between higher risk perceptions and a lower expected count of getting drunk is stronger for American than German teenagers.

Predicting Current Marijuana Use

The final series of models test the relationships between predictors and past month marijuana use for the combined sample. Table 8 displays the results of the nested hierarchical NB regressions on the combined sample. As indicated in model 1, the social bonding measures are of GPA, reading, and sports all have significant, inverse associations with adolescents' use of marijuana, as predicted by hypothesis 1 and net of the other variables in the model. Every standard deviation increase in GPA decreases the expected count of use by more than 30 percent.

[33] See appendix for graphs.

Table 8. NB Regressions Predicting Past Month Marijuana Use (n=16,618)

Independent Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	b	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*	*b*	*p*	*e^b*
Social Bonds															
Notalkparents	.01	***	1.50	.04		1.04	-.09		.91	.08		1.08	.08		1.09
Sometalkparents	.17	*	1.18	.06		1.06	-.01		.99	.08		1.08	.09		1.09
Truancy	.42	***	1.52	.22	***	1.25	.17	***	1.18	.17	***	1.18	.14	***	1.15
GPA	-.49	***	.61	-.22	***	.80	-.17	***	.84	-.20	***	.82	-.20	***	.82
College bound	-.06		.94	-.02		.98	-.05		.95	-.05		.95	-.052		.95
Sports	-.07	**	.93	.01		1.01	.02		1.02	-.01		.99	-.02		.98
Read	-.09	***	.92	-.13	***	.88	-.09	***	.91	-.03		.97	-.033		.97
Social Learning															
Peer marijuana use				1.28	***	3.58	.91	***	2.48	.94	***	2.55	.97	***	2.63
Rational Choice															
Perceived risk							-.24	***	.79	-.22	***	.80	-.22	***	.80
Perceived availability							.52	***	1.67	.58	***	1.78	.55	***	1.73
Socio-demographics															
German										.51	***	1.66	.23	*	1.26
Sex (1=Male)										.33	***	1.40	.32	***	1.38
Living arrangement										-.16	*	.85	-.15	*	.86
Parents' education										.01		1.01	.01		1.01
German*notalk													.04		1.04
German*sometalk													.06		1.07
German*truancy													-.13	*	.88
German*GPA													.01		1.00
German*college bound													.02		1.02
German*sports													-.03		.97
German*read													.01		1.01
German*peer use													.23	***	1.26
German*risk													-.013		.99
German*availability													.04		1.04

* p <.05; ** p <.01; *** p <.001; two-tailed tests.

In addition, skipping school is significant; a one standard deviation increase in this measure augments the expected count of marijuana use by almost 40 percent.

Relationships between the independent and dependent variables changed markedly when the social learning measure was introduced. As shown in Model 2, having peers who smoke marijuana increases the expected count of past month use by 258 percent (b=1.275, p<.000). Further, peer use mediates the effect of social bonds, reducing their impact significantly. Perceived availability and risk perceptions were entered next, and both are highly significant. Demonstratively, the expected count of adolescent marijuana use increases by almost 90% with every standard deviation increase in the adolescents' perceived availability of this substance. Risk perceptions toward marijuana are, while significant as predicted by hypothesis 4, not quite as strong: the expected count decreases by a factor of .24 for every standard deviation increase in risk perceptions (e^b= 0.79, p<.000). The addition of these rational choice measures to the analysis decreases the effect of pot smoking peers significantly, lending support to hypothesis 5.

Following protocol, Model 4 includes the binary measure of nationality and other socio-demographic variables. Males and adolescents who do not live with both parents have a higher expected count of past month marijuana use. German adolescents have a higher expected count of past month use than Americans. More specifically, they are almost 66% more likely to smoke marijuana than their American peers.[34]

Once again, predicted probabilities were computed for the statistically significant study variables. Results show that, holding all other variables at their means, the predicted probability of a count of one for German males is .09 compared to .06 for American males, .07 for German

[34] Curiously, in preliminary drafts when the socio-demographic variables were entered first, Germans had a significantly lower expected count of marijuana use than Americans, net of the other socio-demographic measures (b=.507, p<.000).

females and .05 for American females. In addition, the predicted probability of smoking marijuana 3-5 times in the past month is .10 for Americans that have friends who all smoke marijuana compared to .22 for Germans.

Turning to Model 5 in Table 8, cultural differences in the influence of the theoretical indicators on marijuana use is the exception rather than the norm. Given that no predictions were made about cultural differences in the size or direction of correlates of marijuana use, these results do not address a specific hypothesis. Interestingly, however, the influence of peer use on adolescents' marijuana use is stronger for Germans than Americans ($b=.229$, $p<.000$) (Graph 5). Conversely, the association between truancy and marijuana use is stronger for American than German adolescents, net of other factors (see appendix: Graph 6).

SUMMARY

While German adolescents report higher levels of cigarette and alcohol use, the measures used to predict adolescent substance use were appropriate for both countries. Hypothesis 1 predicting the significance of social bonds found only modest support for cigarette and alcohol use, and no support for marijuana use in the merged sample. On the other hand, findings strongly supported hypotheses 4-6. The remaining hypotheses were not sustained, with the exception for hypothesis 9 in the alcohol model. Similar to the separate models, substance-using peers and the availability of tobacco, alcohol, or marijuana were the strongest predictors of adolescent involvement in substance use.

CHAPTER 6

DISCUSSION & CONCLUSION

This dissertation began by discussing the relevance and importance of cross-national research on adolescent substance use. Although the literature is inundated with substance use-related studies based on American samples, theoretically driven cross-national research on this type of adolescent risk behavior is sparse. Chapter 2 introduced the criminological theories used for the framework of the current study, and reviewed the literature assessing risk and protective factors of adolescent substance use. The next chapter discussed cross-national differences and similarities in adolescents' social environments in Germany and the United States, while chapter 4 introduced the population to be studied and the operationalization of the variables. The previous chapter presented the findings from the analyses. Results pertaining to the hypotheses stated in chapters 2 and 3 were illustrated to create a point of departure for their discussion, which is one of the objectives of the current chapter. This chapter offers a more thorough discussion, explanation, and interpretation of the results. In addition, the limitations of the current study are mentioned. Finally, the present study concludes with suggested avenues for future cross-national comparative research of adolescent substance use. In the following paragraphs, the results of the statistical analyses are discussed in light of the hypotheses, including the similarities and differences in substance use among German and American youths. In addition, the theoretical implications stemming from this study will be assessed.

DISCUSSION OF THE FINDINGS

Social Bonding Hypotheses

Social bonding theory proposes that differential prevalence and incidence of juvenile substance use are due to variation in the strength of social bonds to conventional persons and institutions. Previous research has established that youths who value parental bonds, academics, do well in school, and have high expectations for achieving conventional goals are less involved with substance use (Donovan and Jessor, 1985; Kandel, 1980). Similarly, adolescents who are involved in more non-drug related activities such as sports have less time to get in trouble (Hindelang, 1973).

Accordingly, hypothesis 1 predicted that strong social bonds to conventional institutions would lower substance use. Findings were mixed and support was modest. Various types of adolescent substance use were associated with some indicators of social bonds, but not others. In addition, results were not uniform across samples. While there were some similarities in the predictors of substance use, differences also emerged between the two nations under study (see Table O). For example, the social bonds included in the analyses were better suited to predict cigarette smoking and getting drunk for German adolescents. In addition, involvement in conventional activities such as sports and reading were significant for German but not for American youths. Also, having plans to go to college significantly reduced cigarette smoking and getting drunk among German but not American respondents.

On the other hand, college plans predicted smoking marijuana for American but not for German youths. Similar results were found with regard to getting drunk. Again, measures from all three social bonds dimensions (family, school, and conventional activities) were significantly related to drunkenness among German adolescents, but did not reach significance in the American models. That said, it seems as though the social bonding measures utilized here are more

consistently linked with smoking and drinking among Germans than Americans. However, findings from the merged sample show that the apparent differences did not materialize in the interaction model, meaning that despite the fact that different social bonding predictors reached significance in the separate analyses, the relationship between social bonds and substance use did not differ significantly between Germany and the United States.

In sum, among German youths, all of the social bonds were significantly related to past month cigarette use in the expected direction. In contrast, only three measures of social bonds predicted smoking among American adolescents. A similar picture emerged for adolescent drunkenness; again, social bonds more aptly predicted this outcome for Germans than for Americans.

Findings were different for the marijuana model. Here, only two of the social bonds, namely GPA and truancy, were associated with German adolescents' marijuana use. Both variables also predicted use for the American sample, in addition to college plans. Overall, the social bonds most consistently related to the three types of substance use tested here were school related, namely GPA and skipping school. Thus, while there was some support for the role of social bonds in predicting adolescent substance use, the evidence was limited to one of the dimensions for the American sample. A possible explanation is that the role of social bonds among Americans were undercut by other measures in the model, especially perceived peer use. In order to test this, the measures were entered separately in the American sample, and all but one social bonding measures were significant. This suggests that for American respondents, the effects of social bonds are rendered insignificant once peer effects are controlled.

Social Learning Hypotheses

One of the most consistent findings in adolescent substance use research in the last 30 years has been the strong association between substance-using peers and individual substance use (for an early review see Kandel, 1980). Peers can influence individuals directly (e.g., by offering drinks, round-buying or forcing others to drink) and indirectly through modeling and perceived norms. Social modeling (friends' drinking behavior, friends' attitudes and perceived peer pressure) has also been a strong predictor of perceived risks (Wood, Read, Palfai, and Stevenson, 2001). Social learning theory (Akers, 1977, 1998; Bandura, 1977) considers cognitive and social processes as they impact behavioral acquisition, assessing the balance of current and past models of behavior, or how favorable or unfavorable a behavior is defined.

Replicating previous work and supporting hypothesis 2 (Downs and Rose, 1991; Erickson et al., 2000; Graham et al., 1991; Hussong, 2000; Mounts and Steinberg, 1995; Urberg et al., 1997), peer substance use was positively and strongly associated with adolescents' substance use. More specifically, findings reveal that adolescents whose friends smoke had a higher expected count of smoking than those with only non-smoking friends. Likewise, the chance of adolescents getting drunk increases with the number of their friends who drink alcohol. Finally, the results for marijuana use are consistent with hypothesis 2 in both Germany and the United States, with peer use being positively and significantly associated with adolescents' own marijuana use.

In line with hypothesis 3, the level of exposure to substance-using peers also appears to mediate the association between different dimensions of social bonds and adolescent substance use. This finding supports previous research on this mediating effect (e.g., Agnew, 1993; Aseltine, 1995; Elliott et al., 1985; Erickson et al., 2000; Marcos et al., 1986; Massey & Krohn, 1986). Consistent with differential association theory, one could expect that when teens are

exposed to relatively few deviant peers, the number of pro-social (or anti-drug) definitions to which they are exposed would exceed the number of pro-drug definitions that they experience. However, under conditions of relatively great exposure to substance-using peers, social bonds would not matter; teens would be exposed to an excess of definitions favorable to substance use from their contact with substance-using peers, and the protective effects of social bonds to conventional institutions would be outweighed by the number of pro-drug definitions presented by peers. The significance of deviant peers for both Germany and the United States could mean that despite cultural differences in other domains of adolescents' social environments, the role of peers may be a universal aspects of adolescent development net of other circumstances.

Rational Choice Hypotheses

According to the rational choice paradigm, individuals make rational decisions and choices that maximize benefits and minimize costs. This theoretical tradition attributes desistance from substance use to the individual making a rational decision to not engage in a behavior that is perceived to be risky or harmful. Accordingly, hypothesis 4 proposed that higher levels of perceived risk are associated with lower levels of substance use. Findings were supportive in all but one model. Only higher levels of perceived risk of smoking did not significantly predict German adolescent smoking. One possible explanation could be that the perceived risk measure captures subtle or unmeasured qualitative differences in objective risks (i.e., smoking more deviant in United States and also illegal for adolescents). Also, because the risks related to smoking cigarettes have been increasingly advertised by anti-smoking campaigns, there might be little variance in the measure of perceived risk of smoking, possibly diluting its effects on adolescent smoking.

Hypothesis 5 anticipated that affiliation with drug-using peers would indirectly affect substance use by decreasing the perceived risk of using the specific substance. However, hypothesis 5 was only supported by the multivariate model predicting current marijuana use. The lack of significant findings regarding smoking and drunkenness could be the result of familiarity with the risks of tobacco and alcohol in contrast to those of marijuana. It is common knowledge that the consumption of high levels of alcohol and tobacco lead to severe health risks. However, adolescents have to rely much more on the informal and subjective accounts of peers when it comes to the consequences of marijuana smoking. Another possible explanation could be that adolescents were mainly thinking of health risks when asked about perceived risks of substance use, and the health risks related to alcohol and cigarette use are more clearly defined and advertised than those related to marijuana use, making peer accounts of the effects of smoking marijuana a more important point of reference for marijuana than alcohol or cigarettes.

Hypothesis 6 articulated that strong social bonds would indirectly affect adolescent substance use by augmenting perceived risk of substance use. This hypothesis was only supported by the multivariate model testing current marijuana use. Thus, having strong social bonds does not appear to influence the adolescent's perceived risks of smoking cigarettes and drinking. The absence of an indirect effect for cigarette use and getting drunk could be the result of similar processes as the ones mentioned above in relation to hypothesis 5. Again, significantly fewer adolescents have experimented with marijuana compared to cigarette and alcohol use, and use of the latter two substances is much less mystified.

Cross-National Hypotheses

The measure for nationality was significant in the majority of models, indicating a difference in consumption levels between German and American adolescents and the significance of culture in terms of use. The differences in consumption of alcohol and tobacco could reflect culturally based differences concerning the appropriate timing of such behaviors. Judging from previous research, American families live up to a more traditional value orientation compared to Germans. Characteristic of such belief systems is a heightened emphasis on age and other status attributes (Beck, 1983). Behaviors seen as precocious are subject to a stricter regime and, consequently, become negatively sanctioned. As smoking and drinking represent elements of an adult life-style, people in the United States should be less tolerant concerning a premature timing of such behaviors than are Germans. Accordingly, American adolescents have or take fewer opportunities for the use of alcohol and cigarettes.

A different conclusion as to the role of culture is obtained, however, when the question of cultural influence is framed in terms of patterns of association. When the cross-national relationships were studied, nationality or culture did not have a major effect in most tests. The present study found that although adolescents from Germany and the United States reported differences in outcomes (cigarette use, getting drunk, and marijuana use) and differences in social bonds, perceived peer substance use, and perceived risk, the patterning of associations were similar across the two countries.

Contrary to hypothesis 7, the relationship between adolescent social bonds to family and alcohol and tobacco use did not differ significantly between American and German youths. The results also showed no support hypothesis 8 which predicted that the relationship between social bonds to school and drinking and tobacco use would be stronger for American than German

youths. In other words, while Germans exhibited higher levels of alcohol and cigarette use than Americans, this could not be traced back to differences in social bonds. This suggests that adolescents' stakes in conventionality are not any more or less risked by smoking or getting drunk for American than German youths.

In chapter 3 it was noted that, since alcohol and tobacco use is seen as a greater violation of conformity for American youth, and the importance of social bonds lies in the value and rewards they provide for adhering to conventional standards of behavior, the inverse relationship between specific social bonds and substance use should be stronger for American than for German youth. It was furthermore contended that in Germany, the relationship between bonds to school and substance use may operate differently for alcohol and cigarette use, since cultural norms and reactions to drinking and smoking are considerably different. Due to the cultural and legal positions regarding alcohol and tobacco, the consumption of these substances is much more prevalent in Germany. However, findings did not support these hypothesized cross-national differences. Perhaps the more stringent policies and threats of legal consequences regarding adolescent alcohol and tobacco use in the United States do not have the effect they were intended to have. Put differently, adolescent drinking and smoking seem to be more widely accepted as normal youthful behaviors in the United States than assumed given the strict and repressive policies regarding underage alcohol and cigarette use.

As expected in hypothesis 9, the association between peer alcohol use and adolescent drunkenness is stronger for American than German youth. At the same time, however, hypothesis 9 was not supported for adolescent cigarette use. To tie these cultural differences in peer relations to the assumption posited by social learning theories, it was noted in chapter 3 that supporters of the social learning perspective argue that those who use drugs will likely be those

whose friends use drugs, and that these behavioral patterns are acquired through interaction with other users. What follows from this argument is that the degree of unconventionality of a behavior should not affect the learning process. However, in considering the effect of substance using friends on behaviors across the two countries, we must consider the conventionality of the substances being used. I argued that cross-national differences would be visible with regard to both alcohol and tobacco use due to the disparate legal and cultural views on these substances. However, the findings suggest that the underlying differences between Germany and the United States play a significant role only for adolescent drunkenness, and not for smoking cigarettes. This seems plausible since I am not simply testing alcohol use, but rather a more severe type of alcohol consumption, which is unarguably more deviant than smoking (as can be seen by the lower prevalence rates in both countries).

Additional findings

Several other findings not predicted by formal hypotheses are worth mentioning. First, differences in problem behavior also depend on the structure of opportunities (e.g., availability of goods). Findings here consistently revealed the significance of perceived availability of the respective substance for adolescent substance use, making this measure a useful addition to the model. It seems intuitive that the degree to which countries differ in behavior-specific opportunities such as the availability of drugs or the ease of access to unsupervised material goods could shape the specific configuration of manifest problem behaviors in a given country, and future research would benefit from including the perceived availability of licit and illicit substances in the statistical and explanatory framework. Existing research suggests that

availability corresponds with exposure to these substances and their consumption. Higher levels of exposure, in turn, make a behavior seem less deviant and more conventional.

In addition to the theoretical measures, findings also revealed the significance of socio-demographic variables. For example, one of the differences between the countries was the consistent significance of family structure for German youths. That is, Germans who lived with both their parents were significantly less likely to engage in either one of the three types of substance use tested here compared to those living in any other type of household. A possible explanation for this finding could be the level of supervision. In Germany, mothers in two-parent families are still more likely to stay home or have only a part-time job. In addition, several government programs are in place that support families with children financially, such as paid leave of absence after giving birth and free education for children, to name but two, making it more feasible for one parent to stay home. In the United States, on the other hand, there is an evident lack of comparable public assistance, and stay-at-home mothers are slowly becoming the exception rather than the norm. Furthermore, adolescents in Germany are less mobile since they do not get a driver's license until they turn 18, making it more difficult to "escape" supervision. Useful and interesting to include would be a measure indicating level of parental supervision. Unfortunately, the data available could not provide one that was cross-nationally comparable for the two countries under study.

An additional difference in the significance of the socio-demographic measures can be seen in the two separate models predicting getting drunk: among Germans, being male significantly increased the expected count, while there was no sex gap among American adolescents. A plausible explanation for this may be that Germany is not as advanced as the United States in terms of overcoming traditional gender roles and expectations. This is curious,

since existing research actually indicates greater gender equality in European countries. However, the current results would suggest otherwise, at least for this specific outcome. Further research is needed to more closely investigate this issue.

IMPLICATIONS OF FINDINGS

Silbereisen and Todt (1994) claim that generalizability studies are a worthwhile endeavor in and of itself. Replication helps to get sensitized for context-specific limits of one's approach. However, several other important implications stem from this study. On a very basic level, relationships between predictors and substance use among adolescents in Germany and the United States display both differences and similarities. The current findings suggest that while the use of various substances differs systematically in some aspects in the two national contexts of interest here, there are also consistent similarities with respect to factors contributing to or protecting from adolescent substance use. For example, despite the fact that laws concerning marijuana consumption are more lenient in Germany, Americans' frequency of use is considerably higher according to adolescent self-reports. One potential conclusion from these findings is that the legal provisions to protect adolescents from smoking marijuana may not be achieving their desired effect. In essence, because marijuana is a highly publicized "forbidden fruit," youth in America develop attitudes and behaviors about marijuana that uniquely contribute to the consumption of marijuana. A similar line of reasoning could explain the use of alcohol among this population.

Social bonding theory has received much criticism over the years. Research using American samples has produced mixed findings and only moderate support for several dimensions of the adolescent social bonds. The present study, while by no means a perfect test of Hirschi's (1969) theory, showed that despite the lack of strong support of this perspective in

American samples, social bonding theory may be a decent explanatory framework for adolescent alcohol and cigarette use in Germany. Future research is needed to test the theory's predictive power and adequacy for different types of juvenile delinquency and substance use with more sophisticated longitudinal data and measures.

Findings regarding the role of substance-using peers showed support for social learning/differential association theories, providing further evidence for the need to more closely study not only the association of adolescents with deviant friends, but more specifically the processes leading up to the adolescent choosing to associate with such peers. Existing research using American samples has been clear on the importance of peer relationships, and the current study provided evidence that deviant friends are just as crucial a factor for German adolescents' substance use.

Another implication results from the consistent significance of attitudinal measures such as perceived risk of licit and illicit substances to adolescent populations. Cultural attitudes and perceptions are important factors in shaping individuals' decision whether certain behaviors are assessed as problematic or deviant. Theories of adolescent substance use would benefit from further incorporating these measures in their explanatory framework, as they have been shown repeatedly to add significantly to the explained variance in statistical models.

MAIN OBJECTIVES OF THE CURRENT RESEARCH

In their article on cross-national comparative research, Farrington and Loeber (1999: 300) state that "cross-national comparisons of risk factors for delinquency are important for addressing the question of how far the causes of delinquency are similar in different times and places, and hence how far theories of delinquency can be generalized over time and place." In other words, much like Farrington (1999a, 1999b) suggested, to thoroughly verify theoretical propositions or

explanatory frameworks, we need to employ cross-national comparative data. As Vazsonyi and colleagues (2001:419) note, "as social scientists, we need to be interested in establishing the validity and reliability of previous research, guiding frameworks, and theories not only in a single cultural context, but across national boundaries. Ultimately, this will lead to a science of human behavior, one that is genuinely international and intercultural, one that potentially may provide evidence of developmental universals or differences cross-nationally."

The primary contribution of the present study to the advancement of cross-national research on adolescent substance use is the theoretical exploration of substance use outside of the United States. Specifically, this research is the first theoretically driven cross-national comparative examination of German and American adolescent substance use with representative samples. Explanations offered by most criminological theories should be able to be used for explaining cross-national differences in many types of adolescent problem behaviors (Vazsonyi et al., 2001). The application of American criminological theories to other cultural contexts raises the empirical issue of whether various types of problem behavior are determined by the same factors across national contexts or whether the manifestation of such behavior requires a contextually nuanced explanation.

In this case, the relationship between adolescent social bonds, deviant peers, perceived risk and availability of licit and illicit substances and use of these substances among German and American youths was examined. A number of measures from the 2003 MTF and ESPAD were chosen to broadly represent factors considered important by competing theories of juvenile delinquency. These covariates were not intended to test the criminological theories per se, and in fact, the data are not suited for such tests; the emphasis, rather, is comparative. The measures allow to apply the theoretically predicted correlations to different populations. The direction and

form of these associations suggests routes for future research. For example, there is no need to tease out causal order if cross-sectional data suggests no associations exist.

Although other theoretical arguments certainly deserve and need testing in cross-national research, this study presents a crucial starting point that allows us not only to investigate the extent to which theories that have been tested extensively in the United States might also apply to adolescents elsewhere but also to assess the extent to which these frameworks are similarly associated with substance use in Germany and the United States.

In view of the research questions posited in the earlier chapters of this dissertation, the statistical analysis was organized in two main parts. First, I explored similarities and differences among different types of adolescent substance use across these two countries with separate, country and substance-specific regression analyses. For this, I investigated the relationship between adolescent smoking, getting drunk, and marijuana use and measures derived from social bonding, social learning, and rational choice perspectives.

In the second part, I merged the two national samples and construct theoretically-driven cross-national measures in order to assess their explanatory power for adolescent substance use cross-nationally. Based on aspects of cultural differences between Germany and the United States, I made several hypotheses predicting that theoretical indicators work differently for these two nations. If the interaction terms between the dummy variable for nationality and the predictors were not significant and meaningful, the association or relationship between variable and substance was not significantly different. However, if the interaction terms were significant and meaningful, then the relation between the predictors and the dependent variable varies by country. That means that differential underlying processes are at work that would necessitate a more culture- or country-specific explanatory approach than the one offered by current theories.

Put differently, theoretical approaches attempting to explain adolescent substance use in Germany would need to be modified to account more accurately for the social and contextual factors that lead to or protect from adolescent substance use.

Summary

In Vazsonyi et al.'s (2001) cross-national study, findings on the relationships between routine activities and deviance suggested that national context had very little or no explanatory power in adolescent deviance. In line with their results, I find that national context does not matter much for the three types of adolescent substance use analyzed here. This fact becomes evident when looking at the analysis where only a few of the interaction terms were statistically significant, indicating different relationships between predictors of use and adolescent substance use between Germany and the United States.

Empirically, the current results lend support to the cross-national generalizability of these particular criminological theories of adolescent substance use. However, we cannot dismiss the notion that on a cross-national level, different manifestations of problem behavior do not constitute one single underlying dimension. Theoretically, the findings suggest that any explanation of cross-national differences regarding a specific type of problem behavior should include explicit arguments about why the supposed causes apply to that specific type of behavior in the particular cultural context. Thus, we must understand how the complexities of adolescents' social worlds as well as the cultural context of these social worlds impact their decisions to use substances or abstain from such behavior. Cross-national research on adolescent substance use would benefit from including macro-level measures and those that indicate the legal positions on and reactions to adolescent substance use to accomplish this task.

LIMITATIONS OF THE CURRENT STUDY

Limitations of the current study suggest directions for future research. At least three limitations of the analysis are notable. First, the cross-sectional nature of this dissertation presented a depiction of the complex associations among various dimensions of risk and protective factors in predicting adolescent substance use. Furthermore, cross-sectional research cannot hope to fully clarify the differences in pathways to use of various substances for German and American adolescents across the span of adolescence. For example, this type of data does not allow us to answer the question whether "birds of a feather flock together" or whether other mechanisms are at work that make peer use such an important variable in the equation. Understanding the mechanisms that account for these associations requires future studies that include a longitudinal design. Such studies may then differentiate the impact of social bonds, deviant peers, or rational choice on adolescent substance use over time.

Second, although the participation rate in these school-based assessments were commensurate with those reported by similar studies in the literature, care must be taken in generalizing results to students not likely to participate in such research studies, as well as dropouts not captured in school-based samples. Because some of the more serious substance users are likely excluded in school-based samples (Snow, Tebes, & Arthur, 1992), these findings may under represent the level of use in the adolescent population.

A related limitation concerns the fact that substance use measures in this study rely on student's self-reports and may reflect students' willingness to admit substance use rather than actual use levels, and more so for the American sample where all three types of substance use were illicit behaviors for the sampled adolescents. The validity and reliability of self-reported substance use have been evaluated by numerous studies with adolescent respondents (for review, see Harrison, Haaga, & Richards, 1993; Johnston & O'Malley, 1985). These reviews conclude

that self-report measures generally provide estimates of substance use consistent with external sources of information, including biochemical measures, public and private records, and reports by others, supporting concurrent and predictive validity of these measures. Some more recent research (Rosay, Najaka, & Herz, 2000) has suggested that the validity of self-report measures may be related to a more complex set of factors, including opportunities for under- or over-reporting, and variations in reporting across demographic groups. Nevertheless, when controlling for such factors, differences in self-reported drug use have been found to be relatively rare (Rosay et al., 2000).

Also, the data employed in this cross-national comparison are notably limited in the measures of the various theoretical dimensions. Other, more extensive and more sensitive indicators could produce different results, although studies using more sophisticated tests of these explanatory frameworks tend to, on the whole, produce similar findings. Although a decent amount of variance in substance use is explained by the predictors employed in this analysis, other theories may explain more or have even greater universal explanatory power.

The conclusions are limited by the types of substance use investigated and the countries compared. Future cross-national research, especially in non-Western cultures, needs to be sensitive to the issue of ethnocentrism, as the choice of measures and outcomes here may well be influenced by culture itself. Other types of juvenile delinquency, those that are and those that are not salient to Western and industrialized countries, need to be studied cross-nationally.

AVENUES FOR FUTURE RESEARCH

Cross-national research adds to our understanding of the possible causes and correlates of adolescent substance use and the extent to which such causes and correlates are or are not idiosyncratic to a specific population or universal to adolescents in general by employing

generally accepted measures of major theoretical paradigms to compare a population of adolescents thus far generally ignored by criminological research. Howard and colleagues (2000) proclaim that, "The challenge for comparative criminologists is to develop theories with increased specificity while managing to construct them in such a way that they can be applied across more than one culture or nation-state." Comparative research provides an opportunity for criminological theories, which are typically generated within the context of particular nation-states, to be given a wider hearing (Mueller and Adler, 1996). Do the theories developed to explain adolescent substance use in the United States serve with equal force to account for such behaviors in other nations around the world? This is a question of replication, and one that stands in the heart of the scientific enterprise (Howard et al., 2000). The current research represents a first step in the development of comparative criminological research by exploring this question of the generalizabilty of theory to German adolescents.

The consistency of results with those produced by similar research in other settings suggests that such future research may be quite fruitful in furthering our understanding of why young people engage in substance use everywhere. In this light, limited as it may be, this inquiry suggests that much can be learned by expanding the boundaries of etiological investigations to diverse adolescent populations around the world. Indeed, such factors as drug-using peers and perceived risk may well be central to adolescent substance use everywhere.

Germany, as a historically neglected population for this type of research, offers exciting prospects given the contrast it presents in terms of its treatment of substance using adolescents and its cultural and structural similarities and differences with the United States. Future research needs to incorporate more stringent tests of diverse theoretical arguments in the empirical inquiry along with indicators particularly constructed to measure features of German society and culture

not tapped by the current survey instrument that may impact adolescent substance use among German youth. Accordingly, future research should pay greater attention, both theoretically and empirically, to the ways in which macro-level factors intervene in individual developments during adolescence and influence the degree to which specific manifestations of problem behavior will be more or less prevalent in a given society. A closer empirical examination would require a more refined data set than could be utilized here, however. It is for this reason that Reiss (1994) in particular pointed out that there is ultimately a need for sophisticated longitudinal studies, designed for international comparison, that include systematic variation at the level of national contexts as a level of investigation.

Although this research produced findings consistent with various tests of social bonding and social learning theories, it leaves open the question of causal order between social bonds and learning dimensions. This issue has been addressed by research conducted in the United States. However, the question remains open as to whether adolescent substance use, legal or illegal, is a product of differential association with substance using peers or whether youths are predisposed to seek out deviant others to facilitate their own substance use (Agnew, 1995; Jeglum, Lynam, Moffitt, & Silva, 1997; Mazerolle, Brame, Paternoster, Piquero, & Dean, 2000; Paternoster & Brame, 1997; Poole & Regoli, 1979; Simons, Wu, Conger, & Lorenz, 1994; Wright, Caspi, Moffitt, and Silva, 1999). The evidence suggests that regardless of social control, factors such as delinquent peers and attitudes toward substance use are primary in the genesis of delinquent behavior and substance use. But why youths might hold such attitudes and/or associate with substance-using peers remains unclear. Research focusing on such questions in diverse social and cultural settings might also enhance our understanding of why adolescents come to engage in different types and patterns of substance use.

An issue not addressed by this study is the similarities and differences between males and females. Most of the research examining the gender differences in substance use has found that male and female adolescent substance use seems to have a similar etiology. Some studies, however, have found subtle differences in the relative explanatory power of theoretical indicators. Again, almost all of this type of research has been conducted with American samples. But gender-related cultural orientations and the social environments for boys and girls vary immensely throughout the world. Thus, future cross-national research could cast light on the extent to which to which the etiology of substance use is or is not only universal across, but also among groups within a multitude of societies.

To sum up this research endeavor, it is important to acknowledge that cross-national comparative studies of crime and deviant behavior are likely to become increasingly important in the field of criminological research. Thus, while this study did not unravel any starling or surprising results, it did contribute to advancing the field of adolescent substance use research, not the least of which was to affirm the generalizability and applicability of American criminological theories to German adolescents. It may only be a modest first step, but it is nevertheless a crucial one in the process of verifying and improving explanations of adolescent substance use nationally and cross-nationally. As data become more sophisticated and better equipped for cross-national comparisons, examinations of existing theories or the development of new ones will too.

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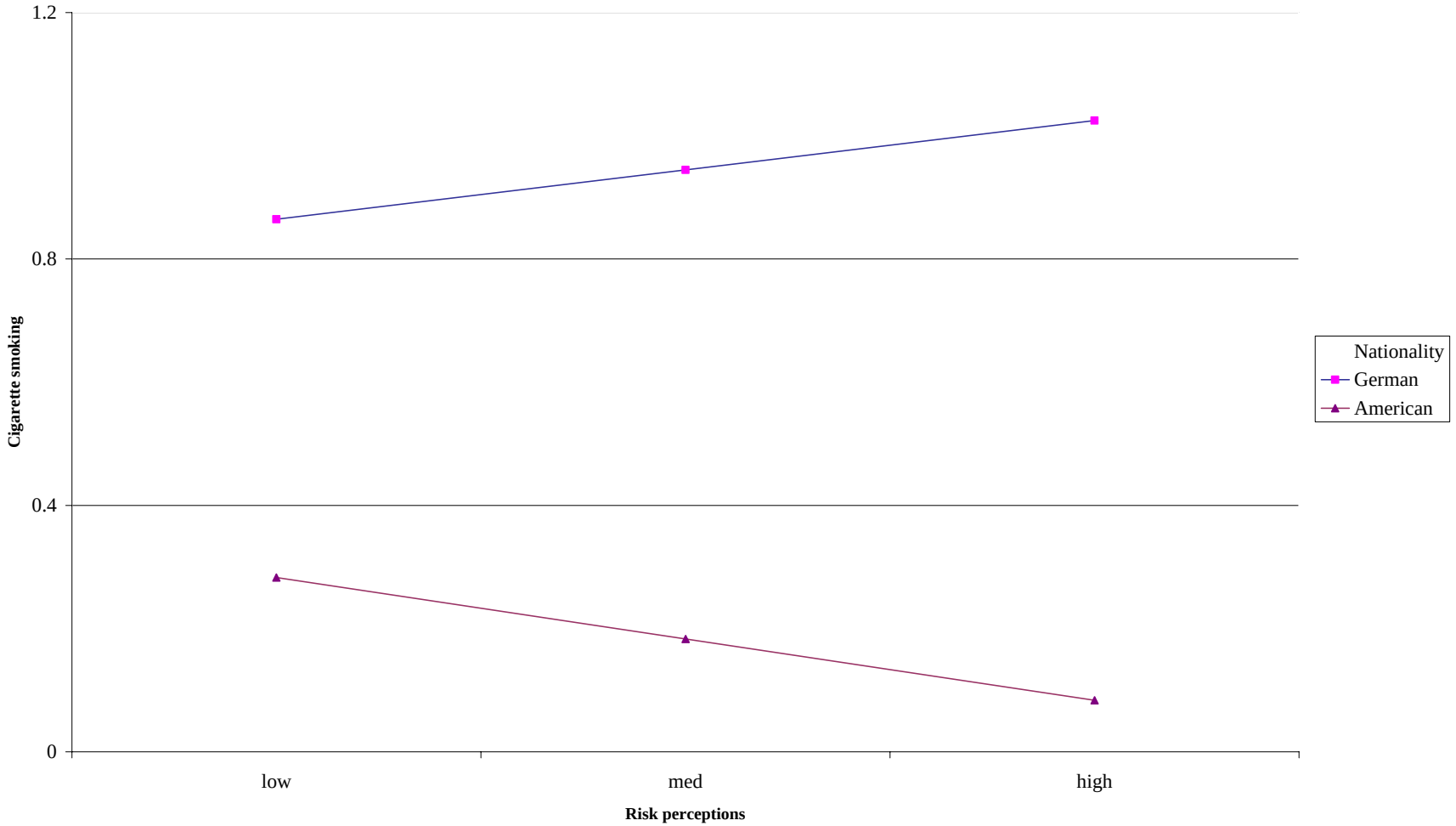
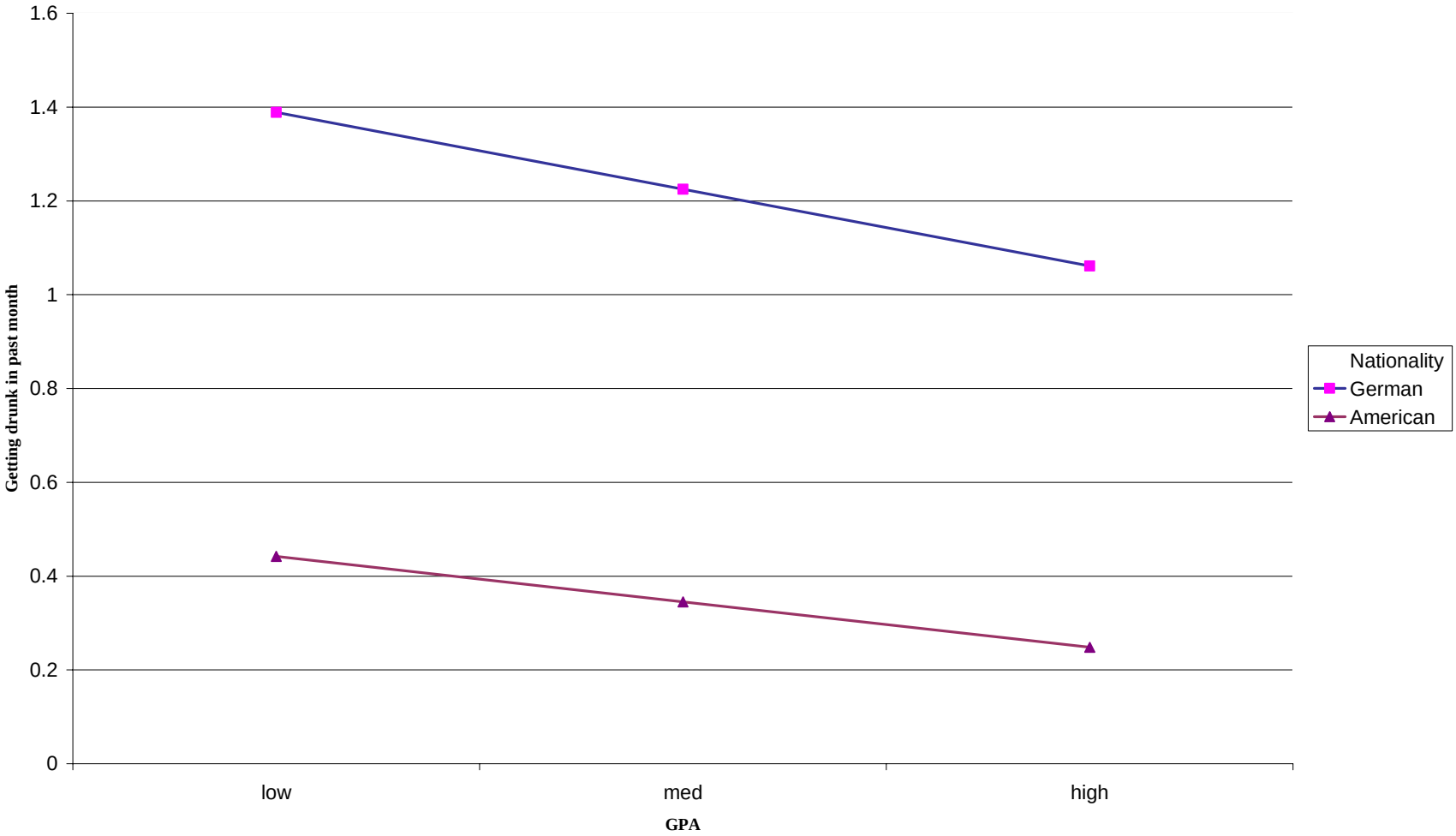
APPENDICES

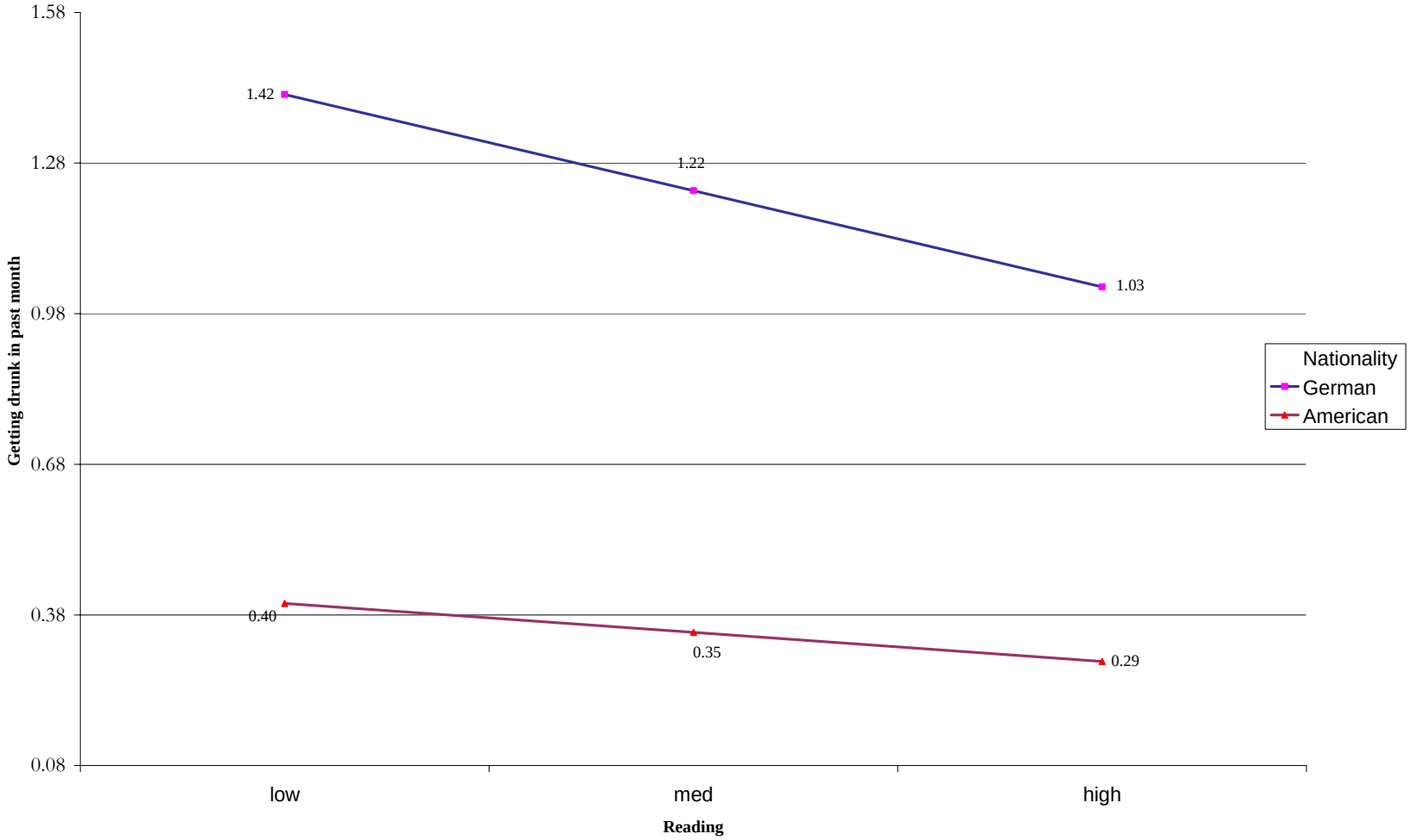
Graph 1: Depicting the effect of risk perceptions on cigarette smoking among German and American adolescents



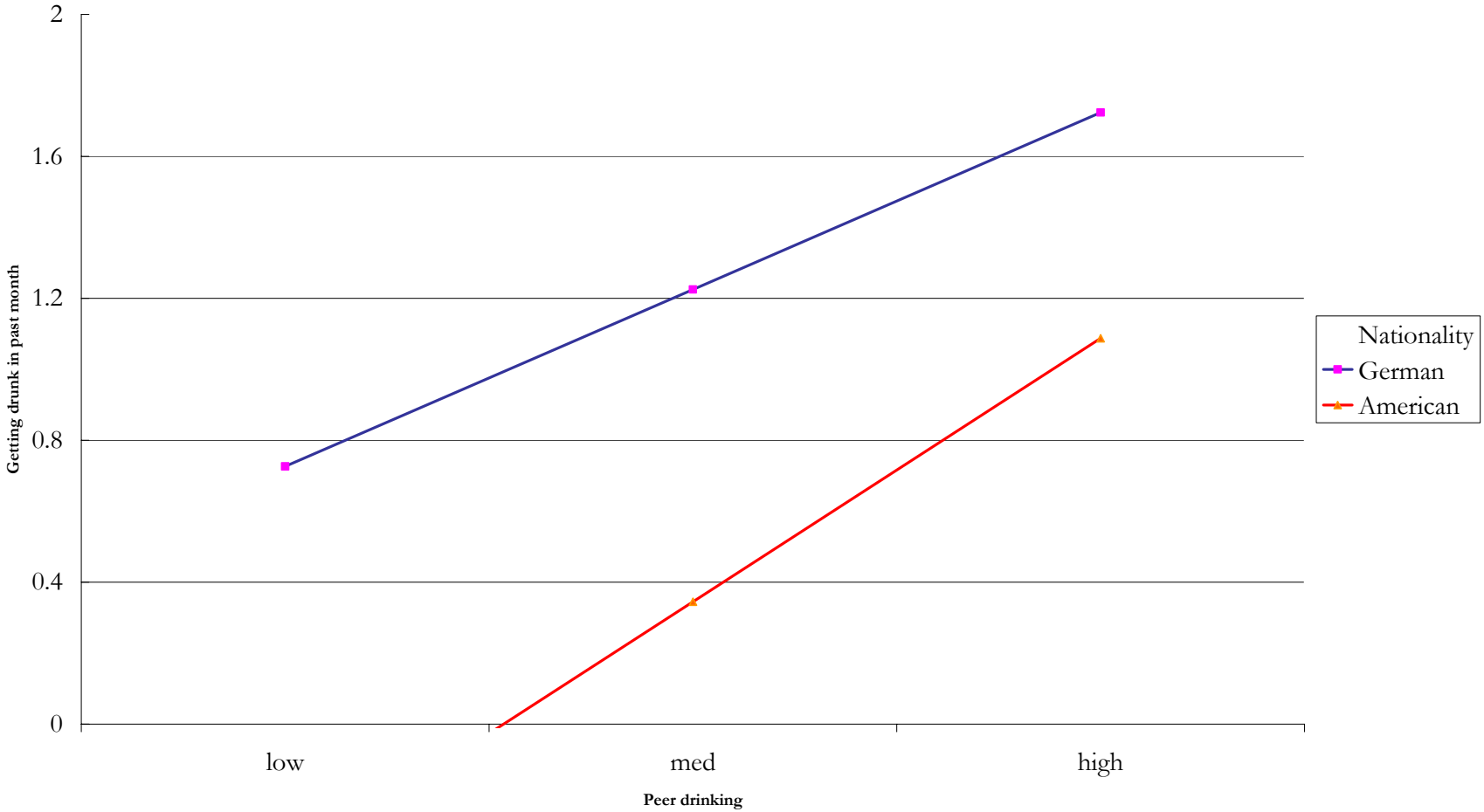
Graph 2: Depicting the effect of GPA on getting drunk among German and American adolescents



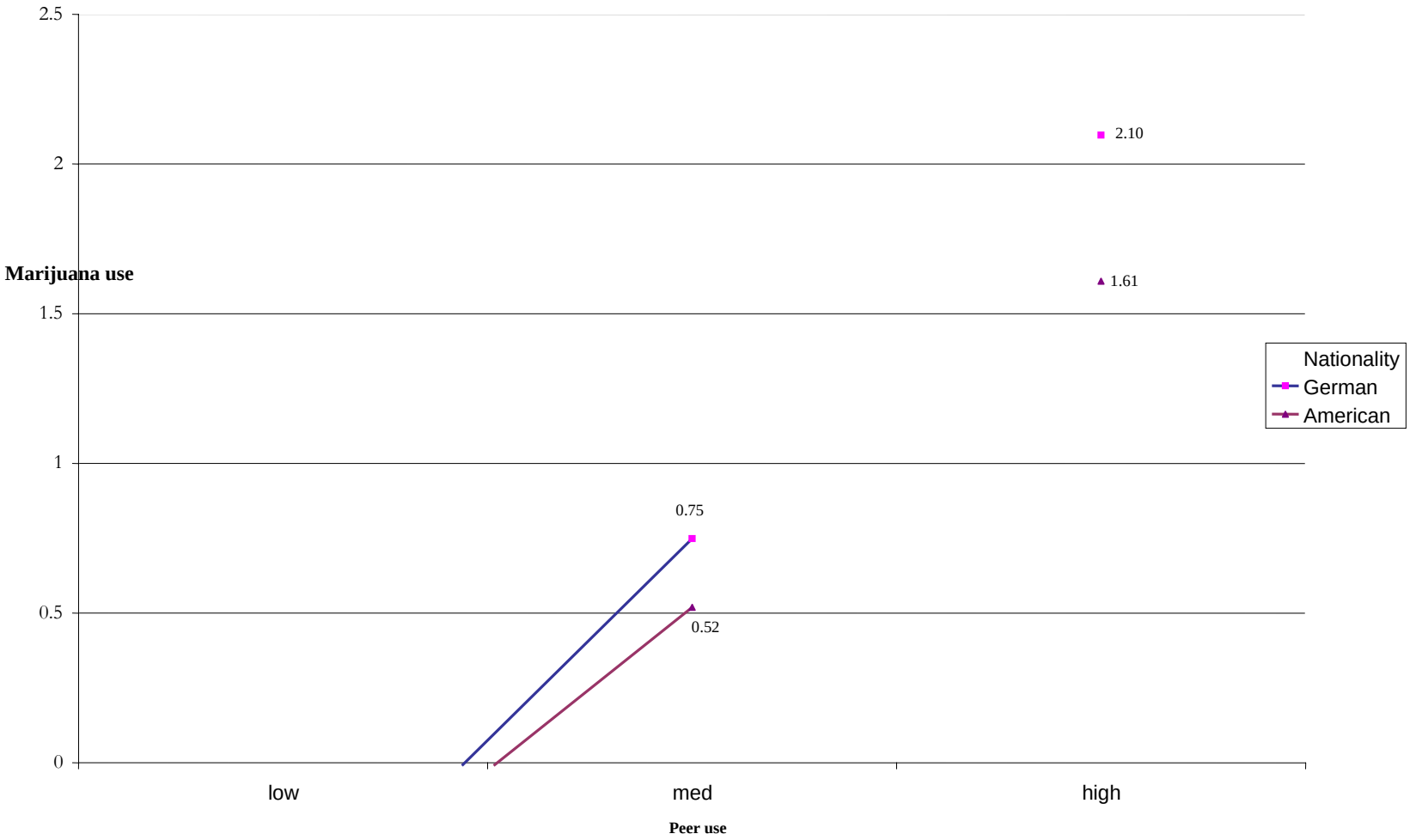
Graph 3: Depicting the effect of reading on getting drunk among German and American adolescents



Graph 4: Depicting the effect of peer drinking on getting drunk among German and American adolescents



Graph 5: Depicting the effect of peer use on marijuana use among German and American adolescents



Graph 6: Depicting the effect of truancy on marijuana use among German and American adolescents