LEGAL CONTEXT AND YOUTH DRUG USE: A MULTILEVEL ANALYSIS OF THE EUROPEAN UNION

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ABSTRACT

Though it has produced a high quality body of research, the study of substance use has remained highly individualized in its focus. This dissertation adds a sociological understanding to that research. A review of theories within sociology, particularly neoinstitutionalism, and within criminology, particularly social disorganization and strain theory, points to the conclusion that both national legal culture and local structural factors should not be overlooked in studies of substance use. This approach is particularly fruitful in law and criminal justice, where much differentiation exists among nations in the enforcement of laws. Using hierarchical models, the following explores individual level substance use and opinions about drug policy using variation at three levels, taking into account individual characteristics, local context, and national legal culture. Two main findings emerge from these models. First, national level legal context plays a role in understanding individual level probabilities of substance use and opinions on drug policy, even after controlling for individual and local characteristics. Second, the effects of the components of theories on the ecology of crime, namely social disorganization and strain theory, depend on the characteristics of the individuals that are experiencing them. Both levels of these contextual effects more firmly root the study of substance use, and crime more generally, in debates within sociology.

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INTRODUCTION

The individual level correlates of substance use are well established by a lengthy body of high quality empirical research. Though both classic and modern theories within sociology and criminology justify an approach that takes contextual factors into account, the study of substance use has remained highly individualized. This approach has not given proper credence to the immediate structural and cultural surroundings in which individuals find themselves. In three major sociology textbooks dedicated to the topic of substance use (Goode 2005; Faupel, Horowitz, and Weaver 2004; Abadinsky 2001), none even describe social disorganization theory (Shaw and McKay 1931) or other macrolevel theories, instead focusing completely on individual level explanations. Social disorganization is only mentioned by name once, and only in passing, in any of these texts (Goode 2005:67). While such individualized approaches are the norm for researchers in psychology and biology, this lack of attention to social context raises the question of where is the sociology in the sociology of substance use.

Given that the more immediate social context has been neglected in substance use research, it is also not surprising that legal context has received scant attention in empirical studies of drug use. Despite evidence of variation in cross-national rates of substance use (Degenhardt 2008), most of sociology's conclusions concerning use have been confined within a single legal context. This oversight neglects variation in the legal culture surrounding drugs that may influence substance use. Further, it overlooks central theoretical bodies within sociology that emphasize the importance of law, both within a given society and across societies internationally. This dissertation seeks to rectify this omission by taking a cross-national modeling approach to understanding youth and

young adult substance use and opinion formation on drug policy. Thus, the main research question is two-fold. First, does the legal context of a nation influence youth and young adult substance use above and beyond characteristics of the individual and the region in which they reside? Second, do the previous correlates found in past substance use research hold when taking into account regional and country level variation and are they constant across these levels? The answers to these questions are explored in a multilevel dataset of the original 15 countries of the European Union (EU).

The dissertation begins by arguing that sociological theories justify a view of substance use that goes beyond the previous individual level focus of this research. Chapter 1 describes these theories and related empirical research. Work within the sociology of law and neoinstitutionalism provide theoretical grounding for a cross-national approach, looking at variation both across and within nations. Further, criminological theories necessitate an approach that examines the individual's immediate surroundings. The well established research at the individual level is also briefly described. Chapter 2 examines the specific case of the European Union. A brief historical analysis argues that while European integration is occurring, as well as international homogenization of drug laws, there still exists a great deal of differentiation in EU drug policies.

Statistical analyses begin in Chapter 3, which provides a summary of the data sources and methods, as well as descriptive and bivariate analyses. Particular focus is given to variation across regions and countries. The chapter concludes with a description of the expected results that come out of the literature review. Chapter 4 contains the hierarchical models of youth and young adult substance use in the original 15 countries of

the EU (from herein, the EU-15). Three substances are used as outcomes: marijuana, any drug other than marijuana, and cigarettes. Chapter 5 switches the focus to hierarchical models of opinions on national drug policy. Finally, the theoretical and policy implications are discussed in Chapter 6.

CHAPTER 1: SUBSTANCE USE IN A MULTILEVEL CONTEXT

Placing Substance Use in a Legal Context: Why Cross-National Comparisons Matter

Questions on why individuals violate norms, the origins of social order, and official reactions to deviance are at the very center of sociological inquiry (Sampson 2000). Law is often considered the most serious of norms, serious enough that their violation requires state intervention in the form of punishment. As such, the role of law has been a fundamental component of all classic sociological theories, whether it is considered the product of a changing morality (Durkheim 1984[1893]), an instrument of economic control (Marx 1976[1867]; Marx and Engels 1947[1845]), or an expression of political domination and authority (Weber 1968[1914]). Despite vastly different ideas, these classic theories shared the common notion that the law was "strongest" when individuals took for granted the existence of the law, viewing it as an outside entity that, for one reason or another, is best simply to follow.

Of course, strength of law defined in this sense is not necessarily a positive outcome for all, as the legal code is the result of long contested struggles between different groups in society (Garland 1990:50-3; Sutton 2001:54-5; Chambliss and Seidman 1971; Vold 1958; Sellin 1938), with what is considered a crime varying over both time and place (see, e.g., Bentham 1843; Becker 1963; Black 1976; Pfohl 1977, 1985; Tierney 1982; Chambliss and Seidman 1971). Thus, criminal law does not simply match public sentiment, with there being basic agreement about some laws, but not others (Garland 1990:57-8; Sutton 2001). Considering the conflicting range of value patterns, a society needs to learn to tolerate or institutionalize deviant values in a way that minimizes

interference with main values (Parsons 1951:169), as public sentiment is important because it helps legitimate authority (Garland 1990:53-4).

Drug policy is an excellent example of a body of law that has changed rapidly over recent history and remains a source of conflicting opinions among individuals (Beckett 1997). Though arguments can be made about how even the definitions of murder, rape, assault, and theft vary from place to place (Chambliss and Seidman 1971:70-1,190-4), for the most part, laws concerning violent and property crime exist in every nation by necessity (Hart 1994[1961]; Packer 1968) and have the tendency of being viewed as wrong (Newman 1976). Substance use does not share this consensus (Duster 1970; Beckett 1997) and the rules outlawing such behavior have greater variability. Placing individuals within a broader legal context can contribute further depth to our understanding of deviant behavior. On the other hand, it is entirely possible that individual level factors and local structural factors completely outweigh these broader legal considerations, in that they are too distant or disconnected from individual behavior. In this section, I argue that modern sociological theories suggest that this is not the case. Rather, individual level behavior and opinions are also influenced by the national context in which individuals reside.

The theory of neoinstitutionalism describes how individual behavior is channeled or scripted by institutionalized cultural frames. Cultural frames also operate at a disaggregated, cognitive level (Dobbin 1994; Friedland and Alford 1991; Meyer et al. 1997; Thomas et al. 1987). These frames provide a lens through which individual actors understand the world and act within it. Several theoretical constructs lend themselves to comprehending these frames. For example, Bourdieu (1972) stated that the individual

develops dispositions, known as habitus, in response to determining structures and external conditions. Expanding upon this, Swidler (1986) defines cultural frames as repertoires of action. Instead of being regarded simply as internalized value systems that rational individuals use to form their preferences, repertoires are cognitive scripts. They are embedded in long institutional traditions and organizational frameworks that shape the social behaviors and practices that are deemed legitimate, or even thinkable. Repertoires of action may also be thought of as existing within symbolic boundaries. Symbolic boundaries are conceptual distinctions used to categorize objects, people, practices, and time and space in order to come to agreements about definitions of reality (Lamont 1992; Lamont and Molnar 2002). Symbolic boundaries also separate people into groups and generate feelings of similarity and group membership. They constitute "a system of rules that guide interaction by affecting who comes together to engage in what social acts" (Lamont 1992:12).

Attitudes, practices, and rules cannot be thought of as independent of the historically grounded institutions in which individual agents find themselves, but rather a dialectical relationship exists (Sewell 1992). In fact, cognitive dissonance results when decisions are made that are contradictory to firmly held beliefs, particularly with regards to law (Savelsberg 1994:921). Thus, knowledge is internalized and values formed only if there are institutions that channel them in certain directions (Berger and Luckman 1966) and political structures serve as social sites where perceptions and ideas about actorhood are played out, institutionalized, and constructed as legitimate (Meyer and Jepperson 2000). The concept of law fits firmly into the framework of neoinstitutionalism, as it is a script that guides individual behavior. As shown by Ewick and Silbey, "…legality is a

structural component of society. That is, legality consists of cultural schemas and resources that operate to define and pattern social life" (1998:43). This legality does not predetermine behavior, however, as individual variation exists in everyday activities in which legal concepts are invoked (Ewick and Silbey 1998). The construction of the modern life course sequence may also be an institutional trend resulting from political and historical forces, giving meaning to the particular activities individuals choose to participate in (Meyer 1987). Substance use, with its particular place in the life course (Bachman et al. 2002), may also be the result of greater institutionalized trends.

The neoinstitutional logic of how cultural scripts operate in a top-down manner has been demonstrated on multiple analytic levels. One area where this logic has been particularly fruitful is in the diffusion of national trends in law into pseudo- or non-legal realms, particularly in the adoption of particular social, economic, and disciplinary policies by firms (see, e.g., Dobbin et al. 1988; Edelman 1990, 1992; Edelman, Abraham, and Erlanger 1992; Dobbin et al. 1993; Sutton et al. 1994; Sutton and Dobbin 1996; Edelman, Erlanger, and Uggen 1999; Dobbin and Dowd 2000; Kelly 2003). At a much higher analytic level, institutional theories, or world society theories, argue that in the modern era, extra-national forces work to homogenize behavior and values through a top-down process (Meyer et al. 1997). According to Meyer et al.'s (1997) model, the world institutionalized and cultural order directly influences the nation-state system, organizations and associations, and individual human identities. Their model is not completely devoid of how these latter three levels influence each other. That is, nation-states still influence individual citizen identities. But, the emphasis is on the homogenization caused by globalization since the end of World War II. This conclusion

stands in contrast to theories that see the world system as an anarchic competition between nation-states (Waltz 1979; Gilpin 1981; Wallerstein 1974; Chase-Dunn 1989; Tilly 1992; Skocpol 1979).

According to institutionalism, the nation-state, organizations, and individual actors will follow the cultural force of the world society, often even in the face of national rhetoric is to the contrary (Meyer et al. 1997). To state it in terms of the research topic at hand: to the extent that homogenization is occurring, the fundamentals of drug policy should be quite similar across national contexts, regardless of the national legal rhetoric. In addition, opinions and beliefs about substance use should conform to the broader globalizing trends in drug laws. One could argue that international trends in drug prohibition are tending towards an enforcement-centered punitive strategy, as in the United States (Beckett 1997; Garland 2001). At the same time, however, many European countries are decriminalizing use and possession and emphasizing treatment and prevention, while simultaneously stepping up enforcement against traffickers. Further, there are competing national interests in drug producing countries compared to drug consuming countries. Thus, a closer look at the institutional force of drug policies must be examined.

As mentioned above, institutionalism does not completely discount the influence of the nation-state on individual beliefs and actions, but it does place great stock in how such beliefs and actions will be guided by the world cultural system as the nation-state aligns closely with that ideal (Meyer et al. 1997). Despite this, an abundance of research has shown that nations that differ on particular relevant characteristics provide a specific context in which individual level behaviors play out and values are formed, supporting

the idea that broad institutional factors are responsible for observed cross-national differences. That is, there are systematic patterns around large ensembles of nations sharing similar cultural and institutional characteristics. Support has been found in various domains of social activity, including labor market regulation (Western 1997), civic engagement (Schofer and Fourcade-Gourinchas 2001), the provision of social goods (Amenta, Bonastia, and Caren 2001; Esping-Andersen 1999), the organization of blood-giving (Healy 2000), and religiosity (Ruiter and De Graaf 2006; Kelley and De Graaf 1997). This research has shown that a more nuanced understanding of how individual action is shaped by broader cultural scripts is necessary, and some institutional scholars have incorporated it into the theory. In this view, the nation-states, with their own particular socio-historical context, may act as filters for global cultural scripts.

Within this particular view of neoinstitional theory, lower levels act as filters to broader cultural scripts, incorporating some ideas and disregarding others. Taking an even more differentiated multilevel approach, Boyle (2002) argues that social science must situate individuals within an international, national, and local context to truly understand how individual actions come about and how opinions are formed. Each of these levels act as a filter in the sense described above. For example, she found that the United States and other Western countries have influenced worldwide adoption of statutes against female genital cutting. In countries such as Egypt, there are now harsh legal statutes against female genital cutting, but local culture and individual beliefs urge the practice to continue unabated. Simultaneously, people in these countries voice opinions against female genital cutting. These contradictions allow countries to appear to

be sympathetic to the globalizing trends, while interpreting or enforcing such laws in a way specific to their unique context.

As demonstrated by Boyle (2002), evidence for the way that lower organizational levels filter broader cultural scripts is specifically strong within criminal justice and law, which is of relevance to the topic at hand. In particular, law enforcement is a product of the collective memory specific to a nation-state, such that international trends do not result in an abandonment of historically grounded national legal institutions (Savelsberg and King 2005). Sutton (2000, 2004) shows that although increased imprisonment is indeed an international trend, the specific characteristics of nation-states influence the degree to which the imprisonment rate climbs. Grattet, Jenness, and Curry (1998) similarly applied this same neoinstitutional logic to the diffusion of hate crime legislation across the 50 United States. They found that such legislation does indeed conform to broader national trends, but becomes increasingly differentiated at the state level, affecting the kinds of activities that can be prosecuted and the kinds of statuses that are protected under hate crime law. Many researchers have found that the reason for this difference in the policies that are adopted within criminal justice that conform to institutional trends and the way these policies play out in action is due to resistance from more localized organizations charged with implementing those new policies (Grattet and Jenness 2008; Savelsberg 1992; Vuolo and Kruttschnitt 2008; Lynch 1998; Garland 1990, 2001; Cheliotis 2006). Thus, there is ample evidence, especially within criminal justice, for the filtering effect of lower national and organizational levels on broader institutionalized policies.

The main point of this section thus far has been to show that individual actions and beliefs are embedded in larger social, historical, and economic institutions, particularly defined by the nation-state. Broader international trends may guide the adoption of national practices, but these practices see significant differentiation in their implementation. Further, countries still fall into specific types, rather than one homogenous world society, and these types guide individual behavior in multiple social realms.

Within this review of neoinstitutionalism, both actions and beliefs have been specified as important. While the emphasis of the following research will be on the "action" of substance use, I also explore youth and young adult opinion formation concerning the most appropriate institutional actions for decreasing substance use. Similar to actions, beliefs and opinions are also embedded in the structure of the nation-state according to neoinstitutionalism. As theorized above, empirical research has shown a close relationship between public opinions and the ability of policy to pass and succeed in implementation, particularly with regard to welfare state policies (Brooks and Manza 2006; Burstein 1998; Peirson 1994, 2001). Boyle (2002) shows that opinions can follow the more predominant international trends, while actions can contradict it. Whereas the international trend was clear for Boyle's subject of study, in an area where there is less international consensus, Kikuzawa, Olafsdottir, and Pescodolido (2008) found that public attitudes toward government responsibility in health care is specific to social location within national contexts. Using a multilevel study of 21 nations, they found that citizens in nations that have more welfare commitment have come to expect greater governmental responsibility in health care, but individuals "in need" call for an even greater

governmental role. Thus, both individual- and national-level circumstances are associated with people's attitudes toward the social organization of health care. Kikizawa et al. conclude that, "Public attitudes toward government involvement in health care are embedded in the larger cultural climate, sociohistorical institutional arrangements defined at the level of the national polity, and individuals' position in the status hierarchy" (2008:397). In the analysis that follows, I take this same viewpoint in trying to understand youth and young adult attitudes toward government involvement in substance use policy.

The review in this section intended to place individual behavior in a national and international context. Important variation exists among nations, particularly in law, that should not be overlooked in explaining behavior and opinions. Given the variability of criminal law around the world and across time (Black 1976; Pfohl 1977, 1985; Tierney 1982; Chambliss and Seidman 1971; Becker 1963) juxtaposed against the rise of globalization, it is somewhat surprising that deviant and criminal behavior has not received more attention in this literature, especially given the role of law in defining scripts and schemas for behavior (Ewick and Silbey 1998). Where crime and criminal justice have been the focus, differentiation has been shown to occur even in the face of broader institutional trends (Sutton 2000, 2004; Grattet et al. 1998). A multilevel approach that takes legal variation into account is long overdue. Of course, legal policy is not the only important structural factor when researching crime and deviance. Rather, criminological theory has also been vocal about the importance of context, but of a more localized nature.

The Immediate Demographic and Economic Surroundings: Social Disorganization and Strain Theories

Above, it was argued that legal factors are missing from studies of crime and deviance, but are justified through research following institutional theories. Boyle (2002) also emphasizes not just the national context, but the more local structural context. This call is particularly relevant in criminology, where the classic theories of social disorganization and strain give reason for the inclusion of such factors. The lack of research linking substance use to the broader social surroundings of an individual is surprising given the history of these factors in sociological and criminological theories. In pushing forth sociology as an independent discipline, Durkheim (1982[1895]) emphasized the importance of these variables measuring aspects of the society, rather than the individual. According to his classic theory, solidarity is maintained through a strong collective conscience, which Durkheim defines as, "The totality of beliefs and sentiments common to the average members of a society form[ing] a determinate system with a life of its own" (1984[1893]:38-9). According to Durkheim (1982[1895]:98-100), crime is normal because it exists in every society and thus cannot be suppressed. Some consensus, however, is necessary for the functioning of a healthy society (Durkheim 1984[1893]). If opposing behaviors reach some critical point, anomie will ensue (Durkheim 1951[1897]). In his study of suicide, Durkheim (1951[1897]) showed how throughout various regions in Europe, structural forces lead to anomie, measured as the rate of suicide. In particular, when areas were extreme on the continuum of social integration and moral regulation, suicide rates were higher.

Durkheim's efforts were driven by a desire to show that social facts drove behavior just as much as any individual propensity (Durkheim 1982[1895], 1951[1897]). In the same vain, the proponents of social disorganization theory within criminology sought to show that structural factors drove crime and delinquency as much, if not more, than inherent characteristics of the individual. Early work by Park, Burgess, and McKenzie (1925) showed that crime was highest in the residential areas closest to downtowns, and crime decreased in concentric circles as one got further from the center. Shaw and McKay (1931) tested this idea using juvenile court statistics in Chicago. They found that the zone directly outside the city's downtown consistently had the highest juvenile delinquency rates regardless of which racial or ethnic group lived there, and juvenile delinquency was lower in areas farther from the center. Further, as different ethnic groups left this area, known as the zone in transition, their delinquency rates dropped. This led them to the conclusion that the nature of the neighborhood, rather than the nature of the individuals within the neighborhood, was responsible for involvement in crime.

So what is it about this area that drives criminal behavior? In affluent neighborhoods, youth's needs were fulfilled by families and other institutions, which carefully supervised them. In the zone in transition, on the other hand, families and other social institutions were strained or broken apart. Shaw and McKay (1931) pointed to several causes for this breakdown. These factors included rapid and concentrated urban growth, people moving in and out, heterogeneity of the population, and poverty. When each of these factors are high, social disorganization, including crime and delinquency, prevail.

Social disorganization theory has created a tradition in criminology that emphasizes the importance of social ecology. Early research was generally supportive of social disorganization's central tenets (Lander 1954; Bordua 1958; Chilton 1964). Recently, studies have shown support for Shaw and McKay's (1931) original formulation and also expanded upon it. For example, there is much support for the effect that concentrated poverty has on increased crime. As working and middle class families leave the inner city, they take financial and institutional resources and support with them, leaving behind only the poorest families and individuals (Wilson 1987). Instead of heterogeneity, a homogenous group of minority residents in extreme poverty occupy these neighborhoods with little connection to social institutions (Anderson 1999). Violent and property crime are higher in areas of concentrated poverty, but especially for minority group members (Morenoff, Sampson, and Raudenbush 2001; Liska and Bellair 1995; Steffensmeier and Haynie 2000; Messner and Tardiff 1986; Anderson 1999; Parker and Pruitt 2000; Parker 2004; Warner and Pierce 1993; Lee, Maume, and Ousey 2003). Area economic disadvantage in the form of unemployment, although less well established, has also been found to be related to the crime rate when examined over time (Messner, Raffalovich, and McMillan 2001) and using gender-specific measures (Steffensmeier and Haynie 2000). In general, economic disadvantage has strong support for its effect on higher crime rates, especially in the case of homicide.

Changes in the composition of a neighborhood have also been shown to have an independent relationship to crime, above and beyond its affect on concentrating poverty. Changes in racial composition are related to crime rates, such that the flight of white residents is a response to increases in crime rates (Liska and Bellair 1995). Since these

areas have the cheapest housing, residents who cannot leave are surrounded by an influx of new residents. This residential turnover affects community culture, as strong networks are unable to develop between inhabitants (Skogan 1990). As an area becomes more solidly "underclass," instability becomes the norm and violence increases. Similarly, neighborhoods undergoing gentrification are also initially unstable during this change and see an increase in violence (Taylor and Covington 1988).

Perhaps the most well known test of social disorganization theory is by Sampson and Groves (1989). They included not only Shaw and McKay's structural variables, but actual measures of what might be considered social disorganization. Their structural variables included socioeconomic status, heterogeneity, mobility, family disruption, and urbanism. Their three measures of whether a locality was organized or disorganized were the strength of local friendship networks, residents' participation in community organizations, and the extent to which the neighborhood had unsupervised teenagers. Consistent with Shaw and McKay, Sampson and Groves (1989) found that structural factors increased social disorganization. In turn, disorganized areas had higher crime than organized areas. Their analysis was also later replicated with the British Crime Survey (Lowenkamp, Cullen, and Pratt 2003).

Social disorganization theory has been expanded by also including potential crime-insulating factors, such as altruism (Pratt and Godsey 2002, 2003; Chamlin and Cochran 1997) and collective efficacy (Sampson, Raudenbush, and Earls 1997; Sampson and Raudenbush 1999; Morenoff et al. 2001; Sampson, Morenoff, and Gannon-Rowley 2002). The latter has particularly taken hold as the modern incarnation of social disorganization, thanks mostly to the work of Robert Sampson and his colleagues.

Sampson, Raudenbush, and Earls define collective efficacy as, "social cohesion among neighbors combined with their willingness to intervene on behalf of the common good" (1997:918). In places where collective efficacy is high, informal social control is more likely to be exercised among citizens in order to proactively counter delinquent behavior (Sampson et al. 1997). Examples include calling the police, rescuing those in trouble, and telling unruly teenagers to behave. They found that weak collective efficacy existed in areas with high concentrations of immigrants, high residential instability, and high economic deprivation. In such areas, there is not enough social capital to assert informal social control. Further, they found that collective efficacy predicted neighborhood violence and mediated the relationship between crime and residential stability and economic deprivation (Sampson et al. 1997)

Researchers in the social disorganization tradition were mostly concerned with relating area characteristics to aggregate crime rates. Though such research started out of the good intentions of establishing structural factors as important in the study of crime, the results are nonetheless subject to the ecological fallacy. Further, researchers have noted that neighborhood socioeconomic status affects official police reaction to crime, which may be the cause for the higher official crime statistics in those areas (Sampson 1986; Black 1980; Morash 1984). Sampson and colleagues' collective efficacy, through the advent of multilevel methods, helped to usher in an era where contextual effects on individual criminal behavior could be directly studied. Studies of such neighborhood effects have grown rapidly in recent years (Sampson et al. 2002). While some still look at the relationship between aggregated rates, many are utilizing a multilevel design of individuals nested in geographic units. These studies suggest crime is related to

neighborhood ties and patterns of interactions (Warner and Rountree 1997; Rountree and Warner 1999; Veysey and Messner 1999; Bellair 1997), collective efficacy and informal social control stemming from social cohesion (Elliot et al. 1996; Sampson et al. 1997; Hirschfield and Bowers 1997; Morenoff et al. 2001; Bellair 2000), institutional resources (Veysey and Messner 1999; Peterson, Krivo, and Harris 2000), and routine activity patterns (LaGrange 1999; Smith, Frazee, and Davison 2000). In addition to these factors, structural characteristics such as concentrated disadvantage, affluence, and stability still remain direct predictors of crime (Morenoff et al. 2001; South and Baumer 2000; Peterson et al. 2000).

These multilevel studies have almost exclusively examined the relationship between contextual factors and either police records of homicide, robbery, or stranger assault or survey reports of violent and property victimization or fear of crime (Sampson et al. 2002). Given the recent explanatory power of multilevel approaches and the limited theoretical explanations of drug use, why have multilevel studies been so slow to catch on in substance use research? Or, more generally, why have structural factors been left out of empirical research on substance use? Sampson et al. (2002) suggest that events such as substance use very often occur outside one's own neighborhood, thereby obscuring the neighborhood effect. While this may be the case, such a conclusion may also be premature given that the research on structural factors' effect on substance use is limited. If true, however, perhaps stepping back to a slightly larger geographic area can compensate for this transportable quality of substance use.

Some evidence does exist to support further research of structural factors' effect on individual level substance use. For example, Eitle and Eitle (2004) examined school

level tobacco use rates while controlling for county level characteristics. Using hierarchical linear models, they found that, in addition to school level factors such as school culture and organization, county level characteristics such as racial segregation and population density affected school level rates of tobacco use also. This study, however, was interested in predicted rates of use by school rather than individual level substance use, thus missing a large part of the picture. Lanctot and Smith (2001) found no significant results of percentage in poverty, percentage of female-headed households, community arrest rate, and neighborhood disorganization in models predicting drug or alcohol use, but this result was based on a sample of urban African-American girls. Further, individuals were not modeled as nested in geographic areas, even though many girls were located within the same census tract. Finally, Esbensen and Huizinga (1990) argue that social disorganization theory should be employed to explain substance use. They describe three different types of disorganized neighborhoods based on the important characteristics laid out by Shaw and McKay (1931). They then showed, using aggregated individual level data from these neighborhoods, how substance use rates differed in the three types. This research, however, focused on high-risk neighborhoods, leaving out four other types of neighborhoods found, and again still falls victim to the ecological fallacy. Thus, the analysis is not very sophisticated, but does provide some associational evidence for structural factors.

A mistake, however, would be to take from this research that the only use of these structural variables is for their main effects on individual level substance use. The ability of contextual factors to condition the effects of individual level predictors is just as important a justification for their inclusion in a study of substance use. In particular,

strain theory posits that those in lower socioeconomic categories will be more prone to crime and deviance in poor economic conditions. As with social disorganization, strain theory also stresses that economic deprivation is central, but alternatively states that those who reject legitimate work and the goal of economic success will be more likely to use drugs (Merton 1938; 1968). Though often interpreted as an individual level theory, Merton (1938; 1968) intended for strain theory to be used at the structural level, and such a theoretical interpretation has been explicitly applied to substance use (Akers 1992). Applying a structural interpretation, strain theory states that those of lower socioeconomic categories will be more likely to reject the means of obtaining economic success if opportunities for success are bleak, resulting in crime and deviance, especially in nations where economic success is a cultural cornerstone (Messner and Rosenfeld 2006[1994]). An alternative economic approach could also argue that there are optimal conditions that would limit both the amount of crime committed and the economic cost to the state (Becker 1968).

Economic conditions are not, however, the only structural conditions that might mediate the effects of individual characteristics. For example, research in Europe suggests that higher rates of substance use are associated with affluence, in that those from affluent backgrounds are more likely to frequent bars and clubs, where they are likely to participate in alcohol and illicit substance use (European Monitoring Centre for Drugs and Drug Addiction 2002a). That data also shows that this effect is more likely in urban areas. Lifetime use of ecstasy among young people is less than 1 percent in Greece, about 5 percent in the Netherlands, and about 8 percent in the United Kingdom. Lifetime use of ecstasy among affluent club goers, on the other hand, is about 22 percent in

Athens, 65 percent in Amsterdam, and 85 percent in London (European Monitoring Centre for Drugs and Drug Addiction 2002a). Thus, the effect of the individual level characteristic of income may vary by regional characteristics indicative of urbanicity. Research has also shown that the effect of structural factors may be gender-specific (Steffensmeier and Haynie 2000). Thus, the influence of area characteristics may affect male and female personal use in differing ways.

Therefore, it seems that a study of substance use using an approach of individuals embedded within structural factors is long overdue. A good understanding of how structural factors directly affect individual substance use or how they mediate individual level characteristics simply does not exist. This section and the previous one have argued that local and national level context cannot be ignored in understanding substance use. This point is particularly important given the individualized nature of past substance use research. In order to apply these structural levels to substance use, it is first necessary to briefly review the individual level research to which these arguments are to be applied.

The Individual Level: Social Bonds, Attitudes, Peers, and Demographics

The individual correlates of substance use are well established by a lengthy, high quality body of empirical research. The goal of this section is to provide a review of that research, such that a neoinstitutional framework that takes national and regional variation into account can be applied to it in the subsequent analyses. As various components of the empirical research are discussed, I occasionally digress to describe the criminological underpinnings. The conceptual model of the Monitoring the Future survey research drives much of the analysis that follows below. Building upon many of their past works and

upon new analyses, Bachman et al. (2002) offer a framework to understand the decline of substance use as adolescents move into young adulthood through the lense of age-graded social control theory. That is, their Monitoring the Future survey shows that attachments to various social groups and institutions change over the early life course, promoting and deterring drug use. Overall, substance use increases with the freedoms of young adulthood, but then declines as young adults take on more adult roles.

Bachman et al. (2002) conclude that the factors that affect drug use are usually well developed by the end of high school, are important contributors to drug use by late adolescence, and continue to operate during young adulthood. New freedoms during the first few years of adulthood contribute to some increases in substance use and new responsibilities that typically follow shortly thereafter contribute to declining substance use. Their model shows a direct effect of social roles on substance use. These roles also influence attitudes and behaviors among youth and young adults, which in turn have their own direct effect on substance use (Bachman et al. 2002:3). The roles they identify as important are student status, work status, marital status, and parenthood. The values and attitudes included as mediating variables are religious views, recreation, attitudes concerning drugs, and friends' drug use. Each of these roles and attitudes as it pertains to substance use is discussed in turn, with some attention given to criminological theories that justify their inclusion in a model of substance use.

Bachman et al. (2002) take a decidely life course approach to their model of substance use. In particular, they focus on the social bonds that occur through adolescence and young adulthood and how the lack thereof may precipitate drug use or how the formation of bonds can deter use. Before focusing specifically on substance use,

it is therefore useful to briefly describe the more general life course approach. Following Hirschi's (1969) social control theory stressing the delinquency-preventing quality of bonds to social institutions, Laub and Sampson (2003; Sampson and Laub 1993) developed their age-graded social control theory, which emphasizes change and continuity in criminal offending. In their study following delinquent males from their childhood through to their seventies, they found support for the fact that everyone desists from crime eventually, though there are variable routes to that desistence (Laub and Sampson 2003). They attribute desistence to the appearance of social controls throughout the life course. Some of these controls are quite routine; others are the result of happenstance. They put particular emphasis on three types of social controls: marriage and family, work, and the military (Sampson and Laub 1993). These social institutions create valuable bonds that one would risk breaking through criminal involvement. Thus, these bonds influence desistence because to lose them through crime is too risky.

Laub and Sampson's (2003) study is unique in its temporal breadth. Most other studies have focused on onset and desistence in the adolescent and young adult years. These studies have found that deviance is normative among youth (Moffitt 1993). The age-crime curve is steep through the period from age 7 to 17, but declines thereafter with about 85 percent desisting by age 28 (Caspi and Moffitt 1995) with some persisting late into life (Moffitt 1993; Laub and Sampson 2003). A bond that is particularly important at this time that is missed by the historical context of Laub and Sampson's (2003) study is that of school. A strong social bond to school, as measured through attachment and commitment, has been shown to decrease the probability of delinquency (Vander Ven et al. 2001; Jenkins 1997; Cretacci 2003; Zaff et al. 2003). Further, some of the effects that

Laub and Sampson (2003) identify as encouraging desistence among adults may have differing effects earlier in the life course. For example, studies have shown that intensive work (more than 20 hours per week) among youth leads to increased deviant behavior (Agnew 1986; Greenberger and Steinberg 1986; Heimer 1995; Wright, Cullen, and Williams 1997; Resnick et al. 1997; McMorris and Uggen 2000). In the Monitoring the Future model (Bachman et al. 2002), the life course approach is applied to substance use, as use is directly influenced by social bonds such as those to school, work, and family. Much empirical research supports this viewpoint.

In general, high school students heading for college use less of all classes of substances compared to those not bound for college (Bachman et al. 1997). Following high school, the effect of student status varies by the type of substance. Marijuana use may be higher among non-college bound high school students, but the rates of use increase rapidly for those attending college such that the rates among the two groups are about equal three to four years out of high school (Schulenberg et al. 2000; Bachman et al. 1997). Some have attributed these increases to changes in living arrangements, with those living away from their parents more likely to drink and smoke (Schulenberg et al. 2000; Wechsler et al. 1995). Cocaine use, on the other hand, is higher for the non-college bound students and remains high in the years following high school (Bachman et al. 1997). The same is true of cigarettes, with the latter group more likely to smoke in high school and with an increase in the years following high school (Schulenberg et al. 1994; Bachman et al. 1997).

As mentioned above, studies have shown that working more than 20 hours per week during high school leads to increased deviant behavior, including substance use

(Agnew 1986; Greenberger and Steinberg 1986; Heimer 1995; Wright, Cullen, and Williams 1997; Resnick et al. 1997; McMorris and Uggen 2000). Following high school, levels of substance use vary by employment status. Full-time work status is associated with decreases in heavy drinking and marijuana use, though cigarette use increases. Part-time workers show patterns of substance use similar to college students, possibly because many part-time working young adults are enrolled in college (Bachman et al. 1997). Those who are neither students nor employed tend to have higher levels of substance use also (Schulenberg et al. 2000; Bachman et al. 1997). Though not addressed in the analyses below, research has also found that those in the military have higher rates of alcohol and cigarette use, but lower rates of illicit substance use (Bray, Marsden, and Peterson 1991; Bachman et al. 1997).

Marital status and family formation also affect the rise and decline of substance use in young adulthood. The effect of marriage is well-established as a cause in the decline of criminal activity in general, especially for males (see, e.g., Sampson and Laub 1993; Laub and Sampson 2003; Sampson, Laub, and Wimer 2006; King, Massoglia, and MacMillan 2007). Similarly, studies consistently show an association between marriage and decreased alcohol and illicit substance use (Arnett 1998; Brown et al. 1974; Burton et al. 1996; Gotham et al. 1997), though this effect may be stronger for women (Horwitz and White 1991; Yamaguchi and Kandel 1985). Longitudinal studies have shown a decrease in many types of substance use after young adults enter into marriage (Bachman et al 1997; Schulenberg et al. 2000). Young adults who cohabitate, on the other hand, have above average rates of use, though this may be due to a selection effect where those who used substances in high school are more likely to become cohabitating adults

(Bachman, O'Malley, and Johnston 1984; Bachman et al. 1997). Finally, becoming a parent is associated with decreases in licit substance use (Kandel and Ravies 1989; Yamaguchi and Kandel 1985), though some research argues that the effects of parenting are better attributed to the influence of marital status (Bachman et al. 1997; Burton et al. 1996; Gotham et al. 1997).

Research suggests that the bonds associated with school, work, and family are not the only important predictors of youth and young adult substance use. Rather, Bachman et al. (2002) incorporate several of what they call "mediating variables" into their models. In particular, these mediating factors represent an individual's values, attitudes, and behaviors. For example, adolescents and young adults who are religious are less likely to use alcohol, marijuana, and other substances (Bachman et al. 2002; Arnett 1998; Bahr et al. 1998; Bachman, Johnston, and O'Malley 1981; Brown et al. 2001; Schulenberg et al. 1994). Religious views are also related to the likelihood of entering into many of the social bonds discussed above, such as marriage as opposed to cohabitation (Arnett 1998; Stolzenberg et al. 1995).

Another mediating variable is attitudes towards drugs. The extent to which one views a drug as risky or dangerous is likely related to the amount one uses. Evidence of such a relationship has been found for cigarettes, marijuana, and cocaine (Bachman et al. 2002; Bachman et al. 1998; Bachman et al. 1990). Though it could be argued that the use of a substance leads to a perception of less dangerousness, evidence from the Monitoring the Future survey suggests the opposite, such that perceiving a substance as risky causes lower use of that substance (Bachman 1994). Perceived ability to obtain drugs has not been found to be associated with use, perhaps due to the very high perceived availability

of drugs and to stronger relationships between use and perceived riskiness (Bachman 1994).

As for behaviors, Bachman et al. (2002) argue that use of time affects the probability of substance use both in adolescents and young adulthood. In adolescence, socializing with peers away from home is related to substance use (Osgood et al. 1996; Bachman et al. 1981; Schulenberg et al. 1994; Agnew and Petersen 1989), with some recreational activities providing more opportunities for substance use. The behaviors that are most likely to involve substance use are those that are unstructured and do not involve authority figures (Osgood et al. 1996; Agnew and Petersen 1989). In young adulthood, new freedoms allow increased ability to use one's time as they please. Spending that time out for fun and recreation, particularly at bars and clubs, is associated with higher substance use (Bachman et al. 2002; Schulenberg et al. 1994), and this effect holds across many demographic and attitudinal measures (Wallace and Bachman 1991).

Of course, who this leisure time is spent with affects substance use, which leads to the final mediating variable: friends' substance use. Though just one part of Bachman et al.'s (2002) model, friends' substance use deserves attention in its own right given the amount of research on the effect of peers' delinquency on one's own delinquency. Some have even argued that the association between decreased delinquency with some of the roles described above, such as marriage, is actually due to the effect that these roles have in decreasing time spent with peers (Warr 1998, 2002). Thus, an alternative approach to social bond life course theories is one which attributes changes in substance use that occur as a result of bonds to the effect those bonds have on times spent with peers. In fact, one of the most consistent findings in all research on delinquency is the association

between the number of delinquent peers and self-reported delinquency (e.g. Short 1957; Reiss and Rhodes 1964; Voss 1964; Erickson and Empey 1965; Jensen 1972; Hepburn 1977; Akers et al. 1979; Johnson 1979; Elliot, Huizinga, and Ageton 1985; Tittle, Burke, and Jackson 1986; Matsueda and Heimer 1987; Warr and Stafford 1991; Warr 1993a, 1993b, 1998, 2002; Dishion, Patterson, and Griesler 1994; Simons et al. 1994; Thornberry et al. 1994; Matsueda and Anderson 1998; Haynie 2001, 2002, 2003). Beyond this, little else is known about the mechanism by which delinquency is socially transmitted (Matsueda 1988; Warr 2002), a potential criticism of this line of research (e.g. Kornhauser 1978).

The dominant theories on the role of delinquent peers stress two different processes. Sutherland's (Sutherland and Cressey 1978) theory of differential association posits that delinquency is learned through intimate social relations. Within these relations, attitudes, or definitions, favorable to the violation of the law are acquired, with a person becoming delinquent due to an excess of definitions favorable to such violation. Thus to Sutherland, the social transmission of delinquency occurs specifically through the dissemination or transference of attitudes about such conduct through social networks (Warr and Stafford 1991). This point is the central distinguishing feature of differential association.

On the other hand, Akers' (1985) theory of social learning requires only mimicry of peer behavior and emphasizes behavioral reinforcement, requiring no transference of attitudes. Akers (1969; Burgess and Akers 1968) uses the term differential reinforcement to describe the process by which individuals come to view deviant activities, such as substance use, as favorable. Behavior is reinforced through the rewards obtained in social

interaction with peers and can be specifically applied to substance use (Akers 1992). "In the initiation of drug use, exposure to definitions favorable to drugs and differential association with other users who provide models and social reinforcement for use are critical" (Akers 1992:97). After use, reinforcement comes from both the peer group, as the individual continues to associate further with substance users, and from the pleasurable effects of the drugs themselves. This description follows Becker's (1963) classic work on the initiation and continuation of marijuana use.

Earlier research by Kaplan, Martin, and Robbins (1982; 1984) found further evidence of some of these patterns. They found a direct influence of drug-using peer networks upon subsequent drug use. In addition, such networks, along with involvement in the broader peer subculture, indirectly lead to drug use through initiation to early stages of the substance use sequence (Kaplan et al. 1984, 281). In fact, some scholars have found that deviant peer groups bonds are as strong, if not stronger, than bonds among non-deviant peer groups (Giordano, Cernkovich, and Pugh 1986; Kandel and Davies 1991). Other research on peer dyads and groups has shown that peer influence on substance use is a process of mutual influence in which peers influence each other's substance use through their use (Gaughan 2003; Rice, Donohew, and Clayton 2003). Naturally, those most at risk for substance use seek out like-minded individuals who share these characteristics. Once substance use begins, association with substance-using peers rises, increasing the chances of further and "harder" drug use (Kandel and Davies 1991; Kandel 1973). Within such associations, users experience increased self-esteem as their behavior is reinforced by their peers, potentially countering the negative effects drug use can cause among other relationships, such as with parents (Kaplan et al. 1986;

Kaplan, Martin, and Robbins 1982; Kaplan 1975). The definitions of substance use as favorable among youth might also have an effect at the aggregate level, as being surrounded by high numbers of youth may influence both behavior and opinions.

Though not explicit in Bachman et al.'s (2002) model, one final group of substance use correlates deserves attention: demographic characteristics. In particular, gender, class and income, and age are important demographics in substance use research. As with most forms of crime and delinquency, males have higher rates of substance use than females. In the United States, these results hold in both national surveys (Substance Abuse and Mental Health Services Administration 2002) and surveys of high school students (Johnston, O'Malley, and Bachman 2000). In Europe, males also have a higher prevalence of use across a variety of substances, though there is considerable variation across countries (European Monitoring Centre for Drugs and Drug Addiction 2006a). For example, among the general population, the ratio of males to females among those reporting use of cannabis in the last year ranged from 6.4 males for each female in Portugal to 1.3 in Italy.

Substance use rates also vary by income levels. Such a relationship between income and substance use was first explicitly put forth by Merton's (1938; 1968) strain theory. It posits that those who reject both the cultural goals of a society (that is, capitalism in the United States) and the means to obtain it (that is, legitimate work) respond by retreating from conventional lifestyles through deviant means, such as alcoholism and drug addiction (Merton 1938, 1968). Surveys have shown that those in the lower class and with lower educational attainment have higher substance use rates (U.S. Department of Health and Human Services 2004; Barr et al. 1993). Among youth,

those in families making less than $20,000 annually were more likely to smoke cigarettes and have used any illicit drug than those in families that make more than $75,000 annually (U.S. Department of Health and Human Services 2004). In the United States context, this effect is compounded by race, with blacks in the lower class and with low levels of education having substantially higher levels of use than similar whites (Barr et al. 1993). In opposition to strain theory, research in Europe suggests that higher rates of substance use are also associated with affluence. That is, those from affluent backgrounds are more likely to frequent bars and clubs, where they are likely to participate in alcohol and illicit substance use (European Monitoring Centre for Drugs and Drug Addiction 2002a).

Finally, patterns of substance use by age are very well documented. It was already mentioned above that, in general, delinquency and crime rise through the teenage years, peaking at age 17 and decreasing throughout an individual's twenties (Caspi and Moffitt 1995; Sampson and Laub 1993; Laub and Sampson 2003; Gottfredson and Hirschi 1990). Substance use is no exception to this trend, except that the peak of substance use occurs somewhat later. Instead, substance use increases throughout the teenage years and peaks between ages 15 and 25, decreasing thereafter (Substance Abuse and Mental Health Services Administration 2002). The timing of this peak corresponds to a host of new freedoms as individuals exit adolescence (Bachman et al. 2002).

This section has described the empirical research on individual level correlates of substance use, as well as the criminological theories related to this research. For the particular behavior of substance use, this is without a doubt the best established and most studied level of variation. Individuals and the social bonds which they have formed,

however, do not occur in a vacuum. Rather, these individuals are situated in a broader social context, which may exhibit a main effect on drug use or alter the effect that these individual level correlates have on use.

Chapter Conclusion

Though the study of substance use has produced strong empirical conclusions, it has in many ways lost its sociological focus. Through the individualization of substance use research, national and local factors have been neglected. This literature review argued from sociological theories of neoinstitutionalism and criminology that such a focus might be a mistake. National level legal culture provides scripts by which individuals structure their behavior (Ewick and Silbey 1998). The local must also not be lost sight of (Boyle 2002), as the immediate surroundings in which one is located also affects propensities for crime and deviance (Shaw and McKay 1931; Merton 1938, 1968; Sampson and Groves 1989; Sampson et al. 1997). It is my intention to apply these theoretical frameworks to the already well established individual level research, which will guide what individual level characteristics are important in statistical modeling.

Thus, variation in national level legal culture, local structural factors, and individual characteristics will each be included in the following analyses of youth and young adult substance use and opinions on drug policy in the EU-15. Given the special case of the EU, a natural question would be to what extent variation even exists in their national drug policy and the subsequent legal environments therein. Thus, I next describe the drug policies of the EU-15 countries. Within this description, a story emerges about

the institutionalization of drug laws, emphasizing both homogenization and differentiation in the ever-increasingly integrated European Union.

CHAPTER 2: DIFFERENTIATION AND CONVERGENCE OF EUROPEAN UNION DRUG LAWS

One of the major goals of the analyses in this dissertation is to understand if national level variation in drug laws influences individual behavior. Put simply, do the laws of a nation affect the probability that an individual will use drugs? Given that the data used below is from the original 15 countries of the EU, it raises the following question: Is there enough variation in drug policy in the EU-15 to justify a study of how policy affects substance use? Thus, a review of drug policy in the EU-15 is needed as background to the following empirical analysis. Given the institutional theory reviewed in Chapter 1, however, I set out to do much more in this chapter.

The European Union is a special case of institutional theory in action. When combined with the institutionalization of international drug law, it would seem inevitable that EU drug policies would converge into similar forms. The major conclusion of this chapter is that, as institutionalist arguments of European integration would support (Fligstein and Stone Sweet 2002), there is a major trend of convergence in drug laws at the policy level. When looking at individual nations with a closer lens, however, there is some notable differentiation, supporting arguments about the need to reexamine institutional arguments within the realm of crime and criminal justice (Grattet and Jenness 2008; Grattet et al. 1998; Savelsberg 1992; Savelsberg and King 2005; Vuolo and Kruttschnitt 2008, Lynch 1998; Garland 1990, 2001; Cheliotis 2006).

The following chapter is organized as follows. First, research is reviewed that emphasizes this convergent and differentiable quality of certain types of policy. Second, the highly successful integration of the EU is described and the effect this has on criminal

law. As will be shown, though economic integration is high, criminal law has been slow to catch on at the EU level. Second, the history of international drug policy is reviewed, detailing how such policy has become institutionalized over time. Third, the effect of both EU integration and the institutionalization of drug policy on EU level and national level drug policy within the EU-15 is described in detail. As is the case with criminal law in general, considerable differentiation exists at the national level despite these larger institutionalizing forces. This section will simultaneously provide a qualitative summary of the drug laws in those countries. This historical review will set the stage for the analyses that follow.

Convergence and Differentiation in the Sociological Literature

The review of institutionalism in the previous chapter set up an argument for both the existence of homogenization and differentiation. On the one hand, institutionalism argues that the world society has become increasingly important in the modern era, creating a homogenizing force with wide breadth (Meyer et al. 1997). According to Meyer et al., "Worldwide models define and legitimate agendas for social action, shaping the structures and policies of nation-states and other national and local actors in virtually all domains of rationalized social life" (1997:145). Thus, the culture of a nation-state is not simply built up from local circumstances and history, but rather organized on a worldwide basis.

Meyer et al. (1997) argue that modern trends in a multitude of arenas that are counter to hypotheses from other sociological perspectives could only occur if worldwide forces are at work. They give the example of the rise of women in higher education

worldwide, a conclusion only expected for Western countries, as opposed to Islamic countries. They provide an extensive list of other examples (Meyer et al. 1997:152-3). Drug policy can be thought of the same way. As will be shown below, the rise of international drug policies has unprecedented support from the most unlikely of countries. According to institutionalism, even if national rhetoric is to the contrary, the nation-state, organizations, and individual actors will still follow the cultural force of the world society (Meyer et al. 1997). Institutional forces are strong when countries support policies that may not be in their best interest internally. Instead, they support such policies for greater acceptance in the international community (Meyer et al. 1997).

Many researchers, particularly within criminal justice, have found this view of the homogenizing force of globalization to be too strong. Rather, even with international trends, the characteristics of the nation-state still influence the degree to which nations conform to those trends (Sutton 2000, 2004; Boyle 2002). The specific history of nation is reflected in its legal institutions, as they evolve with the collective memory of the nation (Savelsberg and King 2005). Of particular relevance to the review below is Grattet et al.'s (1998) study of the diffusion of hate crime legislation across the United States. Noting the institutional pressure to enact hate crime laws as more and more states within the system enact laws, they found that there was large scale diffusion of hate crime laws across the 50 United States, but accompanied by differentiation. Although states converged around the method of altering their criminal codes, the specific content of the laws became increasingly differentiated over time, affecting the kinds of activities that can be prosecuted and the kinds of statuses that are protected under hate crime laws.

Grattet et al. (1998) found that state legislatures have some autonomy regarding their local social and political environments and that cultural linkages between states at the broader system level (Strang and Meyer 1993) facilitate the spread of practices and models. Moving beyond the idea that this spread must involve a homogenization of cultural forms and practices, they note that once the basic practices become institutionalized, subsequent adopters exercise liberty and expand the domain of the cultural form (here, law), creating distinctive permutations. According to Grattet et al., "Homogenization best characterizes higher levels of abstraction; differentiation occurs at less abstract levels. Differentiation of content occurs only when the general construct is institutionalized" (1998:303). They also state that laws that are less diverse, symbolically charged, and contested, namely consensus laws, will have less differentiation. Rather, "policies that are highly symbolic, that address heavily contested and ill-defined issues, that have high heterogeneity in the definition of the phenomena (or offenses) under regulation, and/or that implicate diverse populations (offenders) may produce differentiated policy solutions and formulations" (Grattet et al. 1998:304).

It is my intention below to show that drug policy fits squarely within the framework proposed by Grattet et al. (1998). I make this argument through a brief historical analysis of EU criminal law, international drug policies, and EU drug policies. The point I come back to is that each of these realms builds an argument for institutionalization, but a focused look at secondary sources provided by the EU show differentiation at the level of implementation and enforcement, following a long line of recent research in the sociology of law (Grattet and Jenness 2008; Savelsberg 1992; Vuolo and Kruttschnitt 2008, Lynch 1998; Garland 1990, 2001; Cheliotis 2006). Before

beginning, I note that this historical analysis is not given great methodological rigor, but is instead meant to provide a review of EU drug policies in a way that is both sociologically informative and argues that significant variation exists in those policies, justifying a study within the EU.

The Evolution of Criminal Law in the EU

Given that the EU is a unique case of institutionalism in action, some attention to that evolution is necessary to understand the context of the development of drug policy therein. In particular, the form and structure of EU criminal law is important as way of background. But the realm of criminal law falls out of European economic integration, so it is there that I begin. If one concentrates on the subset of nations that is the EU-15, it appears that there is support for institutionalist arguments. Fligstein and Stone Sweet (2002) show that there has been overwhelming integration among EU countries. The Treaty of Rome, establishing the European Community (hereafter, EC, the precursor to the European Union), established a set of organizations with the capacity to produce, interpret, apply, and enforce market rules in order to promote economic exchange across borders. They argue that the activities of the EC's organizations mixed with the activities of traders and other transnational actors have produced a self-reinforcing system, linking rule structures and market integration. That is, rules and the behavior of political and economic actors evolved symbiotically through positive feedback loops that push steadily for deeper integration (Fligstein and Stone Sweet 2002; Sandholtz and Stone Sweet 1998; Haas 1961).

Fligstein and Stone Sweet (2002) show that the EC, and later European Union, has undergone several changes, each promoting further integration. The first stage was building the supranational organizations and figuring out how to make the Treaty of Rome work. In this period, change was produced by pressure from social and economic actors seeking easier flow of goods across borders. From the 1970s to the 1980s, these organizations worked to dismantle barriers to trade and other forms of exchange, seeking to replace disparate regulatory national level regimes. Rules were built up to regulate this flow of goods, fostering a quasi-federal polity. The final period, up to the present, is a time of active institutionalizing of the European market and governance structures through positive integration. This period is marked by interest groups using the existing machinery of the EU to push forth policy outcomes. In each case, increase in litigation of EC law put pressure on the EC's legislation to replace national frameworks with supranational ones. The result is a deeply integrated European political body, with the member states conforming their own policy to the wider set of regulations.

This European integration lends great support for institutionalist arguments that contend that broader forces will push nation-states to conform. The reciprocal relationship between markets and regulatory policy has ushered in an era of unprecedented European integration (Fligstein and Stone Sweet 2002). How far does this integration extend into other arenas? Fligstein and Stone Sweet (2002) state that in the current era of European integration, as an ever-widening range of national regulation and administrative practices were placed under EC law, and as actors advantaged by EC institutions pushed for more integration through lobbying and litigation, EC legislators found that supranational solutions to the problems posed by the expansion of

transnational society and economic independence were the only feasible response. Thus, the rule structure became more dense and differentiated, increasing grounds for legal action and causing actors to push to establish or interpret new rules in their favor.

Even though integration started in the economic arena, an increasing swath of rules and regulations has come under the legislative and judicial power of the European Union. This trend can be seen with the various realms that came under its jurisdiction with the creation of the EU by the Maastricht Treaty, adding international cooperation in the fields of foreign policy, military, criminal justice, and judicial cooperation. Of particular relevance here, the Justice and Home Affairs (JHA) pillar of the treaty introduced cooperation in law enforcement, criminal justice, asylum, immigration, and judicial cooperation (Fletcher and Loof 2008). Importantly, the traditional social, economic, and environmental spheres of the EC whose development and consequences for integration were outlined by Fligstein and Stone Sweet (2002) were held to their own separate organizations. It should be noted that if the Treaty of Lisbon succeeds, European integration would reach an even greater height, as the treaty would abolish these different pillars and combine the realms into one body.

Even though the force of European integration has facilitated cooperation in other realms (Fligstein and Stone Sweet 2002), effectively extending its reach through treaties such as those mentioned above, the extent to which these supranational bodies have successfully furthered institutionalism is not well researched. In particular, the evolution of criminal law in the EU and its relationship to integration is a newly developing topic (Fletcher and Loof 2008). This subject is of importance to the current research in trying to understand the variability of substance use laws and practices across the EU. In the

remainder of this section, I outline how European integration is taking shape in the area of criminal law and to what extent this supports institutional arguments for such integration (Fligstein and Stone Sweet 2002).

While criminal law in the EU may have come out of the increased calling for European integration, in creating the EU, its founders recognized the importance of criminal law to national sovereignty (Fletcher and Loof 2008). This area was considered important enough to restrict it to what is called the third pillar, or Justice and Home Affairs. The first pillar contained the traditional European Community, including the European Commission, Parliament, and Court of Justice. Since the creation of the EU, it resembles a federal system, including majority voting. The third pillar only operates under the Council of the European Union and requires a unanimous vote. Thus, the member states were unwilling to apply the supranational Community methodology to criminal matters and the third pillar became, "more reminiscent of traditional, international cooperation than the advanced integration of the EC" (Fletcher and Loof 2008:10).

This foundation changed with the 1999 Treaty of Amsterdam, which came about as a reaction to the illegitimate economic activities that rose alongside legitimate economic activities as borders dissolved since the creation of the EU (Fletcher and Loof 2008). Due to its importance, the treaty transferred immigration and asylum to the first pillar, changing the name of the third pillar from JHA to Police and Judicial Cooperation in Criminal Matters (PJCC). With limited power, the third pillar has for the most part been restricted to helping enhance cooperation and also to providing common definitions of criminal offenses. For the former, bodies were created to assist in this cooperation,

such as the European Police Office (Europol) in 1999 and the European Judicial Cooperation Unit (Eurojust) in 2002. As for the latter, the development of substantive criminal law at the EU level has been slow and at times controversial. Only less than a dozen fields have formally been defined (Fletcher and Loof 2008:174). When cases have actually come to the attention of the Council and the Court of Justice, the interpretation has been a source of debate. In reality, when it comes to cooperation in criminal matters and substantive criminal law under the current pillar system, it is still at the discretion of the member states to cooperate in these matters and to enact legislation in line with definitions of substantive law. Several examples support the reluctance of member states to cooperate and follow common definitions, such as matters of extradition, double jeopardy, and requiring a criminal matter be investigated.

The treaty also established the principle of "mutual recognition" as the guiding standard for criminal matters. The object of mutual recognition is that legislative differences should no longer constitute obstacles to the EU-wide effectiveness of judicial decisions in criminal matters taken in the individual member states. Some member states supported this measure because it actually slowed the momentum of legislative harmonization in criminal matters, viewing mutual recognition as less intrusive (Fletcher and Loof 2008).

Despite what might seem a great effort to ensure national sovereignty over criminal matters and a reluctance to give power over these matters to a supranational body, the truth of the matter is that there is large agreement between EU member states when it comes to recognition of the criminality of certain actions and the definition of offenses. That is, the various national systems of criminal justice tend to converge rather

than diverge (Fletcher and Loof 2008:203). So where does the defensiveness in criminal matters stem from? As Fletcher and Loof observe, "where there cannot be said to exist a general consensus among the Member States of the EU is in the field of sanctions… [T]he great diversity in the levels of sanctions imposed for any given offence in different Member States is a source of distrust and suspicion between the criminal justice systems in these Member States" (2008:203).

The evolution of EU criminal law and justice is, nonetheless, a story of the continued integration of the member nations. Slowly but surely, barriers to supranational control have fallen. If the Treaty of Lisbon goes into effect in 2009, the pillar system will be abolished and criminal matters will be subject to majority rule by the European Commission and Parliament. In general, European integration is supportive of institutional arguments. But, as was described above, some areas are slower to catch on due to their perceived importance to national sovereignty. Even when definitions of crimes are consistent, there is still the matter of enforcement and sanctions. In the next section, I take the specific example of the research topic at hand, substance use. The story there goes hand in hand with what was just described. European integration in the response to substance use is quite consistent among the member states, indicating convergence. The way these policies are practiced, however, is a source of divergence.

A Brief History of International Drug Control Policy

Given that the story of the institutionalization of drug policy is a global phenomenon, I first give a brief history of international drug policy. European regional policy occurs within these global trends, modeling their regional provisions within the

guidelines of the United Nations (UN). As the following will show, there have been increased international efforts to create a unitary drug control system, upon which regional and national drug control policies are intended to be based. The next section describes how the European wide drug control model is based on UN decreed guidelines, while focusing on specific issues to the member states of the EU. Further, member states have taken heed of these European policies in the adoption of their own national drug control plan. The final section, following logic similar to Grattet et al. (1998) concerning hate crime laws, argues that the member states adopt the European plan in a unique manner to serve their own purposes, creating differentiation of those laws.

Drug control was not an international issue until the rise of opium trading in the 18th and 19th centuries (United Nations Office on Drugs and Crime 2008). During this time, China banned the import and sale of opium. When the British Empire gained a monopoly on opium production housed out of India, they nonetheless marketed it aggressively in China. This situation resulted in the First and Second Opium Wars, the end result of which removed legal impediments to the sale and importation of opium in China and created a drug use epidemic. Several events occurred simultaneously, giving rise to an international drug control system. First, in 1906, the British Liberal Party, which had opposed opium on moral grounds for many years, took control of British Parliament away from the Conservatives and passed a resolution calling for an end of the Indo-China opium trade. Second, the United States took control of the Philippines, which had a very high rate of opium use among its native population. While at first using a taxation system to benefit from the sale of opium, an outburst of moral indignation caused President Theodore Roosevelt to order the end of the system. Third, after the

Boxer Rebellion in 1900, China began to seek Western help for its drug problems, a call that interested the US given their desire to improve relations with China. With such major powers interested in reducing the world's opium issue, the world was ready for a discussion of international drug policy.

The first such discussion was the Shanghai Opium Commission of 1909. Eager to show progress, participating nations began to pass drug reform policy before the conference even began (United Nations Office on Drugs and Crime 2008). While the results of the Commission were nonbinding, an agreement was reached between Britain and China to eliminate the opium trade and set the stage for the next convention, the Hague Convention of 1912, which expanded the conversation to coca and heroin. A few powerful countries insisted that all 34 countries must ratify the treaty, which did not occur. Several countries ratified it among themselves, however, and the language could be seen in some of those countries national policies, such as the 1913 Harrison Act in the US.

World War I disrupted efforts at drug control policy. The Opium Convention, however, was built into many of the treaties that occurred following the war at the behest of the US, British, and Chinese authorities, including all the major treaties between the Allies and the powers on the German side (United Nations Office on Drugs and Crime 2008). The desire for international drug control policy was then pushed forward by the League of Nations, though it was stymied by the fact that several key players, particularly the US, were not members. The League modeled its policy after the British model, formally adopting it at the Second Opium Convention of 1925 (United Nations Office on Drugs and Crime 2008). Though the US and other key players did not participate, they

did ratify the 1931 Conference on the Limitations of the Manufacture of Narcotic Drugs. The Convention introduced a compulsory system aimed at limiting drug manufacturing to the amounts need for medical and scientific purposes. It also introduced the concept of "drug scheduling," classifying drugs as more or less dangerous. As World War II neared, further efforts at international drug control policy again came to a halt.

After World War II, the UN assumed the drug control functions and responsibilities previously carried out by the League of Nations, officially reinstating all the previous treaties in 1946. With the two new US and Soviet superpowers emerging, the US began to push its own drug policy agenda under the head of the US delegation, Harry Anslinger (United Nations Office on Drugs and Crime 2008). Given the disparate support for past treaties, simplification of the drug control system was needed. The 1961 Single Convention on Narcotic Drugs changed that. Today, it is one of three treaties that define the international drug control system, with 183 countries parties to it (United Nations Office on Drugs and Crime 2008). The treaty bound the parties to take legislative and administrative action to limit drug activities, including production, importation, use and possession, strictly to medical and scientific purposes. The concept of drug schedules described which substances should be given which restrictions. The treaty also went beyond controlling the drugs themselves to controlling the growth of the plants that provide the raw material, restricting it to certain places in certain countries. Finally, the penal provision instructed each party to adopt measures to make drug activities a "punishable offense…particularly by imprisonment or other penalties of deprivation of liberty" (United Nations 1961). Use and possession for personal consumption are not mentioned and thus has been a source of differentiation, as discussed further below. The

1972 amendment to the Single Convention, pushed for by the US, bound parties to enforce laws against illegal cultivation and destroy the plants.

During the 1970s, the rise of synthetic drugs began and the 1971 Convention on Psychotropic Substances was held. This Convention was different than previous ones in that in was not poor countries producing the drugs based on plants, rather it was powerful pharmaceutical companies, located in powerful countries. It did eventually add synthetic drugs to the drug schedules. As one of the other two treaties comprising today's international drug control system, it is ratified by 183 countries (United Nations Office on Drugs and Crime 2008).

The rise of substance use in the 1980s gave way to the third such treaty, the 1988 Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, with 182 countries currently parties to it. In addition to clarifying causes for extradition and punishing precursor substances, the Convention obliged parties to, instead of being a "punishable offense," make both trafficking and "the possession, purchase, or cultivation…of drugs…for personal consumption" a criminal offense (United Nations 1988). The interpretation of this controversial stipulation is made more difficult by a clause that states that in cases of a minor nature, states can provide an alternative to conviction or punishment. This clause, again, is a source of great differentiation is drug policy.

In 1998, the UN decided it was time to reflect on the international drug control system and called a special session of the UN General Assembly (UNGASS). UNGASS obliged member states to adopt strategy for their nation's drug policy in line with the session's "Action Plan," a term which will be important in the discussion below.

According to the document, states should adopt the Action Plan by 2003, with 2008 as the year by which significant results in the field of demand reduction and reduction in illicit cultivation of coca, cannabis, and opium, as well as the manufacture of psychotropic substances. For demand reduction, UNGASS brought to the fore the debate concerning harm reduction and encouraged countries to find new ways to adopt the technique, taking a more treatment and prevention oriented stance than previously. In most of the individual elements of the Action Plan, there was a rise in compliance even in unlikely nations (United Nations Office on Drugs and Crime 2008).

As the UN reviews 100 years of international drug control efforts, their language would support theories of institutionalism. They describe the multilateral system regulating illicit drugs as powerful, in that, "when a State Party ratifies one of the three Conventions, it becomes obliged to bring its national laws in line with international law" (United Nations Office on Drugs and Crime 2008:212). The UN claims that adherence to the conventions is now virtually universal, with 186 countries (96%) as parties to the Single Convention, 183 countries (94%) as parties to the Convention on Psychotropic Substances, and 182 countries (94%) as parties to the 1988 Convention. Further, before World War II, the model of the British Empire was used to guide international standards. After World War II, the US became the dominant voice in global drug control. This Westernization supports ideas of the power of modern global institutional trends (Meyer et al. 1997), particularly with the compliance of non-Western countries to international drug treaties that do not necessarily benefit them. Though the UN promotes this as an achievement, they do recognize that national laws adapt the treaties in a way that works best for their state, particularly in the area of cannabis policies and the interpretation of

the policy of harm reduction (United Nations Office on Drugs and Crime 2008:209-210,215).

Drug Policies in the European Union: Convergence and Differentiation

It is against this global backdrop that the European Union, both as a whole and in the area of crime, was developing. As described above, economic cooperation drove much of the European integration that resulted in the step from the European Community to the European Union (Fligstein and Stone Sweet 2002). It was not until the formation of the EU in 1993, however, that criminal matters, including drugs, came under the purview of this supranational body. It was also described above that the power of the EU to deal with criminal matters is not entirely clear and is a quickly changing matter of policy. Similar to the UN, the EU does not have the power to enforce matters concerning drugs. Rather, both bodies are restricted to essentially writing guidelines to which the member states are said to be bound. The EU recognizes this is their current role, with the legal framework basically granting them the power to adopt a European Union action plan (European Communities 2002), discussed below.

At first glance, it appears that the institutional forces in the field of drug policy are quite strong, with conformity with UN conventions at the EU level and among the individual nations of the EU-15. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), the EU's clearinghouse for drug information and data, cites UNGASS as the impetus to the development of EU and national level strategies (EMCDDA 2002b). In 1999, the EU adopted the European Union Drugs Strategy and the European Union Drug Action Plan (2000-2004), which was the first of its kind in the EU.

The EMCDDA (2002b) defines a drugs strategy as a unifying theme or framework for determination, coherence, and direction, while it defines an action plan as a scheme or program for detailed specific actions. The EU action plan set out objectives that included reducing drug use, reducing drug-related health damage, increasing treatment, reducing availability of drugs, reducing drug-related crime, and reducing money laundering and trafficking of drug precursors (EMCDDA 2001). The action plan contains guidelines and frameworks for the objectives and stresses the importance of regular evaluation. In many ways, the EU is more in line with the UN treaties than many other powerful countries such as the US. Whereas the US takes a defensive stance towards UN conventions concerning treatment and harm reduction, the EU embraces it as part of their action plan, attempting to strike a balance between demand and supply reduction (EMCDDA 2001). In fact, the EU is playing an active role in the 10 year review of UNGASS, creating resolutions on how to conduct the review and providing expert consultation by the EMCDDA (EMCDDA 2008a).

While not legally binding, the EMCDDA (2001) claims the support of the member states shows a commitment to implementing the objectives of the action plan. This commitment is reinforced in the individual nation's adoption of drug strategies and action plans. As with many of the UN conventions over the years, several of the EU nations were conceiving, producing, and adopting national drug plans during the time that the European Union Action Drugs Plan (2000-2004) was being negotiated and discussed in Brussels (EMCDDA 2002b). In this way, the European Union Action Drugs Plan (2000-2004) had a symbiotic relationship to national drug strategies, both a product of UNGASS. Over the time period following UNGASS and during the discussion and

adoption of the European Union Action Drugs Plan (2000-2004), the number of drug strategies in the EU rose dramatically. Whereas in the 10 years from 1987 to 1997 only four national drug strategies had been adopted, at least 25 strategic documents were adopted at the national and regional level in the field of drugs in the EU-15 between 1998 and 2002 (EMCDDA 2002b), the latter being the year of the survey used below. Table 1 shows the rapid rise during this time period. Of course, the year of the survey has no particular significance, as EU and national level drug strategies have been continually developed since then.

[Table 1 here.]

The EU renewed its action plan from 2005 to 2008, which listed over 100 specific actions to be implemented by the EU and its member states by the end of 2008 (EMCDDA 2006b), but had two overarching goals. The first goal was to achieve a high level of health protection, well-being, and social cohesion by complementing the member states' actions in preventing and reducing drug use and dependence and drug-related harm to health and the fabric of society. The second goal was to ensure a high level of security for the general public by taking action against drug production, supply, and cross-border trafficking, and intensifying preventive action against drug-related crime through effective cooperation between the member states (EMCDDA 2005). Currently, a new action plan for 2009 to 2012 is in the process of being adopted (EMCDDA 2008a). Similarly, national drug strategies now exist in all countries of the EU-27, except Austria which has such plans at the regional level. Figure 1 shows the rise of such strategies from 1995 to the present in the EU-27 and Norway as well as candidate countries Croatia and Turkey.

[Figure 1 here.]

Having their origins in these international and EU conventions, the national strategies in the EU-15 shared many similarities. Some of these common elements include focuses on traditional pillars of drug policy such as prevention, treatment, supply reduction, and international cooperation, and to some extent harm reduction, education, research, training, and coordination. Each of the plans also set particular goals and objectives to be achieved in a certain timeline and evaluated thereafter (EMCDDA 2002b). Thus, institutionalist arguments (Meyer et al. 1997) can be applied to the extensive adoption of drug policy stemming from the widely agreed upon international conventions. This argument is further supported by the adoption of drug strategies and plans by once and current candidate countries to the EU. Such adoptions reflect a desire to be accepted into the supranational community and were set forth as an objective in the EU action plan.

But where there is convergence in the adoption of these action plans, a closer look at those plans indicates much differentiation (EMCDDA 2002b). The most apparent difference is the lack of common definitions of some of the aforementioned pillars of drug policy. For example, definitions of harm reduction differ greatly between the EU-15 drug strategies. Table 2 gives a brief overview of the way harm reduction is defined in a subset of the EU-15 national strategies. The table shows that some countries define harm reduction in a very abstract way, such as in the United Kingdom and Ireland, while some are very specific, such as Denmark and Portugal. Strict definitions of what a national drug "plan" or "strategy" actually means or encompasses is not even entirely clear, despite the definitions cited above (EMCDDA 2002b). Further, the overarching goal of

adopting a drug action plan differs among the member states. While prevention of drug use is an overarching goal, some national strategies indicate other goals such as coordination and partnership in approaches to prevention (German, France, United Kingdom), a drug-free society (Italy, Finland, Sweden), and harm reduction (Belgium, Ireland, Luxembourg, Netherlands, Austria). Also, specific drug use reduction targets are only part of the national drug strategies of Spain, Ireland, Portugal, and the United Kingdom (EMCDDA 2002b).

[Table 2 here.]

Differences exist in many other technical areas of the national drug strategies. The duration of the drug action plan or strategy among the European nations is quite varied, with some having short timeframes, others long, and still others none at all. Figure 2 shows the timeframe for the national, as well as the EU, drug strategies. In a comprehensive review, the EMCDDA (2002b) concludes that longer frameworks were better suited to deal with complex domains, such as prevention, while the shorter approaches had more detailed measures with expected results. The administration in charge of coordination in the field of drugs also varies, with most located in the Ministry of Health (11 countries) but with this charge remaining to the Prime Minister in Italy and France and the Ministry of the Interior in Spain and the United Kingdom (EMCDDA 2002b). Finally, ad-hoc political bodies called for in the various national strategies differ greatly in their scope and focus.

[Figure 2 here.]

It was described above how despite the issue of maintaining national sovereignty over criminal issues, a look at the criminal laws throughout the EU shows great

similarities. Rather, the difference was in enforcement and sanctions for violations of those laws (Fletcher and Loof 2008:203). The specific realm of drug policy is no exception. As with all of EU criminal law, little formal law exists on drugs. It was mentioned above that the role of the third pillar has mostly been to increase cross-national cooperation in criminal matters and also to define common definitions of criminal offenses. For the latter, about a dozen offenses have been defined (Fletcher and Loof 2008). After being debated since 1999, a common definition for drug offenses was finally passed in 2004, though it only applied to illicit drug trafficking specifically. The goal is the alignment of definitions and penalties for drug trafficking offenses among the member states (EMCDDA 2004). The decision by the Council of Ministers states that those who participate in any stage of the trafficking of drugs covered by UN and EC decisions, including production, offering for sale, transport, distribution, and possession or purchase with the intent to traffic, should be given criminal penalties of between 1 and 3 years or between 5 and 10 years for large quantities. Due to national differences, the definition could not be extended beyond trafficking. As the EMCDDA states, "In achieving agreement among Member States, national differences in the definition of what constitutes personal consumption had to be overcome. For this reason, offences related to personal drug consumption, as defined by the national laws of Member States, are excluded from the framework decision" (2004:16).

Beyond trafficking, little other formal EU-level decisions exist concerning drugs. Other guidelines that exist are passed under the guise of public health rather than criminal law. This is not surprising given that public health is subject to majority rule in the first pillar, while criminal law is subject to unanimity in the third pillar. For example, in 2002,

the European Parliament passed a Community Action Program for Public Health (2003-2008), which produced documents that encouraged member states to set as a public health objective the prevention of drug dependence and a decrease in the spread of health damage, such as HIV and hepatitis, through drug users by incorporating such strategies into their national action plans (EMCDDA 2004).

Again, despite such limited action at the EU level, there is still impressive conformity among the member states' drug policies, no doubt to some degree due to national drug strategies that are based on the same UN and EU conventions. An examination of implementation and enforcement, however, paints a different picture. A few examples will be illustrated to show this differentiation. The case of marijuana legislation is particular enlightening. Table 3 shows the law on the books compared to the law in action. Except in the case of Spain, imprisonment is explicitly mentioned in each piece of legislation. Some mention directly in the legislation that a warning or no penalty should be used instead in the case of possession for personal use, as in Germany, Italy, Austria, and the Netherlands. For most of the other countries, the practice differs from the legislation and is inconsistent across countries. Exemptions and fines exist in most of the countries for possession of small quantities for personal use. It is unclear what constitutes "small" or "personal use" in each of the various countries and great variation most likely exists within and across countries. For example, in Germany, the phrase "insignificant quantities" from a constitutional ruling was undefined, resulting in interpretations between 3 and 30 grams (EMCDDA 2008a). Of course, no discussion of the differentiation of cannabis law would be complete without a discussion of the Netherlands. The Netherlands gives little priority to possession of cannabis and coffee

shops are openly allowed to sell up to 5 grams per transaction. This more open market differentiates the Netherlands from the rest of the EU-15, among which possession is decriminalized but for which sale of is not openly permitted.

[Table 3 here.]

As both part of their national drug strategies and in their criminal justice practices, nations of the EU-15 have continually revisited the criminal classification of possession of drugs for personal use (EMCDDA 1999; EMCDDA 2004; EMCDDA 2008a). The general trend has been to decriminalize, but what this means is not entirely clear cut. Figure 3 depicts EU responses to minor drug-related offenses as it stood in 1999, including and beyond cannabis discussed above (EMCDDA 1999). Some countries, such as Denmark and Germany, brought no proceeding forth for possession for personal use. In many of the countries, laws exist that prohibit such possession, but it is unusual for them to be enforced, such as in Luxembourg, France, and the United Kingdom. Other countries, such as Ireland and Sweden, use a fine as punishment. The trend towards the lowering of penalties has continued. Since 2001, penalties for use or possession for personal use have been reduced in several EU-15 countries, either for all drugs (Greece, Portugal, Finland) or specifically cannabis (Belgium, Luxembourg, United Kingdom) (EMCDDA 2008a).

[Figure 3 here.]

Differentiation of similar policies cross-nationally is not limited to those that involve the criminal justice system. In the area of treatment and harm reduction, there is both similarities and divergence. In every year of the annual report by EMCDDA, the balanced approach of supply and demand reduction is mentioned. Both are important

parts of the national drug strategies of the EU-15 (EMCDDA 2002b). The different definitions used by the various nations for harm reduction was already shown above. The availability of such services also differs among the nations. Perhaps the most well-known harm reduction technique is syringe exchanges that encourage the use of clean needles among intravenous drug users in order to prevent the spread of health risks, though several other health services fall under the idea of harm reduction. Table 4 shows the availability and geographic coverage of various harm reduction techniques. As the table shows, syringe exchange programs exist in all EU-15 countries, but the geographic coverage is greater in some of them. Coverage is much more restricted in some areas, such as only Athens in Greece and only two areas in Sweden. In many of the countries, however, a large majority of bigger cities are covered. Thus, the effect of syringe exchange programs may be particular to urban areas in some countries. Universal geographic coverage is rare, but Denmark, Spain, France, and Portugal appear the closest, with Portugal using its pharmacy system for the program. Table 4 also shows the near universal availability of safer use education and first aid courses for drug users in the EU-15, though these also appear to be available in limited and urban settings. The final two harm reduction techniques are rarer. Supervised drug consumption rooms, designed to provide a safe environment for drug use, are mostly a phenomenon in Germany and the Netherlands. Finally, though heroin prescription appear to be gaining headway, it has really only taken a lasting form in the United Kingdom and the Netherlands.

[Table 4 here.]

A more classic and formal drug treatment is substance substitution. Table 5 shows that methadone treatment has a long history in the EU-15 and is legal in every country. It

also shows that many of the countries have introduced other substances as a substitution for heroin, or are using heroin prescriptions for maintenance, as mentioned above. Sweden, Greece, and Ireland are the only countries that have not introduced another substance besides methadone. Thus, to look at the legality of substitution programs shows availability of methadone substitution in every country, but the extent of that availability differs. Figure 4 gives an idea of the current state of substitution programs by country. There have been large increases in methadone substitution in Belgium and Spain. There is also a general trend toward the introduction of other substances besides methadone. Perhaps most noteworthy is the limited availability of substitution programs in countries such as Sweden and Finland.

[Table 5 and Figure 4 here.]

A Note on Cigarette and Tobacco Policies

In the previous chapter, tobacco and alcohol were very much treated as part of the same phenomenon as illicit drugs. Both licit and illicit drugs are part of the same substance use literature. The former, however, have had no mention in this review of the institutionalization of drug policy. Though in theories of deviance researchers view all types of substance use as a similar object of study, cigarettes and alcohol have had a history quite separate from the substances that are now outlawed. In their review of over 100 years of international drug control efforts, the UN Office on Drugs and Crime makes no mention of tobacco and alcohol (United Nations Office on Drugs and Crime 2008). In fact, these substances are not included as part of the mission of the UN Office on Drugs and Crime. Rather, the responsibility of yearly international reports on the state of

tobacco and alcohol use fall under a different international body, the World Health Organization (WHO).

Thus, the issue of tobacco and alcohol use has particularly been constructed as a public health issue rather than a legal issue. For the members of the EU-15, who have taken public health as a central component to their national drug strategies, this provided a potential inroad to bridge the gap between licit and illicit substances, perhaps not in the legal arena, but at least in the realm of prevention and treatment. As early as 1999, the EMCDDA noted a trend in the EU-15 countries towards building licit substances into the treatment field, recognizing that most illicit substance users also use licit substances (EMCDDA 1999). They continued to report on this trend in their annual reports into the early 2000s. By 2008, the EMCDDA noted that although licit substances had been built into national drug strategies, they rarely laid out ways to address them, stating, "This reflects a tendency among European countries, whereby the existence of links and similarities between the use of illicit and licit substance is acknowledged, but drug-policy documents rarely comprehensively address substances other than illicit drugs" (EMCDDA 2008a:19).

This somewhat failed trend in the EU-15 seemed to occur without strong international pressure. The institutional force that exists with illicit substances is not nearly as strong at the international level for tobacco and alcohol. While there is homogenization at least in terms of the written law concerning illicit substances in the EU-15, there is actually greater heterogeneity in laws concerning licit substances. Here, I concentrate specifically on cigarettes and tobacco, the use of which is an outcome in the analyses that follow. For cigarettes and tobacco, there is an analogous National Tobacco

Control Action Plan as outlined by the WHO, but they are less universal. In 2002 (the year of the survey used below), 10 out of 15 countries had such a plan (World Health Organization 2003).

The countries' tobacco laws also differ in other respects (World Health Organization 2003). Six countries have no minimum age of purchase for tobacco products. Six countries have a minimum age of 16, while three countries have a minimum of 18. Seven of the 15 countries have a smoking ban in restaurants; while of those seven, another five ban smoking in pubs and bars. Though there is little international pressure for smoking bans, the European Council introduced a bill in 2007 that would prohibit smoking in all places of work, including bars and restaurants. Though the bill could be years away from passing, the force behind it could be seen in the recent passage of smoking ban laws in Ireland and the United Kingdom. The details of these differences in tobacco laws are discussed in the next chapter on data.

Chapter Discussion

There is little doubt that, among governments, drug prohibition has grown into an internationally recognized necessity in some form. The success of UN drug conventions being endorsed by nations in the field of drugs is unprecedented compared to other international law (United Nations Office on Drugs and Crime 2008). The fact that so many countries, including less powerful drug-producing countries, are parties to the three main UN conventions described above is in many ways supportive of institutionalism. According to institutionalism, even if national rhetoric is to the contrary, the nation-state, organizations, and individual actors will still follow the cultural force of the world society

(Meyer et al. 1997). Institutional forces are strong when countries support policies that may not be in their best interest internally. Instead, they support such policies for greater acceptance in the international community (Meyer et al. 1997).

Similarly, at the EU level, they have adopted the UN conventions into their supranational strategies, creating a trend where almost every nation has a national drug strategy. Further supportive of institutionalism is the adoption of strategies by candidate countries to the EU, who can use the creation of national strategy as a way to gain acceptance within the EU system. The EU further pushes this institutional force by having strategies with non-European countries that produce drugs that enter the EU. As parties to these agreements, the non-European countries change their policies in a way beneficial to the EU.

Thus, at the broadest level, there appears to be much homogenization in the field of drug law policy across the EU-15 and among the subsequent countries to enter the EU-27. Looking in depth at the drug strategies and policies in the EU, however, showed much differentiation between the nation-states. Though not given the same methodological rigor, the story outlined above follows the theoretical argument proposed by Grattet et al. (1998). The recent history of drug prohibition in the EU-15 follows their theoretical framework quite well. Drug laws fall squarely onto the side of high symbolism, ill-defined issues, and heavy contestation. At the higher EU level, abstract "drug action plans" are discussed. These create an institutional force whereby the various nation-states feel the need to follow suit due to their mutual cultural linkages, potentially bypassing more localized national sentiment. Thus, the review above showed that all the same concepts enter into the European national drug strategies, with incredible

homogenization at least as the laws and drug strategies are written. A closer look at the specifics of how these laws are practiced, however, revealed a large amount of differentiation. Examples were cited concerning the prosecution of possession for personal use, the legal status of cannabis, and the availability of harm reduction techniques and drug substitution treatment. As drug prohibition became increasingly institutionalized, national actors were free to exercise more discretion in the interpretation and application of their drug policies.

With such apparent homogenization, what is the best way to measure how the legal culture pertaining to drugs affects individual level behavior? It is my intention in the next chapter to show that, although little variation exists in the laws themselves, there is cross-national variation in the way the laws are applied and the availability of resources, such as treatment. These measures will constitute the main predictors at the country level. Though there may be changes with the potential institutionalization of public smoking bans, there still exists a considerable amount of heterogeneity in tobacco laws, which I will also utilize to predict individual tobacco use.

The point of this chapter was to give national context to the individual level data analyzed in what follows. It is possible to cite research that argues that the EU is quite homogeneous and, thus, these national distinctions are becoming less important (Fligstein and Stone Sweet 2002). In the realm of criminal law, however, European integration was slower (Fletcher and Loof 2008). Despite this, the written laws across the EU are very similar. It is in their application that we see differentiation. This national differentiation is important as a potential source of variation in individual level substance use and opinions on substance use policy. In the next chapter, these data are described in detail.

CHAPTER 3: DATA AND METHODS

In this chapter, the data for the subsequent analyses are described in detail. The data and analyses are cross-sectional. Though a longitudinal design could be beneficial, much of the empirical background that included complex longitudinal designs described in Chapter 1 helps to provide evidence for the choices made below. The strength of the data used herein is in its multilevel design, built on theoretical frameworks spanning the three levels. Nonetheless, given the cross-sectional nature of the data, all results should be interpreted as associational and strong causal claims should not be made. At the individual level, Bachman et al.'s (2002) model incorporating life course and learning theories informs the proper variables for analysis. At the regional level, social disorganization and strain theory inform which contextual factors are important. Finally, variants of neoinstitutional arguments justify the inclusion of national level variables specific to the outcome of interest. Each of these levels are described in turn and followed by bivariate analyses with the outcomes. The chapter concludes with a description of the statistical method used in the analyses that follow and a discussion of the expected findings based on the theories reviewed above. First, however, the dataset at the individual level will be discussed.

Individual Level Data: Eurobarometer 57.2OVR

Data Collection

The individual-level data come from the European Commission's statistics branch, collected by their standard Eurobarometer survey. This particular survey (Eurobarometer 57.2) was administered from April to June 2002 and a stratified sampling

technique was used such that a random sample was drawn from each of the 15 European Union member states and focused on youth attitudes toward drugs (Christensen 2003). Wave 57.2 consisted exceptionally of a basic Eurobarometer wave, complemented with an oversample of youngsters of 15 to 24 years old (N = 7,532), in order to attain a target sample of at least 450 respondents, aged 15 to 24, per country. There were three exceptions to this target. First, a lower target of 200 was used for the much lower populated Luxembourg. Second, an oversample of Northern Ireland, itself considered just one region (as defined below) of the United Kingdom, was used, yielding about 200 respondents. Third, the former territories constituting East and West Germany were each given the target of 450 respondents, resulting in about 1000 respondents in the one country of Germany.

Standard Eurobarometer surveys cover the population of the respective nationalities of the European Union member states, aged 15 years and over, resident in each of the member states. The basic sample design applied in all member states is a multistage, random probability sample. In each EU country, a number of sampling points is drawn with probability proportional to population size (for a total coverage of the country) and to population density.

For doing so, points are drawn systematically from each of the "administrative regional units," after stratification by individual unit and type of area. Hence, they represent the whole territory of member states according to EUROSTAT-NUTS 2 Statistical Regions and according to the distribution of resident population of the respective EU-nationalities in terms of metropolitan, urban, and rural areas. Note that the regional level used in the analyses below matches the NUTS 2 (Nomenclature of

Territorial Units for Statistics 2) Statistical Regions used in the sampling and are described in more detail in the next section. In each of the selected sampling points, a starting address is drawn at random. Further addresses are selected as every N^{th} address by standard random route procedures, from the initial address. In each household, the respondent is drawn at random. All interviews are face-to-face in the respondent's home and in the appropriate national language.

For each EU member state, a national weighting procedure, using marginal (RIM) and intercellular weighting (Iterative Proportional Fitting - IPF), is carried out, based on this universe description. The universe description is derived from EUROSTAT population data. As such, in all countries, minimum gender, age, and NUTS 2 region are introduced in the iteration procedure. Two different weights are used in the analyses that follow. When averages within countries are presented, the weight corresponds to the sampling weight for that given country (which appropriately weights the separate German samples and the oversampling of Northern Ireland within the United Kingdom). For averages across the EU-15 and the mixed effects models that follow, the individual level weight that is used appropriately weights respondents across the EU-15 proportional to their representation across the 15 countries. Table 6 shows a summary of the number of respondents per country, as well as the respective country populations.

[Table 6 here.]

To begin with a summary of the survey, an additional set of questions was administered to these young respondents, eliciting responses on why people experiment with drugs, the main reasons why some people find it hard to stop using drugs, the consequences drug use may cause, the most effective ways of tackling drug-related

problems, and the most dangerous drugs. Respondents were also asked who they would turn to if they wanted to know more about drugs, whether it was easy to get drugs, whether people should be punished for using drugs, whether there should be drug testing at school or work, whether they had tried drugs or knew somebody who had, and whether they smoked cigarettes and drank alcohol. Demographic and other background information collected includes respondents' age, gender, nationality, marital status, left-right political self-placement, occupation, age at completion of education, household income, type and size of locality, and region of residence.

Substance Use

The first series of response variables of interest pertain to personal substance use. Table 7 shows the percentage responding "yes" to the various questions on substance use in the survey, as well as variation on these questions by country. Each question was included under the lead question, "Which of the following apply to you?" The first item asked whether the respondent had ever tried cannabis. Across the EU and weighted appropriately, about 28.9 percent responded "yes" to this question. The countries with the highest percentage of cannabis use are Denmark (47.0%) and France (44.9%), where close to half responded in the affirmative. Both countries' averages are significantly higher than the average across the EU-15 according *Z*-tests of proportions, as well as the averages in the United Kingdom and the Netherlands ($p < .05$). With the exception of these four countries and Spain and Luxembourg, most countries' averages are below the overall EU-15 average. At 4.8 percent, Greece is particularly low on cannabis use among youth. Last month cannabis use, with an EU-15 average of 11.3 percent, shows a similar

pattern, with France leading at 19.8 percent and Greece again low at 1.3 percent. In the analyses that follow, lifetime marijuana use is discussed for descriptive purposes. In the mixed effects models in the following chapter, last month marijuana use is used as the outcome variable in order to ensure a more cohesive temporal ordering. That is, several of the predictors may be affected by lifetime marijuana use (political beliefs, ease of obtaining drugs, opinions on marijuana dangerousness, knowing a marijuana user), and such predictors are less likely to be strongly influenced by very recent use.

[Table 7 here.]

The next item in this series of questions asked whether the respondent had ever tried a drug other than cannabis. The overall average in the EU-15 is 8.8 percent. In contrast to cannabis, the United Kingdom (13.8%) and Spain (12.2%) have the highest frequency of such substance use. Again, Greece (1.2%) has the lowest frequency of use, followed by Italy (2.7%) and Austria (4.6%). These five countries are significantly different from the EU-15 average ($p < .05$). Last month use of a drug other than cannabis is a relatively rare occurrence, averaging about 2.7 percent. Given the rarity of this event, I follow the tradition within substance use literature by predicting lifetime use of drugs other than marijuana, rather than the last month, with attention paid to the temporal ordering of predictors. Given the interest in regional variation, utilizing only last month use could create issues with modeling if many regions have no use of drugs, providing another reason to use the lifetime measure. Figure 5 shows these results graphically by country for lifetime use of marijuana or any other drug.

[Figure 5 here.]

As for regional variation, 29 of 192 regions have 50 percent or more of respondents reporting that they have used marijuana and 17 regions have no respondents reporting marijuana use. For other drug use, only 18 regions have more than 20 percent of respondents reporting use, while 58 regions have no respondents reporting such use. Table 8 shows the regional rate of lifetime marijuana and other drug use for the regions containing metropolitan areas with a population of 1,000,000, known as Larger Urban Zones (LUZ) by Eurostat. Though there are some exceptions, the overall pattern appears to be that the regions that contain metros have substance use rates near or higher than their country's average (see Table 7), a result that might be expected from the social disorganization literature.

[Table 8 here.]

In the two largest metros in the EU-15, a quite different picture exists. In the region containing Paris, marijuana use is high at 44.3 percent, but other drug use is quite low at 3.1 percent. In London, marijuana use is relatively low at 24.0 percent, but other drug use is high at 16.1 percent. The metros (region, country) with over 50 percent of respondents reporting marijuana use are Birmingham (West Midlands, United Kingdom), Copenhagen (Hovedstaden, Denmark), Lyon (Rhône-Alpes, France), Amsterdam (Noord-Holland, Netherlands), Bremen (Bremen, Germany), and Tolouse (Midi-Pyrénées, France). Another five regions with metros have marijuana use above 40 percent. For the non-metropolitan regions with over 50 percent of respondents reporting marijuana use, 8 are in the United Kingdom, 7 are in France, 3 are in Spain, 2 are in the Netherlands, 2 are in Germany, and 1 is in Denmark.

The metros with over 20 percent of respondents reporting other drug use are Ruhr Area (specifically Münster, Germany), Barcelona (Cataluna, Spain), Birmingham (West Midlands, United Kingdom), Valencia (Comunidad Valenciana, Spain), Amsterdam (Noord-Holland, Netherlands), Bremen (Bremen, Germany), Newcastle upon Tyne (Northumberland & Tyne and Wear, United Kingdom), and Tolouse (Midi- Pyrénées, France). Note there is quite a bit of overlap between metro areas with the highest marijuana use and the highest use of other drugs. Given the liberal drug policies of the Netherlands within coffee shops in Amsterdam, the high use there is of particular interest. Another five metropolitan regions have other substance use over 15 percent. For the non-metropolitan regions with over 20 percent reporting other drug use, 6 are in the United Kingdom, 2 are in Spain, and 1 is in each Germany and France.

The final two personal substance use questions ask about the legal substances of cigarettes and alcohol. The items simply stated, "I smoke cigarettes regularly," and, "I drink alcohol regularly." Thus, some subjectivity is inherent in these variables in how "regularly" is defined by the respondent, particularly when being asked in many languages. With this caveat in mind, the weighted average for cigarettes is 36.8 percent and for alcohol is about 25.2 percent. For cigarettes, Germany (46.6%), Austria (44.8%), and France (44.3%) stand out as significantly higher than the EU-15 average ($p < .05$), with almost half of youth in those countries considering themselves regular cigarette smokers. Sweden (21.5%) and Luxembourg (23.0%) are lowest on this measure, with less than a quarter of youth smoking regularly. For regular alcohol use, Denmark stands out high above other countries with 63.8 percent responding "yes." Three other countries stand out as high on this measure: Ireland (54.8%), the United Kingdom (49.1%), and the

Netherlands (47.3%). Italian youth are far below other EU-15 countries in considering themselves regular drinkers of alcohol at 8.4 percent, though several other countries are also significantly lower than the EU-15 average.

The drinking measure is particularly subjective, given both how the respondent may define "regularly" and what exactly it means to "drink." Smoking cigarettes, on the other hand, is a specifically defined activity and, in this case, "regular" might be more concrete, such as those who buy packs regularly would be the ones to respond "yes." Also, the legal culture surrounding tobacco is varied with respect to minimum purchase age and smoking bans, discussed further below. Therefore, in order to compare licit and illicit substances, regular cigarette smoking is used as an outcome.

Opinions on Drug Policy

Recalling the importance of the alignment of opinions and behavior to recent research within neoinstitutionalism, the next set of response variables of interest concerns youth and young adult opinion formation on handling the social issue of substance use. The first series of questions on this topic asked, "What do you think are the most effective ways of tackling drug-related problems? Please choose the three that come closest to your own opinion." Table **9** shows the frequency with which respondents chose the various answers to this question. I classify four of the responses as "treatment and prevention" measures: more treatment and rehabilitation of drug users, information campaigns, reducing poverty and unemployment, and more leisure activities. The other three responses are classified as "penal" measures: tougher measures against drug producers and manufacturers, tougher measures against drug dealers and traffickers, and

tougher measures against drug users. As would be expected, the three penal measures are significantly negatively correlated with the four treatment and prevention measures, both overall and within countries, with correlations in the EU-15 ranging from -.281 to -.133 ($p < .001$).

[Table 9 here.]

As the response variable in the analyses that follow, a scale was created to assess whether respondents aligned more with treatment and prevention strategies or penal strategies based on the up to three choices they were allowed to make. These two groupings match the dual claimed goals of the EU action plans to focus on both the supply and demand aspects of drug policy. Thus, the scale assesses preferred support for these two elements. For each respondent, a treatment and preventative choice was assigned a 1, while a legal choice was assigned a -1. Then, the respondent's choices were summed. Thus, the scale ranges from -3 (all penal choices) to 3 (all treatment and prevention choices). A choice for one of each type of strategy, in a sense, cancels one another out. So those who picked one of each would be assigned a zero. Those who chose none (0.5%) or don't know (1.8%) were also assigned a zero. About 9.1 percent of respondents chose all three legal strategies, while about 9.3 percent chose three treatment and prevention strategies. The most common values on the scale are -1 (32.9%) and 1 (32.4%). Only 9.5 percent of respondents have a value of zero. Given this odd distribution and the restriction on the number of choices,[1] several diagnostics and checks for the robustness of the models based on this scale will be employed. The overall EU-15

[1] The restriction on the number of choices affects measures of reliability, such as Cronbach's alpha (DeVellis 2003). With a value of only .502, it appears that the reliability of the scale is low, but an assumption of alpha for dichotomous data is the ability to choose any number of responses. The restriction on the choices could deflate the correlation between items.

average is close to zero. Similarly, the averages within the fifteen countries are also not too far from zero. Spain has the highest average (0.565), indicating a slight average preference for treatment and prevention measures. Belgium has the lowest average (-0.358), indicating a slight average preference for penal strategies.

To complement the results of the analyses based on this scale, descriptive statistics are shown for another response variable representing the most extreme substance use policy; namely, whether individuals should be punished for drug *use*. The question appeared under the lead question, "Please tell me if you tend to agree or disagree with the following statements," and read, "People should be punished for using drugs." Some respondents replied "don't know" to this question and are treated as missing in these analyses (12.7% of the unweighted sample). Figure 6 shows the percentage of young people who agreed with this statement by country. France (38.7%) and the Netherlands (39.4%) have the fewest young people agreeing that users should be punished. Recall that both countries have higher than average substance use, as well as regions that have particularly high use. Sweden has the most young people agreeing with this statement (67.4%), which is also one of the countries with the lowest rates of use. At least at the aggregate level, these results show an alignment of opinions and behavior.

[Figure 6 here.]

By way of comparison, Table 10 shows the results of other items under this lead question pertaining to opinions on specific drug policies. The other questions asked about agreement with whether there should be drug testing at school/college/work; if when testing drivers for alcohol, police should also test for drugs; if drugs were cheaper, there would be fewer problems; and drug users should be able to get clean needles and syringes

at low cost. Along with the punishing users question, the first two items represent tougher measures on substance use, while the latter two represent more liberal policies. The items within these two groups are positively correlated with one another, while being negatively correlated with the items across the two groups (overall and within countries). Though there is some inconsistency on averages within country, patterns do emerge in some countries. Swedish young people support the tougher policies at higher than average rates, while supporting liberal policies at less than average rates. Youth in the Netherlands have the opposite average responses, while those in Portugal tend to be higher than average in their support for both types of policies. Looking back at both the substance use and opinion questions, there is clearly substantial variation between the 15 countries worthy of examination.

[Table 10 here.]

Independent Variables

From the information obtained from survey respondents at the individual level, several independent variables are analyzed in the mixed effects models that follow. These variables closely follow the social bond, intervening beliefs and behaviors, and demographic measures specified as important in explaining youth and young adult substance use in Bachman et al.'s (2002) model. Table 11 shows the descriptive statistics for these predictors. Beginning with the demographic predictors, the individuals sampled are young people aged 15 to 24, with an average age of 19.55. Two measures of economic background are included: occupation of the head of household and income quartile. For the head of household (HH) occupation, eighteen employment categories

were reduced into non-professional or non-management positions (50.7%) and professional or management positions (31.0%), with 17.5 percent of heads of household not working (either unemployed, retired, or a student). Of the total sample, 1.6 percent were missing on this measure and are thus excluded from analyses that contain this variable. Household income was recorded in the currency of the country in which the survey was taken and harmonized across countries (by Eurostat) into quartiles. For household income, about half of the young people did not know. Among those who did, the four quartiles are about evenly split. Respondents were also asked what type of community they lived in. Eighty-four (1.1% of unweighted sample) responded don't know. These respondents were recoded to the modal category for respondents in their NUTS 2 region. The most common response was small or middle sized village (43.1%). In addition, 30.4 percent said they live in a large town, while 26.5 percent said they lived in a rural area or village. The final background variable is gender, which is evenly split male and female.

The next group of variables at this level measure the social bonds that are important in predicting youth and young adult substance use, including marriage, school, and work. These variables come clearly from life course theories that emphasize the deterrent effect inherent in important social bonds. With a sample of young people, it is no surprise that only 3.2 percent of the sample is married, with 85.0 percent unmarried and another 11.8 percent with an unmarried partner. In the analyses that follow, the partnered group is entered into models as both another group and then as unmarried to test whether this distinction matters. A measure for parenthood is not included in the dataset, but researchers have found that the effect of parenthood on substance use is

better attributed to marriage (Bachman et al. 1997; Burton et al. 1996; Gotham et al. 1997). Also as might be expected, 56.9 percent of the sample are still students of some kind. Given its importance in the substance use literature, an age of 18 was used to split this group into high school students (32.3%) and college students (24.6%). Only 7.4 percent have finished tertiary education (20 or more years of education), the cross-national equivalent of a college (Baccalaureate) degree. Eight percent have the equivalent of secondary education or less (up to 15 years of education), while 27.7 percent have some tertiary education or a non-Baccalaureate postsecondary degree (16-19 years of education). Of those non-students, 36.8 percent are working, while 6.3 percent are unemployed. Unfortunately, a specific measure of how often the former is working is unavailable. In the sample, 22.3 percent considered themselves the head of their household, either solely or jointly with another person. Thus, these young adults may be enjoying new freedoms as they no longer live with their parents, or the responsibility of taking care of one's self and potentially others may act as a deterrent (Bachman et al. 2002).

[Table 11 here.]

The final group of predictors collected from individual respondents pertains to what Bachman et al. (2002) refer to as mediating attitudes and behaviors. While religiosity has found support for its reduction in substance use (Bachman et al. 2002; Arnett 1998; Bahr et al. 1998; Bachman, Johnston, and O'Malley 1981; Brown et al. 2001; Schulenberg et al. 1994), there is no such measure in the dataset. Respondents were, however, asked about their personal political placement. While the relationship between religiosity and political beliefs is not exact, religious individuals still tend to

align more closely to the right (Greeley and Hout 2006). Thus, this might be considered a proxy measure, but should be regarded as a potentially important measure in its own right. The original question asked the respondent to rank themselves on a scale from 1 to 10, with 1 as the most left and 10 as the most right. Recoded variables were included in the dataset for left (1-4), center (5-6), right (7-10), and don't know. This variable was used in order to retain the "don't know" respondents in the analysis. For these youth and young adults, 29.3 percent answered "don't know" to their personal political placement. For those that did place themselves politically, 26.3 percent were on the left, 30.2 percent were in the center, and 14.2 percent were on the right.

The remaining intervening predictors (Bachman et al. 2002) pertain to the respondent's exposure to and opinions on substance use. Respondents were asked about whether it was easy to get drugs near where they live, in or near school or college, at parties, and in pubs or clubs. If the respondent answered that they agree that it is easy for them to get drugs at any one of these four places, they were coded as a 1 on easily obtain drugs. After this coding, 3.3 percent of respondents said "don't know" to all 4 questions. In the analyses that follow, this variable was entered both with these respondents as missing (excluded from the analysis) and as coded "no." The results were very similar for both coding strategies. Thus, the latter is only discussed below, chosen to maximize the number of respondents maintained in the analysis. As shown in Table 11, 90.9 percent of young people felt it was easy to get drugs at least at one of these locations. This high percentage is analogous to similar measures in the United States, where most youth also believe drugs are easy to obtain (Bachman et al. 2002).

Respondents were also asked if they know someone who uses cannabis or a drug other than cannabis, an important variable from the learning theory viewpoint described above. This question is more open than what is typically used in the substance use literature. Most past research uses whether the respondent has a *friend* who uses drugs. Here, friends are clearly a subset of the question asked, but respondents may say yes if they know anyone who uses drugs. Though not matching past research exactly, this question is more conservative in that if *only* friends' use matters, then it will be harder to observe a non-null finding. For these questions, 64.8 percent of young people said they know a marijuana user and 45.7 percent said they know a drug user.

The final substance use related predictor is the dangerousness of various substances. The dangerousness of 12 different substances was asked on the survey: ecstasy, LSD, heroin, morphine, cocaine, crack, glue or solvents, cannabis, amphetamines, doping substances, alcohol, and cigarettes and tobacco. The possible responses were very dangerous, fairly dangerous, not very dangerous, not at all dangerous, and don't know. For analyses of last month marijuana use, dangerousness of marijuana is used as the predictor. Of respondents, 4.3 percent said "don't know" and are treated as missing in these analyses. With the very dangerous coded as 4 and not at all dangerous coded as 1, the average for marijuana was 2.59. Similarly, dangerousness of cigarettes/tobacco is used in the analysis of regular cigarette use, with an average of 2.52. For this measure, 1.1 percent responded "don't know" and are treated as missing. For the other drug analyses, there are many possible choices of predictor. With the most variation and the lowest number of respondents saying "don't know" (2.4% of the unweighted sample), dangerousness of cocaine was chosen as the predictor. The other illicit drugs

were also entered as predictors and had very similar effects, discussed further below in those analyses. Unlike marijuana and cigarettes, the distribution for dangerousness of cocaine was quite skewed towards very dangerous. Thus, the variable was dichotomized into not at all to not very dangerous and fairly to very dangerous. 96.7 percent of respondents ranked cocaine as fairly to very dangerous. Finally, lifetime use of marijuana and other drugs, discussed in the previous section are used as predictors in the models for opinions on substance use policy.

Bivariate Analyses

In this section, the analyses explore the bivariate relationships between the individual-level predictors and the outcome measures. Table 12 shows the cross-classification of the categorical predictors and five outcomes of interest. Save two instances discussed below, a chi-square test of independence shows that the null hypothesis of independence can be rejected ($p < .05$), indicating an association between the predictors and the outcome measures.

[Table 12 here]

As with past research, males have higher rates of substance use across all four measures. This result is also reproduced graphically in Figure 7. For example, over the last month, 15.2 percent of young European males reported marijuana use, while only 7.4 percent of females did so. The last two bars show that females are more likely to agree that drug users should be punished, with 58.7 percent agreeing, compared to 50.9 percent for males.

[Figure 7 here]

For the small percentage of young married respondents in the survey, they report lower substance use than unmarried respondents. Those unmarried respondents who consider themselves partnered, however, have higher rates of lifetime marijuana use (36.9%) and last month other drug use (12.1%) than those who are not partnered (28.1% and 8.3%, respectively). At least from these bivariate analyses, it appears that the bond of marriage is associated with lower substance use, and its effect is particular in a way that simply being partnered does not exhibit. Married respondents are also the most punitive in their opinions on drug policy, with 65.9 percent agreeing that users should be punished, compared to the two unmarried groups at about 55 percent agreeing.

Not surprisingly, the results for community type, reproduced in Figure 8 show that the rates of illegal drug use on all three measures are lowest for those located in rural areas or villages, followed by those in small or middle-sized towns, and with the highest rates among those in large towns. For example, lifetime other drug use is 6.5 percent in rural areas and villages, 8.5 percent in small and middle-sized towns, and 11.0 percent in large towns. Interestingly, there is no association between community type and the legal substance of cigarettes, with the rates in each of the three areas ranging from about 36 to 38 percent. Thus, the illegal activities appear to be related to urban surroundings, as social disorganization hypothesizes. For agreeing with punishing users, the opposite trend occurs, with rural areas and villages the most likely to agree (60.1%) and large town residents the least likely (51.8%).

[Figure 8 here.]

For the respondent's employment status, those who are still students have the lowest rates of substance use across all four measures. Those who are currently

unemployed have the highest rates of last month marijuana use (15.4%) and lifetime other drug use (14.1%). Current workers are very similar to unemployed respondents on lifetime marijuana use (32.0%) and regular cigarette use (46.6%), and are most likely to agree that users should be punished (56.7%). These results indicate that the deterrent effect of the social bond of employment for European youth is specifically related to harder drugs. Turning to education level, high school students are the lowest across all four substance use measures. College students, though low on other drugs and cigarettes, have the highest rates for both marijuana measures. Those with only secondary education or less and those with some postsecondary education have the highest rates of cigarette smoking. These results for high rates specifically for marijuana use among college students supports previous findings by Bachman et al. (2002). The most educated group (49.2%) and current college students (48.8%) are the least likely to agree that users should be punished, with the other three groups having similar rates.

Respondents who consider themselves the head of household are more likely to have used marijuana ever and in the last month, to have used other drugs, and to regularly use cigarettes. This result may seem strange, but being 24 or younger and the head of household may be a different phenomenon than for adults. For example, of those indicating they are the head of household, 44.2 percent are in the lowest income quartile, compared to 15.4 percent in the second, 7.3 percent in the third, and 4.7 percent in the fourth (and 28.4 percent responding don't know on income). Further, of these respondents, only 9.7 percent report that their job is a professional or management position. Of the two theoretical possibilities with this measure mentioned above, these bivariate associations support the notion that those who are the head of a household at

this age are experiencing a freedom from their parents that is supportive of substance use, rather than the alternative that being the head of household will create a sense of responsibility that will deter substance use. This result is discussed further in subsequent chapters, as it is associated with regional-level variables.

For the HH occupation, those in the household where the head of household is not working report the highest levels of substance use, with the exception of last month marijuana use. Here, those in the household of a professional or manager have the highest rates of use at 13.5 percent, followed closely by the not working category (13.1%). With the exception of cigarettes, those in the household of non-professional/management report the lowest substance use. This group also is the most likely to agree that drug users should be punished (57.1%). For household income and marijuana use, the lowest quartile and the highest quartile have the highest rates. For other drugs, however, the lowest quartile is relatively higher than the upper three quartiles (12.1%). According to a chi-squared test, household income is not associated with respondent's opinions on whether drug users should be punished.

As for the respondent's political beliefs, those on the left stand out relative to those in the center, right, and those who respondent don't know. For lifetime marijuana use, those on the left have a rate of 39.4 percent, compared to 27.0 percent and 28.4 percent for those in the center and on the right, respectively. Within the last month, 17.9 percent of leftists report marijuana use, while centrists and those on the right have an equal rate of use at 9.6 percent. Though much closer in value, those on the left still lead lifetime other drug use at 11.8 percent. For reasons that are not entirely clear, those who do not know their political orientation have the lowest rates of use. If religiosity and

political beliefs were well aligned in their effect on substance use, those on the right would be expected to stand out as significantly lower. Instead, it appears that those on the left may have a belief system that is generally supportive of permissiveness. Not surprisingly, those with left leanings are the least likely to agree that users should be punished (42.3%), with the other three groups at about 60 percent.

As might be expected, those who do not agree that drugs are easy to obtain have very low rates of illegal substance use. They have incredibly low rates of last month marijuana use at 3.0 percent, compared to 12.1 percent for those who report it is easy. Even fewer report lifetime other drug use at 0.7 percent compared to 9.6 percent for those who said drugs are easy to get. Lifetime marijuana use also has a large gap at 10.1 percent for those who say it is not easy and 30.7 percent for those that say it is easy.

Creating some of the largest distinctions in substance use are the variables for whether the respondent knows a marijuana user or knows a drug user. These results are reproduced in graphical form in Figure 9 and Figure 10. Only 4.7 percent, 2.1 percent, and 3.0 percent of respondents who do not know someone who uses marijuana report lifetime marijuana use, last month marijuana use, and lifetime other drug use, respectively. On the other hand, of those who do know someone who uses marijuana, 42.0 percent report ever using marijuana, 16.3 percent report last month marijuana use, and 11.9 percent report other drug use. Also note the large difference on the agree with punishing users measure. For whether the respondent knows someone who uses a drug other than marijuana, the difference on the two marijuana outcomes is large, but not as large as the marijuana-specific predictor. There is, however, a larger difference for lifetime other drug use, with 16.9 percent of those who know someone who uses another

drug reporting use, while only 1.9 percent of those who do not know such a person reporting use. These results are supportive of the consistent finding from learning theory that associating with substance using individuals influences one's own use.

[Figure 9 and Figure 10 here.]

Recall that lifetime marijuana and lifetime other drug use will also be included in the models predicting opinions on drug policy. Figure 11 graphs these two substance use measures against agreement with punishing users. Of those who have used marijuana or another drug, 35.7 percent and 25.4 percent agree with punishing drug users, respectively. Comparatively, 62.6 percent of those who have never used marijuana agree, while 57.8 percent of those who have never used another drug also agree. Thus, experience with substance use produces the starkest differences on drug policy opinions, showing a strong alignment of behavior and opinions.

[Figure 11 here.]

Finally, the continuous predictors were graphed by the rates on these five outcomes. Figure 12 shows perceived dangerousness of marijuana. All four substance use measures drop greatly from not at all dangerous to very dangerous. Looking specifically at the marijuana measures, lifetime marijuana use drops from 64.6 to 7.3 percent across the response levels. Similarly, the rate of last month use is 38.9 percent among those who say "not at all dangerous," while the rate is 1.3 percent among those who say "very dangerous." Figure 13 graphs the relationship between age and these outcome measures. On the four substance use measures, there is an increase in the rate of use from ages 15 to 18. From ages 19 to 24, the rates appear relatively stable. The very youngest respondents are also most likely to agree with punishing users, but again the rate is stable after age 18.

[Figure 12 and Figure 13 here.]

The final bivariate results are for the continuous outcome of the proper reaction to drugs scale. Table 13 shows the values on the scale for the various categorical predictors, as well as the result of Analysis of Variance tests. Recall that negative numbers are associated with preferences for penal measures against drugs, while positive numbers indicate social and rehabilitative measures. The *F*-statistics indicate that the null hypothesis that the between group means are equal can be rejected for many of the predictors. The exceptions are marital status, HH occupation, and knowing a drug user. For those significant tests, the groups with the most social and rehabilitative leanings are males, urban residents, college students and the highly educated, those in the lower two income quartiles, politically left respondents, those who feel drugs are easy to get, and those who know someone who uses marijuana. As with agreeing with punishing users, past use of marijuana or other drugs is associated with the highest values on the scale.

[Table 13 here.]

Regional Level Data: Eurostat NUTS 2 Data

Nomenclature of Territorial Units for Statistics 2 (NUTS 2)

Before describing the regional level variables that emerge from social disorganization theory and also strain theory, I outline exactly what the unit of region means here. The Nomenclature of Territorial Units for Statistics (NUTS) is a hierarchical classification intended to breakdown EU member states into small comparable statistical areas for study (Eurostat 2007). There are three levels of NUTS. NUTS 1 are the largest and encompass areas of populations between 3 million and 7 million. Each NUTS 1 are

then broken into NUTS 2 areas, which are further broken into NUTS 3 regions. The population threshold for NUTS 2 areas is between 800,000 and 3 million. For NUTS 3, the threshold is between 150,000 and 800,000. NUTS areas were designed to conform to already existing administrative areas where possible. In countries where only two administrative levels existed that conformed to these population cutoffs, a new level was created that did not necessarily correspond to any administrative unit and could be at any of the three levels. Since France, for example, has functional administrative units at levels 2 and 3, the additional level is introduced at NUTS level 1. This is also the case for Italy, Greece, and Spain. By contrast, the additional "non-administrative" level is at NUTS level 2 for Germany and the United Kingdom and at NUTS level 3 for Belgium.[2]

In the following analysis, the NUTS level 2 are used as the regional level. The geographic breakdown of these regions in the entire EU-27 is shown in Figure 14. As mentioned above, this is the regional indicator included in the dataset, which was also used for stratified sampling. NUTS 2 is a good compromise, since NUTS 1 are quite large and heterogeneous within region. Further, much data are simply unavailable for the smaller NUTS 3 regions. By contrast, all regional data is available at the NUTS 2 level.[3] In almost all cases, the regions as defined by Eurostat matched the regions in the Eurobarometer dataset, but there were some exceptions. These exceptions occurred when, in the dataset, a larger area was covered that included multiple NUTS 2 regions.

[2] Due to its size, Luxembourg is an exception to these levels. All three levels with Luxembourg represent the entire country. Thus, there is only one "region" within Luxembourg. When referring to Luxembourg's regions below, the country itself is implied.

[3] The NUTS 2 regions are quite analogous to the county-level within the United States context, which is commonly used in criminological research. Nonetheless, the NUTS 2 regions still represent a high level of aggregation, such that one could not attribute effects to a "neighborhood" effect. There is the risk of attributing an effect to region that is not applicable to the region as a whole, but rather some subset of the geographic region.

[Figure 14 here.]

The most distinctive differences between the dataset and the NUTS 2 regions occurred in Greece. Four regions were an exact match. In three instances, two NUTS 2 regions had to be combined into one region for analysis. The NUTS 2 regions that were combined were Athens and the Eastern Mainland, the Northern Aegean Islands and the Southern Aegean Islands, and Western Macedonia and Central Macedonia. In one case, three NUTS 2 regions were combined into one, which contained the Western Islands, Western Mainland, and Peloponnesus. For these regions where NUTS 2 had to be combined, a population-weighted average of the constitutive NUTS 2 regions was used as the value for the combined region.

The need to combine two NUTS 2 regions occurred in five other instances. In Denmark, Central Jutland and North Jutland were combined. In Italy, Piedmont and Aosta Valley were combined. In the United Kingdom, Devon was combined with Cornwall, Isles of Scilly. Again, a population-weighted average was used for the regional value. The other two combined NUTS 2 regions also occur in the United Kingdom. In the dataset, the two Welsh regions were split into north and south, while the NUTS 2 are split into east and west. Also, London contains two NUTS 2 regions (inner and outer London), but the dataset contains Greater London. For London and Wales, the two respectively form NUTS 1 regions and, thus, the NUTS 1 value in used as the regional value. Thus, while within the EU-15 there are 202 NUTS 2 regions, the number of regional level units in the following analyses is 192.

This regional level data was extracted from the Eurostat online database (Eurostat 2007). Though the individual level variables follow past empirical research nicely, the

lack of substance use studies utilizing structural and contextual factors leaves less certainty as to what variables should be included at this level. In an annual review article, Sampson et al. (2002:457-8) show that very little consistency exists in the way structural factors are operationalized. Therefore, I follow the line of research stemming from social disorganization theory to guide these variables as best as possible. The driving aggregate forces outlined by Shaw and McKay (1931) in their analysis were urban growth, people moving in and out, heterogeneity of the population, and poverty. More recently in their well-known test of social disorganization, Sampson and Groves (1989) found support for the structural factors of socioeconomic status, heterogeneity, mobility, family disruption, and urbanism. Also, as described above, strain theory justifies the use of economic regional indicators in the analysis (Merton 1938; 1968). Following these as best as possible for what is available in the European context, the regional level variables in the following analysis fall into three categories: demographic, economic, and crime indicators. Table 14 shows descriptive statistics for these variables for each country and the EU-15. It is important to note that the values reflect the averages across regions within a given country or the EU-15 as a whole, and not the actual country-level value for that variable. For illustrative purposes, some of the variables are also depicted geographically. In most cases these maps are for the EU-27, not just the EU-15. Since multiple years were not available to compute changes in many of these variables, most of the variables are contemporaneous to the 2002 dataset. Exceptions are noted below.

[Table 14 here.]

Several demographic regional indicators are included. Population density, indicative of the central component of social disorganization theory of urbanicity, is

measured as the number of people per squared-kilometer.[4] The average across the regions of the EU-15 is 367.0 persons/km^2. Belgium and the United Kingdom lead the way in average regional density. Figure 15 shows a map of population density (2002) by the NUTS 2 regions. Belgium, the Netherlands, Germany, the United Kingdom, and Italy have the most regions with dense populations. By contrast, countries such as France, Portugal, Spain, Greece, Austria, and Sweden are only densely populated in the NUTS 2 regions that contain major cities. Finland, Luxembourg, and Ireland have low population density across regions.

[Figure 15 here.]

The next demographic variable is net migration, measuring the total number of people moving into the region minus the total number of people moving out of the region, measured per 1,000 inhabitants. This variable measures a central tenet of social disorganization theory. The zone in transition is high in crime due to the transient nature of its population, which changes rapidly with those moving in and out. The measure used for analysis is the average across the years 2000 to 2004, with the survey occurring directly in the middle, thus capturing the migration patterns around the time of the survey.[5] The regional average on this measure is 3.8. Only Finland has a negative average, indicating a loss of population across its regions. The highest averages belong to

[4] Though firmly grounded and commonly used in the social disorganization literature, some aspects of population density may be associated with social organization, such as, for example, neighborhood associations and block watches. Such organization may actually be missing from rural areas which population density would attribute the characteristic of social organization. While the level of aggregation at the regional level does not allow for this level of nuance, further research may want to consider it.

[5] Net migration, as defined here, is movement of residents in and out of a particular region. Thus, immigrants to the region can come from another region within the country, another EU country, or from outside the EU. The measure, therefore, taps into movement in and out of the region, but not necessarily the in-movement of those people current residents might consider either foreign or non-European.

Spain (12.9) and Ireland (12.0). Figure 16 shows this measure geographically. Every region in Spain, Portugal, Ireland, the Netherlands, and Luxembourg saw a positive net migration over this period. The other countries show some mix among their regions. The areas of negative net migration are located in northern Sweden, Finland, and France, southern Italy, eastern Germany, and central United Kingdom.

[Figure 16 here.]

The final two demographic indicators measure both the age structure and health. The first variable, youth population, is the percentage of the total population in the region aged 15 to 24. This age bracket of youth and young adults is the same as the survey. These ages are also known for being the most deviant- and crime-prone years of the age-crime curve. The idea here is that the denser the youth population, the more youth culture can flourish and influence individual substance using behavior. The average for the regions in the EU-15 is 12.3 percent. Ireland (16.1%) and Portugal (14.0%) have the highest average across their regions, while Italy (10.9%) has the lowest. The death rate, which also measures the exit of the older population from the area, measures the number of deaths per 100,000 inhabitants in 2002. The average across the EU-15 regions is 997.7. Luxembourg (830.2) and the Netherlands (881.9) have the lowest cross-region average, while Portugal (1115.2) has the highest.

The next set of regional indicators measure economic conditions. The first variable is GDP growth, measured as the annual average percent change from 1995 to 2004. Thus, the survey occurred at the latter end of this measure. Aggregate poverty is another central component of Shaw and McKay's (1931) social disorganization theory. While GDP growth is not directly a measure of poverty, it does measure the trend in

wealth and is often used as a substitute, particularly at higher levels of aggregation than the neighborhood.[6] The regional average across the EU-15 is 2.3. Ireland leads the way in regional GDP growth, with a value of 7.9, while Italy and France are the lowest with values of 1.3 and 1.4, respectively. As shown in Figure 17 geographically, the countries with most regional growth in GDP in the EU-15 (the darkest areas) are Ireland, Portugal, Spain, the United Kingdom, Luxembourg, and Finland.[7]

[Figure 17 here.]

The next economic indicator is the unemployment rate in 2002, with a regional average of 7.3. The evidence for the effect of aggregate unemployment on crime in general is quite mixed. While never explicit in social disorganization, unemployment can still be viewed as a form of area instability. Where support for the use of a structural measure of unemployment is theoretically supported is in Merton's (1938; 1968) idea that a lack of means to attain economic goals will result in structural strain, whereby crime and deviance ensue. Turning to the descriptives, the highest regional unemployment is in Finland (10.8%), Greece (10.7%), and Spain (10.4%), while the lowest unemployment is in Luxembourg (2.6%) and the Netherlands (2.9%). The percentage of adults aged 25 to 64 years old who have completed higher education is also included in the analyses. This measure can also be supported by strain theory, given that the presence of highly educated adults indicates both support for the standard means of attaining economic support and most in the area will likely have achieved the goal of economic stability.

[6] It should be noted that GDP growth does not capture the relative level of economic conditions. That is, a region could see large GDP growth but still be lower than a region that saw no growth, but rather retained a high GDP the entire time. GDP growth was used rather than an absolute measure of GDP because the latter had many missing values (including all of Denmark). In models where an absolute measure was used instead of GDP growth, results were similar.

[7] Note that the darkest areas on the right are for countries in the EU-27 that are not in the EU-15.

Specifically, this variable measures adults with a tertiary education. This level is equivalent to the Baccalaureate degree in the United States. The EU-15 regional average is 11.1. The most highly educated regional averages belong to Finland (16.2%) and Belgium (15.3%), while the lowest averages are in Portugal (4.2%) and Italy (5.6%). Figure 18 shows a map of this measure. The highest concentrations of regions with college educated adults are located in Finland, the United Kingdom, and Denmark. On the other hand, Portugal, Italy, and Greece have regions with few college educated adults. According to the map, regions that contain major cities also have highly educated adults.

[Figure 18 here.]

The final economic measure is the number of non-native tourists staying in hotels, in thousands. This variable not only measures economic activity from residents of other countries, but also measures exposure of those in the region to outsiders. Thus, it may be thought of as a different type of in and out movement of individuals than actual residential migration, which is considered one of the key components of classic social disorganization theory. In the analyses that follow, this variable is simply referred to as "tourism." The average across regions in the EU-15 is 872.4. The highest regional averages belong to Ireland (1788.5) and France (1703.3), while the lowest average tourism is in Denmark (318.66). Some of the low averages, particularly in the United Kingdom and Germany, might seem strange, but these countries have many regions with low tourism while containing a few with very high tourism. In fact, the regions with the highest tourism are mainly those that contain major cities (see Table 8).

The last regional measure is an indicator of crime. In particular, the homicide rate per 100,000 is used. Recent research has shown that as violence becomes more

acceptable, those in the area see crime and delinquency, including drug use, as a necessary component of their way of life (Anderson 1999). While having this theoretical advantage, homicide as an indicator of crime also has the advantage of consistent measurement across the regions and is less skewed by official statistics that are highly dependent on enforcement and crime reporting patterns. The cross-region average for the EU-15 is 0.94. While all the homicide rates are relatively low compared to the United States 2002 value of 5.6 (Department of Justice 2005), the United Kingdom has the lowest average across regions of 0.40. Finland has the highest regional average at 3.00.

In very few instances, there was missing data for a given NUTS 2 region. In some cases, the previous year (2001) is used as the value when 2002 was missing. This was only the case for three variables: tourism, death rate, and homicide rate. For tourism, three regions in Germany, the two regions that make up Ireland, and the region for Northern Ireland within the United Kingdom use 2001 values. For death rate, the regions within Belgium and Denmark are taken from 2001. Finally, for homicide rate, the regions within Belgium, three regions within the United Kingdom, and one region within each of Spain, Austria, and Portugal have values from 2001.

Completely missing data from Eurostat only occurred in the regions within Denmark and in two of the Scottish regions (North Eastern Scotland and the Highlands and Islands) of the United Kingdom. In these instances, the data was obtained directly from Denmark's national statistics website and Scotland's statistics website, respectively. While complete information was obtained for Denmark, missing data remains for these two Scottish regions on the percentage of adults with higher education and the homicide rate. For instances where these two variables have significant results in the models below,

these two Scottish regions are not included, reducing the number of regions from 192 to 190 and the number of individual level respondents from 7,532 to 7,522, a loss of only 10 respondents.

An assumption of the models that follow is that the regional level variables are normally distributed. As shown in Figure 19, four variables were not normally distributed according to the Q-Q plots in the panels on the left. These variables are population density, unemployment rate, tourism, and homicide rate. Note in Table 14 that these are the variables whose standard deviations are quite large compared to their means. When the log-transformation is applied to these variables, they conform well to the normal distribution as indicated in the Q-Q plots of the transformed variables in the right panel. No other power transformation conformed to the normal distribution as well as the log-transformation. In the analyses that follow, the log-transformed versions of these four variables are used.

[Figure 19 here.]

Bivariate Analyses

In order to examine the bivariate relationship between regional-level variables and the outcome variables, the regional averages were taken on the substance use and drug policy opinion questions. The correlation between these aggregated values and the regional-level predictors are shown in Table 15. While not completely analogous to examining the individual-level outcomes, these correlations still give an idea of how these predictors are associated with these behaviors and opinions at the pooled aggregate level.

[Table 15 here.]

Population density has a significant positive relationship with two of the substance use predictors, indicating that in more urban areas, there is higher use of marijuana in the last month and any use of another drug, supporting the central idea of social disorganization theory that more urban areas have higher delinquency. College education also has a significant positive correlation with the three illegal substance use aggregated measures. This result is somewhat puzzling, but the relationship may be a spurious one if, for example, one assumes that educated individuals live in greater numbers in densely population areas. Finally, tourism also has a significant positive correlation with last month marijuana use. Thus, in regions with a higher influx of foreign tourists, the average last month marijuana use tends to be higher. The only variable with a significant correlation with regular cigarette use is GDP growth, such that in regions with higher GDP growth, there is a lower rate of cigarette use. Thus, this form of deviance is less likely in regions of growing wealth, as would be expected from the social disorganization research on the relationship between poverty and delinquency.

For the drug policy opinion questions, other regional variables are associated. Net migration has significant correlations with both outcomes. However, the relationship with the proper reaction to drugs scale is positive, while the relationship with agreeing with punishing users is negative. Thus, in regions with high net migration, the averages on the proper reaction scale are higher, indicating a preference for social and rehabilitative measures. When asked directly about whether they agree with punishing users, the averages in regions with high net migration is lower. The significant correlation between the youth population and the proper reaction to drugs scale indicates a preference for

social and rehabilitative measures in regions with more individuals in this age range. GDP growth also has a positive correlation with the scale. For agreement with punishing users, higher rates of agreement are in regions with higher deaths per 100,000, while lower rates are in regions with high tourism.

Country Level Data: National Drug Policy Indicators

In the previous chapter, I argued that the respective national drug policies in the EU-15 are strikingly similar. Thus, qualitative indicators of the laws themselves would yield almost no variation between the countries. It was in their application that there was differentiation. Specifically, the countries varied in their enforcement of drug laws and the availability of drug-related resources. Thus, the question is whether, given that they do not differ substantially in their written laws, do the countries differ quantitatively. In this section, I describe this national level variability in both drug law enforcement and the availability of various drug programs, and it is shown that quantitative variability does indeed exist. As for tobacco policies, there was less homogenization at the policy level. The differences in these policies are also subsequently described.

The specific measures to include are not as clear for the country level. Following the neoinstitutional approach, the variables at the national level should be related to the outcome of interest. In studies of various domains of social activity mentioned above, national level predictors are restricted to those relevant to the topic at hand, including research on labor market regulation (Western 1997), civic engagement (Schofer and Fourcade-Gourinchas 2001), the provision of social goods (Amenta et al. 2001; Esping-Andersen 1999), the organization of blood-giving (Healy 2000), religiosity (Ruiter and

De Graaf 2006; Kelley and De Graaf 1997), and opinions on health care (Kikizawa et al. 2008). Thus, national-level indicators are restricted to those concerning national drug and tobacco policy. Given the emphasis in the EU on striking a balance between supply and demand in drug policy described in Chapter 2, the measures below focus on these two components, looking at supply reduction in the form of law enforcement and demand reduction in the form of availability of drug-related services. For cigarettes, I will take advantage of the actual variation in tobacco laws.

A justification from a statistical viewpoint is that, with only 15 nations, the degrees of freedom at the country-level is small. The ability to take advantage of regional-level variation for demographic and economic indicators is preferable given the increased degrees of freedom and decreased heterogeneity as the geographic area becomes smaller. To use these variables at the country-level could stretch the substantive connection to the individual-level.

The data come from four sources, with all values for the year 2002 except where noted. Data on seizures, arrests for sale and possession, and rehabilitative services come from the European Monitoring Center for Drugs and Drug Addiction (EMCDDA) (EMCDDA 2008b). EMCDDA is a decentralized agency of the European Union and is the central source of comprehensive information on drugs and drug addiction in Europe. Drug arrests and convictions are from the European Sourcebook of Crime and Criminal Justice Statistics (Dutch Ministry of Justice 2006). The Sourcebook is published every few years, originally by the Council of Europe but subsequently by the Research and Documentation Centre of the Dutch Ministry of Justice. The cost of marijuana is from the World Drug Report published by the United Nations Office on Drugs and Crime

(UNODC 2004). Finally, the country-level information on tobacco laws comes from the World Health Organization (World Health Organization 2003) and is discussed after the drug-related variables.

The country-level drug-related variables are shown in Table 16. The first column reproduces the country level averages for last month marijuana use and lifetime drug use for comparative purposes. I begin with the enforcement side of drug policy. According to the review in Chapter 2, the EU-15 were attempting in their policies to remove the stigma for drug users compared to drug traffickers. Therefore, some measures will apply directly to the youth and young adults in the survey, as they measure the extent of local enforcement, while the trafficking measures are more removed. Therefore, I include a measure of trafficking and a measure of the proportion of offenses for use. The measure of trafficking concerns seizures across a variety of illicit drugs. Data on drug seizures relate to all seizures made in each country during the year by all law enforcement agencies, such as police, customs, and the national guard. Double-counting is specifically avoided. Seized quantities of cannabis, heroin, cocaine and amphetamine are measured in kilograms, of LSD in doses, and of ecstasy in tablets. Quantity seized was used instead of the number of seizures due to the unavailability of all 15 countries on the latter. Admittedly, quantity is not a perfect measure due to particularly large seizures that may occur in a given year, but according EMCDDA data, seizures by quantity do not tend to fluctuate to a great degree in these 15 countries (EMCDDA 2008b).

[Table 16 here.]

Due to the few degrees of freedom at the country-level, an attempt was made to factor analyze all the variables at this level. Unfortunately, when all the variables are

considered, no reduction in the number of factors occurs. When considering just the seizure variables, however, one factor can capture the variation in these 6 variables. With $\chi^2 = 16.02$ with 9 degrees of freedom ($p > .05$), the null hypothesis that one factor is sufficient cannot be rejected (see Johnson and Wichern 2002). The factor loadings for the six seizure variables are shown in Table 17. As this weighted average shows, the different drug seizures load about equal for all except heroin and LSD, which contribute less to the factor. The values shown in Table 16 for the factor capture the overall trend among the 6 seizure measures. Luxembourg has the lowest value at -0.70, while the United Kingdom might be considered an outlier with a high value of 2.96.

[Table 17 here.]

In order to understand more localized enforcement, the percentage of drug arrests for sale and possession, as compared to trafficking, is included. This measure is important because it taps into the degree to which law enforcement focuses on large quantities versus small quantities of drugs. Most citizens are separated from the drug trafficking business. Offenses for sale and possession are more visible, impacting users, or potential users, more directly. On average in the EU-15, 67.8 percent of drug arrests are for sale and possession. The countries with the lowest percent of arrests for sale and possession are Luxembourg (23.4%) and the Netherlands (29.1%), two countries with liberal drug policies concerning use and possession. Spain and the United Kingdom lead for the most arrests for sale and use at 87.5 percent each.

The remaining enforcement measures tap into the rate at which individuals are arrested and convicted for drug offenses. The average number of drug arrests across the EU-15 is 239.6 per 100,000 people, while the average number of convictions for those

drug arrests is 64.0 per 100,000. The most drug arrests occurred in Belgium, with 446.0 per 100,000, while the least occurred in Portugal with 42.0. As for convictions, Finland leads with 142.0 per 100,000, with the fewest convictions in Greece (17.0 per 100,000) and Spain (18.0 per 100,000). The drug arrest conviction percentage divides the number of convictions in each country by the number of total arrests. On average in the EU-15, 32.8 percent of arrests result in conviction. The Netherlands convicts the highest percentage of their drug arrests at 68.4 percent, while Spain convicts a mere 5.3 percent of their arrests. Recall that Spain lead in the percentage of drug arrests for sale and use and that most Dutch offenses are for trafficking. Caution is necessary when examining the effects of arrest and conviction data, as they often can signal law enforcement practices that are the result of other factors, such as public sentiment, rather than an actual reaction to the behavior being enforced. For example, countries that arrest more often may due so because of a strong belief that drug use is wrong, even though actual use is low, compared to another country where arrest are low because of a more laxed attitude towards drug use and use is high.

Next, in order to understand demand reduction in the EU-15, I include the extent to which drug rehabilitation is utilized by the nation's population. According to EMCDDA, the data provide insight into general trends in drug use and also offer a perspective on the organization and uptake of treatment. The treatment rate measures the number of clients entering treatment centers in 2002 per 100,000 citizens. The average across the EU-15 is 83.6 people per 100,000. Italy leads in persons in treatment with a value of 278.3, while Belgium has the fewest people in treatment at 14.4. The other rehabilitative measure is the substitution rate per 100,000. While methadone makes up

the majority of substitutions, the measure captures all substitution programs. The EU-15 average is 110.0 per 100,000. Luxembourg has the most people using drug substitution at 236.7, while Finland has the fewest at 11.5.

Finally, and mainly as a control variable for the policy-related variables, to measure the potential impact of the economics of drug markets on substance use, the cost of one gram of marijuana is used.[8] Becker (1968) argues that optimal conditions can be met that will minimize the societal cost of crime. The literal monetary cost of participating in a crime is one such condition, here representing by price. Price data are collected annually from United Nations member countries through UNODC's Annual Reports Questionnaires and are supplemented by information from other international or regional bodies, such as Interpol and Europol (UNODC 2004). Price is standardized and measured in US dollars. The average in the EU-15 is $4.90 per gram of marijuana. With an average cost of $9.00, Denmark has the most expensive gram of marijuana on average. The least expensive gram on average occurs in Greece ($2.10), which also has substantially lower use than the other EU-15 countries. Cost is also the only variable on which 2002 data was not available in all countries. Data from Sweden, Denmark, Luxembourg, and the Netherlands are from 2001.

Given the licit status of cigarettes, there are no analogous offense and rehabilitation measures. Fortunately for the following analyses, whereas variation on drug laws was rare, such variation does exist for tobacco laws. Therefore, predictors for country-level cigarette and tobacco laws are used to capture the legal culture surrounding this substance. Table 18 shows the value of these predictors for each country and the EU-

[8] Information pertaining to other drugs was incomplete.

15 average. It should be noted that this table represents the state of the laws in 2002 (World Health Organization 2003) and will be discussed as such. These laws, particularly for smoking bans, have changed rapidly in recent years since the survey was administered. As with the measures for illicit substances, the first column reproduces the average for regularly using cigarettes in order to make comparisons. The first variable is whether there is a minimum purchase age for tobacco products, including cigarettes. This variable is particularly important for the age group in the sample since it may act as a deterrent for those below the minimum age. Six countries have no minimum purchase age. Of those that have a minimum, the age is 16 in 6 countries and 18 in 3 countries. Thus, 60.0% percent of the EU-15 countries have some minimum age. In the models, this variable is tested for both 3 categories and for the comparison between any minimum and no minimum.

The next two tobacco-related variables measure laws pertaining to smoking bans, particularly in restaurants and pubs and bars. These bans are used because, in addition to having the most variability, they tend to be the most contentious and receive the most public attention. They measure the extent to which public smoking is acceptable. For bans in restaurants, the fifteen countries are about evenly split, with 7 with bans and 8 without bans. On the other hand, only one-third of the countries ban smoking in pubs and bars. Note that all countries that ban smoking in pubs and bars also prohibit smoking in restaurants. Two-thirds of the EU-15 also have a National Tobacco Control Action Plan, which is similar to the drug action plans discussed in the previous chapter. These plans are nationally mandated legislation passed to tackle prevailing problems of smoking, as proposed by the World Health Organization. Finally, again as a control measure for

economic effects, the cost of a pack of Marlboro cigarettes (in US dollars) is used as a predictor in order to understand if higher prices act as a deterrent to youth and young adult smoking. This measure of cost aligns even more closely to economic theories of crime (Becker 1968) because the cost is set by both market conditions and the state in the form of tax. The average cost is $4.09, with the least expensive pack at $2.59 in Portugal and the most expensive pack at $7.65 in the United Kingdom.

Little in the way of trends is apparent from Table 18 concerning the relationship between smoking and the variables measuring the legal culture surrounding tobacco use, at least at the aggregated country-level. Of the six countries with no minimum purchase age, five have rates of regular cigarette use below the EU-15 average. The exception is in France, which has a rate well above the average. The two highest smoking countries of Germany and Austria have a minimum age, though they do not prohibit smoking in restaurants, pubs, and bars, nor do they have a National Tobacco Control Action Plan. The next highest, France, does prohibit smoking in these locations and has a Plan, as does Sweden, which has the lowest rate of use and a minimum purchase age of 18. The cost of cigarettes also does not appear to be related to aggregated smoking rates. Though the significance level is less instructive with only 15 countries, the correlation between these two measures is only -0.035 (p = .903).

Methods

Hierarchical Linear and Generalized Linear Models

In the models in the following chapters, I use what is commonly called mixed effects models (Pinheiro and Bates 2004) or hierarchical models (Raudenbush and Bryk

2001) to analyze the data. All data were analyzed using the software program HLM 6.06 (Raudenbush et al. 2004). In common statistical techniques, such as regression analysis, there is an assumption of independence across the observations. When confronted with a dataset where that assumption is violated, such as this one containing individuals nested within regions nested within nations, mixed effects can model that dependence. Thus, the effects at each level can be explored.

In what follows, I use the notation from Raudenbush and Bryk (2001:231-3). Though there are many forms the fixed and random effects can take given the very general form in which hierarchical models are expressed, I concentrate here on the specific equations that follow in the analysis chapters. While the equations presented in this section cover those used in the analysis chapters in their generality, the specific equations for the four models used in the analysis chapters are presented before discussing each. These analyses will include three-levels, such that individual *i* is nested within level-2 region *j* and level-3 country *k*. For an outcome Y_{ijk}, Level 1 takes the form

$$Y_{ijk} = \pi_{0jk} + \pi_{1jk}a_{1ijk} + \pi_{2jk}a_{2ijk} + ... + \pi_{Pjk}a_{Pijk} + e_{ijk}.$$

In this equation, π_{pjk} for $p = 0,1,...,P$ are individual-level coefficients, a_{pijk} is an individual-level predictor *p* for individual *i* in region *j* and country *k*, and e_{ijk} is the error term for individual *i*. The variance of e_{ijk}, or the individual-level variance, is σ^2. It is assumed that the error term $e_{ijk} \overset{iid}{\sim} N\left(0, \sigma^2\right)$.

Each of the π_{pjk} coefficients in the individual-level model becomes an outcome variable in the region-level model, taking the form

$$\pi_{pjk} = \beta_{p0k} + \beta_{p1k} X_{1jk} + \beta_{p2k} X_{2jk} + \ldots + \beta_{pQ_pk} X_{Q_pjk} + r_{pjk} .$$

In this equation, β_{pqk} for $q = 0,1,\ldots,Q_p$ are the region-level coefficients for a particular individual level coefficient p, X_{qjk} is a region-level predictor, and r_{pjk} is the region-level error term. In the models below, the maximum for the number of regional level predictors Q_p included in the equation is 5 for the individual level intercept π_{0jk} and 3 for a given individual level coefficient. Raudenbush and Bryk (2001) also refer to the β_{pqk} as a cross-level interaction between level 1 and level 2. Many of the individual level coeffients do not significantly vary by region and, in such cases, the error term r_{pjk} is set to zero. In the case where the individual level coefficient does not vary randomly by region or nonrandomly by regional level characteristics, the equation reduces to

$$\pi_{pjk} = \beta_{p0k} .$$

For those individual level measures that do vary randomly, the set of r_{pjk} are assumed multivariate normal with a mean of 0 and some variance τ_{pp} and some covariance between elements r_{pjk} and $r_{p'jk}$ of $\tau_{pp'}$.

Continuing in the same manner, each of the region-level coefficients, β_{pqk}, then becomes an outcome variable in the country-level model. In each of the models, only the intercept is allowed to vary randomly at the country level. This term is necessary within the framework of the HLM software. Since the EU-15 does not represent a random sample of countries, the inclusion of a random country intercept may be questionable. As the models fitted below will show, this variance is reduced to near zero upon inclusion of country level fixed effects. Thus, the intercept takes the form

$$\beta_{p0k} = \gamma_{p00} + \gamma_{p01}W_{1k} + \gamma_{p02}W_{2k} + \gamma_{p03}W_{3k} + u_{p0k}.$$

In this equation, γ_{pqs} for $s = 0,1,2,3$ are the country-level coefficients (which have a maximum of three coefficients in the models below), W_{sk} is a country-level predictor, and u_{p0k} is the country-level error. Since none of the regional or individual level measures vary at the country level, the equations for the other coefficients besides the intercept do not contain random effects and in most cases do not vary by country level measures, reducing to the simple form

$$\beta_{pqk} = \gamma_{pq0}.$$

Or, in the rare case where a regional level characteristic did vary by a specific regional characteristic, the equation is

$$\beta_{pqk} = \gamma_{pq0} + \gamma_{pq1}W_{1k}.$$

For those response variables with a binary outcome, such as drug use, the level 1 equation changes with the inclusion of a logit link (Raudenbush and Bryk 2001:293-6; Agresti 2002). Above, the outcome Y_{ijk} is normally distributed. In the binary case, $Y_{ijk} \mid \pi_{ijk}, \beta_{ijk}, \gamma_{ijk}$ follows a Bernoulli distribution with expected value equal to the probability of success, ϕ_{ijk}, and variance $\phi_{ijk}(1-\phi_{ijk})$. Here, the probability of success refers to the probability of drug use. Such an outcome can be modeled through the logit link: $\eta_{ijk} = \log\left(\frac{\phi_{ijk}}{1-\phi_{ijk}}\right)$; that is, the log-odds of success. The level 1 equation now becomes

$$\eta_{ijk} = \pi_{0jk} + \pi_{1jk}a_{1ijk} + \pi_{2jk}a_{2ijk} + \ldots + \pi_{Pjk}a_{Pijk},$$

where *P* is the number of individual level coefficients. The level 2 and level 3 equations remain the same.

For three-level hierarchical models, both the fixed and random effects are estimated by means of full maximum likelihood. For the binary outcomes, the estimation procedure used is penalized quasi-likelihood (PQL). While Laplace estimation is available for binary outcomes, the computational intensity of the procedure prevents models with many fixed and random components, such as those presented below, from converging in a timely manner. For a very detailed explanation of the PQL estimation procedure used by HLM for the binary case, see Raudenbush et al. (2004:103-5). Due to the complexity of Laplace estimation, PQL has been used in most applications in sociology (see, e.g. Schofer and Fourcade-Gourinchas 2001; Ruiter and De Graaf 2006).

Finally, for the case of hierarchical generalized linear modeling, two forms of the estimates exist: the unit-specific model and the population-averaged model (see Agresti 2002; Raudenbush and Bryk 2001). Note that in both cases the inference concerning the parameter estimates are the same since the parameter estimates and their standard errors are proportional between the two estimation procedures, so the choice of model is usually not crucial to inferential conclusions (Agresti 2002:501). The main difference is thus in the magnitude and interpretation of the fixed effects. In the models presented below, unit-specific models are shown. It should be noted, however, the estimates of the magnitude of the effects produced by both models are very similar for the results that follow.

Modeling strategy

Many modeling possibilities exist within both the fixed effects and with the specification of those variables as random (Raudenbush and Bryk 2001:233-4). The specific modeling strategy used for each of the analyses below follows the strategy suggested by Raudenbush and Bryk (2001:267-8; see also Bryk and Thum 1989). The mean function was concentrated on first level by level. To begin, each individual-level predictor was entered in a random intercepts model (that is, the individual level model contains one predictor, while the regional and country levels only contain the error term) one at a time in the given model. This approach indicated whether there was a significant bivariate relationship between the outcome and a given individual level predictor, while controlling for region and country variation. The variables that were significant ($p < .05$) were put into a model together. Then, each regional-level variable was added one at a time to the regional-level intercept and also entered into the equation for each individual-level coefficient already included. If the main effect or a given cross-level interaction was significant ($p < .05$), it was added to the full model. This process was continued at the country-level.

Due to the complexity of the models and estimation procedures, especially in the case of the binary outcomes, attempts were made to make the model as parsimonious as possible. Thus, after this fixed effects modeling strategy, any variables that became insignificant when in this full model were removed in a stepwise procedure. That is, all the non-significant variables were removed and then reinserted in all possible stepwise combinations to make sure that every combination was non-significant. For groups of indicator variables with more than two categories, multivariate tests were used to ensure

no significant differences in the groups were missed. The null hypothesis from this chi-squared test is that all of the parameters are equal to zero.

After the mean structure was determined, the random effects components were explored. Similar to the fixed effects, the regional-level and country-level random effects were added variable by variable. The test to determine whether a single variance-covariance parameter was included is a chi-squared test (see Raudenbush and Bryk 2001:63-4). The null hypothesis states that the single variance parameter is equal to zero. Though this single parameter test for a random effect may not follow a chi-square distribution, Raudenbush and Bryk (2001:283-4) argue that this univariate chi-squared test will be appropriate in most applications due to several properties they describe in detail.

Also, a multiparameter test for variances and covariances can be conducted using the deviances D_1 of the current model and D_0 of a nested model. The null hypothesis is that the variance covariance matrix $\mathbf{T}$ is equal to a simpler nested form. The test statistic is $\mathrm{H} = D_0 - D_1$, which has an approximate χ^2 distribution with *m* degrees of freedom, where *m* is the difference in the number of unique random effects estimated in the two models. Given that the deviance is simply -2 times the value of the log-likelihood function, this test is actually a likelihood ratio test. Thus, the same multiparameter test can be conducted for nested models differing in both fixed and random effects (Raudenbush and Bryk 2001:64-5). Since deviances are only produced for linear models, the single parameter test must be relied upon for binary outcomes. After testing whether random variation exists for each of the fixed effects in the model individually, all the

significant random effects were added to the model. As with the fixed effects, the random effects were pared down until just significant effects remained. In the next two chapters, hierarchical linear and generalized linear modeling are applied to substance use and opinions on drug policy, respectively.

Expectations

Now that the variables in the analysis and the modeling strategy have been described in detail, this section describes the expected effects of those predictors on the outcomes of interest in multilevel models based on the theoretical framework of the first two chapters, as well as the bivariate analyses above. As we move from the individual level up to the regional and country level, the expectations become less clear, as these higher levels are the unique aspect of the approach taken in this study. The interactions between the levels, also a contribution of these analyses, are also not entirely obvious from the literature. Thus, while many of the expectations are firmly grounded in the literature, as we move up to the country level and as interactions are discussed, the expectations, though grounded in theory, are more speculative. Table 19 summarizes the expectations discussed below by theory, direction for both substance use and drug policy opinions, and potential cross-level interactions. Each of the expectations are discussed below. While many potential interactions are listed, I will focus on some more than others for the sake of brevity.

[Table 19 here.]

I begin with the individual level since those expectations are most definitive given that the study of substance use has been so individualized. Again, I follow Bachman et al.

(2002) in breaking down the variables into demographics, social bonds, and mediating variables. For gender and age, most empirical research supports the conclusion that males and older youth are more likely to engage in substance use. Surveys from both the United States (Substance Abuse and Mental Health Services Administration 2002; Johnston, O'Malley, and Bachman 2000) and Europe (European Monitoring Centre for Drugs and Drug Addiction 2006a) show higher rates of use by males. As for age, though general delinquency research shows a peak at 17 (Caspi and Moffitt 1995; Sampson and Laub 1993; Gottfredson and Hirschi 1990), substance use tends to peak later around age 25 (Substance Abuse and Mental Health Services Administration 2002). Considering this empirical background and the supporting bivariate results above, I expect that *males will be more likely to engage in substance use*, while *substance use will increase with age for this group of 15 to 24 year olds*. Research has also shown that the effect of structural factors may be gender-specific (Steffensmeier and Haynie 2000), with the effect of gender in Europe differing across countries (European Monitoring Centre for Drugs and Drug Addiction 2006a). In particular, the effect of living in urban areas with economic disadvantage in the form of unemployment has been shown to condition the effect of gender (Steffensmeier and Haynie 2000). Therefore, I expect that *the effect of gender will vary with regional characteristics indicative of economic disadvantage and urbanicity*, such as population density, migration patterns, and unemployment.

Research shows that those in the lowest income brackets are most likely to use drugs (U.S. Department of Health and Human Services 2004). Therefore, it might be expected that *lower income quartiles and those whose head of household are unemployed will have higher probabilities of substance use*. Strain theory provides hypotheses for

structural factors that might condition the effect of income and HH occupation. Strain theory states that those who reject legitimate work and the goal of economic success will be more likely to use drugs (Merton 1938; 1968). Though often interpreted as an individual level theory, Merton (1938; 1968) intended for strain theory to be used at the structural level, and such a theoretical interpretation has been explicitly applied to substance use (Akers 1992). Such an interpretation states that those in lower income quartiles or who are unemployed would be more likely to reject the means of obtaining economic success if opportunities for success are bleak. Therefore, I expect that *as variables that measure economic opportunity and wealth, such as unemployment, GDP, and college educated adults, tend in the direction of less wealth and opportunity, those in the lowest income brackets and with HH unemployed will have increased odds of substance use*. In a way perhaps contradictory to strain theory, evidence from Europe also shows that affluent youth in inner cities are using substances at higher rates than those in the country at large due to frequenting bars and clubs at higher rates (European Monitoring Centre for Drugs and Drug Addiction 2002a). This results leads to the expectation that *the effect of income and HH occupation will vary with population density, such that those in the highest income quartile and in households of professionals or management will be more likely to use drugs when residing in highly urban areas compared to non-urban areas.*

The direction of the effect for social bonds comes directly from life course research on substance use (Bachman et al. 2002). I expect that prosocial bonds will be associated with decreased odds of substance use. In particular, *married young adults, those who are working, and those who are students will be less likely to use drugs*. There

is, however, one notable exception. Following the work of Monitoring the Future (Schulenberg et al. 2000; Bachman et al. 1997), *college students will have odds of marijuana use similar to those with just a high school education or some postsecondary education*. This expectation is supported by the bivariate analysis above. Also, *those who have completed college will have lower odds substance use*. As evidenced by the bivariate results above, the directional expectation of head of household is unclear. Life course social bond theories might support the expectation that being the head of household will create a sense of responsibility that will deter substance use. But to the extent that these individuals are experiencing a new freedom of being away from their parents (Bachman et al. 2002), substance use will be higher. Further, it might be expected that *being surrounded by more youth will be associated with higher odds of substance use for those young adults who are the head of the household*.

The final component to Bachman et al.'s (2002) model is what they refer to as "mediating variables." With the exception of political beliefs, these variables can also be considered "substance use related" predictors. To start with the exception, I expect that *rightists will be less likely to use drugs, while leftists will be more likely to use drugs*. Though without strong empirical support, political beliefs may manifest itself differently based on the general permissiveness of the surroundings of the individual, as measured by many of the country-level drug variables such as sale and use arrests or treatment and substitution rates.

Supported by a lengthy empirical tradition grounded in learning theory (see, e.g., Becker 1963; Akers 1969, 1992; Burgess and Akers 1968; Kaplan, Martin, and Robbins 1982, 1984; Kandel and Davies 1991), I expect that *knowing a marijuana user will*

increase the odds of last month marijuana use, while knowing a drug user will increase the odds of use of a drug other than marijuana. While knowing a user may in general increase the odds of personal user, *this effect may vary by country level measures that can offset the influence of knowing a user by deterring use, such as higher conviction and arrest rates*. The expected effect of being able to obtain drugs easily is unknown, given that an association between this measure and use has not been found (Bachman 1994). Bachman (1994) speculates that this may be due to the very high perceived availability of drugs, which was also found in this survey of the EU-15. Evidence of a relationship between perceived dangerousness of cigarettes, marijuana, and cocaine and use of those respective drugs has been found by the Monitoring the Future researchers (Bachman et al. 2002; Bachman et al. 1998; Bachman et al. 1990). Therefore, I expect that *the more dangerous one views a particular substance, the less likely use of that substance will be*. The causal order of this relationship is well established by longitudinal research by the Monitoring the Future research.

Though many of the potential interactions between individual level variables and regional level variables have been described, the expected main effects for the regions have yet to be addressed. The expected direction of the effects of most of these measures comes from social disorganization research, but also from strain theory. As described above, these variables can be thought of as falling into the categories of demographics, economics, and crime. One of the central components of social disorganization theory is that urban concentration is related to crime and delinquency (Shaw and McKay 1931; Sampson and Groves 1989). Following this line of research, I expect that *the probability of individual level substance use will increase with population density*. According to the

review in Chapter 2, the efforts of the reduction of drug supply and demand are concentrated in urban areas, leading to a possible expectation of an interaction between population density and some of these measures of enforcement and rehabilitation, as shown in Table 19.

Another central tenet of social disorganization is residential instability, or in and out movement of the population (Shaw and McKay 1931; Sampson and Groves 1989). In particular, Sampson et al. (1997) argue that areas with high residential instability and high concentrations of immigrants have difficulty establishing collective efficacy. Therefore, I expect that *as net migration increases, the odds of individual level substance use will increase*. Another form of decreasing population is in the natural form of death, where an increased death rate implies a faster loss of the population, mostly older adults. Therefore, I expect that *as the death rate increases, the odds of substance use will increase*. Finally, the youth population may increase the odds of substance use by providing definitions favorable to substance use. Recall from learning theory that an excess of such definitions can cause delinquency (Sutherland and Cressey 1978). To the extent that the youth population would provide such definitions, I expect that *individual in areas with a higher youth population will have higher odds of substance use*.

Economic deprivation is also an important structural factor for both social disorganization and strain theory. For the former, economic deprivation again weakens collective efficacy, decreasing the chances that residents can rely upon each other (Sampson et al. 1997). For the latter, as economic deprivation increases, it creates a situation in which residents are more likely to reject tradition routes to economic success, as described above in relation to individual level income and unemployment (Merton

1938; 1968). Given both these traditions, I expect that *in areas of low unemployment and high GDP and college educated adults, the odds of substance use will be lower*. The cost of marijuana and cigarettes may also be related to economic indicators, such that in wealthy areas the cost may matter less, while in less wealthy areas a high cost may deter purchase. Tourism can be thought of as both an economic measure, indicating one form of wealth brought to the region. In this case, one would expect high tourism to be associated with lower levels of substance use. Tourism, however, can also be thought of as a measure of movement of non-resident individuals in and out of the area in the sense described concerning migration. In this case, one would expect that as tourism goes up, implying more and more individuals moving through, the odds of substance use would increase.

Finally, given the abundance of research on the relationship of violent crime to structural measures (Morenoff, Sampson, and Raudenbush 2001; Liska and Bellair 1995; Steffensmeier and Haynie 2000; Messner and Tardiff 1986; Anderson 1999; Parker and Pruitt 2000; Parker 2004; Warner and Pierce 1993; Lee, Maume, and Ousey 2003), it seems appropriate to include homicide rate as a measure of aggregate crime. Violent crime becomes acceptable, individuals come to see crime, including drug use, as a way of life (Anderson 1999). Therefore, I expect that *individual level probabilities of substance use will be higher in areas with higher homicide rates*. Drug offenses at the country level may exacerbate the effect of the homicide rate on substance use. Thus, one might expect that *in countries with high drug conviction and arrest rates and in regions with high homicide rates, the probability of substance use will be higher*.

The justification for the inclusion of country level measures of the legal environment surroundings drugs was a neoinstitutional framework that emphasized the importance of including national indicators relevant to the outcome (see, e.g., Western 1997; Schofer and Fourcade-Gourinchas 2001; Amenta et al. 2001; Esping-Andersen 1999; Healy 2000; Ruiter and De Graaf 2006; Kelley and De Graaf 1997; Boyle 2002). This framework, however, does not help with the directional expectation of these variables in the realm of drug policy and substance use. Therefore, the expectations are taken from the last chapter, where the drug action plans in the EU-15 emphasized a dual plan of supply and demand reduction, while decreasing punitiveness on the user. Therefore, *the directional expectations are all set up to be negative, such that increased efforts at supply and demand reduction will decrease the probability of individual substance use*. The one exception is sale and use arrests. Since this measure indicates effort aimed at users and diverted attention from supply reduction of traffickers, *the expectation is that in countries with a higher proportion of arrests for sale and use, the probability of substance use will be higher*. For cigarettes, a similar hypothesis applies to these demand reduction efforts, such that I expect that *where there are smoking bans, tobacco action plans, and purchase age minimums, the probability of regularly smoking cigarettes will be lower*. Finally, it could be argued that an economic measure should be included in the form of cost, as higher cost will deter use and lessen the economic impact of crime (Becker 1968). The expectation here would be that *where cigarettes or marijuana are more expensive, the probability of use will be lower*.

For each of these expectations, it is possible that the causal direction is opposite, such that rates of use cause a national level response in drug enforcement and services

and tobacco policy. While this caution should be kept in mind throughout, the multilevel approach of the models examining individual behavior as a result of policy makes for a stronger case than the examination of cross-sectional aggregate rates. That is, it is unlikely that the individual choice to use substance use by youth and young adults has a direct causal influence on national policy and enforcement. In the aggregate, this may certainly be the case, but any respondent's personal usage should not directly cause a change in policy or enforcement. Even in the aggregate, this young cohort would most likely not have influenced the current state of policy, but rather their predecessors would more likely be the cause for current policy.

I finish this chapter with the expectation of the model predicting the drug opinion scale. The scale, described above, has support for enforcement centered strategies in the negative direction and support for rehabilitative measures in the positive direction. Many of the directional hypotheses come from the multilevel cross-national study of health care expenditure by Kikuzawa et al. (2008). Their outcome was a scale of support for government intervention in health care. Since the rehabilitative side of the scale can easily be viewed as support for government-provided health care, especially since this is the view taken by nations in the EU-15 as described in Chapter 2, I expect that many of the individual level effects will be similar. They found that males, the highly educated, and those with higher incomes were less likely to support expenditure. I also expect that *males, those with a college education or in college, and those in the highest income quartiles or in households of professionals or management will be more supportive of enforcement strategies*. Though Kikuzawa et al. (2008) also found this effect for those who were older, I expect that, in this cohort of young people, *older respondents will be*

more supportive of rehabilitative measures, given their increased probabilities of use, the latter of which could reduce the effect of age. Given the typical association of enforcement measures with conservative thinking and rehabilitation with liberal thinking, I also expect that *those whose political beliefs are to the left will be more supportive of rehabilitative policies, while those who political beliefs are to the right will be more supportive of enforcement policies, with centrists in the middle*.

The remaining individual level variables are drug-related measures. Described above, Boyle's (2002) research indicated that opinions do not always align with behaviors. This finding was in an area, namely female genital cutting, where institutional force is strongly against the behavior, resulting in those who engage in the act still reporting that they are against it. Though drug prohibition has a strong institutional force, the countries of the EU-15 have acted to take the stigma off of the user, as described in Chapter 2. Thus, it is my expectation that the behaviors will align in opposition to enforcement measures that reduce supply. That is, *those who have used marijuana or other drugs will be more supportive of rehabilitative measures*. I also expect that knowing a drug user, viewing drugs as less dangerous, and being able to obtain drugs easily will have this same relationship, but that these effects will be mediated by personal use.

Theory and empirical work has little to say on the possible effects for the regional level variables in Table 19. Given general patterns of political opinions, however, one would expect that those in more urban, wealthy, and college educated areas would tend to be more liberal and, thus, in support of rehabilitative measures. No particular expectation is listed for many of the other regional level variables, as indicated by the question mark

in the table. For example, migration is most likely higher in urban areas, which are more politically liberal. To the extent that individuals view drug use as a behavior of immigrants, as is often used as a political tactic by moral entrepreneurs (Becker 1963), it would be expected that high migration would be associated with more enforcement centered strategies. Another example of a regional expectation for opinions is that, given the potential influence of favorable definitions to deviance, rehabilitative measures will be supported more in areas of high youth populations.

As for the country level drug-related variables, Kikuzawa et al. (2008) follow a neoinstitutional framework by including solely variables related to their outcome (in the form of health expenditures and national health care type). As with the substance use outcomes, this approach is again followed with drug policy opinions. Kikuzawa et al. (2008) found that the type of health care system aligned closely with individual level opinions on government health care expenditures. That is, individuals in countries with a centralized or national health service model were more supportive of increased government expenditure than those in countries with an insurance model. I also expect this close alignment. That is, I expect that *those in countries high on the drug law enforcement measures will be more supportive of enforcement centered policies, while those in countries high on drug service rehabilitation use will be more supportive of rehabilitative measures*.

As can be garnered from the length of this section on expectations, there are seemingly endless modeling possibilities for both the substance use models and the drug policy opinion model. The modeling strategy described above is intended to accurately narrow in on the appropriate model. Throughout the course of describing the models,

these expectations based on theoretical and empirical work outlined in Chapter 1 and Chapter 2 should not be lost sight of. As I move on to the models in the next two chapters, I will periodically return to these expectations with respect to the outcomes observed. I now turn to the main empirical chapters of the dissertation.

CHAPTER 4: MULTILEVEL MODELS OF SUBSTANCE USE

As mentioned at the outset of this dissertation, the individual level correlates of substance use are well established. The first chapter applied other theoretical and empirical research to this same field. It was argued there that a framework can be applied to these individual level correlates that places them in a larger local and national context. Building on this multilevel approach, the above described hierarchical linear modeling is used to predict three substance use outcomes: last month marijuana use, lifetime other drug use, and regular cigarette use. Specifically, hierarchical generalized linear models with a logit link are used given that each of these responses is a binary outcome. As the centerpiece of this dissertation, these models show how the country, regional, and individual level interact to influence young people's substance use in the EU-15. As will be shown, the individual level interacts with the demographic and economic surroundings to shape youth's probability of substance use. Further, the legal culture surrounding substance use in the countries of the EU-15 exhibit independent effects that also contribute to that probability. Each of the three substance use outcomes are discussed in turn.

Last Month Marijuana Use

I begin with marijuana, the most frequently used illicit drug. As described in the previous chapter, respondents were asked whether they had used cannabis in the last month, with 11.3 percent of European youth responding in the affirmative. Again, last month marijuana use is the outcome considered in order to give more concrete temporal ordering between the predictors and the outcome. Since no estimate of the level 1

variance is produced in the case of a binary outcome, the variance decomposition between the three levels cannot be reported. But, if momentarily the outcome is treated as continuous, 71.7 percent of the variance in substance use is in the individual level, while 17.7 percent is in the regional level and 10.6 percent is in the country level. Though too much weight should not be given to this result as it is an inappropriate method for the outcome, it still shows that a great amount of the variance in last month marijuana use is at the individual level.

I now turn to the results of the multilevel logistic regression models for last month marijuana use. Table 20 shows the final results of the modeling procedure outlined above. In this model, 5.9 percent of respondents were dropped due to being missing on at least one predictor, including the two Scottish regions mentioned above. There were several individual level predictors that were significant in a random intercepts model (model with no regional or country level predictors), but were non-significant in a full model. These effects include age[9], married versus not married (partnered did not have a significant effect), employment status, head of household, and obtaining drugs easily. Recall that stepwise procedures were used throughout the process described here to ensure that no variable became significant when others were dropped in all possible combinations.

[Table 20 here.]

Of the six individual level variables that retained their significance in the full model, several had significant interactive effects with regional level variables. Though

[9] Particularly in a sample of youth and young adults, education and age are closely related, so the absence of an age effect may be partially explained by the significance of education in this model and the models below.

knowing a marijuana user, political beliefs, and HH occupation had several significant interactive terms when considered individually, only one of these interactions remained significant for each of these individual-level variables when considered in a full model. For education, however, three interaction terms remain significant and are included in the model in Table 20. Thus, the effect of education varies considerably by the surroundings of the individual. In addition, there were two significant country level variables: sale and possession arrests and the substitution rate. The former also had a significant interaction with regional GDP growth. The equations for this final model are shown in Appendix 1.

Following neoinstitutional arguments and having reviewed the variation in EU-15 drug policy, country level effects were added to the models in order to understand how they affect individual level probabilities of substance use. Of the variables introduced in the previous chapter, two country level drug measures were statistically significant. As shown in Table 20, the substitution rate has a significant positive effect on last month marijuana use. Thus, in countries with more citizens taking advantage of drug substitution, the youth and young adults have higher rates of marijuana use in the last month. Where youth and young adults are surrounded by a higher frequency of hard drug users seeking treatment in the form of substitution, their probability of recent marijuana use is higher. As will be shown in the next section, rehabilitative measures have the opposite effect on drug use other than marijuana. These results will be discussed further below.

The other significant country level effect is related to drug law enforcement, rather than rehabilitation. According to the coefficients in Table 20, there is little variation in the effect of country level sale and possession arrests in high GDP growth

regions. But in regions with little regional GDP growth, the probability of last month marijuana use among youth and young adults grows with the percentage of such drug arrests. These more visible forms of drug arrests, compared to trafficking, only matter in regions with little GDP growth. Where GDP growth is lowest and possession and sale arrests are highest, youth and young adults have the highest odds of marijuana use. The country level effects show that, even controlling for individual and regional characteristics, variation in national level drug laws still matter for individual level substance use. Next, I describe the effect of the other two levels.

Throughout this chapter, a common theme will be that, despite the expectations outlined above, there are no significant main effects for the regional level variables measuring important concepts in social disorganization and strain theory. Rather, the importance of these measures lies in how they condition the effects of the individual level correlates, which in research up until now have been considered without this contextual element. Of the six significant individual level effects, four have significant interactions with regional level characteristics. As shown in Table 20, education and its variable effects by regional characteristics are a centerpiece of the model. In particular, education level interacts with regional GDP growth, population density, and youth population. Since the regional level variables are centered at their respective means, the part of the table that refers to individual level effects can be interpreted as the effect of education at the mean value of the regional characteristics by which education interacts, and controlling for the other variables in the model.[10] In regions average on those three

[10] The same does not hold true for the coefficients for the regional main effects. These coefficients represent the slope for the baseline category of the individual level variables with which they interact.

regional characteristics and net of the other predictors, those with a tertiary education are about 71 percent (100% * $(1 - e^{-1.2224}) = -70.5\%$) less likely to have used marijuana than those with only a secondary education, while those who are still students are 36 percent less likely.[11] Thus, this important social bond (for the students) and socioeconomic measure (for the non-students) has support similar to past criminological studies. With coefficients close in magnitude, high school and college students did not differ significantly from one another in this full model on their main or cross-level interaction effects, unlike past studies that found higher levels among college students.

The effect of education is most noteworthy in the various ways it interactions with regional characteristics. For youth and young adults in the EU-15, the effects of several regional characteristics vary significantly by their education level. Figure 20 shows the interaction between education level and GDP growth, controlling for the other predictors at the mean. Not surprisingly, those with tertiary education or higher have the lowest probability of last month marijuana use, with a slight increase as GDP grows. For those who are still students, the probability of last month marijuana use does not vary at all by GDP, with a predicted use of use of about 3.5 percent. Those with some postsecondary education have a slightly higher probability than students of use, but specifically at high GDP levels. Most apparent from Figure 20 is the effect of GDP growth on last month

[11] It should be noted that those with tertiary education and are the head of their household might also be more likely to be in professional or managerial occupations, the coefficient of which is negative. Thus, there would be a reduction in the magnitude of the effect of tertiary education for such an individual. For most respondents, however, income and occupation come from their household of origin, so a move between respondent education categories would not necessarily imply a move on either income or occupation (in fact, the reverse may be more accurate, though less deterministic). Nevertheless, such possibilities concerning the direction of associated predictors should be kept in mind throughout these analyses, as examples such as the one described here would imply an overstating of the effect for such respondents.

marijuana use for those with only a secondary education or less. The highest probability of last month marijuana use is for those in this low education category in a region with low GDP growth. The probability for the low education group, however, drops dramatically in wealthier regions. In this figure and subsequent interaction graphs with regional variables, the x-axis shows the 10^{th} to 90^{th} percentiles on the regional measure. For example, the probability of last month marijuana use is 8.6 percent at the 10^{th} percentile of GDP growth, while the probability for the 90^{th} percentile is 2.8 percent. Thus, growth in the wealth of a region matters almost exclusively for those with only a secondary education. This finding supports some of the expectations from strain theory that structural economic factors will affect the crime and delinquency of those in the lowest socioeconomic categories by creating strain.

[Figure 20 here.]

As shown in Figure 21, the significant interaction of youth population and education level is again due mostly to the way this regional measure varies for the lowest education level. For the other three categories, there is little variation across youth population, with the highest educated group again with the lowest probability of last month marijuana use, followed by students and then those with some postsecondary education. For youth and young adults with only a secondary education or less, the probability of last month marijuana use at the 10^{th} percentile of youth population is 2.6 percent. The odds, however, steeply increase for those who reside in regions with more individuals in this age range, with a predicted use of 10.5 percent for the 90^{th} percentile. Thus, while there may be some evidence of the effect of youth culture on individual substance use, it mainly affects those in the lowest education levels. Being surrounded by

increasingly high number of youth and young adults does not appear to condition the probability of use for those in the other education categories.

[Figure 21 here.]

Finally, the effect of regional population density also varies by the individual's education level, as shown in Figure 22. Here, however, there is virtually no variation across population density for those in the lowest education level, though the odds of last month marijuana use are still higher than those with tertiary education and those still in school. Instead, the probability increases for the other three education groups. In particular, the largest increases in the odds of substance use are for those with some postsecondary education and those with tertiary education. Despite this increase, the latter still have the lowest odds of marijuana use of the four education levels. For the former, the probability of substance use increases to the highest levels among the four categories in regions that are densely populated, going from 2.0 percent at the 10^{th} percentile of population density to 8.3 percent at the 90^{th} percentile. While substance use of the lowest education category was driven by economic and cultural factors, the substance use of those with some postsecondary education and those with a college degree is driven by the degree of urbanicity of the area in which they live. Thus, this central component of social disorganization theory is not universal in its effect. Rather, it matters more for those in higher education categories, while economic conditions drive use among the lowest category.

[Figure 22 here.]

Another socioeconomic characteristic, HH occupation, is also significant and varies by a central tenet of social disorganization theory as well. According to the

coefficients, the probability for all three categories of head of household is about the same in regions with low regional net migration. Thus, in areas where few residents leave and few new residents come in, the occupation of head of household does not distinguish who has used marijuana in the last month and the probability of use is relatively low at about 2.5 percent. As net migration increases, the probability of last month marijuana use increases for those whose head of household is either in a professional or management position or is not working, rising to about 7 percent. For those in households of non-professionals and non-management, the probability of last month use does not change with net migration, remaining low. As social disorganization theory would predict, the influx of new settlers does increase the odds of this form of substance use, but specifically for those in the lowest and highest economic positions.

Many of the individual level effects in the model for last month marijuana use fall under what Bachman et al. (2002) referred to as mediating variables. As described above, political beliefs were used given the lack of a measure for religiosity. This variable was significant and, further, varies by the regional homicide rate.[12] At average homicide rates and controlling for the other variables, those on the left are 77 percent more likely to have used marijuana than those in the right/center/don't know categories. Both categories, however, have equally low probabilities of last month marijuana use at low homicide rates. For those on the left, there is a sharp increase as they reside in increasingly higher

[12] Recall that political beliefs had four categories: left, center, right, and don't know. After the final model was selected, comparisons between all the various levels of the main effect and interaction coefficients for homicide rate showed that only the comparison between left political orientation and the other three categories is significant. A multivariate test of the right, center, and don't know main effects and interaction terms indicated that they are not significantly different from one another. Therefore, to simplify the model, political beliefs is reduced to left versus right/center/don't know.

crime areas. The probablity of last month marijuana use increases from 3.6 percent at the 10^{th} percentile of homicide rate to 7.1 percent at the 90^{th} percentile.

The final two mediating variables are drug-related and support past empirical results. Perceived dangerousness of marijuana has a large effect on the probability of last month marijuana use. The negative coefficient shows that the more dangerous one views marijuana use, the less likely last month use becomes. Holding the other variables constant at the mean, the probability of last month marijuana for young people who view marijuana as not at all dangerous use is 21.0 percent. For those whose opinion is that marijuana is very dangerous, the chances of last month marijuana use are quite low at 0.7 percent.

As past research shows, one of the most robust findings in substance use research is the influence of friends' use on personal use. This study is no exception, with those who know a marijuana user about 4.1 times as likely to have used marijuana ($e^{1.4091}$ = 4.09), at average homicide rates and controlling for the other variables. This effect varies, however, by the regional homicide rate. The probability between those who do and do not know someone who uses marijuana diverges across regions with increasingly higher homicide rates, such that there is an increase in the probability for those who know a marijuana user. At the 10^{th} percentile for regional homicide rate, the probability of last month marijuana use is 4.6 percent, while at the 90^{th} percentile the probability is 6.9 percent. Thus, knowing a marijuana user has a differing effect in high violent crime regions compared to low violent crime regions. Knowing a marijuana user in an area high in violent crime results in higher probabilities of last month marijuana use. It is possible

that this effect is due to urbanicity, but other measures that would indicate an effect of urban areas, such as population density, did not exhibit this same effect.

As described above, random effects were also entered into the model. The significant random effects are shown in Table 20 at the bottom of the table. Only the variance components are shown, but covariances are discussed where of importance. First, the regional intercept varies randomly, indicating significant variation in last month marijuana use across the 190 regions in the model. Specifically, the regional level intercept has a standard deviation of 0.774 among the regions ($\sqrt{0.5990} = 0.744$). Further, while male and marijuana danger do not vary by any of the regional characteristics tested in the model, these two measures vary randomly across regions. Thus, the effect of gender and marijuana danger on last month marijuana use vary depending upon the region in which the respondent resides, though not systematically with any of the characteristics of the region.

For example, the fixed effect coefficient for gender is estimated to be 0.581 with a standard deviation of 0.786 among the regions ($\sqrt{0.6174} = 0.786$). Supporting a long line of empirical research, the coefficient for males shows that they are about 79 percent more likely to have used marijuana in the last month than females ($100\% * (1 - e^{0.5808}) = 78.7\%$). Holding all the other variables in the model constant at the mean, males have a probability of last month marijuana use of 0.046, while the probability for females is about half that at 0.026. The standard deviation, however, shows that there is some variation in the regions around these estimates. There is also quite high positive correlation (0.754) between the coefficients for male and marijuana danger in their effect

on last month marijuana use. Finally, in addition to varying by regional homicide rate, political orientation also varies randomly across the regions. These findings lend further support for moving beyond the individualized outlook on substance use and taking into account the differences of context, as the effects vary across region.

As a further example, Figure 23 shows the effect of left political beliefs in a random draw of 16 of the 190 regions in this analysis. The figure shows the variability in the effect of political beliefs across regions that is captured in the random effect. That is, the effect of political beliefs ranges from almost no effect to a quite large effect when examining the slopes. The level of the lines in the graph also depicts the significant variability in the region level intercept. The flat line among region level numbers 304 and 328, corresponding to Tübingen, Germany and Arnsberg, Germany respectively, shows little effect of political beliefs in these regions. Large differences, however, exist in region level numbers 315 (Hamburg, Germany), 714 (Poitou-Charentes, France), 720 (Languedoc-Roussillon, France), and 1008 (Noord-Holland, Netherlands). Note that Hamburg and Noord-Holland are composed of large cities, with the latter containing Amsterdam. Though this is a random draw, it still illustrates the idea of the significant random slopes.

[Figure 23 here.]

The estimate for the random effects for the country level intercept is small (0.028) and is not statistically significant according to a chi-squared test, though this was not the case in models before the country level effects were added. In a model without country level effects, this country-level variance was 0.361. This change indicates that the country level effects in the model explain any random variation in last month marijuana

use between the EU-15 countries. In support of neoinstitutionalism, this result lends credence to the importance of observing national level characteristics, as it is these systematic differences that explain behavior, rather than some inherent characteristic of the country itself. Additionally, no individual level or regional level effects varied significantly at the country level. While this is in part due to the small number of degrees of freedom at the country level, it may also be due to an overall homogeneity of these effects within the EU-15 for the regions, while significant individual level variation occurs at the regional level rather than the country level.

Before moving on to use of a drug other than marijuana, I summarize the results of the last month marijuana use model. As hypothesized above, the legal context in which individuals are surrounded makes a difference in last month marijuana use. As drug arrests for sale or possession increase, so does the probability of an individual's use of marijuana, but particularly for regions with low GDP growth. This result matches the expected direction outlined in the previous chapter, as such enforcement goes counter to the trend in EU drug policy to concentrate less on prosecuting low level offenses and diverts resources away from trafficking violations. As noted in the expectations, the causal direction should be taken cautiously, but the multilevel design adds some strength to the direction, as individual choices to use most likely do not affect aggregate arrests directly. Nonetheless, these effects are associational in nature and should be interpreted as such. Second, the number of citizens in drug substitution programs is associated with higher odds of last month marijuana use among those aged 15 to 24. I defer discussion of this effect for after the next model presented below. Finally, though there is significant

random variation at the regional level, such variation at the country level is explained by the fixed effects in the model.

As described above, the model really centers on the effect of education level, which varied significantly across the three regional characteristics of GDP growth, youth population, and population density. In general and as past research has shown, those with a tertiary education have the lowest odds of last month marijuana use, followed by those who are still a student and those with some college education. Those with only secondary education or less, have the highest odds, but these odds increase greatly with youth population and decrease with GDP growth. For the group with some postsecondary education, the odds of use increase with population density, as does the odds for those with tertiary education. These findings lend support to both strain theory and social disorganization, while also adding a new component of their interaction with characteristics of the individual. The model showed that urbanicity mattered most for those in higher education categories, while economic conditions drive use among the lowest category.

Perceived dangerousness of marijuana and gender had the effects expected from past research, with females and those who view marijuana as more dangerous less likely to have used marijuana in the last month. While these effects did not vary by specific regional characteristics, their effects still vary randomly by region and they are highly correlated with one another in their effect on marijuana use. Supporting most research in the learning theory tradition, knowing a marijuana user significantly increases one's odds of last month marijuana use. A new result from this model is that this effect varies by the homicide rate of the region in which one lives. Specifically, for those who know a

marijuana user the odds of marijuana use increases as the homicide rate increases. Regional net migration also has an effect on marijuana use, but specifically for those in the household of professionals and management and those not working. At low net migration, this measure of occupational prestige makes no differences, but the odds increase with net migration for the two aforementioned groups. As social disorganization theory would predict, a high influx of immigrants affects delinquency, but most for those who are in a household of an unemployed individual.

Lifetime Use of a Drug Other Than Marijuana

Using the same approach, the next outcome is use of a drug other than marijuana, referred to in this section as simply "use of a drug." Use of another drug is a rare event, with only 8.8 percent reporting such use in the EU-15. For this reason and in line with past research of substance use, any use of a drug is predicted rather than over the last month, for which only 2.7 percent responded in the affirmative. In what follows, effects must be interpreted with care in cases where it is possible that the drug use preceded the predictor. Again, if the outcome is momentarily used in a hierarchical linear model, most of the variance is at the individual level at 73.3 percent, with 17.5 percent at the regional level and 9.2 percent at the country level. Due to missing data on at least one predictor, 2.4 percent of respondents are not included in the final model, though no regions are excluded due to missing regional data.

As shown in Table 21, there are fewer significant variables in the full model for drug use compared to marijuana use, mostly due to fewer interaction terms. The variables that were significant in random intercept models individually, but were not significant in

the full model include marital status[13], student versus non-student[14], household income, community type, and ease of obtaining drugs. Similarly, percentage of adults with higher education was significant when entering the regional level variables, but was not significant in the full model, nor had any significant interactive effects. The same was true of the country level variable for drug arrests. The equations for the final model are shown in Appendix 2.

[Table 21 here.]

Beginning again with drug policy measures, Table 21 shows that variation in national drug policy law enforcement and implementation affects individual level probabilities of drug use. First, the drug seizures factor has a significant positive effect, indicating that in countries with higher drug seizures, there is a higher probability of individuals aged 15 to 24 having used a drug. For example, at the lowest value of the seizures in Luxembourg, the predicted probability, holding all other variables constant at the mean, is about 2.4 percent. On the other hand, in the United Kingdom, which is highest for seizures, the predicted probability is about 7.2 percent. In the previous section, it was noted that the United Kingdom has the highest rate of lifetime drug use among the EU-15.

Second, the treatment rate has a significant negative effect. Thus, in countries with more individuals enrolled in drug treatment programs, the youth and young adults are less likely to have used drugs. For example, Italy has the most individuals enrolled in treatment at 278.3 per 100,000, which corresponds to a probability of drug use of about

[13] Specifically, partnered had a higher probability of drug use than the other two groups.
[14] The comparisons between the three education levels and between working and unemployed were not significant. For each, only the comparison to student was significant, with students having lower probabilities of drug use.

1.1 percent among those aged 15 to 24, holding all other variables constant at the mean. Recall that Italy was second only to Greece in having the lowest level of lifetime drug use. Thus, among the country level predictors, the variable corresponding to increased law enforcement is associated with higher levels of drug use, while higher values on the rehabilitative measure are associated with lower levels of drug use. While the latter supports the expectation in the previous chapter, it appears that enforcement strategies are not having the intended effect.[15]

While education was the centerpiece of the individual and regional effects in the marijuana model, the drug-related measures are central to predicting drug use. Of the six individual level variables retained in the full model in Table 21, two did not vary by regional characteristics, both of which are drug-related predictors. First, knowing a drug user increases the odds of personal use of a drug by about 8.3 times ($e^{2.115} = 8.2906$). Controlling the other predictors at the mean, the probability for use of a drug for someone who does not know a drug user is about 1.2 percent, while for those who do know such a person, the probability is 8.9 percent. Again, this finding supports the robust empirical conclusion of the influence of peers' drug use on personal use.

Additionally supportive of past individual level studies of drug use is the result for cocaine danger. As mentioned above, cocaine danger was dichotomized into very/fairly and not very/not at all due to skewness. Perceiving cocaine to be very or fairly dangerous decreases the odds of drug use by about 80.3 percent, with those in this category having a probability of use of about 2.8 percent. By comparison, those who

[15] Without longitudinal data, it is not possible to rule out that this association does not occur in the opposite direction. That is, seizures are higher because of higher levels of substance use. Thus, some level of caution is necessary in interpreting these results.

respond not very or not at all dangerous have a probability of drug use of about 13.0 percent. Recall that, for reasons described above, cocaine danger was used as the predictor. Similar effects were observed for dangerousness of ecstasy, LSD, and amphetamines. Dangerousness of heroin and crack cocaine were not significantly predictive of drug use, but little variation exists on these two measures compared to the other four measures of perceived dangerousness.

Another drug-related predictor, ease of obtaining drugs, was also significant, but additionally varied significantly by regional population density. At the average value of population density and controlling for the other variables, those who believe drugs are easy to obtain are 8.7 times as likely to have used drugs compared to those who do not believe this to be true. For those who believe that drugs are easy to obtain, the probability of drug use increases with regional population density. Across the range of population density from the 10^{th} to the 90^{th} percentile, the probability of drug use for someone who believes drugs are easy to obtain has a modest increase from 3.1 percent to 4.5 percent. Thus, this social disorganization measure of urbanicity is indeed important, but becomes increasingly salient for those who can easily obtain drugs. The probability of use for someone who does not believe drugs are easy to obtain is quite low (below 1 percent) across population density. Such a finding regarding the effect of easily obtaining drugs has not been found in the American research, but appears here in the European context.

These three results should be cautiously interpreted, as they may be a result of drug use rather than occurring strictly before it. That is, cocaine may be viewed as less dangerous, drugs perceived as easier to obtain, and associations created with those who use drugs after personal drug use when considered as lifetime use rather than last month.

These results, however, are similar to past studies of substance use. They also are similar to the results discussed above for last month marijuana use. The causal direction of these relationships is also well established by research, such that use is a result of opinions (Bachman et al. 2002; Bachman et al. 1998; Bachman et al. 1990). Further, in the same model run for the last month use of a drug other than marijuana, these three variables maintain their significant effects and the same direction. Thus, the results appear to be robust.

Two of the other individual level variables in the final model are demographic characteristics and both vary by regional characteristics. First, as found with marijuana, the effect of gender is significant. Concentrating momentarily on the main effect, males are about 31 percent more likely to have used drugs. Unlike marijuana, however, the effect on drug use varies by regional population density, as shown in Figure 24. This variation, however, is only in the case of males, for whom the odds of drug use increases with population density from 2.8 percent at the 10^{th} percentile to 4.2 percent at the 90^{th} percentile. Interestingly, in regions with low population density, there is virtually no difference in the odds of use for males and females. Further, the odds for females are roughly constant across population density at about 2.5 percent. Thus, the difference between males and females is only apparent in more densely populated areas, where males are more likely to have used drugs, supporting this central component of social disorganization in a gender-specific way.

[Figure 24 here.]

As would be expected from life course research and criminological research more generally, the odds of drug use increase with age, here ranging from 15 to 24. In a finding

not in this previous research, the effect of age varies by the youth population. Though those who are older are always more likely to have used drugs, the odds of use are higher for the youngest respondents in regions with a higher youth population. This effect, however, flattens out by about age 20, with the youth population having no effect on drug use. Thus, the cultural effect of being surrounded by more youth and young adults is particularly salient for those younger respondents.

In the expectations in the previous chapter, it was noted that the effect of being the head of a household for an individual in this young age range is unknown. If this is viewed as a responsibility similar to a social bond, it would be expected to decrease drug use. If it is indicative of new freedoms as one is no longer in the parents' household, it would be expected to increase drug use. The results in Table 21 indicate that this depends on the surroundings in which these individuals find themselves. For both those that responded that they were the head of their household and those that did not, the odds of drug use increases as regional net migration increases. But, as shown in Figure 25, the probability of use increases more steeply for those that are the head of their household. For those in this category, the probability of drug use increases from 2.1 percent to 5.9 percent from the 10^{th} to 90^{th} percentile of net migration, while for those that are not the head of the household, the probability only increases from 2.1 percent to 3.7 percent. While being the head of a household might seem like a position that would decrease the odds of drug use due to potential bonds that may be necessary to be in such a position, it is clear that being the head of a household within the ages in the sample means something different than for a sample with older adults. As mentioned above, of those who say they are head of their household, 44.2 percent are in the lowest income quartile and only 9.7

percent report that their job is a professional or management position. Given these associations, the results for drug use are not surprising. Those who are young adults living on their own in areas of high in-migration are most likely to have used a drug. This facet of social disorganization theory is also specific to a particular group of young adults, namely those that are experiencing a new freedom of being on their own.

[Figure 25 here.]

As with marijuana, the random effect for the regional intercept term indicates significant regional variation on drug use. That is, there is high correlation among the responses to drug use for the individuals within a region. In other words, individuals within a region are likely to reply similarly. Random effects were also significant for knowing a drug user and gender. As with marijuana, the effect of gender varies across regions, indicating different slopes for gender in the various regions. The lack of a random effect for the other variables in the model is evidence that these predictors are constant across regions.

These significant random effects indicate that the slopes for these measures vary across the regions in the sample. As an example similar to what was shown for last month marijuana use, Figure 26 shows the effect of gender in a random draw of 16 of the 192 regions in this analysis. The figure shows the variability in the effect of gender across regions that is captured in the random effect. That is, the effect of gender ranges from almost no effect to a large effect by examining the slopes. Again, the level of the lines in the graph also depicts the significant variability in the region level intercept. The flat line among region level numbers 610 (Castilla-La Manch, Spain), 1206 (Açores, Portugal), and 1303 (Länsi-Suomi, Finland) shows little effect of gender in these regions. Large

gender differences, however, exist in region level numbers 312 (Berlin, Germany), 314 (Bremen, Germany), and 608 (Madrid, Spain). These three regions all contain large cities, which should come as no surprise given the significant interaction of gender and regional population density in this model.

[Figure 26 here.]

Again similar to marijuana, the random effect for the country level effect is quite low and insignificant according to a chi-squared test. With caution taken as to the small number of countries, this result indicates homogeneity amongst the countries in the EU-15. Again, this parameter became insignificant with the addition of the country level effects. In the model without these country level effects, this random effect was equal to 0.299 ($p < .001$). When country level effects are added, the value is 0.010. This change indicates that the country level effects in the model explain any variation in drug use between the EU-15 countries, again pointing to the explanatory power of the drug policy measures. Also, no individual or regional level effects varied randomly by country, again indicating homogeneity of the regional effects across countries and the individual effects across countries, though with the regional variation on the latter noted above.

Again, I pause to summarize the findings pertaining to drug use. Through their significant associations, the importance of country level drug policy measures was again demonstrated. Higher seizures, which indicate increased law enforcement, are associated with higher levels of drug use, while higher values on the rehabilitative measure of the treatment rate are associated with lower levels of drug use. The former goes counter to the intended efforts to reduce supply as outlined in the EU drug action plans. It could be that seizures are indicative of a large drug supply and it is this availability in those

countries that is driving individual level use. The treatment rate, however, does follow the expectations outlined in the previous chapter. Where more individuals pursue treatment, the probability of substance use among the youth and young adults is lower. Note that the latter is opposite in direction from the effect of the substitution rate found for last month marijuana use. Substitution programs may be more unique in their effect, sending a message that some forms of substance use are alright, just not harder drug use. Further, marijuana and "harder" drugs may be unique phenomena, such that measures such as treatment and substitution can affect use in differing ways.

Drug-related predictors played a large role in explaining youth and young adult drug use in the EU-15. Knowing a drug user greatly increased the odds of drug use, while considering cocaine to be very or fairly dangerous greatly decreased the odds. Further, the effect of the former varied across regions, while the effect of the latter is constant across regions. Also, the opinion that drugs are easy to obtain increases the odds of drug use compared to those who say they are not easy to obtain. But, for those who believe they are easy to obtain, the odds of use increases the higher the regional population density. Though this last result adds something new to the way criminologists think about drug use by showing the specific individual circumstances in which social disorganization measures play out, the main effects of these drug-related variables are similar to past studies of substance use, where the causal direction of the effect of these measures on use are well established (Bachman et al. 2002; Bachman et al. 1998; Bachman et al. 1990).

Individual demographic characteristics also played a part in the model. The difference between males and females on drug use is only apparent in regions with higher

population densities. At the lowest population density values, there is no difference in the odds of drug use for males and females. This probability remains constant for females, but increases for males as the population density increases, indicating a gender-specific effect of this central component of social disorganization. Thus, while much emphasis has been put on the higher odds of male use of drugs compared to females, this effect should be interpreted differently in light of this interaction with population density. In addition to this variation by population density, the effect of gender also varies randomly across regions. Next, the older an individual is in this age category, the more likely they are to have used drugs. For the youngest, however, these odds increase with the youth population in the region. Finally, the probability of drug use increases with regional net migration, but more quickly for those who consider themselves the head of their household. As described above, this result indicates that for young adults living on their own in places of high in-migration, the odds of drug use are the highest, showing support for the idea that new freedoms in early adulthood increase the odds of drug use.

Regularly Smoke Cigarettes

In order to compare the different multilevel effects between licit and illicit substances, similar analyses are conducted for whether the respondent indicated that they "regularly smoke cigarettes." Cigarettes also offer an interesting comparison because of the variation in the legal culture surrounding tobacco in the EU-15 countries. Thus, instead of country-level variables that measure the legal circumstances of licit substances, indicators are used that measure the laws pertaining to tobacco. As described in the previous chapter, these variables are whether there is a minimum purchase age for

tobacco products, the status of smoking bans in restaurants and pubs, whether the country has a tobacco action plan, and the economic indicator of the cost of cigarettes. Due to missing values on one or more predictors, 1.4 percent of the sample is dropped from these models, though all 192 regions are included. Again, if a linear model is momentarily used for exploratory purposes, the overwhelming majority of the variance is at the individual level at 97.8 percent, with only 0.9 percent and 1.3 percent at the regional and country levels, respectively.

The results of the final model for regularly smoking cigarettes are shown in Table 22. Starting with the country-level variables, each of the above measures are in the model in some form except for whether the country has a smoking ban, either in restaurants or pubs and bars. There was a significant interaction between income and bans in restaurants, such that those below the median in countries with no bans had the highest rates of smoking, but this effect was not significant in the full model with the other country-level effects. In addition, at the individual level, the respondent's employment status, whether they were the head of household, occupation of the head of household, and community type were each significant in models alone, but were not significant throughout a stepwise elimination procedure and are thus not in the final model. The equations for the final model are shown in Appendix 3.

[Table 22 here.]

The results for cigarettes again support the importance of placing individuals within a national legal context. Whereas the drug models showed the impact of enforcement and service availability, the cigarette model shows that in a realm where variation exists in the laws themselves, this variation is important in explaining individual

level behavior. Turning to the model in Table 22, a minimum purchase age for tobacco has a significant effect on an individual's probability of smoking regularly. If the country has no minimum purchase age, the odds of an individual smoking regularly is increased by about 41.9 percent. The comparison between countries with purchase ages of 16 and 18 was not statistically significant, though the effect was in the expected direction where countries with age 18 have the lowest probability, followed by age 16. Whereas this effect was unclear in the last chapter when examining the aggregated smoking rates, the effect of having no minimum smoking age is in the expected direction when controlling for the other variables in the model.

There is one cross-level interaction between the country level and the regional level, namely between population density and whether the country has a National Tobacco Control Action Plan. Figure 27 shows this relationship graphically, holding the other variables constant at the mean. For countries that have no tobacco action plan, the probability of youth and young adults smoking regularly increases with regional population density. On the other hand, this probability decreases slightly with population density for countries with a Plan. Why might this be the case? In general, substance use would be expected to increase with population density, such that more urban areas have higher smoking rates. If a country has a tobacco action plan, however, we would expect the bulk of the anti-smoking media to be in the most densely populated areas. The model shows a slight payoff to such plans, especially in urban areas. In the most densely populated areas, the probability of smoking in a country with a plan is 32.9 percent, while in countries without a plan the probability is 41.2 percent.

[Figure 27 here.]

Unlike in the models for marijuana and other drugs, a cross-level interaction is observed between a national policy measure and an individual level characteristic. The relationship between cigarettes cost and cigarettes danger is shown is Figure 28 using the 1st and 3rd quartiles of cigarette cost. As would be expected, the probability of smoking decreases with increasing opinions of dangerousness. The figure also shows, though, that when youth and young adults view cigarettes and tobacco as not at all dangerous, the probability of regular cigarette use is conditioned on the cost of cigarettes. Thus, there is some support for economic theories of crime, but particularly where the state contributes directly to the cost of the substance as is the case with cigarettes. For those of this opinion, the probability of regularly smoking cigarettes is 49.6 percent where cigarettes are more expensive (the 3rd quartile) and 55.6 percent where cigarettes are cheaper (the 1st quartile). When individuals are of the opinion that cigarettes and tobacco are fairly or very dangerous, the probability is low regardless of the price. It also should be noted that for marijuana and other drugs, viewing them as very dangerous almost eliminated the possibility of use, with probabilities close to zero for this category. For cigarettes, this is not the case, with those who view cigarettes as very dangerous still having an odds of use of about 21.0 percent, meaning that it is possible to know that cigarettes are dangerous yet still use them regularly.

[Figure 28 here.]

Figure 29 shows the interaction between gender and population density. The probability of regularly smoking cigarettes for males is roughly constant at about .380. For females, however, this probability increases across population density, with probabilities of 30.1 percent at the 10th percentile and 35.0 percent at the 90th percentile.

Thus, the difference between males and females is largest at low population densities, where males are more likely to smoke. The difference between males and females become negligible at the highest population densities. This was the opposite effect seen with use of a drug other than marijuana, where females were at a constant low, males had increasing probabilities as population densities increased, and there was no difference at low population densities. This finding lends further support to the gender-specific effects of concepts from social disorganization. The effects are not only gender-specific, but the differences between this and the previous model also show that they are substance-specific.

[Figure 29 here.]

The final interaction effect in this model is an interaction between marital status and GDP growth. As Figure 30 shows, those who are not married have higher odds of smoking regularly than those that are married.[16] The odds for those who are not married is roughly constant across increases in regional GDP growth. The probability of smoking regularly this group is about 0.355. For young adults who are married, the probability of smoking regularly is less than the unmarried youth, but decreases as the GDP growth of the region increases. At the 10^{th} percentile, the probability of smoking regularly for married individuals is about 33.1 percent, but decreases to 14.4 percent at the 90^{th} percentile. Thus, in regions with high growth in wealth, those young adults who are married are even less likely to smoke regularly, showing strong support for this social bond, but particularly in wealthier regions as would be hypothesized by social

[16] The comparison among those who said they were unmarried, but partnered and those unmarried and unpartnered was not significant.

disorganization.[17] Thus, the effect of the bond of marriage is, in a sense, overridden by the effect of being in an area with little economic growth.

[Figure 30 here.]

At the individual level, age, household income, and education level did not have any significant cross-level interactions. In line with the expectations outlined above, regular smoking increases with age for this young group of respondents. At age 15, the probability of smoking regularly is about 30.4 percent. At age 24, however, this probability increases to about 41.8 percent. For household income, those above the median are about 17.3 percent less likely to smoke regularly. The probability of smoking regularly, holding other variables constant at the mean, is about 39.4 percent for below the median and 33.3 percent for above the median.[18]

Finally, education level was significant and closely follows the expected outcomes from past research by the Monitoring the Future researchers. Here, we see a distinction between those students in high school and those in college. Those that have tertiary education or higher or are still college students have an odds of regularly smoking 47.2 percent higher than high school students, while those with some postsecondary education or secondary or less are about 2.5 times more likely than high school students

[17] The country level variables pertaining to licit substances were also entered into the cigarette model for consistency. These variables were not statistically significant, with one exception (model not shown). There was a significant interaction between the treatment rate and gender. The probability of regularly smoking cigarettes decreases as more individuals are in drug treatment, but the decrease is slightly more dramatic for females. Thus, in countries with high levels of drug rehabilitation, the youth and young adults are less likely to regularly use the licit substance of cigarettes, with this effect especially pronounced for females.

[18] In order to simplify the model as much as possible, this comparison between above and below the median was used instead of quartiles since the comparison between the 1st and 2nd quartile was not statistically significant and very close in magnitude, as was the comparison between the 3rd and 4th quartiles.

to smoke.[19] This translates to a probability of regularly smoking cigarettes of 0.511 for those with secondary and some postsecondary education, 0.382 for those with tertiary education and those still in college, and 0.296 for high school students.

In general for regularly smoking cigarettes, individual level variables did not vary by specific regional characteristics. The only exceptions were the probabilities for females across population density and those who are married across GDP growth. Most of the individual level effects, however, do vary randomly across regions, which differs from the illicit substances models where only a few variables did. The only exception in the cigarette model not varying randomly across region is the effect of marital status. Thus, the effects of the individual level variables besides marital status are different from region to region, implying greater geographic variability in the effect of these variables on cigarette use compared to marijuana and other drugs. For example, the fixed effect coefficient for age is estimated to be 0.062 with a standard deviation of 0.069 among the regions ($\sqrt{0.0048} = 0.069$). Also unlike the illicit substance models, the country-level fixed effects did not explain all the between-country variation. Thus, the estimate of the country level intercept has a standard deviation of 0.226 among the countries in the EU-15. None of the slopes, however, vary at the country level, as was the case for the illicit substance models.

To summarize, this model provides evidence that the legal culture surrounding cigarette smoking impacts youth and young adult smoking habits. A main effect was

[19] As with household income, this reduced form of education level was used since the comparison between those with some postsecondary education and those with secondary or less was not statistically significant and very close in magnitude, as was the comparison between those with tertiary education or higher and those that are still college students.

found showing that in countries with no minimum tobacco purchase age, youth and young adults are more likely to smoke regularly. Further, in countries with no tobacco action plan, the odds of youth and young adults smoking cigarettes regularly is higher in more densely populated areas. In countries where there is such a plan, however, the probability of smoking regularly is lower in more densely populated regions where such media campaigns are likely to be focused. Thus, the effect of urbanicity has the expected effect from social disorganization in countries with no tobacco action plan. Though associational in nature due to the cross-sectional design of the survey, the effect in countries with a plan shows that the effect of living in an urban area may be countered by effective anti-smoking campaigns. Finally, while the probability of smoking decreases among those who view tobacco and cigarettes as more dangerous, the probability of smoking regularly for those who view tobacco as not at all dangerous is higher in countries with lower cigarette prices. While economic theories were not supported for the illicit substances, they find support where the state contributes to price control, a finding more in line with traditional economic theories of crime. It is also noteworthy that viewing cigarettes and tobacco as very dangerous does not, in a sense, negate the possibility of smoking regularly as was seen above with marijuana and other drugs.

The individual and regional level interactions continued to show the importance of interpreting social disorganization concepts as specific to particular groups of individuals. They also demonstrated the need to understand individual level effects as conditioned by context. Married young adults have a lower probability of smoking regularly compared to those who are not married and this probability decreases in more wealthy regions as measured by the region's GDP growth. Thus, the salience of this bond

is counteracted by living in an area with little economic growth. The odds of smoking regularly for females increases with regional population density, such that at high population densities the probability for females is almost equal to that of males, while at low population densities males have higher odds. This effect is different for what was observed for drugs, indicating that the effect of urbanicity is both gender-specific and substance-specific.

For the other individual level effects, the results followed directly from the expectations from past research. The probability of smoking regularly increased with age for this group of 15 to 24 year olds, was lower for those whose household is above the median on income, and was lower for high school students, followed by those with tertiary education or higher and college students. Those with secondary education or less and some postsecondary education had the highest levels of regular smoking.

Unlike marijuana and other drugs where several individual level effects varied by specific regional characteristics, only the effects for females and married individuals vary by regional measures for smoking regularly. On the other hand, all the individual level variables, except for marital status, vary randomly across regions. Further, the random effect for the country level intercept is significant, indicating variation in the values across the EU-15. Though the models cannot speak to this directly, one possible reason for these differences in the impact of regional level measures may be due to the diffuse nature of cigarette smoking. The probability of smoking regularly appears to be more related to where in particular a person is from rather than common structural characteristics across regions, indicating the possibility of a more local cultural component to cigarette smoking compared to the licit measures.

Chapter Conclusion

The models above show that substance use cannot truly be understood without taking into account variation at the country, regional, and individual level. While many of the expected relationships at the individual and regional levels based on criminological theory and empirical research held in this multilevel context, the results also necessitate a new way of thinking about contextual effects and their relationship to substance use. Two general findings are worth highlighting, while keeping in mind the cross-sectional design of the study, which lends caution to interpreting the results as causal. First, even with such low degrees of freedom and a sample of countries that are homogenous in many ways, significant relationships between substance use and country level measures of the legal culture surrounding those substances were still uncovered. For example, the more visible police actions are against everyday drug users in the form of drug offenses for possession and sale, the more likely youth and young adults are to have used marijuana in the last month, but especially in areas of decreasing GDP. Also, rehabilitative measures such as drug treatment were found to decrease the probability of youth and young adults having ever used a drug other than marijuana. Even when the focus was shifted to licit substances like cigarettes, the legal environment surrounding tobacco exhibits a significant effect. Individuals in countries with no minimum tobacco purchase age were found to have higher probabilities of smoking regularly, while national anti-tobacco measures were found to decrease this probability, especially in densely populated areas. The latter shows that such campaigns can counteract the detrimental effects of living in a more urban environment. Much effort was spent arguing for the existence of national

level variation on drug policy in the EU-15, and these models show that that variation does indeed make a difference in individual level substance use. These findings support variants of neoinstitutionalism that emphasize the importance of the effect of national level cultural scripts on individual behavior.

The second theme worth highlighting is that many individual level characteristics are conditioned by the immediate demographic and economic surroundings in which the individual is located. No main effects of the components that are central to social disorganization emerged in the models. Rather, the effects of these measures depend upon the characteristics of the individuals that are subject to them. Several examples were noted above. The effects of several social disorganization measures on marijuana use were dependent on education level, with these measures particularly salient for those with low levels of education. In some respects, these results may even support a strain theory interpretation by showing how the effect of structural economic deprivation is most significant for those in of low socioeconomic status. The effect of urbanicity was shown to be both gender-specific and substance-specific, indicating the need for a more nuanced understanding of both gender and urbanicity. The salience of social bonds such as marriage can even be countered by economic conditions.

This chapter highlighted the multilevel predictors of youth and young adult substance use. Both behavior and opinions are central to neoinstitutionalism, as both are hypothesized to be influenced by broader cultural scripts as these provide templates within which individuals view the world. In the next chapter, the focus is shifted to what influences how this same sample of young people come to form opinions on how best to deal with issues of substance use. The same predictors, as well as substance use itself,

will be used to uncover how young people in the EU-15 feel about how best to reduce substance use.

CHAPTER 5: YOUTH AND YOUNG ADULT OPINIONS ON DRUG POLICY

In this chapter, the focus is shifted from understanding youth substance use in a broader context to what influences youth and young adult opinions on drug policy in the EU-15. Both Kikuzawa et al. (2008) and Boyle (2002) argue from a neoinstitutional standpoint that opinions are tied to national level characteristics. For example, Kikuzawa et al. (2008) show that the type of health care system aligned closely with individual level opinions on government health care expenditures. Boyle (2002) also found that opinions on female genital cutting strongly followed institutional pressures to define this activity as negative. In some cases, these opinions ran counter to individual behavior, as they remained involved in the practice while simultaneously voicing opinions against it. Thus, in addition to the multilevel predictors in the previous chapter, substance use itself becomes important in understanding opinion formation. As will be shown, it is one of the main predictors of youth and young adult opinions. Beyond the individual and their immediate surroundings, this chapter will show that the broader legal culture cannot be ignored when trying to understand opinion formation on law. Each of these levels are important to understanding opinions and behavior (Boyle 2002). Similar to Kikuzawa et al.'s (2002) modeling of health care, the models test whether individuals in more punitive or more rehabilitative legal environments tend to lean in that same direction even after controlling for individual and regional level fixed and random effects.

Hierarchical Linear Models for a Scale of Legal versus Social and Rehabilitative Drug Policy

As described above, the outcome variable in this chapter is constructed from a series of choices under the lead question, "What do you think are the most effective ways of tackling drug-related problems?" Three choices reflected increased punitiveness: tougher measures against drug producers and manufacturers, tougher measures against drug dealers and traffickers, and tougher measures against drug users. Four choices reflected increased social or rehabilitative measures: more treatment and rehabilitation of drug users, information campaigns, reducing poverty/unemployment, and more leisure activities. Respondents were asked to choose up to 3 choices. For the scale, legal measures were assigned a -1, while social and rehabilitative measures were assigned a 1. A respondent's choices were then summed. Thus, the outcome variable is a scale that ranges from -3 to 3, with negative values indicating a preference for penal strategies and positive values indicating a preference for social and rehabilitative strategies. Throughout this chapter, this outcome is referred to simply as the "drug policy opinion scale." For several reasons described above, including an odd distribution and a low alpha partially due to the ability to only check off three choices, there may be cause for concern with the scale. These concerns are addressed in the next section on diagnostics and robustness.

The modeling strategy proceeds as in the previous chapter, with one exception. The model comparison tests for the random effects utilize log-likelihood tests between models, which is only available in HLM for linear outcomes. As discussed above, this method is admittedly better, since there is some contention about whether the univariate tests for the random effects exactly follow a chi-square distribution (Pinheiro and Bates 2004; Raudenbush and Bryk 2001:283-4). The biggest advantage to these log-likelihood

tests is the ability to conduct mulitparameter hypothesis testing for nested models with changes in both fixed and random effects.

While the justification for the national level predictors falls nicely within the theory of neoinstitutionalism, the theoretical and empirical connection between the individual and regional level predictors included in these analyses and opinions on substance use are less well established than with the behavior of substance use. As outlined in the expectations in Chapter 3, Kikizawa et al. (2008) found support for many of the individual level demographic and background measures in their multilevel study of public support for government's role in health care. Neoinstitutionalism is also interested in the (mis)alignment of behavior and opinions (Boyle 2000). Therefore, I use the same set of measures as in the previous chapter, but adding experience with substance use.

Before discussing the results of the final model predicting the drug policy scale, I pause to discuss the unconditional model, or the model with no predictors, in order to understand the variance decomposition between the three levels of data. According to the model, 94.8 percent of the variance in the scale is at the individual level ($\sigma^2 = 2.4879$). By contrast, an equal 2.6 percent of the variance is at each of the regional level (0.0693) and country level (0.0681). Thus, when it comes to youth and young adults opinions on drug policy in the EU-15, most of the variance to be explained is between individuals. The intercept in this unconditional model indicates that the average value on the scale is about 0.0445 after controlling for regional and country level variation, a value that is not significantly different from zero. In the final model, 12.6 percent of the variability at the individual level is explained by the predictors.

Table 23 shows the final results of a hierarchical linear model predicting the drug policy opinion scale. The equations for the final model are shown in Appendix 4. Perhaps most surprising is the lack of individual level variables that were not significant even in models alone. Marital status, employment status, age, community type, knowing a drug user, and ease of obtaining drugs were all not statistically significant as sole predictors in the model. The only individual level variables that were eliminated from the full model because model comparisons indicated they could be dropped were head of household status, HH occupation, and knowing a marijuana user.

[Table 23 here.]

Turning to Table 23, only one country level measure was statistically significant, but the results are telling nonetheless. As the percentage of drug arrests resulting in conviction increases, the predicted value on the drug policy opinion scale decreases. Figure 31 shows this relationship across the values on this predictor. Thus, in countries that punish more of those that they arrest for drug offenses, youth and young adults are more likely to support penal measures over social and rehabilitative measures. Put more simply, youth and young adults in the EU-15 have more punitive opinions in more punitive countries. Even after controlling for individual and regional effects, the legal context in which individuals reside still plays a role in their opinion formation on drug law and policy. Individual opinions on drug policy among youth and young adults are closely tied to the extent to which individuals are punished for their drug crimes. In theory, opinions could drive country level punitiveness, particularly in a democracy where such a relationship between popular opinion and policy should exist. For this particular age cohort, however, the direct effect of their opinions and voting habits,

representing a small portion of the voting population, are less likely to drive national level police behavior. As with the findings for substance use, this effect should be taken as associational rather than causal.

[Figure 31 here.]

The model also shows that opinions are closely tied to behavior, as experience with both marijuana and other drugs influence opinions. When describing Analyses of Variance for the drug policy opinion scale, the largest impacts on the scale were related to personal experience with substance use. The model reiterates this conclusion as both ever having used marijuana and ever having used another drug are significant, even when controlling for other multilevel measures. Figure 32 shows the interaction between having used marijuana and the youth population, holding other variables constant at their respective means. Not surprisingly, those who have used marijuana are more likely to be supportive of social and rehabilitative measures than those who have not used marijuana. For the latter group, however, their value on the scale increases with the youth population. This result makes intuitive sense. Experience with marijuana results in support of more liberal policies. But when those who have not used marijuana are surrounded by lower numbers of youth and young adults, they become more supportive of penal measures. As described in the first chapter, the presence of larger numbers of youth may be representative of being surrounded by more opinions and definitions that are favorable to deviance. Like marijuana, those who have used another drug are more supportive of social and rehabilitative measures than those who have not. For those that have, however, their value on the scale increases with regional tourism. Thus, those who

have used drugs are even more supportive of social and rehabilitative measures if they live in areas with a large influx of outside visitors.

[Figure 32 here.]

Given the political nature of drug policy, it is not surprising that personal political beliefs are a significant predictor of the drug policy opinion scale, though the effect varies by GDP growth. Figure 33 depicts this relationship graphically. As also shown by the main effects, those who self-identify as leftists are most likely to support social and rehabilitative measures. Centrists and those who respond don't know are constant at about zero on the scale. Finally, those on the right are more likely to support penal measures. Interestingly, the effect of GDP growth for those in these three categories has different directions. As mentioned, those in the center and who respond don't know are roughly constant across GDP growth. The predicted value increases with GDP growth for those on the left, while it decreases for those on the right. Thus, in regions with high GDP growth, left politically oriented youth and young adults are even more likely to support social and rehabilitative measures, while right politically oriented youth are even more likely to support legal measures.

[Figure 33 here.]

The remaining individual effects are similar to those found by Kikuzawa et al.'s 2008) study of health care expenditure opinions. First, there is a significant cross-level interaction between income and GDP growth. Across the values of GDP growth, the highest predicted value on the drug policy scale, indicating a preference for social and rehabilitative measures, belongs to those in the first quartile in regions with little GDP growth. Those in the fourth quartile also in regions with little GDP growth have the

lowest values, indicating the strongest preference for penal measures. Thus, in regions with low economic growth, those in the least wealthy households are more oriented towards rehabilitation, while those in the wealthiest households are more supportive of penal measures. As for the variation among the groups across GDP growth, the first quartile decreases values on the drug policy opinion scale with increased GDP growth, while the fourth quartile increases with GDP growth. The wealthiest group, therefore, becomes less likely to support penal measures as they reside in regions high in economic growth, while the least wealthy become more likely to support such measures.

Gender and education level are the only individual level variables without cross-level interactions with the regional level. For gender, males are 0.1487 higher on the drug policy opinion scale ($p < .001$), indicating that male youth and young adults in the EU-15 are somewhat more supportive of social and rehabilitative drug policy measures. The same is true of those with tertiary education or those that are still a student compared to those with only a secondary education or some postsecondary education. Those in the former group are about 0.1973 higher on the scale compared to the latter ($p < .001$).[20] There is also one regional level variable with no cross-level interactions. Unemployment rate has a marginally significant negative relationship with the drug policy opinion scale.[21] For every one unit increase from the average regional unemployment, there is a 0.1345 decrease on the drug policy opinion scale.

[20] Similar to the effort to simplify models as much as possible in the previous chapter, this reduced form of education level was used since the comparison between those with some postsecondary education and those with secondary or less was not statistically significant and very close in magnitude, as was the comparison between those with the three categories representing tertiary education or higher, college students, and high school students.

[21] The unemployment rate was reduced to marginal significance when the random effects were added to the model.

When predicting illicit substance use, most of the fixed effects were constant across region and country, with a couple of exceptions for the cases of marijuana and other drugs. The predictors that influence opinion formation, however, appear to be highly variable across region. Of the predictors in the model, only drug use and gender are constant across region. For example, the standard deviation of the effect of past marijuana use is 0.2729 ($\sqrt{0.0745} = 0.2729$). As in the previous chapter, this variation can be examined graphically. Figure 34 shows the effect of past marijuana use in a random draw of 16 of the 192 regions in this analysis. The figure shows the variability in the effect of marijuana use across regions captured in the random effect. That is, the effect of marijuana use ranges from almost no effect to a large effect on drug policy opinions by examining the slopes. Again, the level of the lines in the graph also depicts the significant variability in the region level intercept. For example, the line is practically flat in region number 106 (West-Vlaanderen, Belgium). A steeper slope, however, exists in most of these randomly drawn regions. Similar random variability exists across region for most of the other individual level coefficients. In addition, the regional and country intercepts have significant random effects. Thus, some regions and countries have a preference for penal or social and rehabilitative measures beyond the characteristics included in the model.

[Figure 34 here.]

Diagnostics and Robustness

This section reports some diagnostics for the model above and describes the results of models with different codings of the scale to examine the robustness of the

results. First, as with any hierarchical linear modeling, the assumption of normality should be examined. Figure 35 shows a Q-Q plot for the model in Table 23. The plot is approximately linear, suggesting there is not a serious departure from a normal distribution. Further, several power transformations of the outcome scale were tried, and all failed to better satisfy this distributional assumption.

[Figure 35 here.]

The next diagnostic tool examines the influence of outliers. Figure 36 shows a boxplot of the individual level residuals. Three cases appear to be outliers. When these three cases were removed from the dataset, the results reported in Table 23 did not change. Further, 4.5 percent of cases had standardized residuals above 2 standard deviations. When these 336 cases were removed, the results reported in Table 23 again did not change. Thus, the model appears to be robust to influence from outliers.

[Figure 36 here.]

Though the results appear to be robust to distributional assumptions, additional specifications of the drug policy scale were attempted for verification. These checks also make sense in order to ensure the reliability and measurement validity of the scale. First, the same model was run where the outcome was treated as a seven category ordinal scale. Second, the same model was run where the outcome was treated as a three category ordinal scale, with categories -3 to -2, -1 to 1, and 2 to 3. In both cases, the inferential conclusions and direction of the effects remained the same.

Finally, another concern may be that the penal items and social and rehabilitative items that compose the drug policy opinion scale are different phenomena, and thus are not measuring the same thing. In such a case, the predictors that influence whether a

respondent chooses one type of item are not the same as the other type. To examine whether this may be true, Poisson hierarchical models were run, mimicking Table 23, that treated the number of penal and social and rehabilitation items chosen as separate counts. Note that due to the unequal mean and variance for these counts, an overdispersion parameter was included. The model for the count of penal items selected matched the results in Table 23 for the fixed effects, with the exception of the marginal significance of the unemployment rate. The model for the count of legal items replicated all the effects in Table 23 in terms of direction, but the main effect of the unemployment rate and the interaction between use of a drug other than marijuana and tourism were not statistically significant. In both the model for the legal items and the social and rehabilitation items, the results of chi-squared tests for the random effects are non-significant, a departure from the model in Table 23. Though the conclusions concerning the random effects might differ, it would appear that the predictors that influence choices of penal or rehabilitative items are the same for both types of items and the model in Table 23 is robust to this possibility.

Finally, in the chapter of descriptive statistics, I reported simple bivariate relationships between the predictors and the most extreme punitive case of whether users should be punished. This extreme case was also attempted as an outcome variable in a logistic hierarchical model. The model, however, became quite unwieldy, with multiple three level interactions that were not easily interpretable. Further, the models did not always converge. It is possible that the concept of "punishing" users is too variable across countries and in so many languages. Therefore, the model for the drug policy opinion

scale is only described here, with the punish users measure used for comparative descriptive purposes only.

Chapter Conclusion

This chapter explored youth and young adult opinions on drug policy by examining preferences for penal policy measures or social and rehabilitative policy measures in a hierarchical linear model. Further modeling and diagnostics found that the model is quite robust to distributional assumptions. Following Kikuzawa et al. (2008) and Boyle (2002), opinions were found to be closely tied to national level measures specific to the outcome of interest. At the country level, the percentage of drug arrests that resulted in conviction was significant, even after controlling for fixed and random effects. Those that reside in countries that punish a higher percentage of those they arrest for drug offenses are more likely to support penal measures. Thus, those in more punitive countries have more punitive opinions, though causal direction should be interpreted with caution. This measure is particularly compelling, though, given how well it represents punitiveness by measuring the proportion of arrests that are actually convicted, rather than an absolute arrest or conviction rate. This finding lends support to the idea that national level policies and enforcement provide scripts by which individual opinions form.

In predicting opinions on government health care expenditures, Kikuzawa et al. (2008) found significant individual level effects for age, gender, education, and income. With the exception of age, perhaps due to a smaller, more homogenous range, each of these variables was also significant in predicting opinions on government drug policy.

Males and the higher educated or those still students were more likely to support social and rehabilitative measures. Though males in the United States are often associated with more conservative viewpoints, it may be different in this age group in the EU-15 and for a topic such as substance use, which males are disproportionately involved with. The effect of income varied by GDP growth. In regions with little growth, those in the wealthiest household are the most conservative in their opinions, while the least wealthy are the most liberal. Further, the former become more liberal with increasing GDP growth, while the latter become more conservative.

What Kikuzawa et al. (2008) did not include in their model, but is important as shown by Boyle (2002), is individual level behavior related to the outcome. Whether it be use of marijuana or another drug, such use makes an individual less likely to support penal measures and more likely to support social and rehabilitative measures compared to those with no history of use. For those who have not used marijuana, however, their views become less oriented around penal approaches in regions with higher youth populations. These effects support calls to understand the relationship of behavior and opinions and to place individuals in local and national contexts.

Political beliefs behaved exactly as one would assume, with those on the left supporting social and rehabilitative measures, centrists and those responding "don't know" right in the middle, and those on the right supporting penal measures. Interestingly, this effect varied by GDP growth, with leftists even more liberal and rightists even more conservative in regions with economic growth. Finally, with the exception of gender and lifetime use of a drug other than marijuana, the individual level effects vary randomly across region. Unlike the illicit substance use models where most

of the individual level effects were constant across region, most of the individual level effects vary across region when it comes to opinions on handling illicit substance use. Thus, what influences opinion formation appears to be highly variable across region, in addition to variation across countries. In what follows, the results of the preceding chapters are discussed in the larger context of the literature described at the outset.

CHAPTER 6: DISCUSSION AND CONCLUSION

Discussion

The results from the analyses above lend themselves to two conclusions. First, national level legal context plays a role in understanding individual level probabilities of substance use and opinions on drug policy, even after controlling for individual and local characteristics. Second, the effects of the components of theories on the ecology of crime, namely social disorganization and strain theory, depend on the characteristics of the individuals that are experiencing them. Both levels of these contextual effects more firmly root the study of substance use, and crime more generally, within debates within sociology. By over-individualizing the study of substance use, much of what is unique to a sociological perspective is lost. These analyses demonstrate that the loss would take away some of the explanatory power of concepts that only sociology can add to this line of research.

The Importance of National Legal Context

Beginning with the first point above, one of the central unique component of this research was incorporating national level variation in the legal culture surrounding drug policy into individual level substance use outcomes. Neoinstitutionalism was used to justify the inclusion of national level measures that indicate that state variation may affect the individual level outcome of interest (Western 1997; Schofer and Fourcade-Gourinchas 2001; Boyle 2002; Amenta, Bonastia, and Caren 2001; Esping-Andersen 1999; Healy 2000; Ruiter and De Graaf 2006; Kelley and De Graaf 1997), here substance use and opinions on drug policy. Further, work in this area specific to law emphasizes the

need to think of individuals as embedded in a local context within a national legal setting (Boyle 2002). The special cases of the European Union and international substance use laws were reviewed. Both of these arenas have seen considerable recent integration and homogenization. The EU and the constitutive nation-states' drug policies were no exception. Based on work by Grattet et al. (1998) and a review of the EU-15 national drug policies, it was shown that considerable differentiation also exists. The point of the review was to argue that even as the EU homogenizes, variation still exists in policies, particularly in the realm of criminal justice and even more specifically in drug law enforcement and availability of resources for drug users.

Thus, the review set the stage to explore cross-national variation in legal culture pertaining to substance use and opinions on drug policy. Given the observational and cross-sectional nature of the data, strong causal claims cannot be made. In each substance use model, however, the variation in legal culture helped explain individual level probabilities of use even when controlling for individual and regional level characteristics. Some implications for policy emerge from these associations. For marijuana, increased enforcement of possession and sale arrests led to higher odds of last month use. This distracted attention from trafficking offenses goes counter to the trend in EU drug policy to concentrate less on prosecuting low level offenses. Thus, there may be some support for a more decriminalized outlook on these low level offenses, as countries that disproportionately arrest for these offenses have fewer users. For drugs other than marijuana, where increased treatment lowered the probability of use, the implications are clear. Increased availability of services may help lower drug use among the youth and young adult population.

For cigarette use, variation in the laws themselves was used as predictors of individual level behavior. With unambiguous policy implications, those in countries with no minimum purchase age had higher odds of regularly smoking. Since the survey was conducted, some countries in the sample have indeed moved to create a minimum age. Evidence was also shown for the effectiveness of anti-tobacco campaigns. Countries that have a campaign saw a payoff in urban areas where such campaigns are likely to be focused. Finally, unlike the illicit drugs, the cost of cigarettes affected the probability of use, but particularly for those who do not view cigarettes as dangerous. So for this group of youth and young adults who do not believe there are health disadvantages to smoking, higher prices could deter use.

Given the cross-sectional nature of the data and design, it is worth pausing to discuss causality. Without experimental or longitudinal data, strong causal claims cannot be made. For the national level measures, enforcement and services availability may actually be a result of prevalence of substance use rather than the reverse. I have attempted to remain agnostic on causality, particularly in the language with with which the effects are described, viewing these effect as associational rather than causal. The multilevel design and age of the respondents adds some strength to the findings, as their individual choice to partake in substance use most likely does not directly affect enforcement patterns and service availability or tobacco policy. Future research should incorporate longitudinal data in order to understand if changes in policy precede changes in substance use.

Though certainly not the final word, the findings contribute to the conversation on legalization and decriminalization of drugs. As nations and states look to reduce their

criminal justice expenditures, the results give promising direction for alternatives to punishment. Rehabilitative policies were related to lower hard drug use. On the other hand, increased seizures and concentrating on low level offenses were associated with higher marijuana and drug use, indicating that this approach high in resource utilization may have limited positive consequences compared to increased drug service availability. Further, the results from the cigarette model show that legal measures can be successful in lowering substance use, as both a minimum age and a higher cost for cigarettes were associated with lower use.

These effects fit squarely within the body of literature that views national and local organizations as filters for broader globalizing trends. While the neoinstitutional logic argues specifically for the top-down influence of world society, there are important national and local levels with specific socio-historical contexts that also provide cultural scripts for what behavior is acceptable or even thinkable (Dobbin 1994; Friedland and Alford 1991; Meyer et al. 1997; Thomas et al. 1987). Institutionalized cultural frames affect behavior by providing scripts, with law as a central framing device (Ewick and Silbey 1998). These frames provide a lens through which individual actors understand the world and act within it.

Boyle (2002) demonstrated that our understanding of law must be more nuanced, as nations and local traditions can outweigh policies that countries adopt despite their congruence with global trends. As Savelsberg and King (2005) describe, law enforcement is a product of the collective memory specific to a nation-state, such that international trends do not result in an abandonment of historically grounded national legal institutions. Even in the face of international trends in criminal justice, the specific

characteristics of nation-states influence the degree to which nations adopt those trends (Sutton 2000, 2004). It is clear that substance use follows a similar pattern. Despite the unifying trends in international drug policy, there is still variation at the national level in the enforcement of laws and the availability of programs pertaining to substance use. The variation in individual substance use between countries is explained by the the legal environment created by the particular nations. This behavior is guided by the cultural frames dictated by drug law and policy in its enforcement and service availability and in the laws for cigarettes.

Again following neoinstitutional examples (Kikuzawa et al. 2008; Boyle 2002), drug policy opinions were also found to be guided by these scripts. In more punitive countries, the youth and young adults have more punitive opinions concerning drug policy. This effect remained significant even with the importance of related individual behavior in the form of personal substance use. The fact that each of these effects can emerge controlling for individual and regional characteristics, especially given the concentration in previous research on the former, is a testament to their centrality in understanding individual level probabilities of substance use. In this area of law where there is much ambiguity and the potential for immediate context to outweigh the role of law, the characteristics of the national legal culture are important, despite global trends toward one unified drug policy.

The Importance of the Moderating Effect of Local Context on Characteristics of the Individual

In many ways, the findings at the individual level were generally supportive of Bachman's et al.'s (2002) model of incorporating life course social bonds with mediating variables. For example, significant effects were shown for bonds such as marriage and education and for mediating effects such as knowing drug users and dangerousness of drugs. Lack of significant individual level effects should not be taken as discounting findings by the Monitoring the Future researchers and others.[22] They have done extensive longitudinal research in building their model. The focus here, rather, was to use this model as an underlying structure to understand how it is embedded in a regional and national level context. I now turn to a summary of the former.

If one was to concentrate solely on the main effects of the individual level effects, it does not appear to add very unique findings besides applying the model in Europe. It was shown, however, that this picture is incomplete without incorporating how these individual level factors varied by region. It is here that new findings emerge. Ideas from social disorganization theory (Park, Burgess, and McKenzie 1925; Shaw and McKay 1931; Sampson and Groves 1989; Sampson, Raudenbush, and Earls 1997) and strain theory (Merton 1938, 1968; Akers 1992) were taken in order to justify the inclusion of regional level variables and to take a multilevel approach. This body of research suggests broader contextual factors play an important role in determining individual level behavior. Thus, regional level variables were included that measure demographic characteristics, economic conditions, and crime trends. Besides adding further depth to Bachman et al.'s (2002) model by understanding the ways that their individual level

[22] One null effect that should be interpreted cautiously is that of employment status. The lack of a distinction between full and part time work and the trumping of student status over working is potentially problematic and could explain the lack of findings for this particular social bond.

components vary by local context, the findings indicated that the social disorganization and strain measures should be considered in conjunction with the characteristics of the individual.

This point is especially salient given the surprising lack of significant main effects of regional level variables. Though from social disorganization and strain theory I outlined expectations of main effects, the regional level variables enter only as a significant cross-level interaction in all three substance use models. This lack of effects does not necessarily discount the possibility of main effects of regional characteristics, as controlling for individual level characteristics indicative of social disorganization and strain may, in a sense, control for these measures in the aggregate. The unemployment rate, the death rate, college educated adults, and tourism were not statistically significant in any of the substance use models, either as main effects or interaction effects. Rather, demographic variables measuring population density, net migration, and the youth population, the economic measure of GDP growth, and the crime measure of the homicide rate were the only social disorganization and strain theory variables in the substance use models.

These measures show a need to place individual level characteristics in a broader context. Several examples were noted above. The effects of several social disorganization measures on marijuana use were dependent on education level, with these measures particularly salient for those with low levels of education. For instance, having only a secondary education is not a detriment with respect to marijuana use in both areas high in economic growth and areas with few youth and young adults. Rather, the less educated are at a disadvantage with respect to marijuana use the poorer the region in which they

reside. The effect of urbanicity was shown to be both gender-specific and substance-specific, indicating the need for a more nuanced understanding of both gender and urbanicity. In less densely populated areas, males and females have equal probabilities of using hard drugs, while males have a higher probability of smoking cigarettes regularly. In densely populated areas, males and females have equal probabilities smoking cigarettes regularly, while males have a higher probability of using hard drugs. The salience of social bonds such as marriage can even be countered by economic conditions, or others such as head of household can be exacerbated by residential instability.

So what do these findings mean for aggregate theories of criminal and deviant behavior in the family of social ecology? The lack of main effects might lend support to the individual level nature of substance use that much drug research uses as its theoretical framework. One possibility is that the regional level is too aggregated and does not truly measure the individual's surroundings. The regional measures used within this analysis reflect both what data is available and factors identified as important by social disorganization theory. To the extent that these measures represent an antiquated view of city life, they may represent other phenomena other than those identified by social disorganization and alternative interpretations may be possible. Further, many modern studies, though not focusing on drugs specifically, would indicate a need to look at a smaller geographic unit, such as the neighborhood, and perhaps use measures that reflect a more realistic view of modern city life, such as collective efficacy. While certainly a need in future substance use research, the utility of the regional level results of these analyses is in incorporating cross-level effects across a large multinational landscape. The findings suggest that social disorganization theory and its modern incarnates should

integrate the ways that individual level characteristics vary across the theoretically important aggregate measures. Without such an approach, important findings, such as the very specific way gender or education affects use dependent upon contextual factors, would go undiscovered. Those who call for multilevel studies should be cognizant of this variation. Further, individual level substance use studies should condition their results on the fact that they may represent averages within variable contextual characteristics.

Conclusion

These analyses demonstrated that there is much depth that sociology can bring into the study of substance use by moving beyond its individualized focus. A theoretical framework can be applied around the well established models of individual substance use that stresses local structural and national policy characteristics. Using this multilevel approach, it was shown that national level variation in the enforcement of drug policy and the availability of drug-related services affects youth and young adult probabilities of substance use and their opinions on drug policy. Thus, broader sociological theories such as neoinstitutionalism have utility in theoretical and empirical work within crime, law, and deviance because national context provides frames through which individuals understand their world, affecting behavior and opinions. Given that these findings were found among the relatively similar countries of the EU-15, including a more diverse set of countries should lead to even further insight concerning the nature of law and individual deviant behaviors.

Substance use research has also lost sight of the local structural forces that influence involvement in use. The above analyses show that neglecting these components

is a mistake. The effects of individual level correlates used in previous studies vary by those structural components, indicating that general conclusions about individual level effects may be misguided. From a social disorganization perspective, the models show that the hypothesized aggregate effects are not by any means universal. Rather, the way these factors play out varies by the characteristics of the individual that is subject to those factors.

Both the findings concerning national policy and the conditioning effects of local factors support the conclusion that substance use, and surely deviance more generally, must be thought of within the social context in which it takes place. Such considerations, however, are not currently the norm. The individualization of substance use research has the potential to continue unabated. As geneticists move into substance use and deviance research, though a welcome addition, there is a high chance of further individualization of the field. Though inclusion of genetic measures could alter some of these results, it is unlikely that it would make the contextual effects disappear completely. As this research continues, this study is a tale of caution that the sociological contributions to substance use cannot be overlooked, as legal policies and local context also have their place.

REFERENCES

Abadinsky, H. 2001. *Drugs: An Introduction*. Belmont, CA: Wadsworth/Thomson.

Agnew, R. 1986. "Work and Delinquency among Juveniles Attending School." *Journal of Crime and Justice* 9:19–41.

Agnew, R., and D. Petersen. 1989. "Leisure and Delinquency." *Social Problems* 36:332-48.

Agresti, A. 2002. *Categorical Data Analysis, Second Edition*. Hoboken, NJ: Wiley.

Akers, R. L. 1969. *Deviant Behavior: A Social-Learning Approach*. Belmont, CA: Wadsworth.

Akers, R. L. 1985. *Deviant Behavior: A Social Learning Approach*. Belmont, CA: Wadsworth.

Akers, R. L. 1992. *Drugs, Alcohol, and Society: Social Structure, Process, and Policy*. Belmont, CA: Wadsworth.

Akers, R. L., M. D. Krohn, L. Lanza-Kaduce, M. Radosevich. 1979. "Social Learning and Deviant Behavior: A Specific Test of a General Theory." *American Sociological Review* 44: 636-55.

Amenta, E., C. Bonastia, and N. Caren. 2001. "US Social Policy in Comparative and Historical Perspective: Conceptes, Images, Arguments, and Research Strategies." *Annual Review of Sociology* 27:213-34.

Anderson, E. 1999. *Code of the Street*. New York: W.W. Norton.

Arnett, J. J. 1998. "Risk Behavior and Family Role Transitions during the Twenties." *Journal of Youth and Adolescence* 27:301-20.

Bachman, J. G. 1994. "Incorporating Trend Data to Aid in the Causal Interpretation of Individual-level Correlations among Variables: Examples focusing on the Recent Decline in Marijuana Use." In L. Collins and L. Seitz (eds.), *Advances in Data Analysis for Prevention Intervention Research* (NIDA Research Monograph No. 142, pp.112-139).

Bachman, J. G., K. Wadsworth, P. M. O'Malley, L. D. Johnston, and J. Schulenberg. 1997. *Smoking, Drinking, and Drug Use in Young Adulthood: The Impacts of New Freedoms and Responsibilities*. Mahweh, NJ: Lawrence Erlbaum Associates.

Bachman, J. G., L. D. Johnston, and P. M. O'Malley. 1981. "Smoking, Drinking, and Drug Use among American High School Students: Correlations and Trends, 1975-1979." *American Journal of Public Health* 71:59-69.

Bachman, J. G., L. D. Johnston, and P. M. O'Malley. 1990. "Explaining the Recent Decline in Cocaine Use among Young Adults: Further Evidence that Perceived Risks and Disapproval Lead to Reduced Drug Use." *Journal of Health and Social Behavior* 31:173-84.

Bachman, J. G., L. D. Johnston, and P. M. O'Malley. 1998. "Explaining the Recent Increases in Students' Marijuana Use: The Impacts of Perceived Risks and Disapproval from 1976 through 1996." *American Journal of Public Health* 88:887-92.

Bachman, J. G., P. M. O'Malley, and L. D. Johnston. 1984. "Drug Use among Young Adults: The Impacts of Role Status and Social Environments." *Journal of Personality and Social Psychology* 47:629-45.

Bachman, J. G., P. M. O'Malley, J. E. Schulenberg, L. D. Johnston, A. L. Bryant, and A. C. Merline. 2002. *The Decline of Substance Use in Young Adulthood: Changes in Social Activities, Roles, and Beliefs*. Mahwah, NJ: Lawrence Erlbaum Associates.

Bahr, S. J., S. L. Maughan, A. C. Marcos, and B. Li. 1998. "Family, Religiosity, and the Risk of Adolescent Drug Use." *Journal of Marriage and the Family* 60:979-92.

Barr, K. E. M., M. P. Farrell, G. M. Barnes, and J. W. Welte. 1993. "Race, Class, and Gender Differences in Substance Abuse: Evidence of Middle-Class/Underclass Polarization among Black Males." *Social Problems* 40:314-27.

Becker, H. S. 1963. *Outsiders: Studies in the Sociology of Deviance*. New York: The Free Press.

Becker, G. S. 1968. "Crime and Punishment: An Economic Approach." *Journal of Political Economy* 76:169-217.

Beckett, K. 1997. *Making Crime Pay: Law and Order in Contemporary American Politics*. New York: Oxford University Press.

Bellair, P. E. 1997. "Social Interaction and Community Crime: Examining the Importance of Neighbor Networks." *Criminology* 35:677-703.

Bellair, P. E. 2000. "Informal Surveillance and Street Crime: A Complex Relationship." *Criminology* 38:137-67.

Bentham, J. 1843. "Of the Influence of Time and Place in Matters of Legislation." In Jeremy Bentham, *The Works of Jeremy Bentham, Published under the Superintendence of His Executor, John Bowring, Volume 1*. London: Simpkin, Marshall, and Co.

Berger, P. L., and T. Luckman. 1966. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge* New York: Anchor Books.

Black, D. 1976. *The Behavior of Law*. New York: Academic Press.

Black, D. 1980. *Toward a General Theory of Social Control*. Orlando: Academic Press.

Bordua, D. 1958. "Juvenile Delinquency and 'Anomie': An Attempt at Replication." *Social Problems* 6:230-8.

Bourdieu, P. 1972. *Outline of a Theory of Practice*. New York: Cambridge University Press.

Boyle, E. H. 2002. *Female Genital Cutting: Cultural Conflict in the Global Community*. Baltimore: Johns Hopkins University Press.

Bray, R. M., M. E. Narsden, and M. R. Peterson. 1991. "Standardized Comparisons of the Use of Alcohol, Drugs, and Cigarettes among Military Personnel and Civilians." *American Journal of Public Health* 81:865-69.

Brooks, C., and J. Manza. 2006. "Social Policy Responsiveness in Developed Democracies." *American Sociological Review* 71:474-94.

Brown, J. W., D. Glaser, E. Waxer, and G. Geis. 1974. "Turning Off: Cessation of

Marijuana Use after College." *Social Problems* 21:527-38.

Brown, T. N., J. Schulenberg, J. G. Bachman, P. M. O'Malley, and L. D. Johnston. 2001. "Are Risk and Protective Factors for Substance Use Consisten across Historical Time?: National Data from the High School Classes of 1976 through 1997." *Prevention Science* 2:29-43.

Bryk, A. S., and Y. M. Thum. 1989. "The Effect of High School on Dropping Out: An Exploratory Investigation." *American Educational Research Journal* 26:353-84.

Burgess, R. and R. L. Akers. 1968. "A Differential Association-Reinforcement Theory of Criminal Behavior." *Social Problems* 14:128-47.

Burstein, P. 1998. "Bringing the Public Back In: Should Sociologists Consider the Impact of Public Opinion on Public Policy?" *Social Forces* 77:27-62.

Burton, R. P. D., R. J. Johnson, C. Ritter, and R. R. Clayton. 1996. "The Effects of Role Socialization on Initiation of Cocaine Use: An Event History Analysis from Adolescence into Middle Adulthood." *Journal of Health and Social Behavior* 37:75-90.

Caspi, A., and T. E. Moffitt. 1995. "The Continuity of Maladaptive Behavior: From Description to Understanding in the Study of Antisocial Behavior." In D. Cicchetti and D. Cohen (eds.), *Manual of Developmental Psychology*, pp. 472-511. New York: John Wiley.

Chambliss, W., and R. Seidman. 1982. *Law, Order, and Power*, Second edition. Reading, MA: Addison-Wesley.

Chamlin, M., and J. Cochran. 1997. "Social Altruism and Crime." *Criminology* 35:203-27.

Chase-Dunn, C. 1989. *Global Formation: Structures of the World Economy*. Cambridge: Basil Blackwell.

Cheliotis, L. K. 2006. "How Iron Is the Iron Cage of New Penology? The Role of Human Agency in the Implementation of Criminal Justice Policy." *Punishment & Society* 8:313-40.

Chilton, R. 1964. "Continuities in Delinquency Area Research: A Comparison of Studies in Baltimore, Detroit, and Indianapolis." *American Sociological Review* 29:71-3.

Christensen, T. 2003. Eurobarometer 57.2OVR: YOUTH ATTITUDES ABOUT DRUGS, APRIL-JUNE 2002 [Computer file]. ICPSR version. Brussels: European Opinion Research Group EEIG [producer], 2002. Cologne, Germany: Zentralarchiv fur Empirische Sozialforschung/ Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributors].

Cretacci, M. 2003. "Relgion and Social Control: An Application of a Modified Social Bond of Violence." *Criminal Justice Review* 28:254-77.

Degenhardt, L., W. Chiu, N. Sampson, R. C. Kessler, J. C. Anthony, M. Angermeyer, R. Bruffaerts, G. de Girolamo, O. Gureje, Y. Huang, A. Karam, S. Kostyuchenko, J. P. Lepine, M. E. M. Mora, Y. Neumark, J. H. Ormel, A. Pinto-Meza, J. Posada-Villa, D. J. Stein, T. Takeshima, J. E. Wells. 2008. *PLoS Medicine* 5:1053-67.

DeVellis, R. F. 2003. *Scale Development: Theory and Application, Second Edition*. Thousand Oaks, CA: Sage.

Dishion, T. J., G. R. Patterson, and P. C. Griesler. 1994. "Peer Adaptations in the Development of Antisocial Behavior: A Confluence Model." In L. Rowell Huesmann (ed.), *Aggressive Behavior: Current Perspectives*. New York: Plenum Press.

Dobbin, F. 1994. *Forging Industrial Policy*. Cambridge: Cambridge University Press.

Dobbin, F., and T. Dowd. 2000. "The Market that Antitrust Built: Public Policy, Private Coercion, and Railroad Acquisitions." *American Sociological Review* 65:632-57.

Dobbin, F., J. R. Sutton, J. W. Meyer, and W. R. Scott. 1993. "Equal Opportunity Law and the Construction of Internal Labor Markets." *American Journal of Sociology* 99:396-427.

Dobbin, F., L. B. Edelman, J. W. Meyer, W. R. Scott, and A. Swidler. 1988. "The Expansion of Due Process in Organizations." In L G. Zucker, *Institutional Patterns and Organizations: Culture and Environment*, pp. 71-98. Cambridge, MA: Ballinger.

Durkheim, E. 1951. *Suicide: A Study in Sociology*. New York: Free Press.

Durkheim, E. 1982. *The Rules of the Sociological Method*. New York: Free Press.

Durkheim, E. 1984. *The Division of Labor in Society*. New York: Free Press.

Duster, T. 1970. *The Legislation of Morality: Law, Drugs and Moral Judgment*. New York: Free Press.

Dutch Ministry of Justice. 2006. *European Sourcebook of Crime and Criminal Justice Statistics - 2006, Third Edition*. Hague, Netherlands: Research and Documentation Centre of the Dutch Ministry of Justice.

Edelman, L. B. 1990. "Legal Environments and Organizational Governance: The Expansion of Due Process in the Workplace." *American Journal of Sociology* 95:1401-40.

Edelman, L. B. 1992. "Legal Ambiguity and Symbolic Structures: Organizational Mediation of Civil Rights Law." *American Journal of Sociology* 97:1531-76.

Edelman, L. B., H. Erlanger, and C. Uggen. 1999. "The Endogeneity of Law: Grievance Procedures as Rational Myth." *American Journal of Sociology* 105:406-54.

Edelman, L. B., S. E. Abraham, and H. S. Erlanger. 1992. "Professional Construction of Law: The Inflated Threat of Wrongful Discharge Doctrine." *Law and Society Review* 26:47-83.

Eitle, D. J., and T. M. Eitle. 2004. "School and County Characteristics of Predictors of School Rates of Drug, Alcohol, and Tobacco Offenses." *Journal of Health and Social Behavior* 45:408-21.

Elliot, D. S., D. Huizinga, and S. S. Ageton. 1985. *Explaining Delinquency and Drug Use*. Newbury Park, CA: Sage.

Elliot, D. S., W. J. Wilson, D. Huizinga, R. J. Sampson, A. Elliot, and B. Rankin. 1996. "The Effects of Neighborhood Disadvantage on Adolescent Development." *Journal*

of Research in Crime and Delinquency 33:389-426.

Erickson, M. L. and L. T. Empey. 1965. "Class Position, Peers, and Delinquency." *Sociology and Social Research* 49: 268-82.

Esbensen, F., and D. Huizinga. 1990. "Community Structure and Drug Use: From a Social Disorganization Perspective." *Justice Quarterly* 7:691-709.

Esping-Andersen, G. 1999. *The Social Foundations of Postindustrial Economies*. Oxford: Oxford University Press.

European Communities. 2002. *Framework and Instruments of the European Union in the Field of Drugs*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 1999. *1999 Extended Annual Report on the State of the Drugs Problem in the European Union*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2000. *2000 Annual Report on the State of the Drugs Problem in the European Union*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2001. *2001 Annual Report on the State of the Drugs Problem in the European Union*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2002a. *Drugs in Focus: Recreational Drug Use - A Key EU Challenge*. Drugs in Focus bimonthly briefing, November-December, 2002. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2002. *2002 Annual Report on the State of the Drugs Problem in the European Union and Norway*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2003. *The State of the Drugs Problem in the European Union and Norway Annual Report 2003*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2004. *The State of the Drugs Problem in the European Union and Norway Annual Report 2004*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2005. *The State of the Drugs Problem in the Europe Annual Report 2005*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2006b. *The State of the Drugs Problem in the Europe Annual Report 2006*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2006a. *Annual Report 2006 Selected Issues 2: A Gender Perspective on Drug Use and Responding to Drug Problems*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2008a. *The State of the Drugs Problem in the Europe Annual Report 2008*. Luxembourg: Office for Official Publications of the European Communities.

European Monitoring Centre for Drugs and Drug Addiction. 2008b. *The State of the Drugs Problem in the Europe Annual Report Statistical Bulletin 2008*. Luxembourg: Office for Official Publications of the European Communities.

Eurostat. 2007. *Eurostat Regional Yearbook 2007*. Luxembourg: Office for Official Publications of the European Communities.

Ewick, P., and S. S. Silbey. 1998. *The Common Place of Law: Stories from Everyday Life*. Chicago: University of Chicago Press.

Faupel, C. E., A. M. Horowitz, and G. S. Weaver. 2004. *The Sociology of American Drug Use*. New York: McGraw-Hill.

Fletcher, M., and R. Loof. 2008. *EU Criminal Law and Justice*. Northampton, MA: Edward Elgar Publishing.

Fligstein, N., and A. Stone Sweet. 2002. "Constructing Polities and Markets: An Institutionalist Account of European Integration." *American Journal of Sociology* 107:1206-43.

Friedland, R., and R. R. Alford. 1991. "Bringing Society Back In: Symbols, Practices, and Institutional Contradictions." In W. W. Powell and P. J. DiMaggio, *The New Institutionalism in Organizational Analysis*, pp. 232-66. Chicago: University of Chicago Press.

Garland, D. 1990. *Punishment and Modern Society: A Study in Social Theory*. Chicago: University of Chicago Press.

Garland, D. 2001. *The Culture of Control: Crime and Social Order in Contemporary Society*. Chicago: University of Chicago Press.

Gaughan, M. 2003. "Predisposition and Pressure: Mutual Influence and Adolescent Drunkenness." *Connections* 25:17-31.

Gilpin, R. 1981. *War and Change in World Politics*. New York: Cambridge University Press.

Giordano, P., S. Cernkovich, and M.D. Pugh. 1986. "Friendships and Delinquency." *American Journal of Sociology* 91:1170-1202.

Goode, E. 2005. *Drugs in American Society, Sixth Edition*. New York: McGraw-Hill.

Gotham, H. J., K. J. Sher, and P. K. Wood. 1997. "Predicting Stability and Change in Frequency of Intoxication from the College Years to Beyond: Individual-Difference and Role Transition Variables." *Journal of Abnormal Psychology* 106:619-29.

Gottfredson, M. R., and T. Hirschi. 1990. *A General Theory of Crime*. Stanford: Stanford University Press.

Grattet, R., and V. Jenness. 2008. "Transforming Symbolic Law into Organizational Action: Hate Crime Policy and Law Enforcement Practice." *Social Forces* 87:1-27.

Grattet, R., V. Jenness, and T. R. Curry. 1998. "The Homogenization and Differentiation of Hate Crime Law in the United States, 1978 to 1995: Innovation and Diffusion in the Criminalization of Bigotry." *American Sociological Review*

63:286-307.

Greeley, A., and M. Hout. 2006. *The Truth about Conservative Christians: What They Think and What They Believe*. Chicago: University of Chicago Press.

Greenberger, E., and L. Steinberg. 1986. *When teenagers work: The psychological and social costs of adolescent employment.* New York: Basic Books.

Haas, E. 1961. "International Integration: The European and the Universal Process." *International Organization* 15:366-92.

Hart, H.L.A. 1994. *The Concept of Law*, 2nd edition. New York: Oxford University Press.

Haynie, D. L. 2001. "Delinquent Peers Revisited: Does Network Structure Matter?" *American Journal of Sociology* 106: 1013-57.

Haynie, D. L. 2002. "Friendship Networks and Adolescent Delinquency: The Relative Nature of Peer Delinquency." *Journal of Quantitative Criminology* 18: 99-134.

Haynie, D. L. 2003. "Contexts of Risk? Explaining the Link between Girls' Pubertal Development and Their Delinquency Involvement." *Social Forces* 82: 355-97.

Healy, K. 2000. "Embedded Altruism: Blood Collection Regimes and the European Union's Donor Population." *American Journal of Sociology* 105:1633-57.

Heimer, K. 1995. "Gender, Race, and the Pathways to Delinquency: An Interactionist Explanation." In John Hagan and Ruth D. Peterson (eds.), *Crime and inequality,* 140–173. Stanford, CA: Stanford University Press.

Hepburn, J. R. 1977. "Testing Alternative Models of Delinquency Causation." *Journal of Criminal Law and Criminology* 67:450-60.

Hirschfield, A., and K. J. Bowers. 1997. "The Effect of Social Cohesion on Levels of Recorded Crime in Disadvantaged Areas." *Urban Studies* 34:1275-95.

Hirschi, T. 1969. *Causes of Delinquency*. Berkeley: University of California Press.

Horwitz, A. V., and H. R. White. 1991. "Becoming Married, Depression, and Alcohol Problems among Young Adults." *Journal of Health and Social Behavior* 32:221-37.

Jenkins, P. 1997. "School Delinquency and the School Social Bond." *Journal of Research in Crime and Delinquency* 34:337-67.

Jensen, G. F. 1972. "Parents, Peers, and Delinquent Action: A Test of the Differential Association Perspective." *American Journal of Sociology* 78: 562-75.

Johnson, R. A., and D. W. Wichern. 2002. *Applied Multivariate Statistical Analysis, Fifth Edition*. Upper Saddle River, NJ: Prentice Hall.

Johnson, R. E. 1979. *Juvenile Delinquency and Its Origins*. Cambridge: Cambridge University Press.

Johnston, L. D, P. M. O'Malley, and J. G. Bachman. 2000. *The Monitoring the Future National Results on Adolescent Drug Use: Overview of Key Findings*. Rockville, MD: National Institute on Drug Abuse.

Kandel, D. 1973. "Adolescent Marijuana Use: Role of Parents and Peers. *Science* 181:1067-70.

Kandel, D., and M. Davies. 1991. "Friendship Networks, Intimacy, and Illicit Drug Use

in Young Adulthood: A Comparison of Two Competing Theories." *Criminology* 29:441-69.

Kandel, D., and V. H. Ravies. 1989. "Cessation of Illicit Drug Use in Young Adulthood." *Archives of General Psychology* 46:109-16.

Kaplan, H. B. 1975. *Self-Attitudes and Deviant Behavior*. Pacific Palisades, CA: Goodyear.

Kaplan, H. B., S. S. Martin, and C. Robbins. 1982. "Application of a General Theory of Deviant Behavior: Self-derogation and Adolescent Drug Use." *Journal of Health and Social Behavior* 23:274-94.

Kaplan, H. B., S. S. Martin, and C. Robbins. 1984. "Pathways to Adolescent Drug Use: Self-derogation, Peer Influence, Weakening of Social Controls, and Early Substance Use." *Journal of Health and Social Behavior* 25:270-89.

Kaplan, H. B., S. S. Martin, R. J. Johnson, and C. Robbins. 1986. "Escalation of Marijuana Use: Application of a General Theory of Deviant Behavior." *Journal of Health and Social Behavior* 27:44-61.

Kelley, J., and N. D. De Graaf. 1997. "National Context, Parental Socialization, and Religious Belief: Results from 15 Nations." *American Sociological Review* 62:639-59.

Kelly, E. 2003. "The Strange History of Employer Sponsored Childcare: Interested Actors, Ambiguity, and the Transformation of Law in Organizational Fields." *American Journal of Sociology* 109:606-49.

Kikuzawa, S., S. Olafsdottir, and B. A. Pescodolido. 2008. "Similar Pressures, Different Contexts: Public Attitudes toward Government Intervention for Health Care in 21 Nations." *Journal of Health and Social Behavior* 49:385-99.

King, R. D., M. Massoglia, and R. MacMillan. 2007. "The Context of Marriage and Crime: Gender, the Propensity to Marry, and Offending in Early Adulthood." *Criminology* 45:33-66.

Kornhauser, R. R. 1978. *Social Sources of Delinquency: An Appraisal of Analytic Models*. Chicago: University of Chicago Press.

LaGrange, T. C. 1999. "The Impact of Neighborhoods, Schools, and Malls on Spatial Distribution of Property Damage." *Journal of Research in Crime and Delinquency* 36:393-422.

Lamont, M. 1992. *Money, Morals, and Manners: The Culture of the French and the American Upper-Middle Class*. Chicago: University of Chicago Press.

Lamont, M., and V. Molnar. 2002. "The Study of Boundaries in the Social Sciences." *Annual Review of Sociology* 28:167-95.

Lanctot, N., and C. A. Smith. 2001. "Sexual Activity, Pregnancy, and Deviance in a Representative Sample of African American Girls." *Journal of Youth and Adolescence* 30:349-72.

Lander, B. 1954. *Towards an Understanding of Juvenile Delinquency*. New York: Columbia University Press.

Laub, J. H., and R. J. Sampson. 2003. *Shared Beginnings, Divergent Lives: Deliquent*

Boys to Age 70. Cambridge, MA: Harvard University Press.

Lee, M., M. Maume, and G. Ousey. 2003. "Social Isolation and Lethal Violence across the Metro/Non-metro Divide: The Effects of Socioeconomic Disadvantage and Poverty Concentration on Homicide." *Rural Sociology* 68:107-31.

Liska, A., and P. Bellair. 1995. "Violent Crime Rates and Racial Composition: Convergence over Time." *American Journal of Sociology* 101:578-610.

Lowenkamp, C. T., F. T. Cullen, and T. C. Pratt. 2003. "Replicating Sampson and Grove's Test of Social Disorganization Theory: Revisiting a Criminological Classic." *Journal of Research in Crime and Delinquency* 40:351-73.

Lynch, M. 1998. "Waste Managers? The New Penology, Crime Fighting, and Parole Agent Identity." *Law and Society Review* 32:839-70.

Marx, K. 1976. *Capital: A Critique of Political Economy, Volume One*. New York: Vintage Books.

Marx, K., and F. Engels. 1947. *The German Ideology*. New York: International Publishers.

Matsueda, R. L. 1988. "The Current State of Differential Association Theory." *Crime and Delinquency* 34: 277-306.

Matsueda, R. L., and K. Anderson. 1998. "The Dynamics of Delinquent Peers and Delinquent Behavior." *Criminology* 36: 269-308.

Matsueda, R. L., and Karen Heimer. 1987. "Race, Family Structure, and Delinquency: A Test of Differential Association and Social Control Theories." *American Sociological Review* 52: 826-40.

McMorris, B. and C. Uggen. 2000. "Alcohol and Employment in the Transition to Adulthood." *Journal of Health and Social Behavior* 41:276-94.

Merton, R. K. 1938. "Social Structure and Anomie." *American Sociological Review* 3:672-82.

Merton, R. K. 1968. *Social Theory and Social Structure*. New York: Free Press.

Messner, S., and K. Tardiff. 1986. "Economic Inequality and Levels of Homicide: An Analysis of Urban Neighborhoods." *Criminology* 24:297-317.

Messner, S., and R. Rosenfeld. 2006. *Crime and the American Dream, Fourth Edition*. Belmont, CA: Wadsworth.

Messner, S., L. Raffalovich, and R. McMillan. 2001. "Economic Deprivation and Changes in Homicide Arrest Rates for White and Black Youths, 1967-1998: A National Time Series Analysis." *Criminology* 39:591-614.

Meyer, J. M. 1987. "Self and Life Course: Institutionalization and Its Effects." In G. M. Thomas, J. M. Meyer, F. O. Ramirez, and J. Boli (eds.), *Institutional Structure: Constituting State, Society, and the Individual*, pp. 242-60. Sage: Newbury Park, CA.

Meyer, J. W., and R. L. Jepperson. 2000. "The 'Actors' of Modern Society: The Cultural Construction of Social Agency." *Sociological Theory* 18:100-20.

Meyer, J. W., J. Boli, G. M. Thomas, and F. O. Ramirez. 1997. "World Society and the Nation-State." *American Journal of Sociology* 103:144-81.

Moffitt, T. E. 1993. “Adolescent-Limited and Life-Course-Persistent Antisocial Behavior: A Developmental Taxonomy.” *Psychological Review* 100:674-701.

Morash, M. 1984. “Establishment of a Juvenile Police Record.” *Criminology* 22:97-113.

Morenoff, J., R. Sampson, and S. Raudenbush. 2001. “Neighborhood Inequality, Collective Efficacy, and the Spatial Dynamics of Urban Violence.” *Criminology* 39:517-60.

Newman, G. 1976. *Comparative Deviance: Perception and Law in Six Cultures*. New York: Elsevier Scientific.

Osgood, D. W., J. K. Wilson, P. M. O'Malley, J. G. Bachman, and L. D. Johnston. 1996 “Routine Activities and Individual Deviant Behaviors.” *American Sociological Review* 61:635-74.

Packer, H. L. 1968. *The Limits of the Criminal Sanction*. Palo Alto, CA: Stanford University Press.

Park, R., E. W. Burgess, and R. D. McKenzie. 1925. *The City*. Chicago: University of Chicago Press.

Parker, K. 2004. “Industrial Shift, Polarized Labor Markets, and Urban Violence: Modeling the Dynamics between the Economic Transformation and Disaggregated Homicide.” *Criminology* 42:619-45.

Parker, K., and M. Pruitt. 2000. “Poverty, Poverty Concentration, and Homicide.” *Social Science Quarterly* 81:555-82.

Pearson, M., and P. West. 2003. “Drifting Smoke Rings: Social Network Analysis and Markov Processes in a Longitudinal Study of Friendship Groups and Risk-taking.” *Connections* 25:59-76.

Peirson, P. 1994. *Dismantling the Welfare State? Reagan, Thatcher, and the Politics of Retrenchment*. New York: Cambridge University Press.

Peirson, P. 2001. “Investigating the Welfare State at Century's End.” In Paul Peirson (ed.), *The New Politics of the Welfare State*, pp.1-14. New York: Oxford University Press.

Peterson, R. D., L. J. Krivo, and M. A. Harris. 2000. “Disadvantage and Neighborhood Violent Crime: Do Local Institutions Matter?” *Journal of Research in Crime and Delinquency* 37:31-63.

Pfohl, S. J. 1977. “The ‘Discovery of Child Abuse.’” *Social Problems* 24:310-23.

Pfohl, S. J. 1985. *Images of Deviance and Social Control: A Sociological History*. New York: McGraw-Hill.

Pinheiro, J.C., and D.M. Bates. 2004. *Mixed Effects Models in S and S-Plus*. New York: Springer.

Pratt, T., and T. Godsey. 2002. “Social Support and Homicide: A Cross-National Test of an Emerging Criminological Theory.” *Journal of Criminal Justice* 30:589-601.

Pratt, T., and T. Godsey. 2003. “Social Support, Inequality, and Homicide: A Cross-National Test of an Integrated Theoretical Model.” *Criminology* 41:611-44.

Raudenbush, S. W., and A. S. Bryk. 2001. *Hierarchical Linear Models, Second Ed*.

Thousand Oaks, CA: Sage.

Raudenbush, S., A. Bryk, Y. F. Cheong, R. Congdon, M. du Toit. 2004. *HLM 6: Hierarchical Linear on Nonlinear Modeling*. Lincolnwood, IL: Scientific Software International.

Reiss, A. J., Jr., and A. L. Rhodes. 1964. "An Empirical Test of Differential Association Theory." *Journal of Research in Crime and Delinquency* 1: 5-18.

Resnick, M. D., P. S. Bearman, R. W. Blum, K. E. Bauman, K. M. Harris, J. Jones, J. Tabor, T. Beuhring, R. E. Sieving, M.Shew, M. Ireland, L. H. Bearinger, and J. R. Udry. 1997. "Protecting Adolescents from Harm: Findings from the National Longitudinal Study on Adolescent Health." *Journal of the American Medical Association* 278:823-32.

Rice, R. E., L. Donohew, and R. Clayton. 2003. "Peer Network, Sensation Seeking, and Drug Use among Junior and Senior High School Students." *Connections* 25:32-58.

Rountree, P. W., and B. D. Warner. 1999, "Social Ties and Crime: Is the Relationship Gendered." *Criminology* 37:789-813.

Ruiter, S., and N. D. De Graaf. 2006. "National Context, Religiosity, and Volunteering: Results from 53 Countries." *American Sociological Review* 71:191-210.

Sampson, R. J. 1986. "Effects of Socioeconomic Context of Official Reaction to Juvenile Delinquency." *American Sociological Review* 51:876-85.

Sampson, R. J. 2000. "Whither the Sociological Study of Crime?" *Annual Review of Sociology* 26:711-714.

Sampson, R. J., and J. H. Laub. 1993. *Crime in the Making: Pathways and Turning Points through Life*. Cambridge, MA: Harvard University Press.

Sampson, R. J., and S. W. Raudenbush. 1999. "Systematic Social Observation of Public Spaces: A New Look at Disorder in Urban Neighborhoods." *American Journal of Sociology* 105:603-51.

Sampson, R. J., J. D. Morenoff, and T. Gannon-Rowley. 2002. "Assessing 'Neighborhood Effects': Social Processes and New Directions in Research." *Annual Review of Sociology* 28:443-78.

Sampson, R. J., J. H. Laub, and C. Wimer. 2006. "Does Marriage Reduce Crime? A Counterfactual Approach to Within-Individual Causal Effects." *Criminology* 44:465-508.

Sampson, R. J., S. Raudenbush, and F. Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277:918–24.

Sampson, R. J., and W. B. Groves. 1989. "Community Stucture and Crime: Testing Social Disorganization Theory." *American Journal of Sociology* 94:774-802.

Sandholtz, W., and A. Stone Sweet (eds.). 1998. *European Integration and Supranational Governance*. Oxford: Oxford University Press.

Savelsberg, J. J. 1992. "Law That Does Not Fit Society: Sentencing Guidelines as a Neoclassical Reaction to the Dilemmas of Substantivized Law." *American Journal of Sociology* 97:1346

Savelsberg, J. J. 1994. “Knowledge, Domination, and Criminal Punishment.” *American Journal of Sociology* 99:911-943.

Savelsberg, J. J., and R. D. King. 2005. “Institutionalizing Collective Memories of Hate: Law and Law Enforcement in Germany and the United States.” *American Journal of Sociology* 111:579.

Schofer, E., and M. Fourcade-Gourinchas. 2001. “The Structural Contexts of Civic Engagement: Voluntary Association Membership in Comparative Perspective.” *American Sociological Review* 66:806-28.

Schulenberg, J. E., J. G. Bachman, P. M. O'Malley, and L. D. Johnston. 1994. “High School Educational Success and Subsequent Substance Use: A Panel Analysis Following Adolescents into Young Adulthood.” *Journal of Health and Social Behavior* 35:45-62.

Schulenberg, J. E., P. M. O'Malley, J. G. Bachman, and L. D. Johnston. 2000. “Spread Your Wings and Fly: The Course of Well-Being and Substance Use during the Transition to Young Adulthood.” In L. J. Crockett and R. K. Silbereisen (eds.), *Negotiating Adolescence in Times of Social Change*, pp. 224-55. New York: Cambridge University Press.

Sellin, T. 1938. *Culture Conflict and Crime*. New York: Social Science Research Council.

Sewell, W. H. 1992. “A Theory of Structure: Duality, Agency, and Transformation.” *American Journal of Sociology* 98:1-29.

Shaw, C., and H. H. McKay. 1931. *Juvenile Delinquency in Urban Areas*. Chicago: University of Chicago Press.

Short, J. F. 1957. “Differential Association and Delinquency.” *Social Problems* 4: 233-39.

Simons, R. L., C. Wu, R. D. Conger, and F. O. Lorenz. 1994. “Two Routes to Delinquency: Differences between Early and Late Starters in the Impact of Parenting and Deviant Peers.” *Criminology* 32: 247-75.

Skocpol. 1979. *States and Social Revolution*. New York: Cambridge University Press.

Skogan, W. 1990. *Disorder and Decline: Crime and the Spiral of Decay in American Neighborhoods*. New York: Free Press.

Smith, W. R., S. G. Frazee, and E. L. Davison. 2000. “Furthering the Integration of Routine Activity and Social Disorganization Theories: Small Units of Analysis and the Study of Street Robbery as a Diffusion Process.” *Criminology* 38:489-523.

South, S. J., and E. P. Baumer. 2000. “Deciphering Community and Race Effects on Adolescent Premarital Childbearing.” *Social Forces* 78:1379-1407.

Steffensmeier, D., and D. Haynie. 2000. “Gender, Structural Disadvantage, and Urban Crime: Do Macrosocial Variables Explain Female Offending Rates?” *Criminology* 38:403-38.

Stolzenberg, R. M., M. Blair-Loy, L. Waite. 1995. “Religious Participation in Early Adulthood: Age and Family Life Cycle Effects on Church Membership.” *American Sociological Review* 60:84-103.

Strang, D., and J. W. Meyer. 1993. "Institutional Conditions for Diffusion." *Theory and Society* 22:487-512.

Substance Abuse and Mental Health Services Administration. 2002. *National Household Survey on Drug Abuse Main Findings, 2000*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Sutherland, E. H. and D. R. Cressey. 1978. "A Sociological Theory of Criminal Behavior." In Edwin H. Sutherland, ed., *Criminology*, Tenth Edition. New York: Lippincott.

Sutton, J. R. 2000. "Imprisonment and Social Classification in Five Common-Law Democracies, 1955-1985." *American Journal of Sociology* 106:350-86.

Sutton, J. R. 2001. *Law and Society: Origins, Interactions, and Change*. Thousand Oaks, CA: Sage.

Sutton, J. R. 2004. "The Political Economy of Imprisonment in Affluent Western Democracies, 1960-1990." *American Sociological Review* 69:170-89.

Sutton, J. R., and F. Dobbin. 1996. "The Two Faces of Governance: Responses to Legal Uncertainty in Firms, 1955-1985." *American Sociological Review* 61:794-811.

Sutton, J. R., F. Dobbin, J. W. Meyer, and W. R. Scott. 1994. "The Legalization of the Workplace." *American Journal of Sociology* 99:944-71.

Swidler, A. 1986. "Culture in Action: Symbols and Strategies." *American Sociological Review* 51:273-86.

Taylor, R., and J. Covington. 1988. "Neighborhood Changes in Ecology and Violence." *Criminology* 26:553-89.

Thomas, G. M., J. W. Meyer, F. O. Ramirez, and J. Boli. 1987. *Institutional Structure: Constituting State, Society, and Individual*. Newberry Park, CA: Sage.

Thornberry, T. P., A. J. Lizotte, M. D. Krohn, M. Farnworth, and S. J. Jang. 1994. "Delinquent Peers, Beliefs, and Delinquent Behavior: A Longitudinal Test of Interactional Theory." *Criminology* 32:47-84.

Tierney, K. J. 1982. "The Battered Women Movement and the Creation of the Wife Beating Problem." *Social Problems* 29:207-20.

Tilly, C. 1992. *Coercion, Capital, and European States, A.D. 990-1992*. Cambridge: Basil Blackwell.

Tittle, C. R., M. J. Burke, and E. F. Jackson. 1986. "Modeling Sutherland's Theory of Differential Association: Toward an Empirical Clarification." *Social Forces* 65: 405-32.

U.S. Department of Health and Human Services. 2004. "Substance Use and Family Income." *The NSDUH Report* December 24, 2004.

U.S. Department of Justice. 2005. *Homicide Trends in the United States*. Washington, DC: Office of Justice Programs.

United Nations. 1961. *Single Convention on Narcotic Drugs, 1961, as Amended by the 1961 Protocol Amending the Single Convention on Narcotic Drugs, 1961*. New York: United Nations .Publications

United Nations. 1988. *United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances*. New York: United Nations Publications.

United Nations Office on Drugs and Crime. 2004. *2004 World Drug Report*. New York: United Nations Publications.

United Nations Office on Drugs and Crime. 2008. *2008 World Drug Report*. New York: United Nations Publications.

Vander Ven, T., F. Cullen, M. Carrozza, and J. P. Wright. 2001. "Home Alone: The Impact of Maternal Employment on Delinquency." *Social Problems* 48:236-57.

Veysey, B. M., and S. F. Messner. 1999. "Further Testing of Social Disorganization Theory: An Elaboration of Sampson and Groves's 'community structure and crime.'" *Journal of Research in Crime and Delinquency* 36:156-74.

Vold, G. B. 1958. *Theoretical Criminology*. New York: Oxford University Press.

Voss, H. L. 1964. "Differential Association and Reported Delinquency Behavior: A Replication." *Social Problems* 23: 78-85.

Vuolo, M., and C. Kruttschnitt. 2008. "Prisoners' Adjustment, Correctional Officers, and Context: The Foreground and Background of Punishment in Late Modernity." *Law and Society Review* 42:307-36.

Wallace, J. M., Jr, and J. G. Bachman. 1991. "Explaining Racial/Ethnic Differences in Adolescent Drug Use: The Impact of Background and Lifestyle." *Social Problems* 38:834-44.

Wallerstein, I. 1974. *The Modern World System, Volume 1*. New York: Academic Press.

Waltz, K. M. 1979. *Theory of International Politics*. Reading, MA: Addison-Wesley.

Warner, B. D., and P. W. Rountree. 1997. "Local Social Ties in a Community and Crime Model: Questioning the Systemic Nature of Informal Social Control." *Social Problems* 44:520-36.

Warner, B., and G. Pierce. 1993. "Reexamining Social Disorganization Theory Using Calls to the Police as a Measure of Crime." *Criminology* 31:492-519.

Warr, M. 1993a. "Age, Peers, and Delinquency." *Criminology* 31: 17-40.

Warr, M. 1993b. "Parents, Peers, and Delinquency." *Social Forces* 72: 247-64.

Warr, M. 1998. "Life-Course Transitions and Desistance from Crime." *Criminology* 36:183-216.

Warr, M. 2002. *Companions in Crime: The Social Aspects of Criminal Conduct*. Cambridge: Cambridge University Press.

Warr, M., and M. C. Stafford. 1991. "The Influence of Delinquent Peers: What They Think or What They Do?" *Criminology* 29: 851-66.

Weber, M. 1968. *Economy and Society*. Berkeley: University of California Press.

Wechsler, H., G. Dowdall, A. Davenport, and S. Castillo. 1995. "Correlates of College Students' Binge Drinking." *American Journal of Public Health* 85:921-26.

Western, B. 1997. *Between Class and Market: Postwar Unionization in the Capitalist Democracies*. Princeton: Princeton University Press.

Wilson, W. J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago: University of Chicago Press.

World Health Organization. 2003. *WHO European Country Profiles on Tobacco Control* Copenhagen: WHO Regional Office for Europe.

Wright, J. P., F. T. Cullen, and N. Williams. 1997. "Working while in School and Delinquent Involvement: Implications for Social Policy." *Crime and Delinquency* 203–21.

Yamaguchi, K., and D. B. Kandel. 1985. "On the Resolution of Role Incompatibility: Life Event History Analysis of Family Roles and Marijuana Use." *American Journal of Sociology* 90:1284-1325.

Zaff, J., K. Moore, A. R. Papillo, and S. Williams. 2003. "Implications of Extracurricular Activity Participation during Adolescence on Positive Outcomes." *Journal of Adolescent Research* 18:599-631.

TABLES AND FIGURES

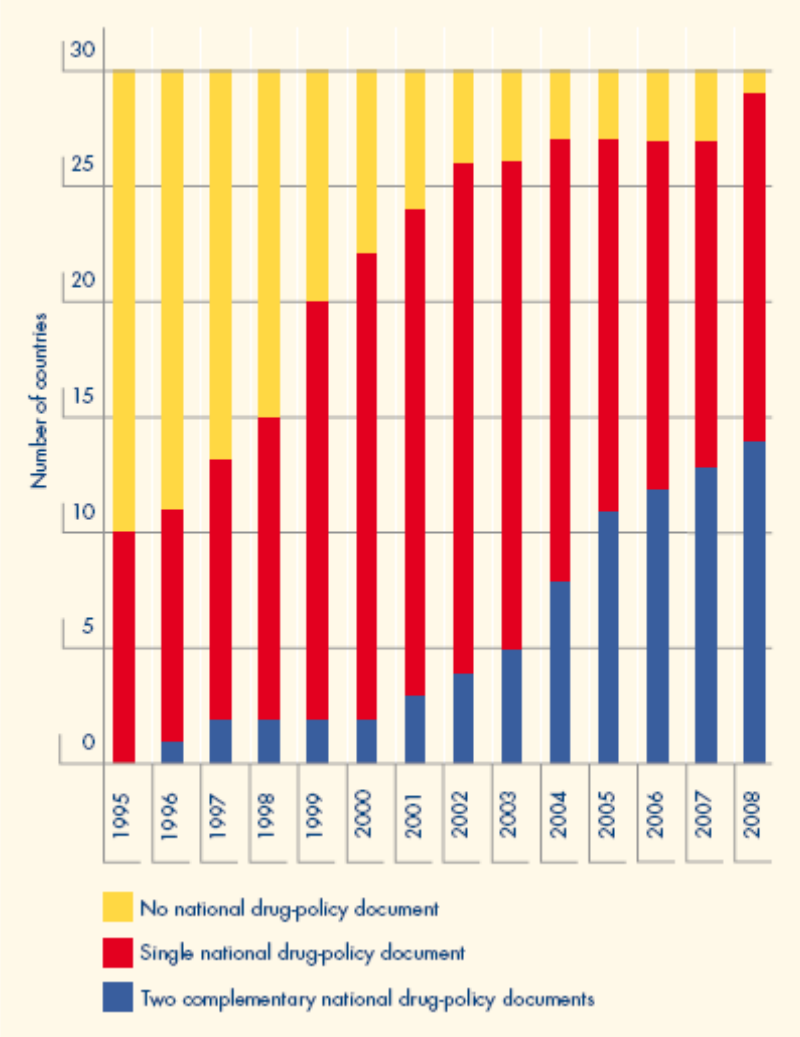
CHAPTER 2: DIFFERENTIATION AND CONVERGENCE OF EUROPEAN UNION DRUG LAWS

Table 1: Drug Strategies Adopted in the EU-15 from 1998 to 2002

1998		2001	
UK:	Drug Strategy 1998-2008	Belgium:	Policy note 2001
Norway:	Action Plan 1998-2000	Portugal:	Action plan 2001-2004
		Ireland:	Drug Strategy 2001-2008
		Finland:	Action Plan 2001-2003
		UK:	Annual Plan
		Greece:	Ministerial Council Decision
		Austria:	(Carinthia) Action Plan 2001-2005
1999		**2002**	
France:	Three-Year Plan 1999-2001	Italy:	Three year Governmental Program
Spain:	Drug Strategy 2000-2008	Austria:	(Burgenland) Drug Strategy
Portugal:	Drug Strategy	Sweden:	Drugs action plan 2002-2005
UK:	Annual Plan	Norway:	Action Plan to Combat Psychoactive Substance Use Problems 2003-2005
Scotland:	Drug Strategy	UK:	Updated Drug Strategy
Norther Ireland:	Drug Strategy		
Austria:	(Salzburg, Vienna): Drug Strategies		
2000		**2003**	
Luxembourg:	Action plan 2000-2004	Germany:	(Announced drug strategy)
UK:	Annual Plan	Italy:	(Announced drug strategy)
Wales:	Drug Strategy	Greece:	(Announced drug strategy)
Austria:	(Lower Austria, Styria) Drug Strategies	Austria:	(Announced drug strategy Upper Austria, Vorarlberg)

Source: EMCDDA 2002b.

Figure 1: Trend in the Number of Countries with National Drug Policy Documents in the EU-27, Croatia, Turkey, and Norway



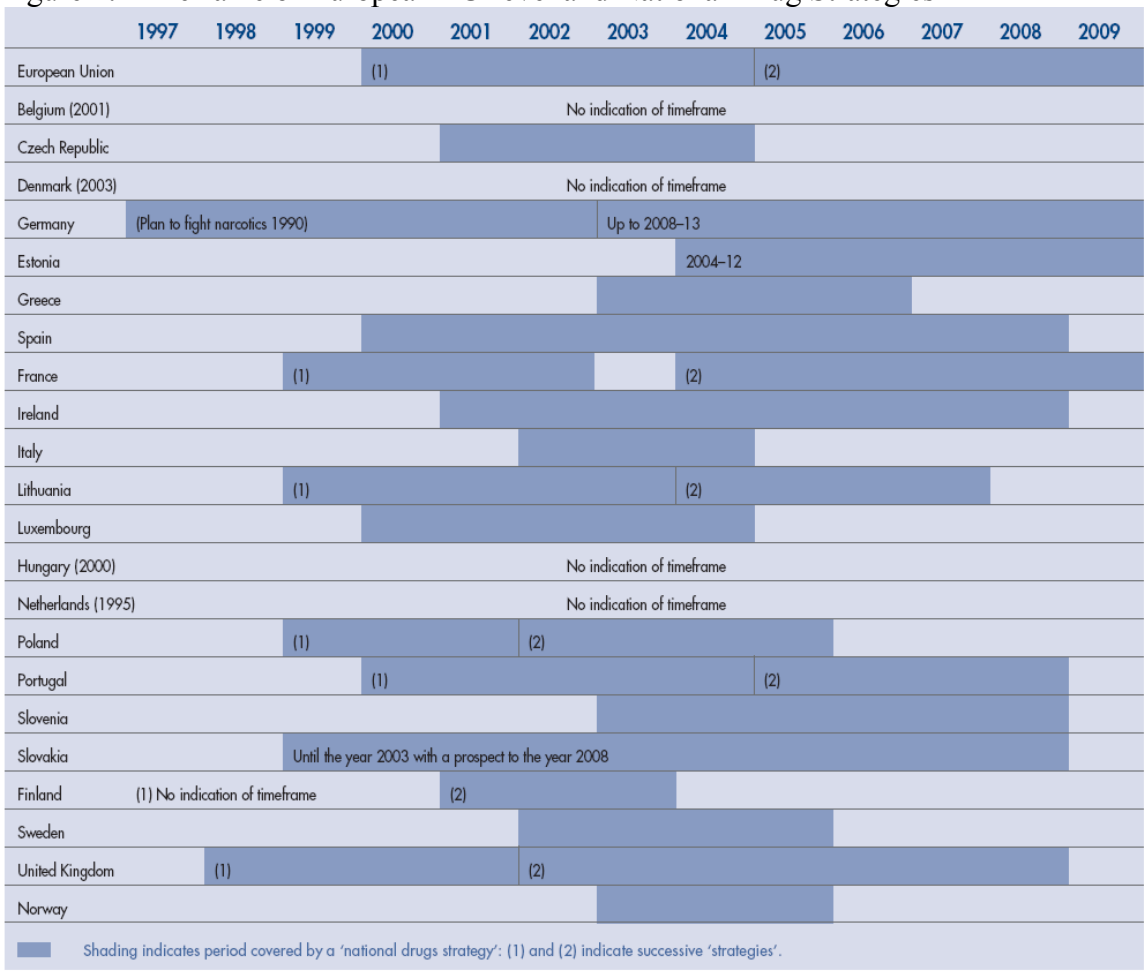
Source: EMCDDA 2008.

Table 2: Different Degrees of Harm Reduction in Select EU-15 Member States' Strategies

Belgium	Low-threshold services will be enhanced and officially recognized and needle exchange and substitution treatment will be put onto a more secure legal basis
Denmark	Demand-oriented treatment and differentiated goals must be available for each individual drug addict. This means that in cases where it appears difficult to guide the addict to a drug-free life, a more realistic goal would perhaps be to reduce the harm inflicted on the drug addict
Germany	Offer help to survive is the principle that will be implemented through low threshold services to prevent especially overdoses and infections, among others drugs consumption rooms
Spain	To start up harm-reduction programmes associated with drug consumption in a general manner, particularly programmes for exchanging syringes, safe sex and consumption with less risk, anti-AIDS kits, etc
Greece	Reduction of harm caused by the use of addictive substances, is one of the task of the draft proposal Action Plan (2002-2006)
France	The message of the law must be accompanied by a prevention approach which does not only focus on preventing the use of drugs, but also, when it exists, on avoiding the passage from harmful use to dependence
Ireland	To significantly reduce the harm caused to individuals and society by the misuse of drugs through a concerted focus on supply reduction, prevention, treatment and research
Netherlands	Harm reduction for users is among the objectives pursued by the Dutch drug policy
Austria (Länder)	In the last few years the importance of measures of accepting assistance ([20]) (Akzeptierender Ansatz) has been emphasised more strongly, with the objective of limiting drug-related risks and harm
Portugal	To create a primary national network for harm reduction, composed of street teams, contact and information points, syringe- exchange programmes and low-threshold methadone substitution programmes in 100% of the districts. To make harm-reduction programmes available to 100% of reclusive drug addicts
UK	Reducing the harm that drugs cause to society – communities, individuals and their families.

Source: EMCDDA 2002b.

Figure 2: Timeframe of European EU-level and National Drug Strategies



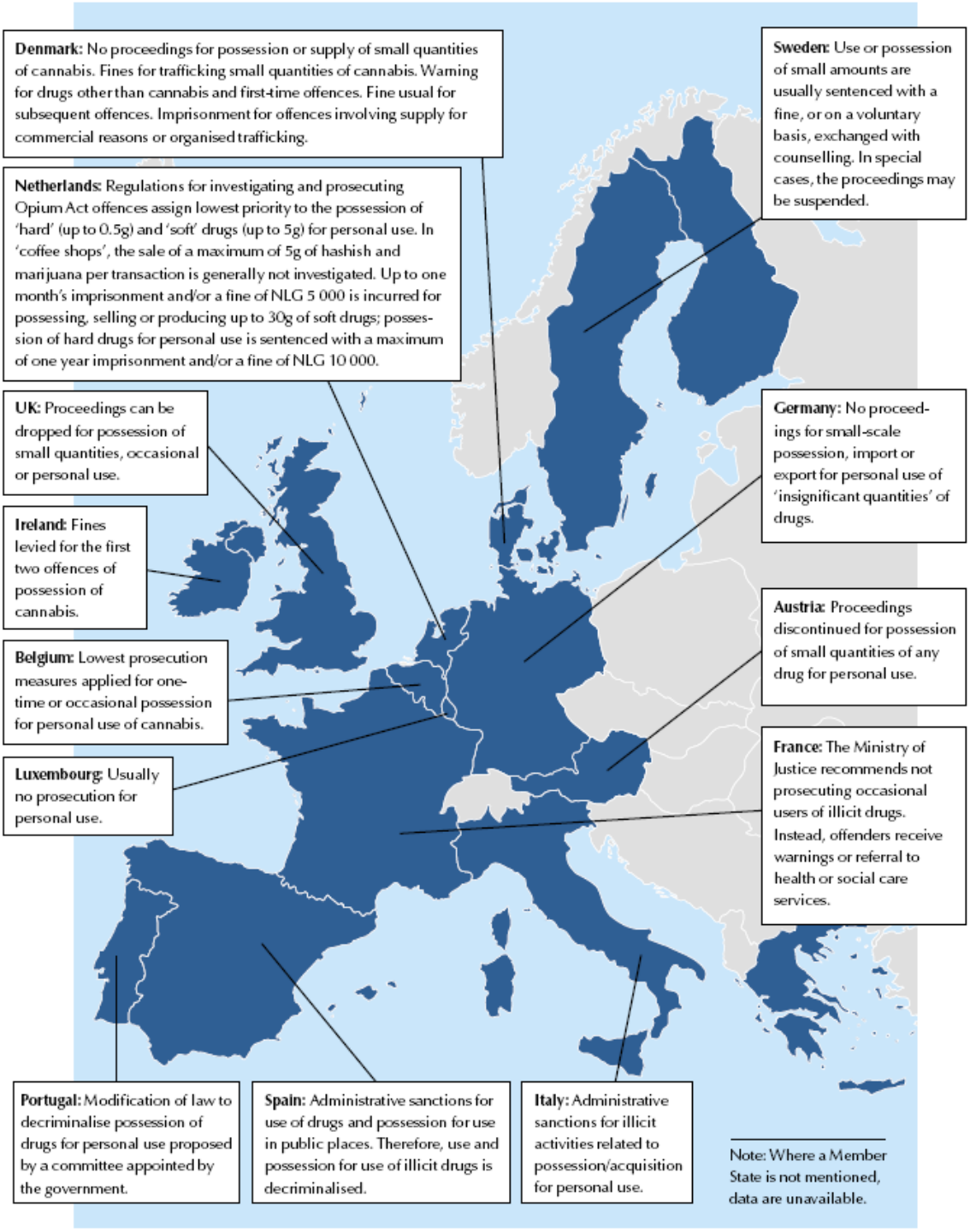
Source: EMCDDA 2004.

Table 3: Legal Status of Cannabis in the EU Member States

	Legislation	Prosecution level	Notes
Belgium	Drug-related offences (including cannabis) are punishable by imprisonment for between three months and five years and/or a fine.	Possession and cultivation for personal use are less likely to be punished according to the directive of 17 April 1998.	
Denmark	Cannabis-related offences (possession) are punishable by a fine or imprisonment for up two years.	For possession of small quantities of cannabis, the Chief Public Prosecutor recommends that the police should settle cases by dismissing the offender with a caution.	
Germany	Drug-related offences (including cannabis) are punishable by up to five years' imprisonment or a fine; punishment can be remitted in case of 'insignificant quantities' for personal use.	The Constitutional Court stated that even if penal provisions for the possession of cannabis are in line with the Constitution, the *Länder* should waive prosecution in minor cases when possession of cannabis is for personal use. The *Länder* have determined the following amounts as 'insignificant quantities' of cannabis: up to three consumer units or up to 6 g (four *Länder*), up to 10 g (three *Länder*), up to 15 g (two *Länder*), up to 30 g (two *Länder*), up to the 'size of a matchbox' (one *Land*).	Possession of a small quantity of all drugs is a criminal offence, but is not prosecuted/ punished when: • there is no harm to third persons; • minors are not involved; • it is for personal use; • it involves an 'insignificant quantity'.
Greece	Drug-related offences (including cannabis) are punishable by up to five years' imprisonment, which the offender can exchange for compulsory treatment.		
Spain	Drug-related offences, such as possession and use in public places, are punished by administrative sanctions.		
France	Cannabis-related offences, such as use, are punishable by a fine or imprisonment for up to one year.	Warnings are given for first cannabis use, if use is occasional and the circumstances justify not prosecuting.	
Ireland	Cannabis-related offences (possession for personal use) are punishable by a fine on the first or second conviction. From the third offence onwards, the offender incurs prison sentences of up to one year (summary) or up to three years (on indictment).		
Italy	Cannabis-related offences (such as possession for personal use) are punishable by administrative sanctions (such as suspension of driving licence) from the second offence onwards. Only a warning is given for first offences for possession of cannabis for personal use.		
Luxembourg	Drug-related offences (including cannabis) are punishable by imprisonment for between three months and three years and/or a fine.	First offences of simple consumption usually incur only a warning.	The distinction between lower-risk and higher-risk drugs is proposed as a modification of the drug law.
Netherlands	Sale, production and possession of up to 30 g of cannabis are punishable by one month's imprisonment and/or a fine (NLG 5 000); for possession of more than 30 g of cannabis, the maximum penalties are four years' imprisonment for import or export, and two years for manufacture including cultivation of hemp for non-agricultural purposes, transportation, sale or possession/storage.	Investigation and prosecution of possession of cannabis for personal use (up to 5 g) carry the lowest priority; the sale of cannabis in coffee shops of up to 5 g per transaction is generally not investigated.	AHOJ-G guidelines specify the terms and conditions for sale of cannabis in coffee shops. AHOJ-G criteria = 'A' stands for no advertising of any drug; 'H' for no hard drug sale; 'J' for not selling cannabis to young persons (under 18); 'O' for no public nuisance; 'G' for no large quantities (more than 5 g of cannabis) per transaction. The maximum stock allowed at any one time is 500 g per coffee shop.
Austria	Drug-related offences (including cannabis) are punishable by up to six months' imprisonment. If the defined conditions are fulfilled, reports have to be withdrawn in cases involving small quantities. The conditions for withdrawal of reports in connection with 'first consumers' of cannabis are easier to fulfil.		
Portugal	Cannabis-related offences, such as use, incur up to three months' imprisonment or a fine if the quantity does not exceed three daily doses, and up to one year's imprisonment if the quantity exceeds this limit (1).	Offences involving very small quantities are usually exempt from punishment.	The new strategy proposes to distinguish penalties and administrative sanctions taking into account the varying risks of illicit substances.
Finland	Cannabis-related offences, such as use, possession, and cultivation, are punishable by a fine or up to two years' imprisonment.		Finnish law recognises the concept of a 'very dangerous drug', which refers to a narcotic drug that may cause death by overdose or serious damage to health. This definition is not normally applied to cannabis.
Sweden	Drug-related offences, such as use of cannabis, if judged minor, are punished with imprisonment for up to six months or a fine.	Users are usually fined, which may be exchanged on a voluntary basis for counselling.	
UK	Cannabis-related offences, such as possession, are punishable by up to five years' imprisonment; police may caution instead of prosecuting; courts may apply fines, probation or community service.	Where only small amounts are involved for personal use, the offence is often met by a fine.	

Source: EMCDDA 1999.

Figure 3: Summary of EU Responses to Minor Drug-related Offenses in 1999



Source: EMCDDA 1999.

Table 4: Geographic Coverage of Harm Reduction Techniques in the EU-15

Country	Geographical coverage of syringe-exchange programmes (1)	Low-threshold medical care (2)	Safer use education (3)	First aid courses for drug users (4)	Supervised drug consumption rooms	Heroin prescription
Belgium	> 40 sites, major cities		Yes	Yes		Trials under discussion
Denmark	10 of 14 counties		Yes	Yes		
Germany	Almost all cities	Yes	Yes	Yes	20 facilities in 11 cities	Three-year medical study started in 2002
Greece	Athens	Yes	Yes	Yes		
Spain	18 of 19 regions, prisons	Yes	Yes	Yes	2 facilities	Trial in Andalucia and Cataluña
France	87 of 100 *départements*	Yes	Yes	Yes		
Ireland	20 sites and outreach, mainly Dublin area		Yes			
Italy	SerT and non-government organisations in 'many cities'; machines in smaller urban settings	Yes		Yes		
Luxembourg	Specialised services in three main cities; machines in five cities	Yes	Yes	Yes	1 (planned)	Legal framework created
Netherlands	> 95 % of bigger cities	Yes	Yes	Yes	21 rooms in 11 cities	Randomised clinical trial completed; 300 clients continue treatment
Austria	13 towns across most provinces	Yes	Yes	Yes		
Portugal	National coverage through pharmacy-based programme; SEP/outreach network under construction	Yes	Yes	Yes	Legally possible, not foreseen	
Finland	Over 70 % of cities > 50 000 inhabitants, plus five smaller cities	Yes	Yes	Yes		
Sweden	Malmö and Lund			Yes (at SEP)		
UK	Major programmes in most English and Scottish cities; SEPs introduced in N. Ireland in 2001		Yes	Yes	Recommendation by Home Affairs Select Committee not supported by Home Secretary	Limited, ongoing heroin prescription. Expansion recommended by Select Committee (and agreed in principle by government)
Norway	Oslo since 1988 and most major municipalities	Yes		Yes		

(1) See Table 7 OL: Provision and types of syringe-exchange programmes (SEPs), pharmacy involvement, numbers of syringes distributed/sold (online version).
(2) At least one low-threshold medical care service.
(3) At least one service regularly provides safer use training courses.
(4) Regular first aid courses for drug users in at least in one city.
See Table 11 OL: Strategies and selected measures to reduce drug-related deaths in the EU Member States and Norway.

Source: EMCDDA 2003.

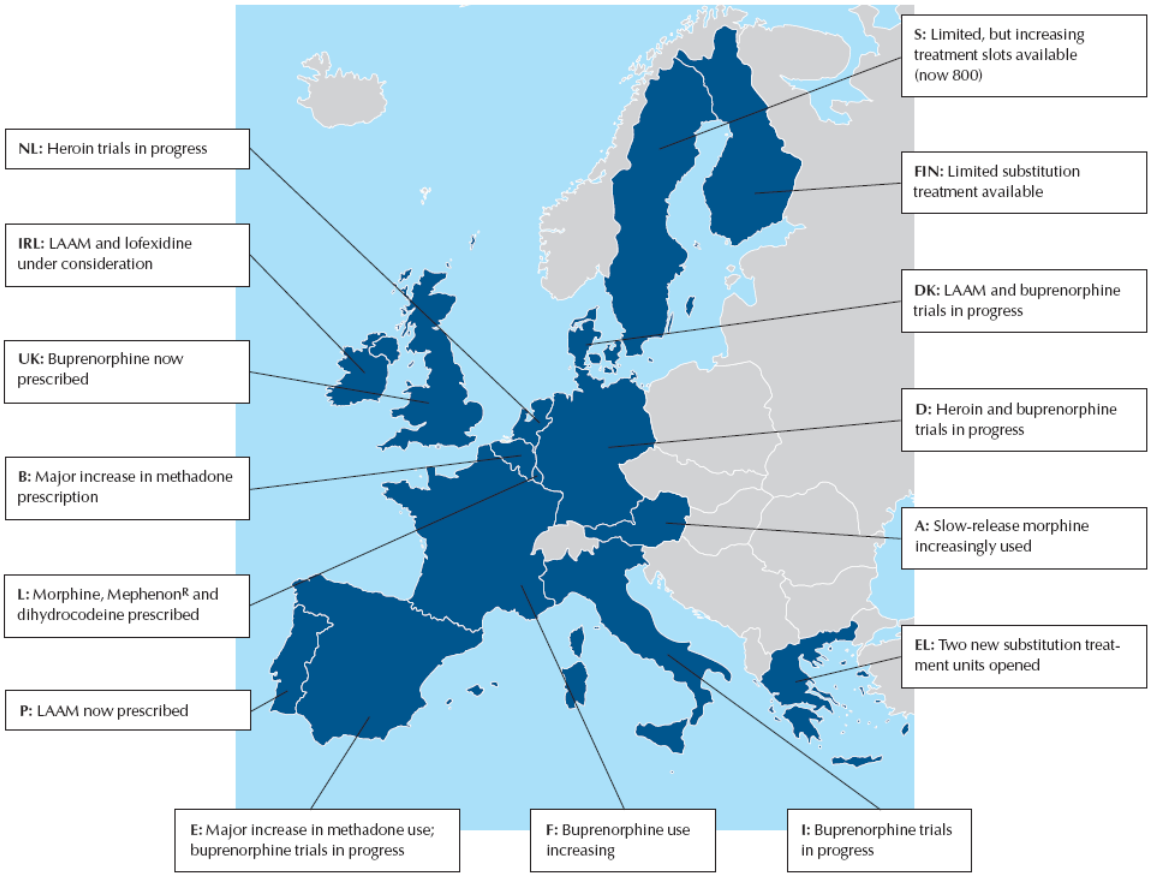
Table 5: Substance Substitutions Available in the EU-15 with Date Introduced

Country	Methadone treatment introduced	Introduction of other substitution substances [a]
Belgium	1994	Occasional use of buprenorphine [b], dihydrocodeine
Denmark	1970	Buprenorphine [b, c] and LAAM (both 1998) [c]
Germany	1992	Dihydrocodeine (1985), heroin (1999) [c], LAAM (1999), buprenorphine (2000) [b]
Greece	1993	No other substance prescribed
Spain	1983	LAAM (1997)
France	1995	Buprenorphine (1996) [b]
Ireland	1970	No other substance prescribed
Italy	1975	Buprenorphine (1999) [b, c]
Luxembourg	1989	Dihydrocodeine (1994) [c], Mephenon^{R} [d]
Netherlands	1968	Heroin (1997) [c]
Austria	1987	Slow-release morphine (1997), buprenorphine (1997) [b, c]
Portugal	1977	LAAM (1994) [c]
Finland	1974	Buprenorphine (1997) [b]
Sweden	1967	No other substance prescribed
UK	1968	Buprenorphine (1999) [b]

Notes: [a] Dates refer to the year the political decision was taken to prescribe the substance.
[b] Buprenorphine is in the form of Subutex^{R} and not Temgesic^{R} as this only contains small amounts of the substance.
[c] Trial only.
[d] Date not known.

Source: EMCDDA 2000.

Figure 4: An Overview of Substitution Programs in the EU-15



Source: EMCDDA 2000.

CHAPTER 3: DATA AND METHODS

Table 6: Sample and Population Summary

	Net Sample Size	Total Population Aged 15-24	Total Population	No. of NUTS 2 Statistical Regions
Belgium	456	1,248,261	10,332,787	11
Denmark	454	598,518	5,368,354	4
Germany	1,013[1]	9,454,616	82,488,503	38
Ireland	524	641,610	3,931,771	2
Greece	469	1,489,117	10,987,545	8
Spain	450	5,553,366	41,175,906	17
France	447	7,765,809	59,593,411	21
Italy	450	6,174,332	56,371,382	18
Luxembourg	189[2]	50,986	446,175	1
Netherlands	453	1,922,246	16,148,934	12
Austria	541	971,482	8,083,664	9
Portugal	457	1,409,165	10,368,402	7
Finland	402	649,764	5,174,466	4
Sweden	477	1,404,704	11,997,882	6
United Kingdom	750[3]	7,412,944	59,347,649	34
Total	7,532	46,746,920	381,816,831	192

[1] Includes separate samples from former East and West Germany
[2] Target sample size was lower for Luxembourg
[3] Includes an oversample of 202 respondents in Northern Ireland

Table 7: Percentage responding "yes" to substance use questions

	Lifetime cannabis	Last month cannabis	Lifetime other drug	Last month other drug	Regularly use cigarettes	Regularly use alcohol
Belgium	24.7%[2]	9.5%	6.8%	1.9%	31.1%[2]	27.4%
Denmark	47.0%[1]	12.2%	11.4%	2.5%	36.7%	63.8%[1]
Germany	25.6%[2]	8.3%[2]	8.6%	2.4%	46.6%[1]	17.4%[2]
Ireland	24.2%[2]	8.7%[2]	8.9%	4.8%[1]	34.3%	54.8%[1]
Greece	4.8%[2]	1.3%[2]	1.2%[2]	0.4%[2]	29.5%[2]	14.6%[2]
Spain	29.4%	15.0%[1]	12.2%[1]	3.7%	38.7%	20.4%[2]
France	44.9%[1]	19.8%[1]	8.0%	2.9%	44.3%[1]	18.6%[2]
Italy	17.2%[2]	7.8%[2]	2.7%[2]	0.6%[2]	24.9%[2]	8.3%[2]
Luxembourg	27.3%	4.5%[2]	6.6%	2.3%	23.0%[2]	21.4%
Netherlands	35.3%[1]	12.2%	10.6%	3.2%	32.3%[2]	47.3%[1]
Austria	17.9%[2]	4.6%[2]	4.6%[2]	1.3%[2]	44.8%[1]	20.8%[2]
Portugal	14.1%[2]	4.9%[2]	6.8%	1.8%	31.5%[2]	20.6%[2]
Finland	19.2%[2]	5.6%[2]	9.0%	3.1%	33.3%	27.8%
Sweden	16.5%[2]	3.9%[2]	9.9%	1.6%[2]	21.5%[2]	27.9%
United Kingdom	37.0%[1]	13.4%	13.8%[1]	4.4%[1]	32.3%[2]	49.1%[1]
EU-15 Average	28.9%	11.3%	8.8%	2.7%	36.8%	25.2%

[1] Significantly greater than EU-15 average (two-tailed *Z*-test of proportions, $p < .05$)
[2] Significantly less than EU-15 average (two-tailed *Z*-test of proportions, $p < .05$)

Figure 5: Percentage Responding "Yes" to Ever Used Marijuana or Other Drug by Country

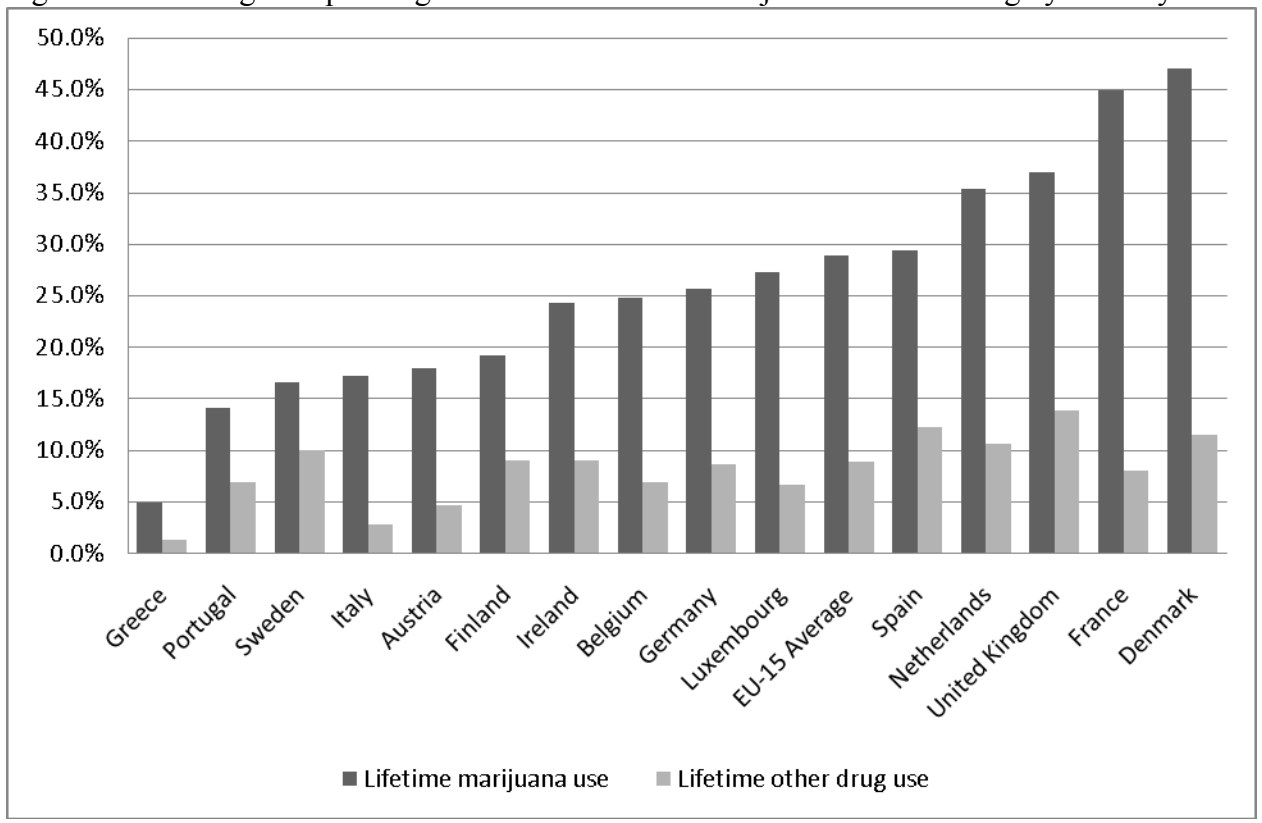


Table 8: Regional Drug Use for NUTS-2 Containing Metropolitian Areas (Population Greater Than 1,000,000)

Rank	City name	NUTS 2 Region	Country	metro area population	Regional lifetime marijuana use	Regional lifetime other drug use
1	London	London	United Kingdom	11,917,000	24.0%	16.1%
2	Paris	Ile de France	France	11,089,124	44.3%	3.1%
3	Madrid	Comunidad de Madrid	Spain	5,804,829	23.2%	13.4%
4	Ruhr Area	*Multiple*: Düsseldorf, Münster, Arnsberg	Germany	5,302,179	24.3%, 39.7%, 14.2%	5.6%, 32.9%, 0.0%
5	Berlin	Berlin	Germany	4,971,331	20.6%	8.2%
6	Barcelona	Cataluna	Spain	4,233,638	40.3%	20.0%
7	Athens	Attiki & Sterea Ellada	Greece	4,013,368	6.1%	1.5%
8	Rome	Lazio	Italy	3,457,690	29.5%	2.8%
9	Hamburg	Hamburg	Germany	3,134,620	36.1%	4.3%
10	Milan	Lombardia	Italy	3,076,643	39.1%	10.9%
11	Stuttgart	Stuttgart	Germany	2,663,660	23.2%	10.4%
12	Manchester	Greater Manchester	United Kingdom	2,539,100	23.5%	14.0%
13	Munich	Oberbayern	Germany	2,531,706	15.7%	15.8%
14	Frankfurt	Darmstadt	Germany	2,517,561	36.4%	12.5%
15	Lisbon	Lisboa	Portugal	2,435,837	24.8%	10.1%
16	Leeds - Bradford	West Yorkshire	United Kingdom	2,393,300	18.7%	7.4%
17	Birmingham	West Midlands	United Kingdom	2,357,100	54.0%	20.1%
18	Naples	Campania	Italy	2,253,964	7.3%	0.0%
19	Vienna	Wien	Austria	2,179,769	30.1%	11.1%
20	Cologne	Köln	Germany	1,873,580	30.1%	13.3%
21	Stockholm	Stockholm	Sweden	1,860,872	31.1%	13.0%
22	Copenhagen	Hovedstaden	Denmark	1,806,667	54.5%	12.9%
23	Brussels	Région de Bruxelles-Capitale	Belgium	1,800,663	24.7%	8.8%
24	Glasgow	South Western Scotland	United Kingdom	1,747,100	12.6%	8.4%
25	Turin	Piemonte & Valle d'Aosta	Italy	1,745,221	12.0%	0.0%
26	Lyon	Rhône-Alpes	France	1,717,300	50.1%	19.3%
27	Valencia	Comunidad Valenciana	Spain	1,564,145	26.3%	20.4%

28	Dublin	Southern and Eastern	Ireland	1,535,446	29.0%	10.2%
29	Düsseldorf	Düsseldorf	Germany	1,525,029	24.3%	5.6%
30	Amsterdam	Noord-Holland	Netherlands	1,443,258	54.0%	21.4%
31	Liverpool	Merseyside	United Kingdom	1,365,900	41.6%	7.9%
32	Bielefeld	Detmold	Germany	1,297,876	41.2%	0.0%
33	Hanover	Hannover	Germany	1,294,447	29.2%	14.3%
34	Nuremberg	Mittelfranken	Germany	1,288,797	25.6%	0.0%
35	Sheffield	South Yorkshire	United Kingdom	1,277,100	21.3%	0.0%
36	Seville	Andalucia	Spain	1,249,346	20.3%	7.1%
37	Bremen	Bremen	Germany	1,249,291	59.3%	78.5%
38	Helsinki	Etelä-Suomi	Finland	1,224,107	28.7%	17.0%
39	Rotterdam	Zuid-Holland	Netherlands	1,186,818	35.5%	15.1%
40	Porto	Norte	Portugal	1,099,040	5.4%	0.9%
41	Newcastle upon Tyne	Northumberland, Tyne and Wear	United Kingdom	1,055,600	41.7%	29.6%
42	Tolouse	Midi-Pyrénées	France	1,052,497	65.7%	24.8%
43	Bristol	Gloucestershire, Wiltshire and Bristol/Bath area	United Kingdom	1,006,600	39.0%	14.7%

Table 9: Percentage choosing option as the most effective way to tackle drug-related problems

	Treatment & Prevention				Penal			Scale
	More treatment and rehab	Info campaigns	Reduce poverty and unemployment	More leisure opportunities	Tougher on producers and manufacturers	Tougher on dealers and traffickers	Tougher on users	Mean (St. Dev.)
Belgium	40.6%[2]	37.1%	14.4%[2]	16.4%[2]	53.1%	60.3%	31.0%[1]	-0.358[2] (1.616)
Denmark	64.7%[1]	36.5%	15.5%[2]	34.1%[1]	34.6%[2]	57.9%	25.0%	0.332[1] (1.459)
Germany	47.0%[2]	32.7%[2]	24.1%[1]	27.6%[1]	51.0%[2]	62.6%[1]	21.7%	-0.038 (1.644)
Ireland	60.7%[1]	40.5%	23.0%	37.2%[1]	35.8%	64.1%[1]	21.1%	0.403[1] (1.553)
Greece	56.7%	49.5%[1]	15.9%[2]	7.6%[2]	56.4%[1]	77.0%[1]	16.8%[2]	-0.204[2] (1.347)
Spain	54.7%	54.9%[1]	14.6%[2]	31.7%[1]	41.8%[2]	44.4%[2]	13.2%[2]	0.565[1] (1.546)
France	52.7%	43.1%	22.2%	26.6%	49.9%	58.6%	19.6%	0.166 (1.647)
Italy	48.4%[2]	41.7%	13.0%[2]	13.6%[2]	59.5%[1]	64.1%[1]	22.3%	-0.292[2] (1.574)
Luxembourg	34.2%[2]	46.4%[1]	16.7%	29.5%	54.3%	70.2%[1]	24.0%	-0.217[2] (1.684)
Netherlands	46.9%[2]	40.8%	14.7%[2]	15.3%[2]	52.6%	61.0%	29.8%[1]	-0.257[2] (1.680)
Austria	53.6%	42.0%	26.5%[1]	30.2%[1]	47.2%	57.8%	19.6%	0.278[1] (1.657)
Portugal	55.4%	41.1%	30.8%[1]	19.2%[2]	53.0%	45.4%[2]	18.3%[2]	0.298[1] (1.480)

Finland	57.0%	33.7%[2]	17.6%	29.5%[1]	50.9%	61.7%	29.7%[1]	-0.046 (1.584)
Sweden	62.3%[2]	34.6%[2]	15.2%[2]	30.6%[1]	45.0%	60.4%	26.0%	0.113 (1.645)
United Kingdom	63.8%[1]	27.6%[2]	21.7%	24.2%	40.1%[2]	59.8%	28.8%[1]	0.086 (1.570)
EU-15 Average	53.3%	38.9%	19.8%	24.2%	48.7%	59.1%	22.1%	0.062 (1.619)

Note: Respondents were allowed to choose up to three responses.
[1] Significantly greater than EU-15 average (two-tailed *Z*-test of proportions, $p < .05$)
[2] Significantly less than EU-15 average (two-tailed *Z*-test of proportions, $p < .05$)

Figure 6: Percentage Agreeing with People Should Be Punished for Using Drugs by Country

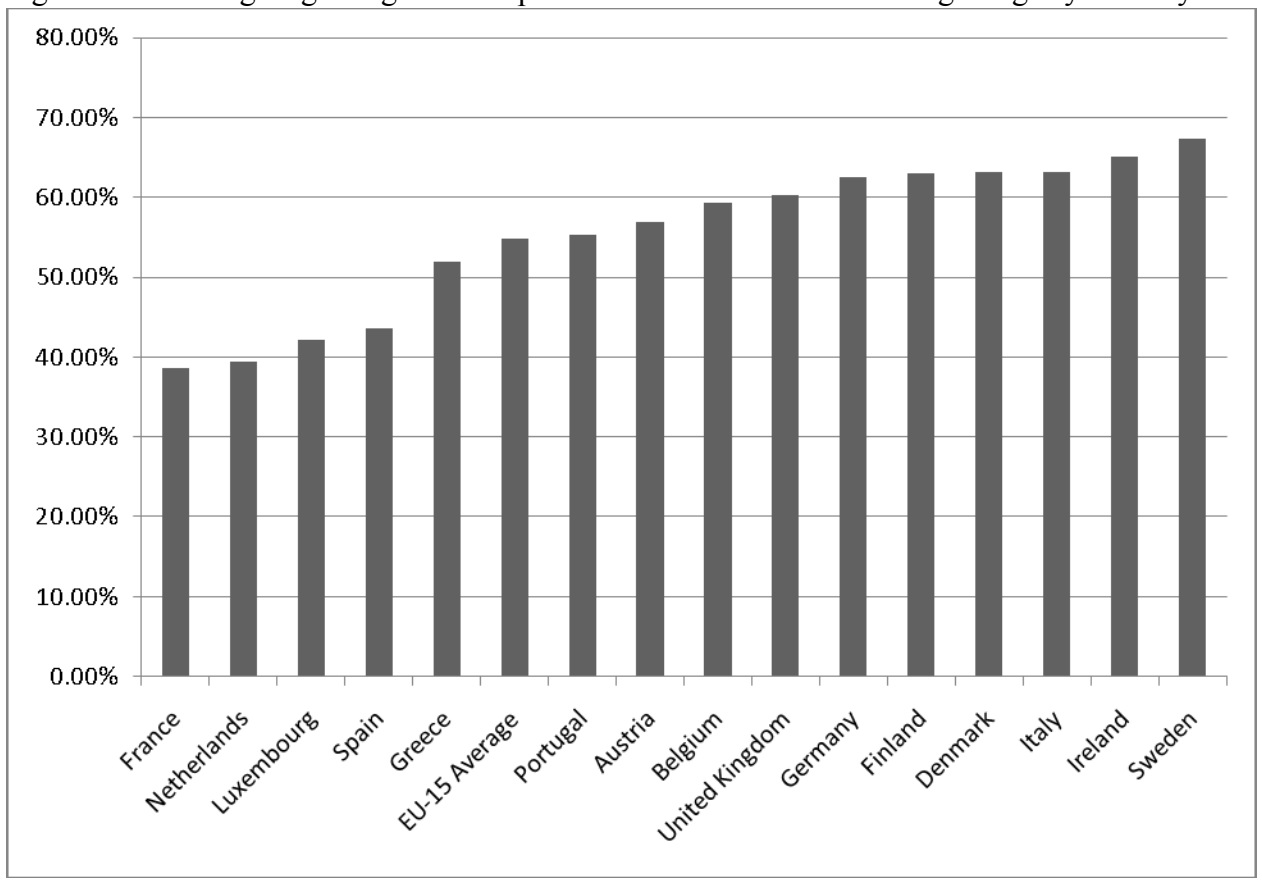


Table 10: Percentage agreeing with drug policies

`	People should be punished for using drugs	There should be drug testing at school/ college/work	When testing drivers for alcohol, police should also test for drugs	If drugs were cheaper, there would be fewer drug-related problems	Drug users should be able to get clean needles at low cost
Belgium	59.3%	49.9%[2]	81.7%	21.0%[2]	47.2%[2]
Denmark	63.1%[1]	38.5%[2]	84.0%	30.3%[1]	77.0%[1]
Germany	62.6%[1]	57.0%	89.1%[1]	26.4%	67.4%[1]
Ireland	65.1%[1]	54.3%	88.6%[1]	21.1%[2]	61.4%
Greece	52.0%	86.5%[1]	79.8%[2]	24.5%	60.4%
Spain	43.6%[2]	70.3%[1]	79.8%[2]	30.0%	74.7%[1]
France	38.7%[2]	55.3%	81.6%	23.9%	60.4%
Italy	63.1%[1]	59.1%	78.1%[2]	24.2%	29.0%[2]
Luxembourg	42.2%[2]	65.7%	85.8%	33.1%[1]	54.8%
Netherlands	39.4%[2]	42.5%[2]	82.1%	36.5%[1]	63.9%[1]
Austria	56.9%	44.3%[2]	68.5%[2]	23.0%	61.4%
Portugal	55.3%	79.4%[1]	88.0%[1]	44.4%[1]	73.5%[1]
Finland	63.0%[1]	61.4%	84.6%	13.8%[2]	71.4%[1]
Sweden	67.4%[1]	55.8%	89.6%[1]	10.6%[2]	35.4%[2]
United Kingdom	60.3%[1]	55.8%	91.2%[1]	21.4%[2]	55.0%
EU-15 Average	54.8%	58.9%	84.4%	25.5%	58.6%

[1] Significantly greater than EU-15 average (two-tailed *Z*-test of proportions, $p < .05$)
[2] Significantly less than EU-15 average (two-tailed *Z*-test of proportions, $p < .05$)

Table 11: Descriptive Statistics for Predictors

Variable	Weighted Percentage
Gender	
Female	50.0
Male	50.0
Marital status	
Unmarried, unpartnered	85.0
Married	3.2
Partnered, unmarried	11.8
Community type	
Rural area or village	26.5
Small or middle sized town	43.1
Large town	30.4
Employment status	
Working	36.8
Student	56.9
Unemployed	6.3
Education	
Secondary or less	7.9
Some postsecondary	27.7
Tertiary or higher	7.4
College student	24.6
High school student	32.3
Head of household	22.3
HH Occupation	
Non-professional/management	50.7
Professional/management	31.0
Not working	17.5
Income quartiles	
1st	15.2
2nd	10.5
3rd	11.1
4th	13.0
Don't know	50.2
Political Beliefs	
Left	26.3
Center	30.2
Right	14.2
Don't know	29.3
Obtain drugs easily	90.9
Know marijuana user	64.8
Know drug user (besides marijuana)	45.7
Cocaine Very/Fairly Dangerous	96.7

Variable	Weighted Mean (St. Dev)
Age	19.55 (2.91)
Marijuana danger	2.59 (0.96)
Cigarettes danger	2.52 (0.83)

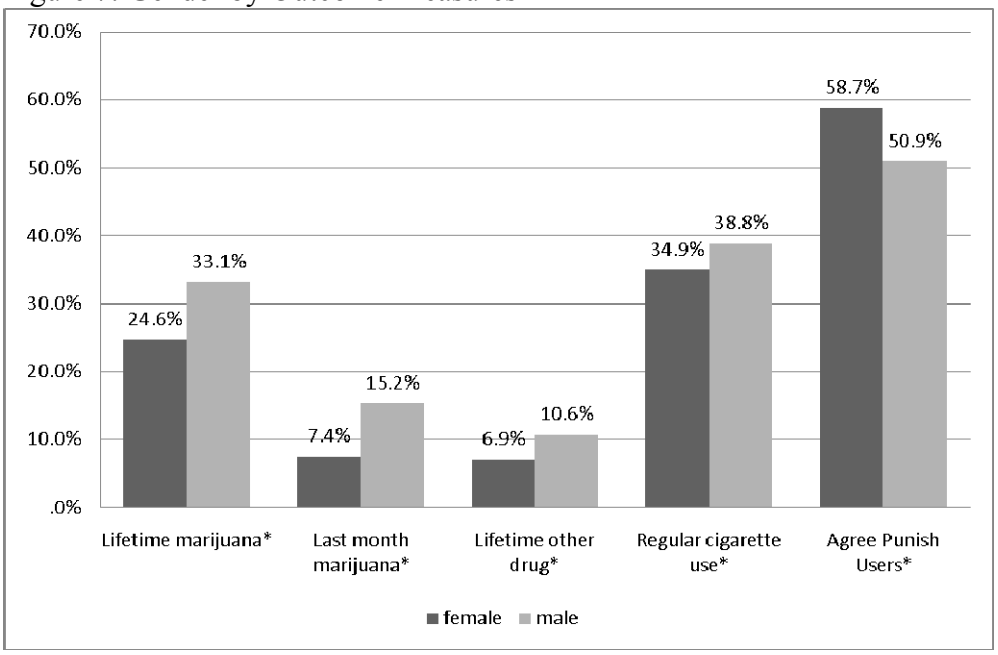
Table 12: Cross-classification Tables of Predictors and Categorical Outcome Variables

	Lifetime marijuana	Last month marijuana	Lifetime other drug	Regular cigarette use	Agree Punish Users
Gender					
female	24.6%	7.4%	6.9%	34.9%	58.7%
male	33.1%	15.2%	10.6%	38.8%	50.9%
Marital status					
unmarried, unpartnered	28.1%	11.4%	8.3%	35.4%	54.2%
unmarried, partnered	36.9%	11.8%	12.1%	48.5%	55.8%
married	20.3%	6.1%	8.1%	31.7%	65.9%
Community type					
rural area or village	24.7%	10.3%	6.5%	37.0%	60.1%
small or middle sized town	28.4%	11.0%	8.5%	36.0%	53.7%
large town	33.2%	12.6%	11.0%	37.9%	51.8%
Employment status					
student	26.5%	10.6%	6.4%	29.4%	54.2%
working	32.0%	11.6%	11.5%	46.6%	56.7%
unemployed	31.7%	15.4%	14.1%	47.3%	49.3%
Education					
Secondary or less	34.7%	12.4%	10.3%	46.6%	57.1%
Some postsecondary	31.0%	12.5%	12.2%	48.8%	56.9%
Tertiary or higher	32.7%	10.9%	12.1%	38.7%	49.2%
college student	34.8%	13.0%	8.4%	35.2%	48.8%
high school student	20.2%	8.9%	4.9%	24.9%	58.1%
Head of household					
no	25.6%	10.0%	7.0%	34.3%	56.3%
yes	40.0%	16.0%	15.0%	45.5%	49.4%
HH occupation					
professional/management	30.3%	13.5%	8.4%	34.4%	51.6%
non-professional/management	25.7%	9.4%	7.9%	37.3%	57.1%
not working	33.6%	13.1%	11.2%	38.7%	53.5%
Income quartiles					
1st	34.2%	14.0%	12.1%	45.7%	51.3%
2nd	29.6%	10.3%	9.9%	43.7%	55.7%
3rd	25.8%	9.4%	6.9%	37.9%	56.4%
4th	33.6%	13.3%	9.4%	36.9%	52.7%
DK	26.5%	10.6%	7.7%	32.4%	55.9%
Political beliefs					
left	39.4%	17.9%	11.8%	41.4%	42.3%
center	27.0%	9.6%	9.1%	37.9%	59.0%
right	28.4%	9.6%	9.6%	38.7%	60.0%

DK	21.6%	7.9%	5.2%	30.7%	59.3%
Obtain drugs easily					
no	10.1%	3.0%	.7%	23.9%	60.6%
yes	30.7%	12.1%	9.6%	38.1%	54.3%
Know marijuana user					
no	4.7%	2.1%	3.0%	26.2%	64.9%
yes	42.0%	16.3%	11.9%	42.6%	49.5%
Know drug user					
no	18.2%	5.4%	1.9%	30.9%	58.7%
yes	41.5%	18.3%	16.9%	43.9%	50.3%

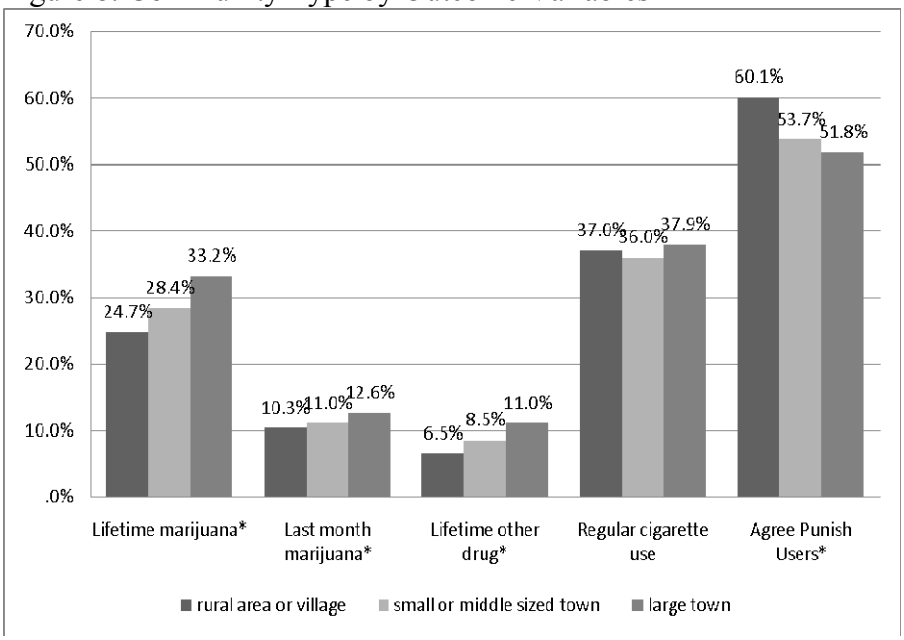
Note: All chi-squared tests of independence significant ($p < .05$) except (1) community type and regular cigarette use, (2) education and last month marijuana use, and (3) income quartiles and agree with punish users.

Figure 7: Gender by Outcome Measures



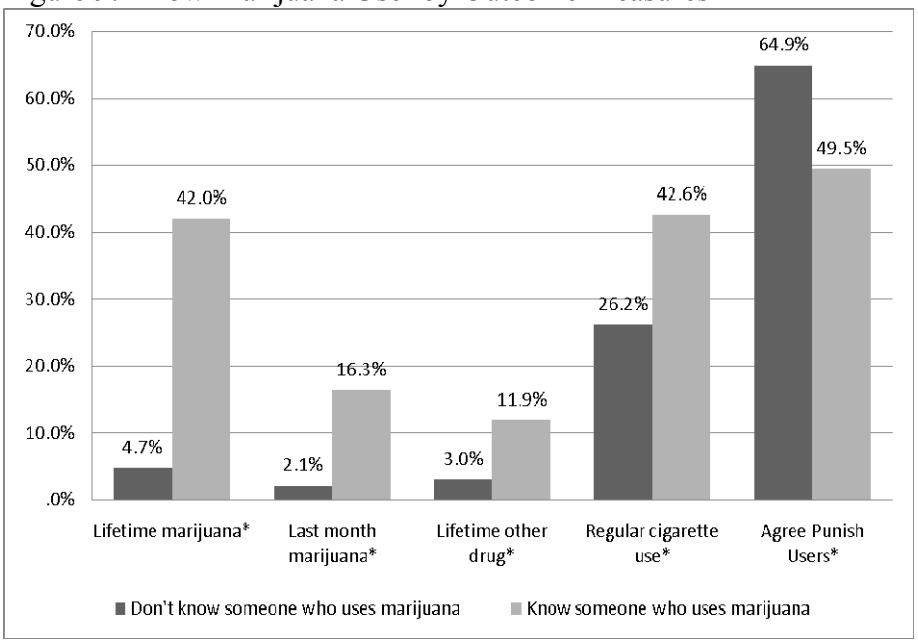
* Chi-square test, $p < .05$

Figure 8: Community Type by Outcome Variables



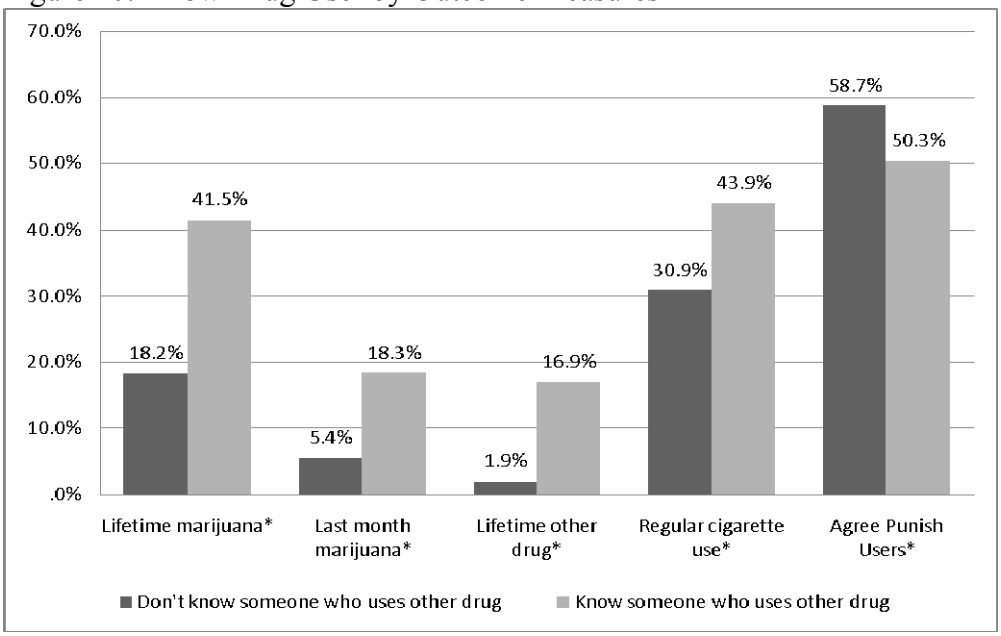
* Chi-square test, $p < .05$

Figure 9: Know Marijuana User by Outcome Measures



* Chi-square test, $p < .05$

Figure 10: Know Drug User by Outcome Measures



* Chi-square test, $p < .05$

Figure 11: Lifetime Marijuana and Other Drug Use by Agree with Punishing Users

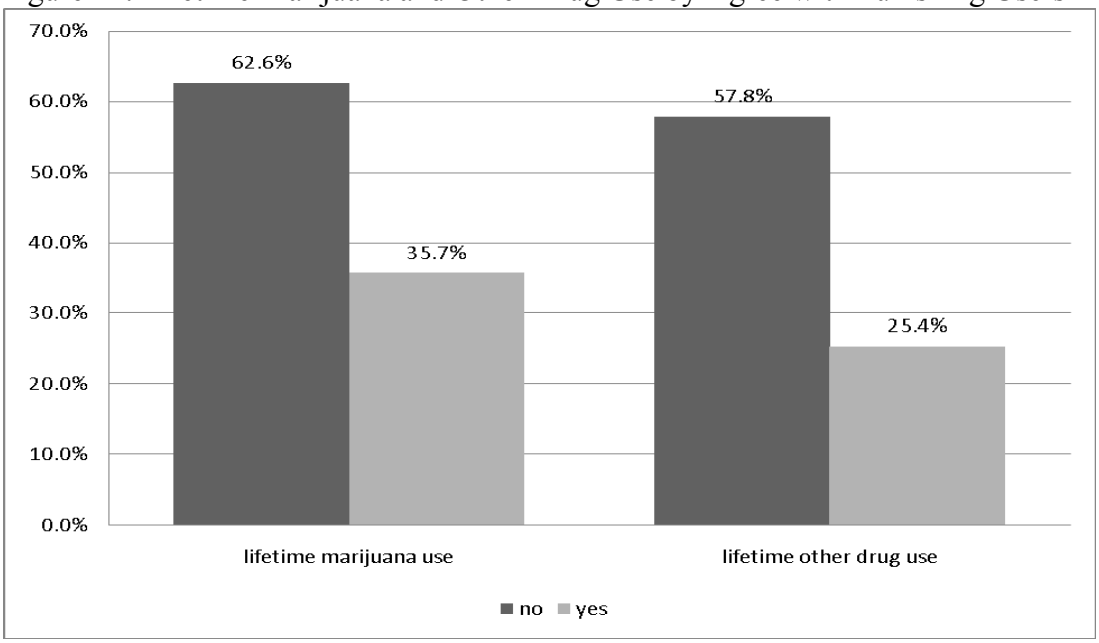


Figure 12: Marijuana Danger by Outcome Measures

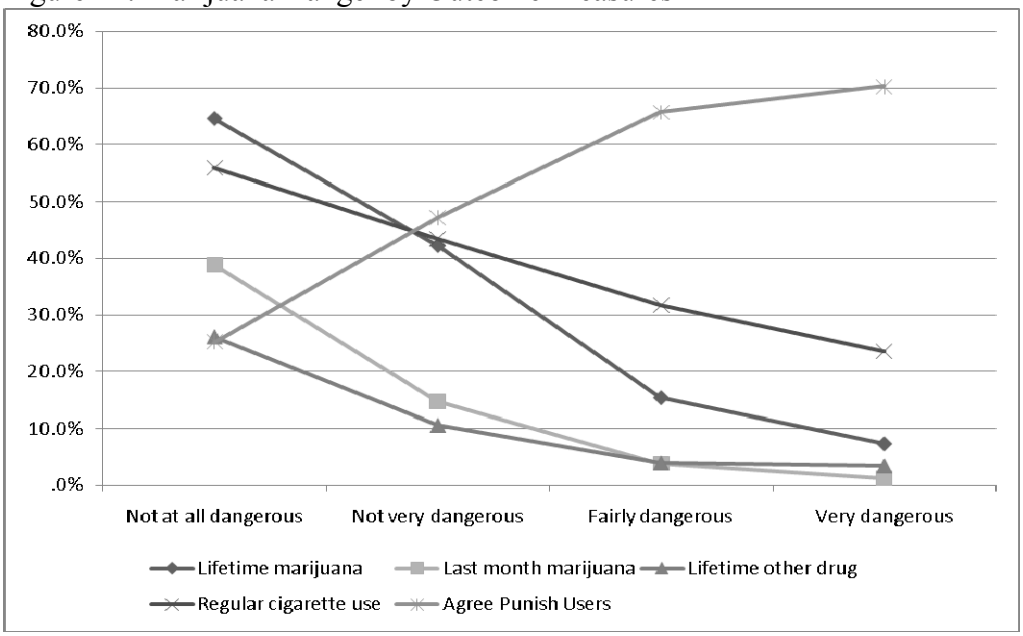


Figure 13: Age by Outcome Measures

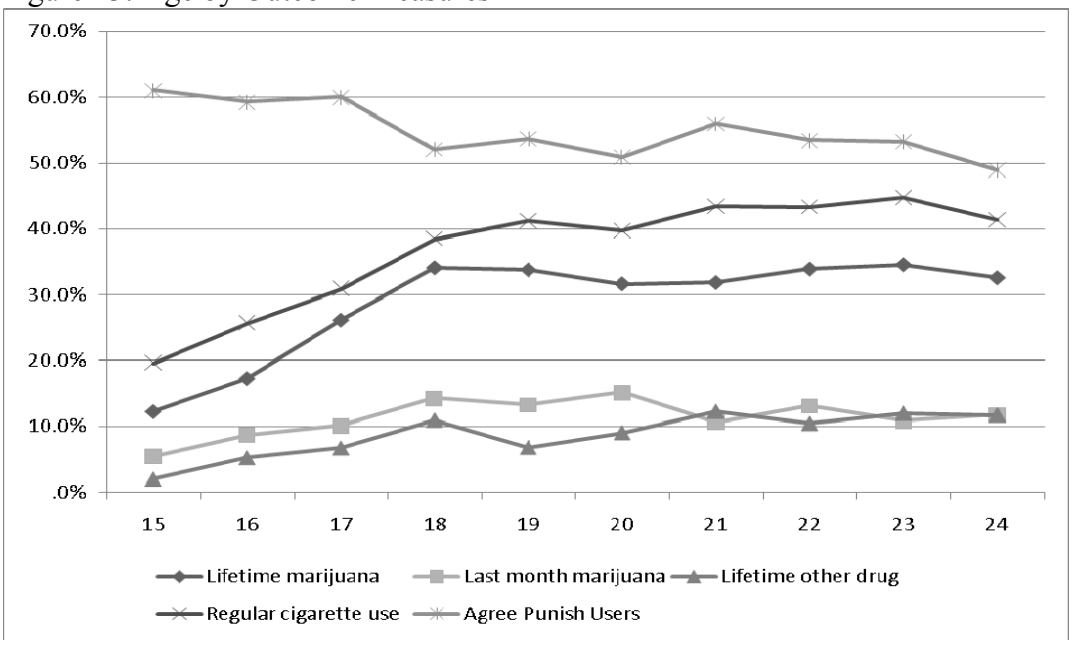


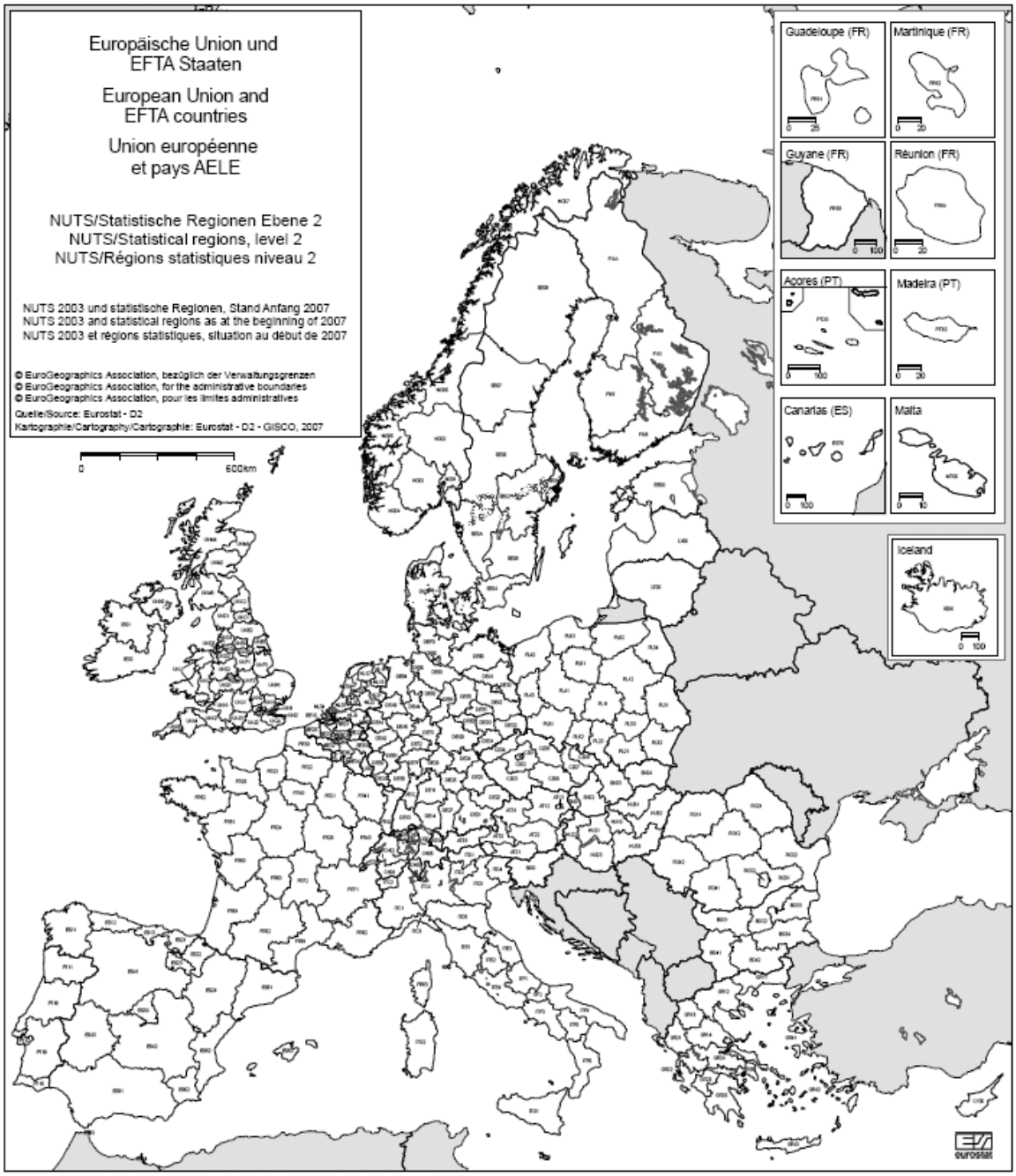
Table 13: Averages and ANOVAs for Categorical Predictors on the Proper Reaction to Drugs Scale

Variable	Scale Average	*F*-statistic
Gender		29.021***
Female	-0.037	
Male	0.161	
Marital status		1.599
Unmarried, unpartnered	0.060	
Married	-0.085	
Partnered, unmarried	0.120	
Community type		4.947**
Rural area or village	0.008	
Small or middle sized town	0.034	
Large town	0.148	
Employment status		4.469*
Working	0.004	
Student	0.110	
Unemployed	-0.029	
Education		7.567***
Secondary or less	-0.048	
Some postsecondary	-0.033	
Tertiary or higher	0.168	
College student	0.214	
High school student	0.030	
Head of household		21.249***
No	0.016	
Yes	0.220	
HH Occupation		1.584
Non-professional/management	0.045	
Professional/management	0.057	
Not working	0.135	
Income quartiles		2.681*
1st	0.152	
2nd	0.111	
3rd	-0.003	
4th	-0.052	
Don't know	0.068	
Political beliefs		37.062***
Left	0.356	
Center	-0.045	
Right	-0.218	
Don't know	0.044	
Obtain drugs easily		
No	-0.060	4.368*
Yes	0.074	
Know marijuana user		19.618***
No	-0.049	
Yes	0.122	
Know drug user		3.075
No	0.032	
Yes	0.097	

Have used marijuana		146.272***
No	-0.079	
Yes	0.409	
Have used drug other than marijuana		88.893***
No	0.008	
Yes	0.621	

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

Figure 14: NUTS 2 Statistical Regions in the EU-27



Source: Eurostat 2007.

Table 14: Regional-Level Variables Averages and Standard Deviations across Regions

	Population density (2002)*	Net migration (2000-2004)	Youth population (2002)	Death rate (2002)	GDP growth (1995-2004)	Unemploy-ment (2002)*	College educated (2002)	Tourism (in thousands, 2002)*	Homicide rate (2002)*
Belgium	861.29	3.52	12.22	1007.25	2.24	7.73	15.31	483.87	2.16
	(1750.61)	(1.35)	(0.46)	(122.12)	(0.62)	(3.59)	(3.36)	(603.46)	(1.02)
Denmark	232.07	2.10	11.01	1097.42	1.99	5.20	11.54	318.66	0.92
	(268.37)	(0.70)	(0.73)	(44.73)	(0.01)	(0.40)	(2.88)	(349.27)	(0.21)
Germany	441.35	2.24	11.58	1033.51	1.38	8.55	11.62	409.22	0.76
	(704.70)	(3.42)	(1.07)	(86.47)	(0.69)	(4.93)	(2.53)	(475.11)	(0.41)
Ireland	55.80	11.98	16.14	788.85	7.91	4.75	11.45	1788.50	0.90
	(33.23)	(4.49)	(0.55)	(102.18)	(0.34)	(0.92)	(2.87)	(1402.19)	(0.57)
Greece	68.12	2.95	13.81	987.76	3.81	10.73	8.02	831.79	0.68
	(37.36)	(1.90)	(0.59)	(81.79)	(0.84)	(1.38)	(2.02)	(715.36)	(0.25)
Spain	145.17	12.91	13.23	920.41	3.62	10.43	13.32	1563.69	0.94
	(160.68)	(8.11)	(1.04)	(136.36)	(0.60)	(3.90)	(3.29)	(2050.81)	(0.41)
France	143.07	2.68	12.84	958.80	1.40	8.57	10.37	1703.25	0.80
	(192.55)	(4.95)	(0.85)	(130.85)	(1.16)	(1.97)	(2.57)	(3205.02)	(0.34)
Italy	191.98	5.71	10.88	1000.58	1.31	9.57	5.64	1495.08	0.87
	(106.55)	(4.99)	(2.03)	(152.24)	(0.35)	(7.25)	(0.84)	(1659.84)	(0.66)
Luxembourg[#]	172.50	5.53	11.43	830.20	4.63	2.60	10.06	598.68	1.80
Netherlands	483.67	3.41	12.02	881.90	2.60	2.93	12.79	619.40	1.05
	(341.05)	(5.35)	(0.94)	(123.90)	(1.09)	(0.61)	(3.02)	(1237.74)	(0.47)
Austria	516.49	4.03	12.24	909.97	2.36	3.52	8.24	1498.53	0.88
	(1296.44)	(2.78)	(0.77)	(143.54)	(0.44)	(1.54)	(1.47)	(1533.95)	(0.39)
Portugal	242.27	6.24	14.02	1115.21	3.08	4.65	4.23	722.91	1.83
	(320.62)	(6.03)	(1.78)	(166.55)	(0.72)	(2.03)	(1.95)	(594.61)	(1.15)

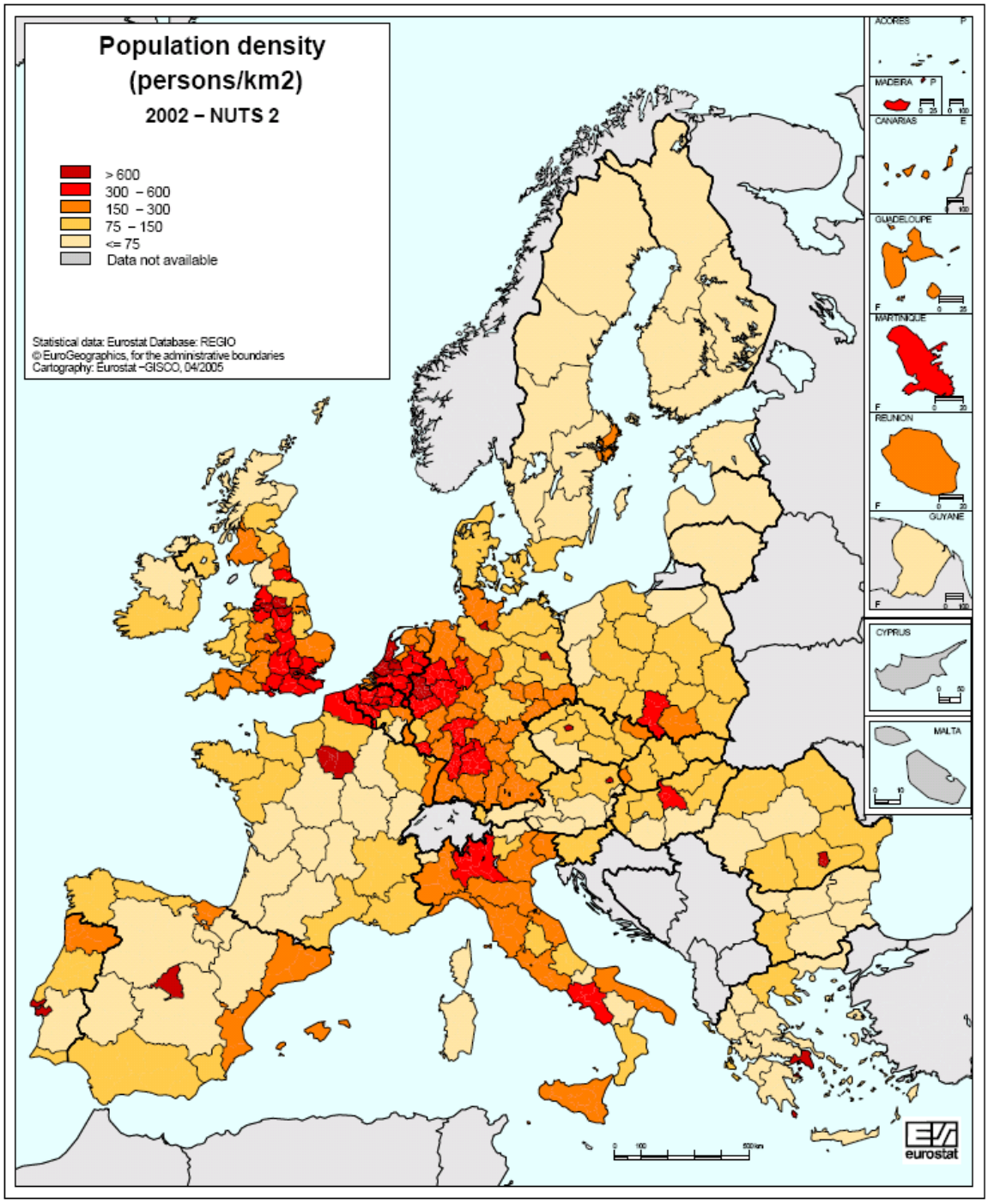
Finland	24.88	-0.62	12.83	973.25	3.27	10.83	16.19	430.51	3.00
	(26.21)	(3.27)	(0.88)	(122.38)	(1.02)	(3.08)	(2.76)	(487.52)	(1.06)
Sweden	90.73	3.43	11.70	1066.06	2.69	5.27	13.92	579.39	1.07
	(99.42)	(2.13)	(0.37)	(111.17)	(0.95)	(0.84)	(2.72)	(379.38)	(0.46)
United Kingdom	610.02	0.98	12.25	1054.11	2.65	4.95	12.63	414.26	0.40
	(947.52)	(7.78)	(1.01)	(131.97)	(0.82)	(1.27)	(2.41)	(1118.56)	(0.57)
Regional Average	367.00	3.84	12.26	997.67	2.31	7.30	11.10	872.41	0.94
	(742.79)	(6.16)	(1.40)	(131.97)	(1.27)	(4.32)	(3.77)	(1574.15)	(0.75)

*Log-transformation applied in subsequent analyses.

[#] With only one region in Luxembourg, there is no standard deviation.

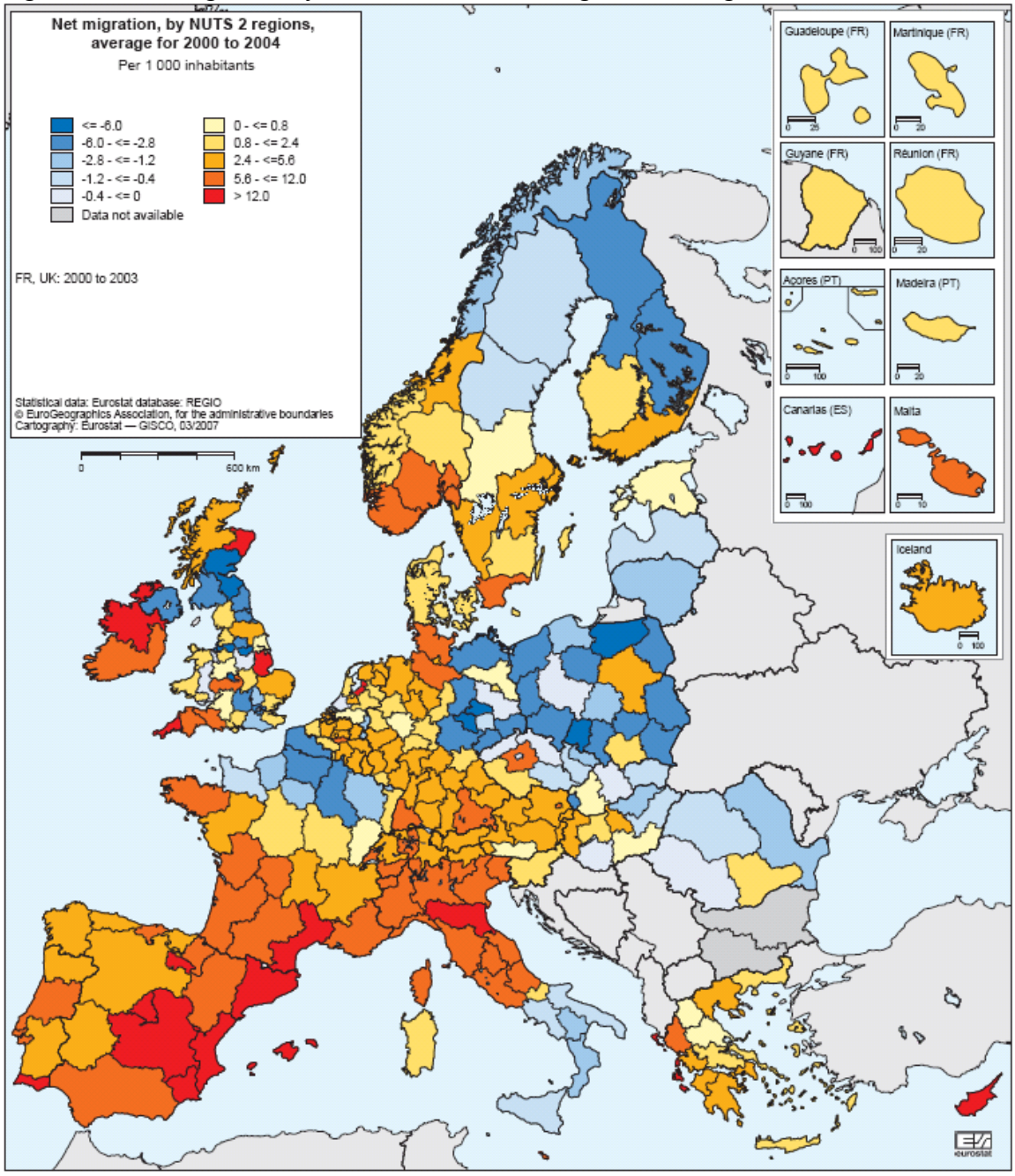
Note: Values represent averages across the regions within that country, rather than the actual overall value for the country.

Figure 15: Population Density (2002) by NUTS 2 Statistical Regions



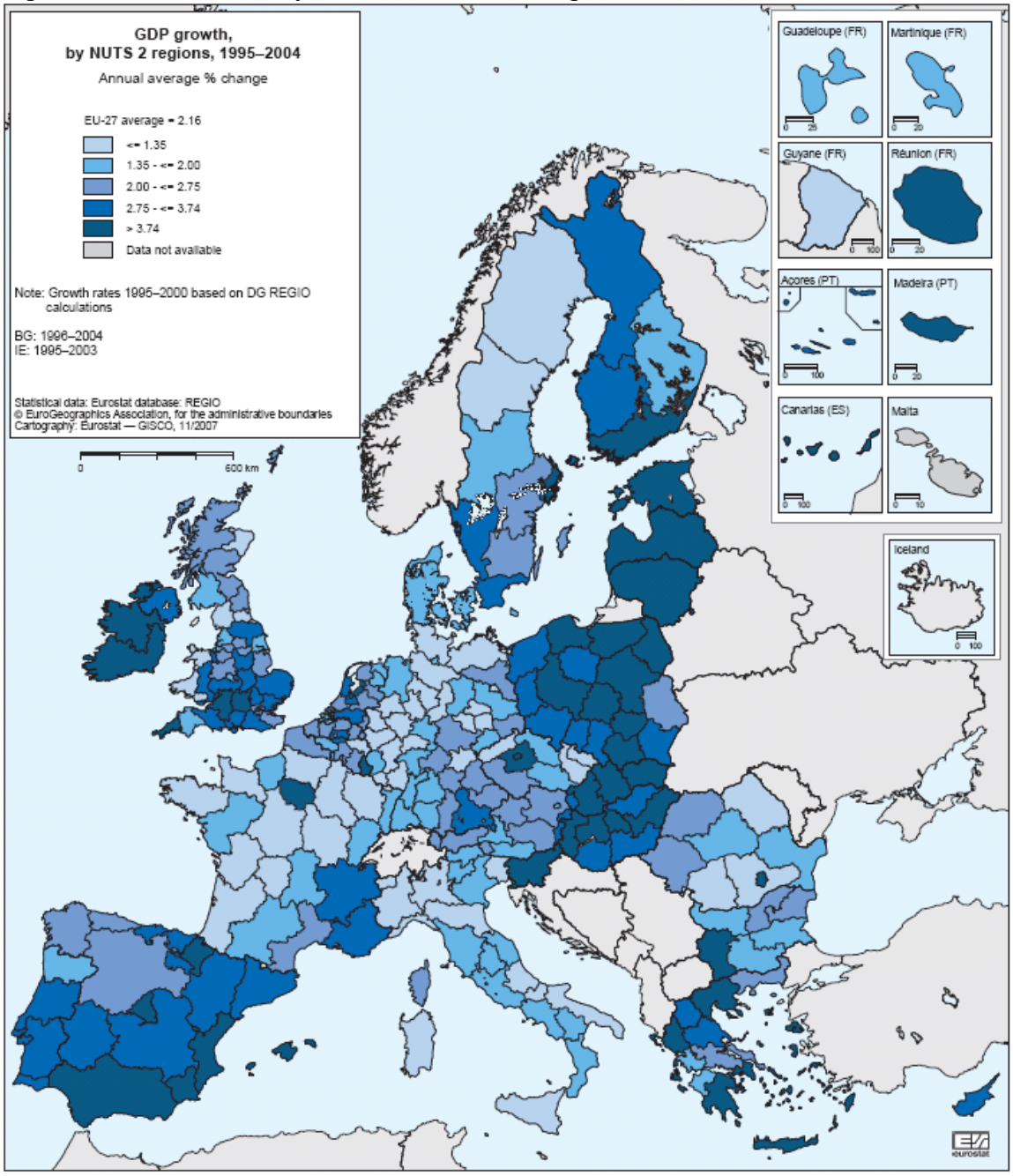
Source: Eurostat 2007.

Figure 16: Net Migration by NUTS 2 Statistical Regions, Average for 2000-2004



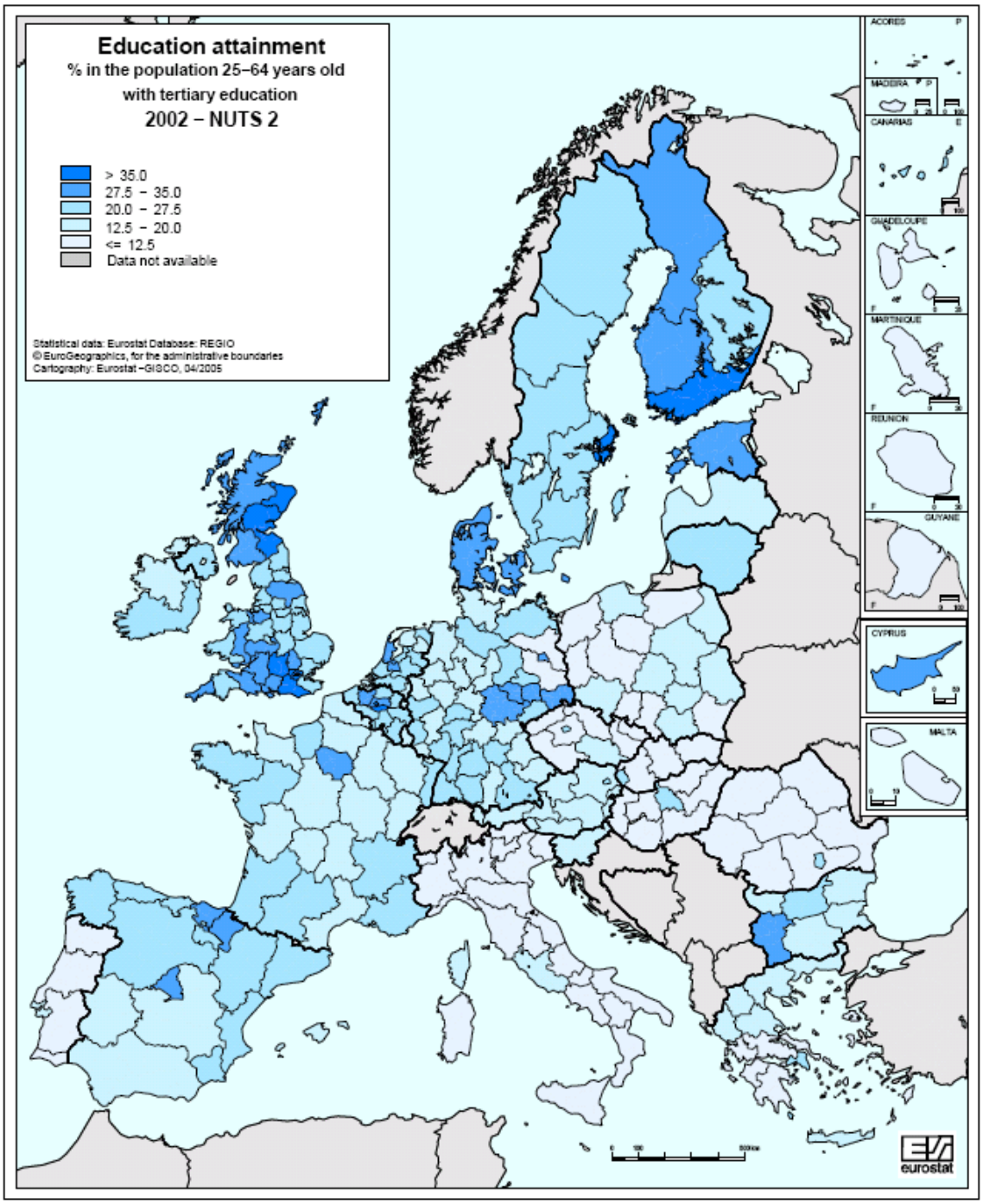
Source: Eurostat 2007.

Figure 17: GDP Growth by NUTS 2 Statistical Regions, 1995-2004



Source: Eurostat 2007.

Figure 18: College Educated (2002) by NUTS 2 Statistical Regions



Source: Eurostat 2007.

Figure 19: Q-Q Plot for Transformed Regional Variables

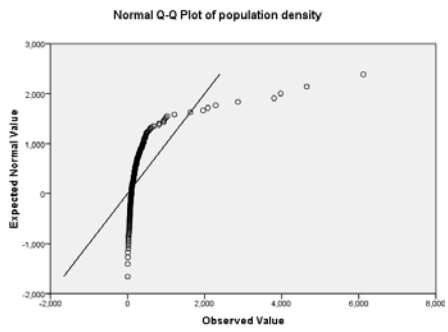
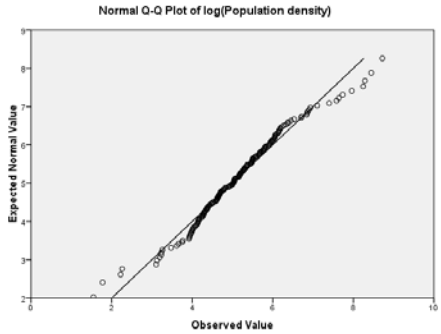
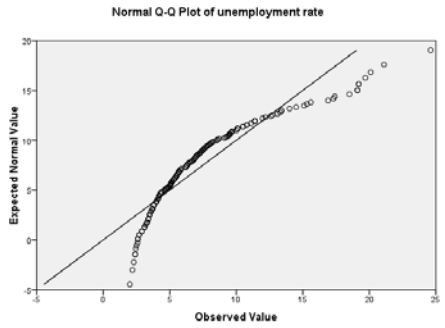
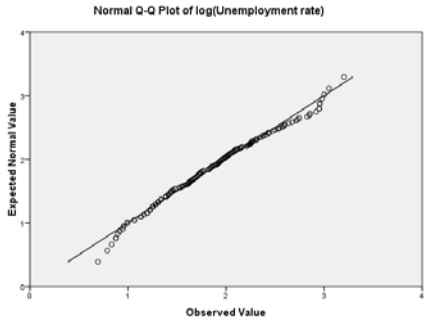
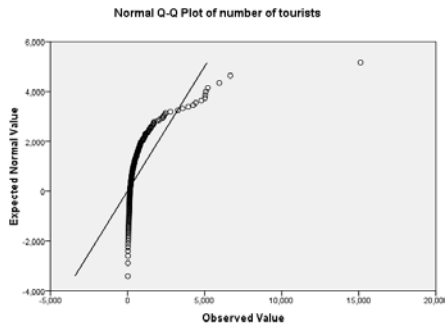
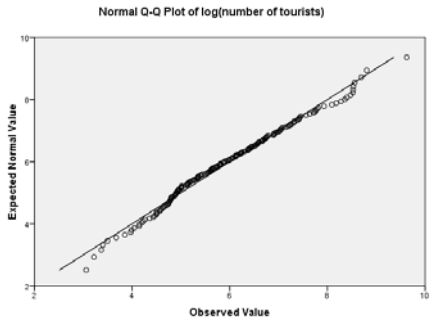
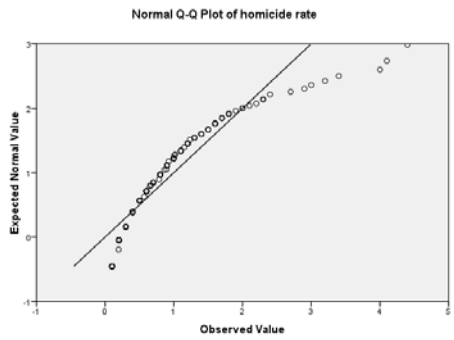
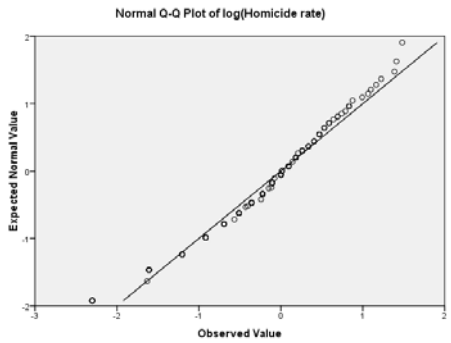
Q-Q plot of untransformed variable	Q-Q plot for log-transformed variable
	
	
	
	

Table 15: Correlations between Regional Variables and Aggregated Regional Averages on Outcome Variables

	log(Population density)	Net migration	Youth population	Death rate	GDP growth	log(Unemploy-ment)	College educated	log(Tourism)	log(Homicide rate)
Lifetime marijuana	.129	.012	-.125	-.015	-.077	-.071	.296***	-.059	-.117
Last month marijuana	.200**	.083	-.037	-.110	-.031	.022	.175*	.182*	-.049
Lifetime other drug	.191**	.069	-.075	.052	.079	-.029	.277***	-.040	-.033
Regular cigarette use	.062	-.055	-.068	-.027	-.192**	.140	.105	-.012	.033
Agree punish users	-.026	-.282***	-.129	.320***	-.127	.084	-.092	-.177*	-.083
Proper reaction to drugs scale	-.056	.182*	.199**	-.122	.171*	.033	.088	.082	-.021

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

Table 16: Values and Overall Average for Country-Level Drug-Related Variables (2002)

	Last month cannabis	Lifetime other drug	Seizures Factor	Sale and Poss. arrests	Conviction Rate	Arrest rate	Arrests convicted	Treatment Rate	Substitution Rate	Marijuana cost
Belgium	9.5%	6.8%	0.675	70.4	39.0	446.0	8.7	14.4	93.4	5.0
Denmark	12.2%	11.4%	-0.631	85.9	100.0	245.0	40.8	80.2	102.7	9.0
Germany	8.3%	8.6%	0.320	68.0	66.0	305.0	21.6	25.3	63.9	6.8
Ireland	8.7%	8.9%	-0.573	75.7	106.0	232.0	45.7	126.8	209.7	2.8
Greece	1.3%	1.2%	-0.431	77.4	17.0	94.0	18.1	33.0	20.9	2.1
Spain	15.0%	12.2%	-0.381	87.5	18.0	337.0	5.3	106.1	214.9	2.7
France	19.8%	8.0%	-0.149	84.0	36.0	180.0	20.0	35.9	152.1	4.7
Italy	7.8%	2.7%	-0.094	55.4	37.0	66.0	56.1	278.3	158.8	5.6
Luxembourg	4.5%	6.6%	-0.700	23.4	73.0	293.0	24.9	105.3	236.7	2.5
Netherlands	12.2%	10.6%	0.932	29.1	54.0	79.0	68.4	64.4	81.3	4.9
Austria	4.6%	4.6%	-0.639	87.2	54.0	275.0	19.6	72.5	79.3	6.2
Portugal	4.9%	6.8%	-0.653	51.5	23.0	42.0	54.8	83.3	44.1	2.5
Finland	5.6%	9.0%	-0.488	52.2	142.0	267.0	53.2	67.2	11.5	6.6
Sweden	3.9%	9.9%	-0.152	81.2	102.0	424.0	24.1	35.6	23.5	5.0
United Kingdom	13.4%	13.8%	2.964	87.5	93.0	309.0	30.1	125.7	157.6	7.5
EU-15 Average (St. Deviation)	11.3%	8.8%	0.000 (1.000)	67.8 (21.1)	64.0 (37.7)	239.6 (125.3)	32.8 (19.1)	83.6 (64.7)	110.0 (74.2)	4.9 (2.1)

Table 17: Factor Loadings for Drug Seizure Factor Analysis

Seizure variable	Factor loadings
Marijuana	0.799
Cocaine	0.681
Heroin	0.177
Amphetamines	0.936
Ecstasy	0.802
LSD	0.085

Table 18: Values and Overall Average for Country-Level Cigarette Law Variables (2002)

	Regularly use cigarettes	Minimum purchase age?	Smoking ban in restaurants?[2]	Smoking ban in pubs/bars?[3]	Tobacco action plan	Cigarette cost
Belgium	31.1%	No	Yes	Yes	No	3.68
Denmark	36.7%	No	No	No	Yes	5.15
Germany	46.6%	16	No	No	No	3.68
Ireland	34.3%	18	Yes	No	Yes	5.71
Greece	29.5%	No	Yes	Yes	No	2.87
Spain	38.7%	16	No	No	Yes	2.66
France	44.3%	No	Yes	Yes	Yes	4.20
Italy	24.9%	16	Yes	No	Yes	3.79
Luxembourg	23.0%	No	No	No	No	2.99
Netherlands	32.3%	16	No	No	Yes	3.68
Austria	44.8%	16	No	No	No	3.35
Portugal	31.5%	No	No	No	Yes	2.59
Finland	33.3%	18	Yes	Yes	Yes	4.60
Sweden	21.5%	18	Yes	Yes	Yes	4.82
United Kingdom	32.3%	16	No	No	Yes	7.65
EU-15 Average	36.8%	60.0%[1]	46.7%	33.3%	66.7%	4.09

Note: Many changes in tobacco laws for minimum age and smoking bans have occurred since the time of the survey in 2002.

[1] Number represents percentage with any minimum age.

[2] Does not necessarily imply a ban in pubs and bars.

[3] All EU-15 countries that ban smoking in pubs and bars also ban smoking in restaurants.

Table 19: Theoretical Justification and Directional and Interactional Expectations for Predictors

Predictor	Theoretical Justification	Directional Expectation for Drug Use	Potential Cross-level Interaction for Drug Use	Directional Expectation for Drug Policy Opinion
Individual Level				
Demographics				
Gender	Life Course Theories	+ (Males)	Population density; migration pattern; unemployment	– (Males)
Age	Life Course Theories	+ (Older)	Population density; youth population; purchase age	+ (Older)
Income	Strain Theories	– (Higher)	Unemployment rate; GDP growth; population density; college educated; cost	– (Higher)
HH Occupation	Strain Theories	– (Prof.)	Unemployment rate; GDP growth; population density; college educated; cost	– (Prof.)
Community type	Social Disorganization	+ (Urban)		+ (Urban)
Social Bonds				
Marital Status	Life Course Theories, Control Theories	– (Married) + (Partnered)		– (Married) + (Partnered)
Employment Status	Life Course Theories, Control Theories	– (Working)	Unemployment rate; GDP growth; population density; cost	– (Working)
Education	Life Course Theories, Control Theories	– (Student, College deg.)	Unemployment rate; GDP growth; cost	–
Head of household	Life Course Theories, Control Theories	?	Youth population; population density	?
Mediating Variables				
Political beliefs	MTF Integrated Drug Model	+ (Left)	GDP growth; population density; youth population; poss. and sale offenses; treatment and substitution rate	+ (Left)
Know marijuana user	Learning Theories	+	Population density; youth population; treatment rate; conviction and offense rate	+
Know drug user	Learning Theories	+	Population density; youth population; treatment rate; conviction and offense rate	+

Obtain drugs easily	MTF Integrated Drug Model; Learning Theories	?	Migration pattern; youth population; conviction rate; treatment rate	?
Marijuana danger	MTF Integrated Drug Model	–	Treatment rate; seizures; youth population; cost	–
Cocaine danger	MTF Integrated Drug Model	–	Treatment rate; seizures; youth population; cost	–
Cigarettes danger	MTF Integrated Drug Model	–	Treatment rate; seizures; youth population; cost	–
Marijuana use	Neoinstitutionalism	N/A	N/A	+
Drug use	Neoinstitutionalism	N/A	N/A	+
Regional Level				
Demographics				
Population density	Social Disorganization	+	Poss. and sale offenses; conviction rate; treatment rate; tobacco action plan	+
Net migration	Social Disorganization	+ (In-migration)	Poss. and sale offenses; conviction rate; treatment rate	?
Youth population	Subcultural Theories	+	Purchase age	+
Death rate	Social Disorganization	+		?
Economics				
GDP growth	Social Disorganization, Strain Theories	–	Cost	+
Unemployment	Social Disorganization, Strain Theories	+	Cost; Conviction rate; Treatment rate	?
College educated	Social Disorganization; Strain Theories	–		+
Tourism	Social Disorganization	?		?
Crime				
Homicide rate	Social Disorganization	+	Poss. and sale offenses; conviction rate	?
National Level				
Drug Law Enforcement Patterns				
Seizures	Neoinstitutionalism	–		–
Possession and sale arrests	Neoinstitutionalism	+		–
Conviction rate	Neoinstitutionalism	–		–
Arrest rate	Neoinstitutionalism	–		–
Arrests convicted	Neoinstitutionalism	–		–

Drug Service Availability			
Treatment rate	Neoinstitutionalism	–	+
Substitution rate	Neoinstitutionalism	–	+
Economic Indicators			
Marijuana cost	Economic Theories	–	?
Cigarette cost	Economic Theories	–	
Cigarette Laws			
Purchase age	Neoinstitutionalism	+ (No min.)	
Smoking ban	Neoinstitutionalism	–	
Tobacco action plan	Neoinstitutionalism	–	

Table 20: Logistic Hierarchical Generalized Linear Model for Last Month Marijuana Use

	Fixed Effect Coefficient	*Standard Error*
Country Level Drug Policy Effects (N = 15)		
(Intercept)	-4.3249***	(0.2642)
Possession and sale arrests	0.0154#	(0.0071)
Substitution rate	0.0066**	(0.0021)
Regional Level Effects (N = 190)		
log(Population density)	0.0284	(0.1681)
Net migration	0.0365*	(0.0173)
Youth population	0.4516**	(0.1574)
GDP growth	-0.4024*	(0.1636)
log(Homicide rate)	-0.4895*	(0.2165)
*Country * Regional Level Interactions*		
Possession and sale arrests * GDP growth	-0.0273***	(0.0060)
Individual Level Effects (N = 7086)		
Male	0.5808***	(0.1173)
HH occupation: prof/mgmt vs. non-prof/mgmt	0.3191**	(0.1047)
HH occupation: not working vs. non-prof/mgmt	0.2135	(0.1276)
Education: some postsec. vs. secondary	-0.2933	(0.2015)
Education: tertiary vs. secondary	-1.2224***	(0.3037)
Education: student vs. secondary	-0.4466*	(0.1920)
Political beliefs: left vs. center/right/DK	0.5730***	(0.1129)
Know marijuana user	1.4091***	(0.1613)
Marijuana danger	-1.1883***	(0.0812)
*Regional * Individual Level Interactions*		
Net migration * HH occ: prof/mgmt vs. non-prof/mgmt	0.0403*	(0.0161)
Net migration * HH occ: not working vs. non-prof/mgmt	0.0412*	(0.0200)
Population density * Education: some postsec. vs. secondary	0.5813***	(0.1765)
Population density * Education: tertiary vs. secondary	0.8681***	(0.2285)
Population density * Education: student vs. secondary	0.2231	(0.1684)
Youth population * Education: some postsec. vs. secondary	-0.4712**	(0.1614)
Youth population * Education: tertiary vs. secondary	-0.5814*	(0.2402)
Youth population * Education: student vs. secondary	-0.4768**	(0.1540)
GDP growth * Education: some postsec. vs. secondary	0.5323***	(0.1579)
GDP growth * Education: tertiary vs. secondary	0.8200***	(0.2289)
GDP growth * Education: student vs. secondary	0.4547**	(0.1519)
Homicide rate * Political beliefs: left vs. center/right/DK	0.4725**	(0.1541)
Homicide rate * Know marijuana user	0.5583**	(0.1973)
Random Effects		
Level 2:		
(Intercept)	0.5990***	
Male	0.6174***	
Political beliefs: left vs. center/right/DK	0.3781***	
Marijuana danger	0.2905*	
Level 3:		
(Intercept)	0.0282	

#$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$ (two-tailed)

Note: For categorical predictors, the second category listed is the omitted category.

Note: All region-level and country-level variables are centered at the grand mean.

Note: Covariance components not shown.

Figure 20: Effect of the Interaction of Education Level and GDP growth on Last Month Marijuana Use, Holding Other Variables Constant at the Mean

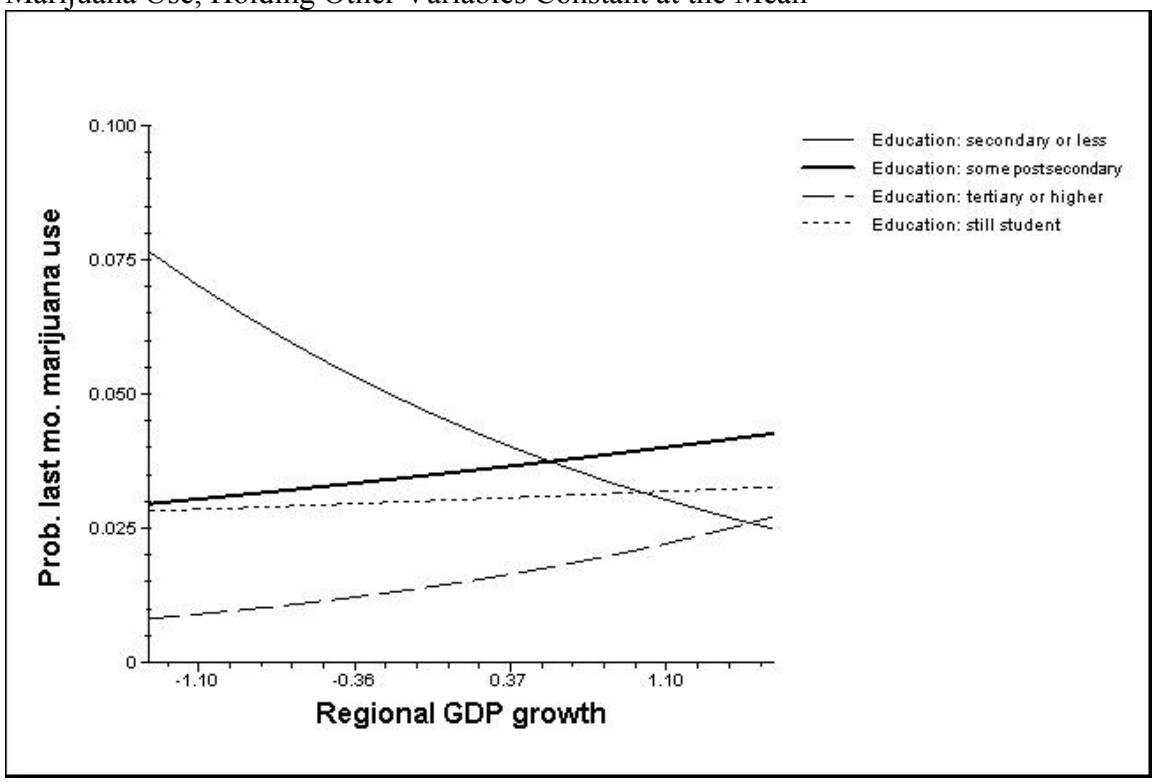


Figure 21: Effect of the Interaction of Education Level and Youth Population on Last Month Marijuana Use, Holding Other Variables Constant at the Mean

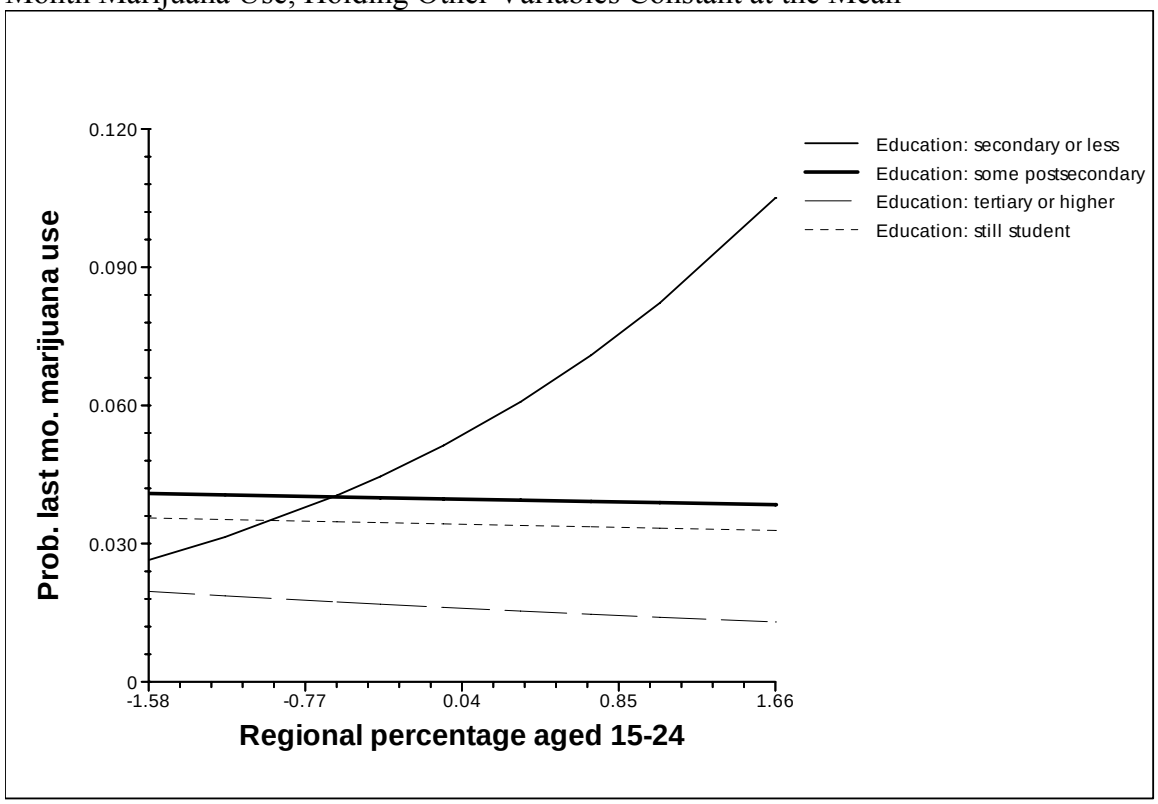


Figure 22: Effect of the Interaction of Education Level and Population Density on Last Month Marijuana Use, Holding Other Variables Constant at the Mean

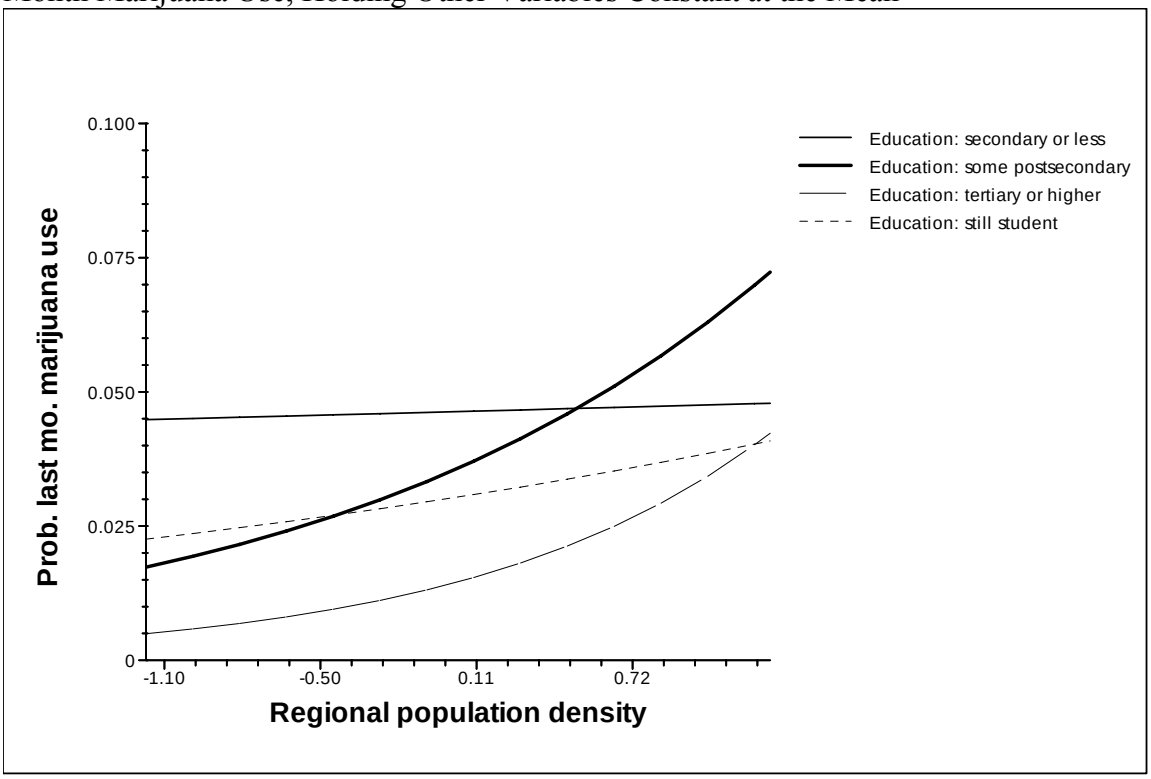


Figure 23: Random Slope for Left Political Beliefs for Last Month Marijuana Use in a Random Draw of 16 Regions

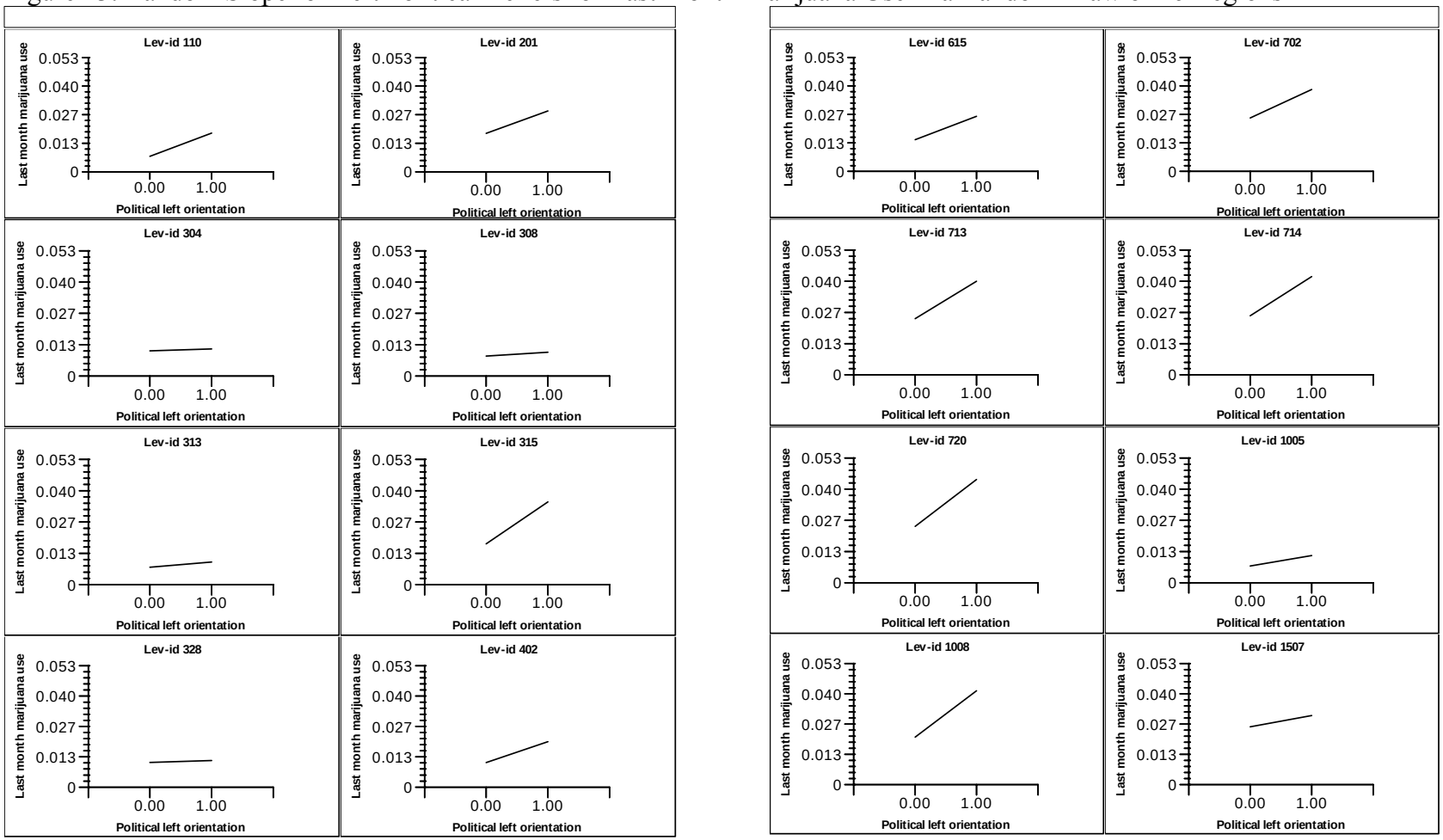


Table 21: Logistic Hierarchical Generalized Linear Model for Lifetime Drug Use Other Than Marijuana

	Fixed Effect Coefficient	*Standard Error*
Country Level Drug Policy Effects (N = 15)		
(Intercept)	-5.0096***	(0.6117)
Seizures	0.3113***	(0.0667)
Treatment rate	-0.0053***	(0.0012)
Regional Level Effects (N = 192)		
log(Population density)	-0.8616*	(0.3991)
Net migration	0.0457***	(0.0132)
Youth population	0.0145	(0.0557)
Individual Level Effects (N = 7353)		
Male	0.2680*	(0.1160)
Age	0.1398***	(0.0196)
Head of household	0.2599*	(0.1149)
Know drug user	2.1151***	(0.1550)
Obtain drugs easily	2.1667***	(0.5818)
Cocaine danger	-1.6276***	(0.1789)
*Regional * Individual Level Interactions*		
Population density * Male	0.2019*	(0.1010)
Youth population * Age	-0.0277*	(0.0126)
Net migration * Head of household	0.0341*	(0.0163)
Population density * Obtain drugs easily	0.9269*	(0.3972)
Random Effects		
Level 2:		
(Intercept)	0.2795***	
Male	0.3527***	
Know drug user	0.7057***	
Level 3:		
(Intercept)	0.0102	

$^{\#}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$ (two-tailed)

Note: For categorical predictors, the second category listed is the omitted category.

Note: All region-level and country-level variables are centered at the grand mean.

Note: Covariance components not shown.

Figure 24: Effect of the Interaction of Gender and Population Density on Ever Used Drug Other Then Marijuana, Holding Other Variables Constant at the Mean

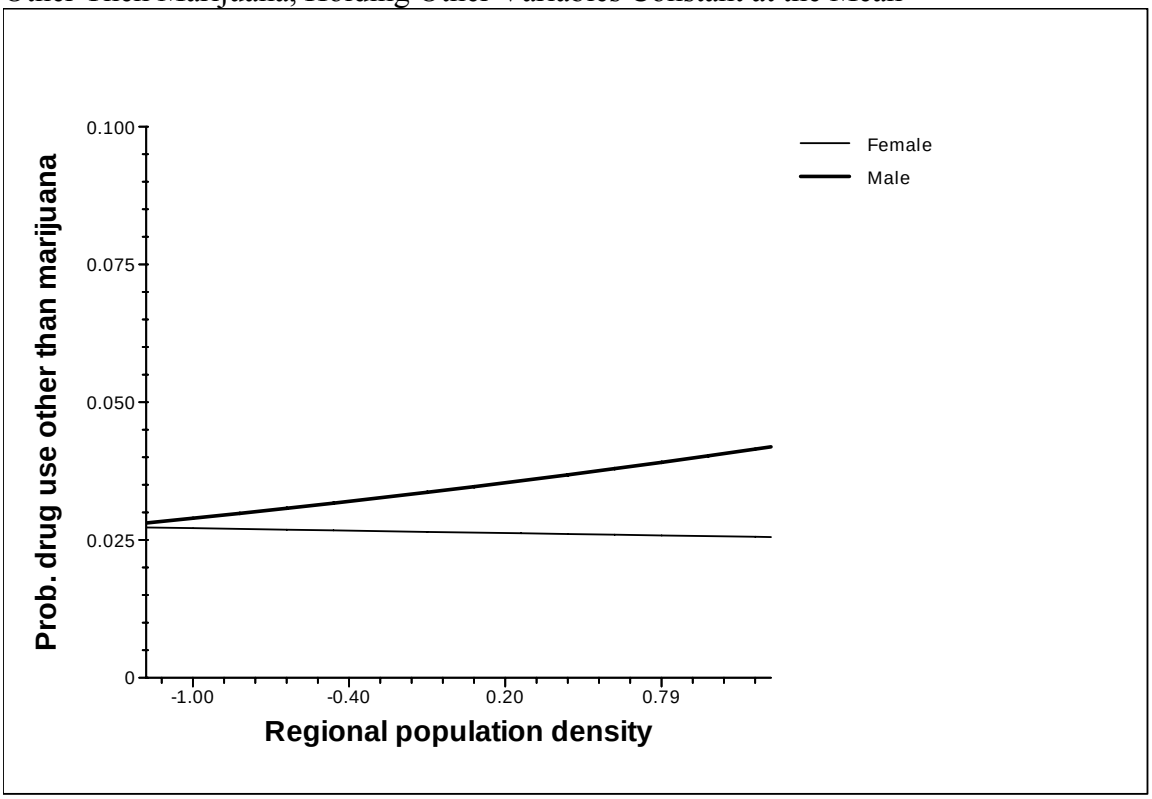


Figure 25: Effect of the Interaction of Head of Household and Net Migration on Ever Used Drug Other Then Marijuana, Holding Other Variables Constant at the Mean

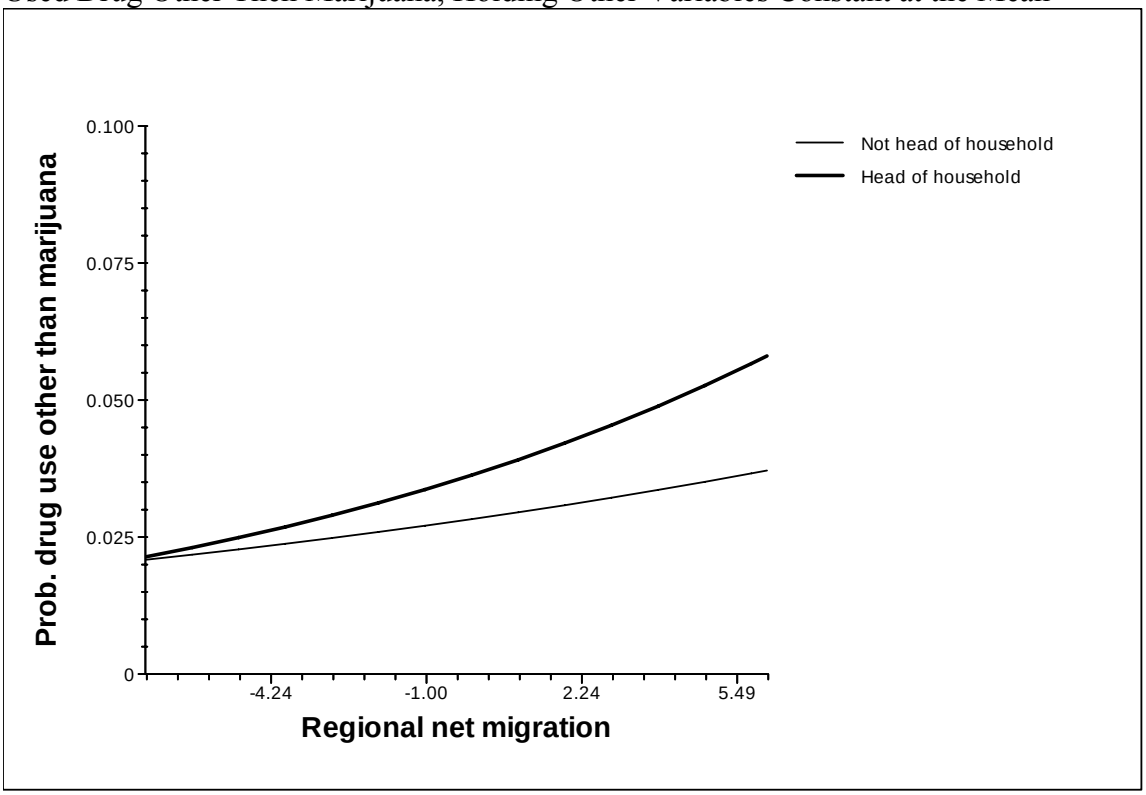


Figure 26: Random Slope for Gender for Lifetime Use of a Drug Other Than Marijuana in a Random Draw of 16 Regions

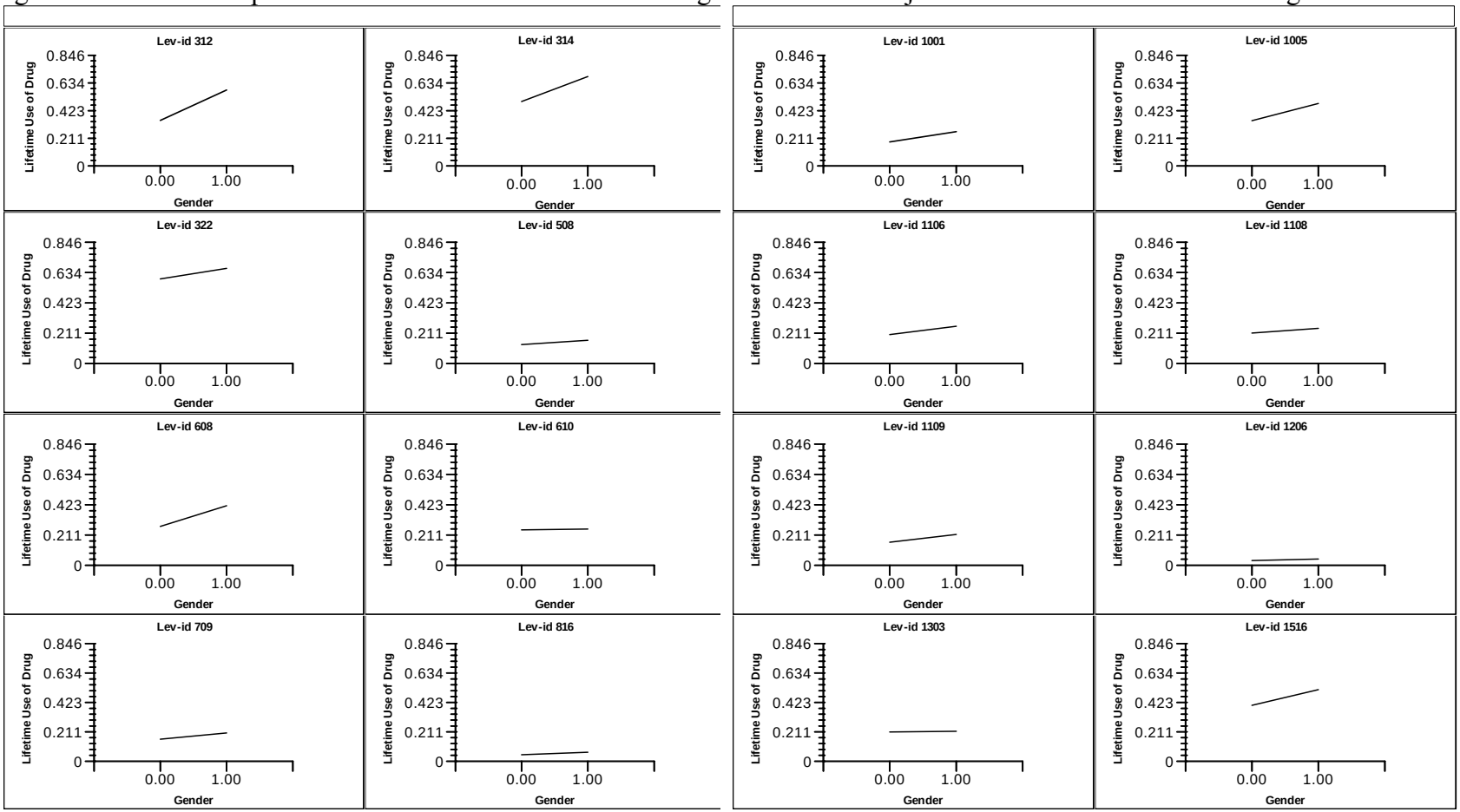


Table 22: Logistic Hierarchical Generalized Linear Model for Regularly Smoke Cigarettes

	Fixed Effect Coefficient	*Standard Error*
Country Level Tobacco Policy Effects (N = 15)		
(Intercept)	0.1780	(0.1610)
No purchase age	0.3499*	(0.1589)
Cigarettes cost	-0.2014*	(0.0731)
Tobacco action plan	-0.0681	(0.1757)
Regional Level Effects (N = 192)		
log(Population density)	0.0917#	(0.0494)
GDP growth	-0.0095	(0.0399)
*Country * Regional Level Interactions*		
Tobacco action plan * log(Population density)	-0.2302*	(0.0894)
Individual Level Effects (N = 7430)		
Male	0.2490***	(0.0648)
Age	0.0624***	(0.0157)
Income: Above median vs. Below median	-0.1895*	(0.0881)
Income: DK vs. Below median	-0.2642***	(0.0795)
Marital status: Married vs. Not married	-0.6104***	(0.1644)
Education: Secondary/some postsec. vs. HS student	0.9097***	(0.0994)
Education: Tertiary/college student vs. HS student	0.3862***	(0.1127)
Cigarettes danger	-0.4585***	(0.0377)
*Country * Individual Level Interactions*		
Cigarettes cost * Cigarettes danger	0.0690**	(0.0215)
*Regional * Individual Level Interactions*		
log(Population density) * Male	-0.1557**	(0.0576)
GDP growth * Marital status: Not married vs. Married	-0.3693**	(0.1330)
Random Effects		
Level 2:		
(Intercept)	0.8072***	
Male	0.1365***	
Age	0.0048*	
Income: Above median vs. Below median	0.1899**	
Income: DK vs. Below median	0.2375***	
Education: Secondary/some postsec. vs. HS student	0.1793	
Education: Tertiary/college student vs. HS student	0.4268***	
Cigarettes danger	0.0261***	
Level 3:		
(Intercept)	0.0512***	

#$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$ (two-tailed)

Note: For categorical predictors, the second category listed is the omitted category.

Note: All region-level and country-level variables are centered at the grand mean.

Note: Covariance components not shown.

Figure 27: Effect of the Interaction of Population Density and Tobacco Action Plan on Regular Cigarette Smoking, Holding Other Variables Constant at the Mean

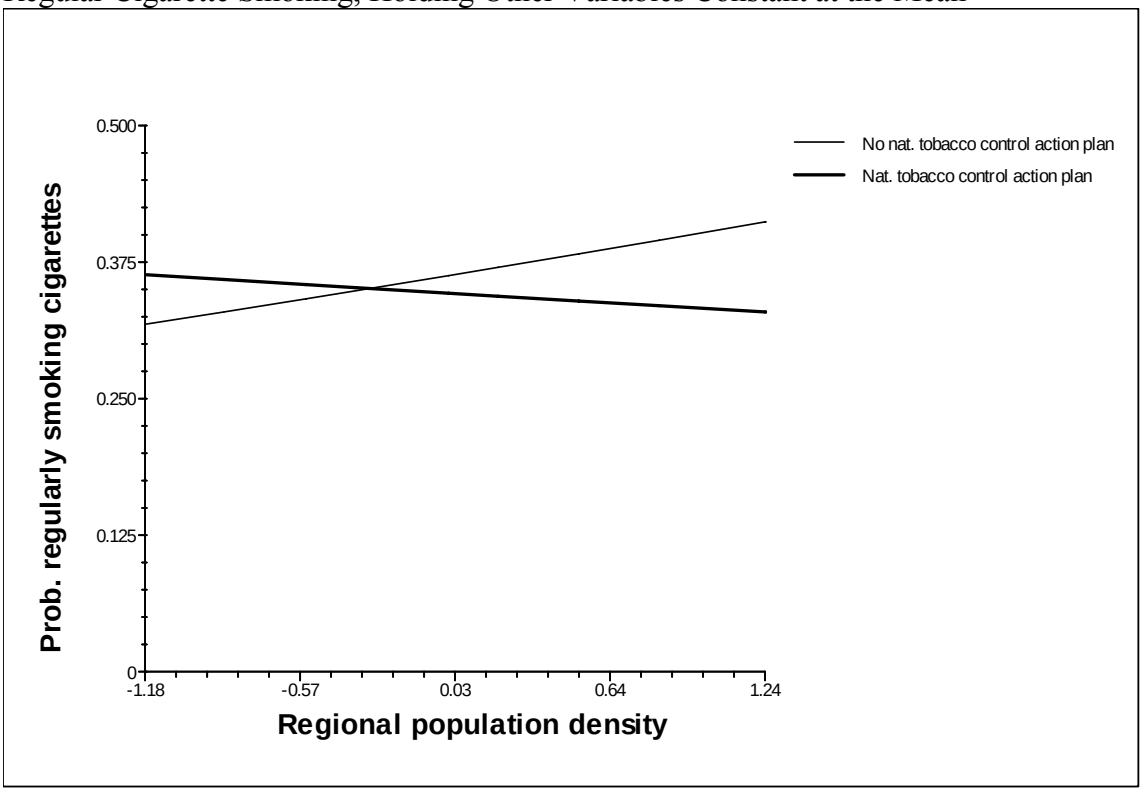


Figure 28: Effect of the Interaction of Cigarettes Danger and Cigarettes Cost on Regular Cigarette Smoking, Holding Other Variables Constant at the Mean

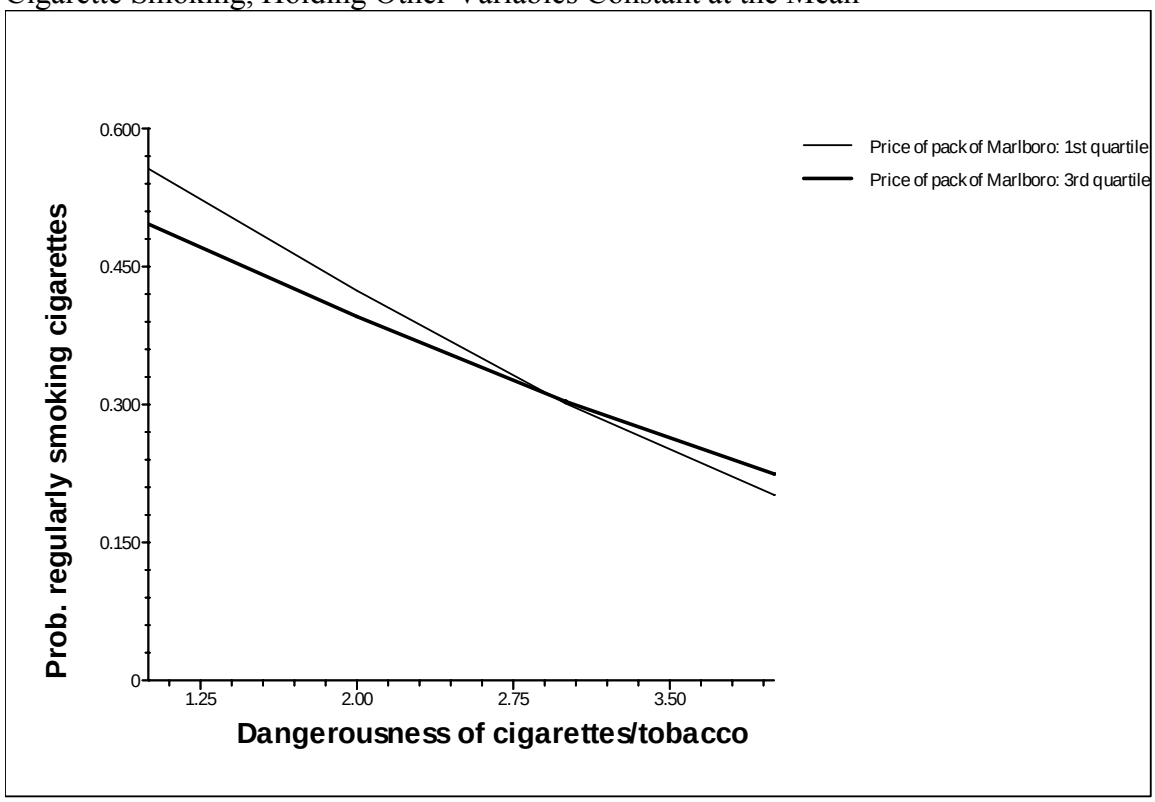


Figure 29: Effect of the Interaction of Gender and Population Density on Regular Cigarette Smoking, Holding Other Variables Constant at the Mean

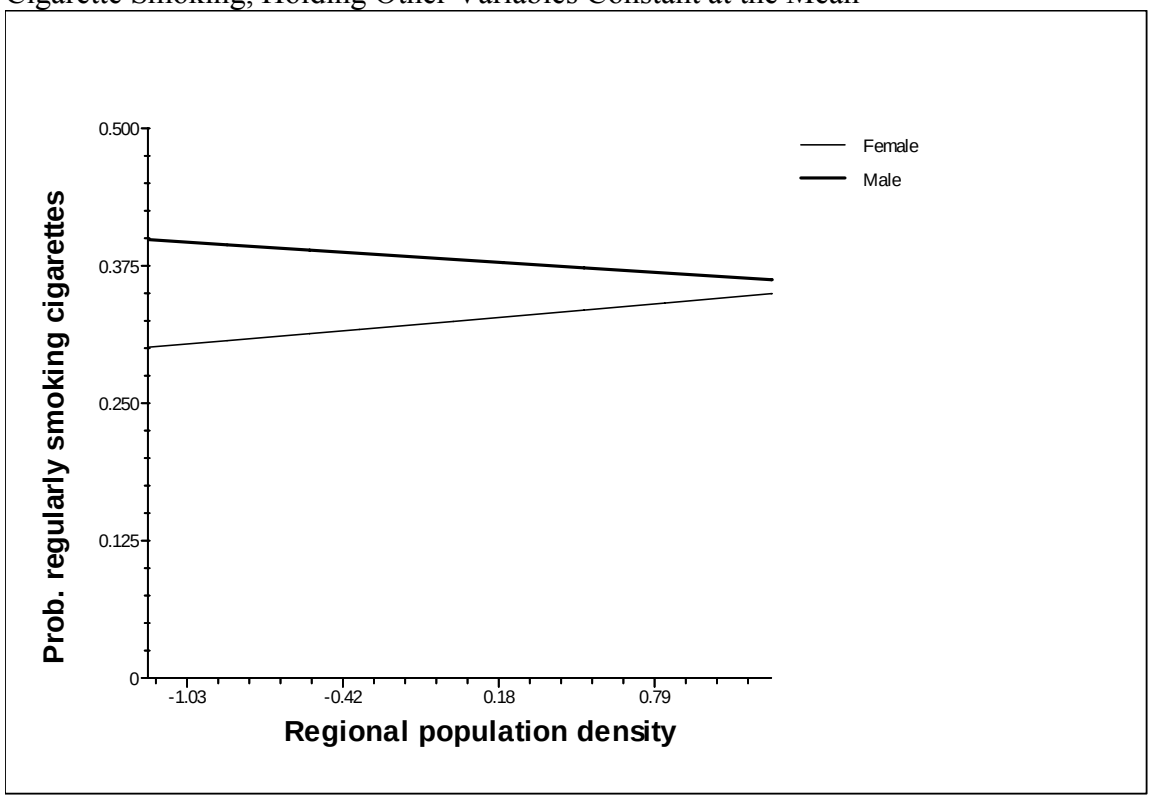


Figure 30: Effect of the Interaction of Marital Status and GDP growth on Regular Cigarette Smoking, Holding Other Variables Constant at the Mean

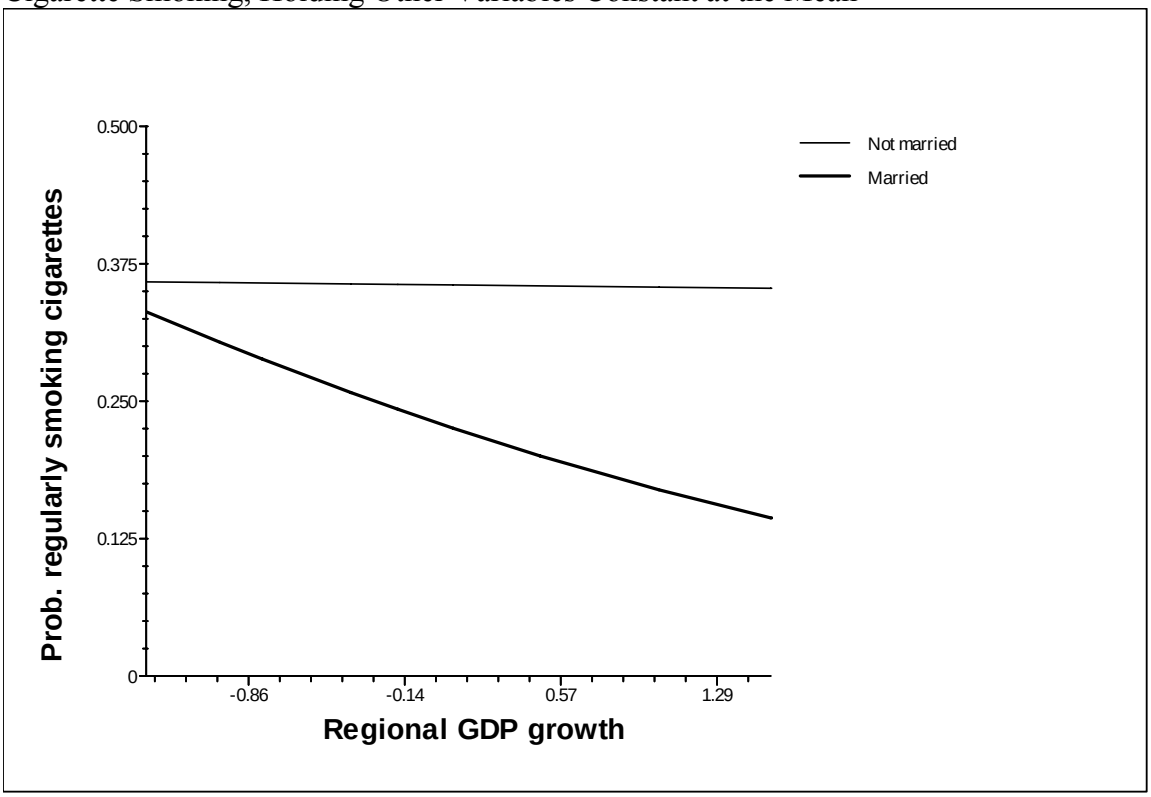


Table 23: Hierarchical Linear Model for Drug Policy Opinion Scale

	Fixed Effect Coefficient	*Standard Error*
Country Level Drug Policy Effects (N = 15)		
(Intercept)	-0.5421***	(0.0944)
Arrests convicted	-0.0066*	(0.0027)
Regional Level Effects (N = 192)		
Youth population	0.1224***	(0.0310)
GDP growth	-0.3062***	(0.0692)
Unemployment	-0.1345#	(0.0794)
Tourism	0.0272	(0.0243)
Individual Level Effects (N = 7532)		
Male	0.1487***	(0.0357)
Income quartile: 2nd vs. 1st	-0.0064	(0.0997)
Income quartile: 3rd vs. 1st	-0.1044	(0.0878)
Income quartile: 4th vs. 1st	-0.1901*	(0.0856)
Income quartile: DK vs. 1st	0.0121	(0.0743)
Education: Tertiary/student vs. secondary/some postsec.	0.1973***	(0.0485)
Political beliefs: center/DK vs. right	0.1972**	(0.0674)
Political beliefs: left vs. right	0.5185***	(0.0806)
Marijuana use	0.3432***	(0.0510)
Drug use	0.3134***	(0.0730)
*Regional * Individual Level Interactions*		
GDP growth * Political beliefs: center/DK vs. right	0.1435**	(0.0520)
GDP growth * Political beliefs: left vs. right	0.2377***	(0.0630)
GDP growth * Income quartile: 2nd vs. 1st	0.2134**	(0.0801)
GDP growth * Income quartile: 3rd vs. 1st	0.0715	(0.0694)
GDP growth * Income quartile: 4th vs. 1st	0.2420***	(0.0633)
GDP growth * Income quartile: DK vs. 1st	0.1591**	(0.0606)
Youth population * Marijuana use	-0.0976**	(0.0337)
Tourism * Drug use	0.1131*	(0.0478)
Random Effects		
Level 1:		
σ^2	2.1735	
Level 2:		
(Intercept)	0.1547***	
Income quartile: 2nd vs. 1st	0.5088***	
Income quartile: 3rd vs. 1st	0.2451***	
Income quartile: 4th vs. 1st	0.2399**	
Income quartile: DK vs. 1st	0.2922***	
Education: Tertiary/student vs. secondary/some postsec.	0.1102***	
Political beliefs: center/DK vs. right	0.1735**	
Political beliefs: left vs. right	0.3331***	
Marijuana use	0.0745***	
Level 3:		
(Intercept)	0.0225***	

#$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$ (two-tailed)

Note: Positive values on the response variable represent a leaning toward social/rehabilitative approaches; negative values represent penal approaches.

Note: For categorical predictors, the second category listed is the omitted category.

Note: All region-level and country-level variables are centered at the grand mean.

Note: Covariance components not shown.

Figure 31: Predicted Probability on Drug Policy Opinion Scale Varying Percentage of Drug Offenses Resulting in Conviction, Holding Other Variables Constant at the Mean

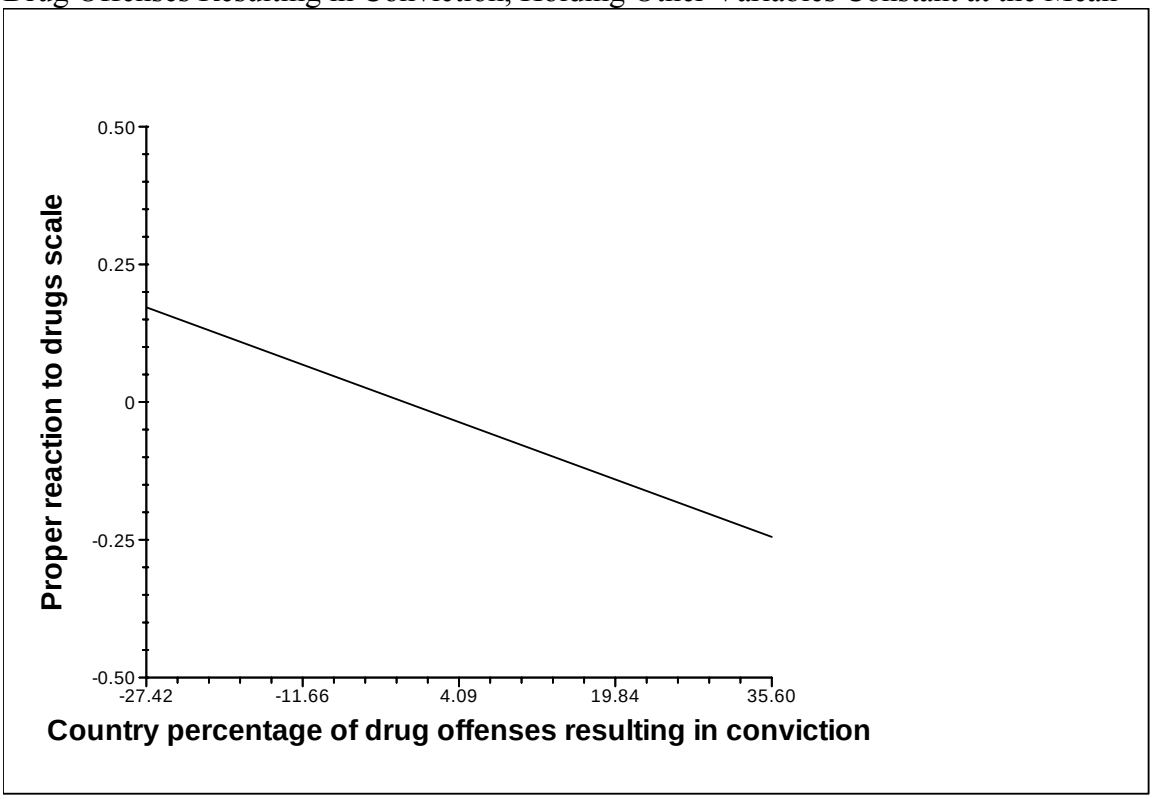


Figure 32: Predicted Probability on Drug Policy Opinion Scale Varying Marijuana Use and Youth Population, Holding Other Variables Constant at the Mean

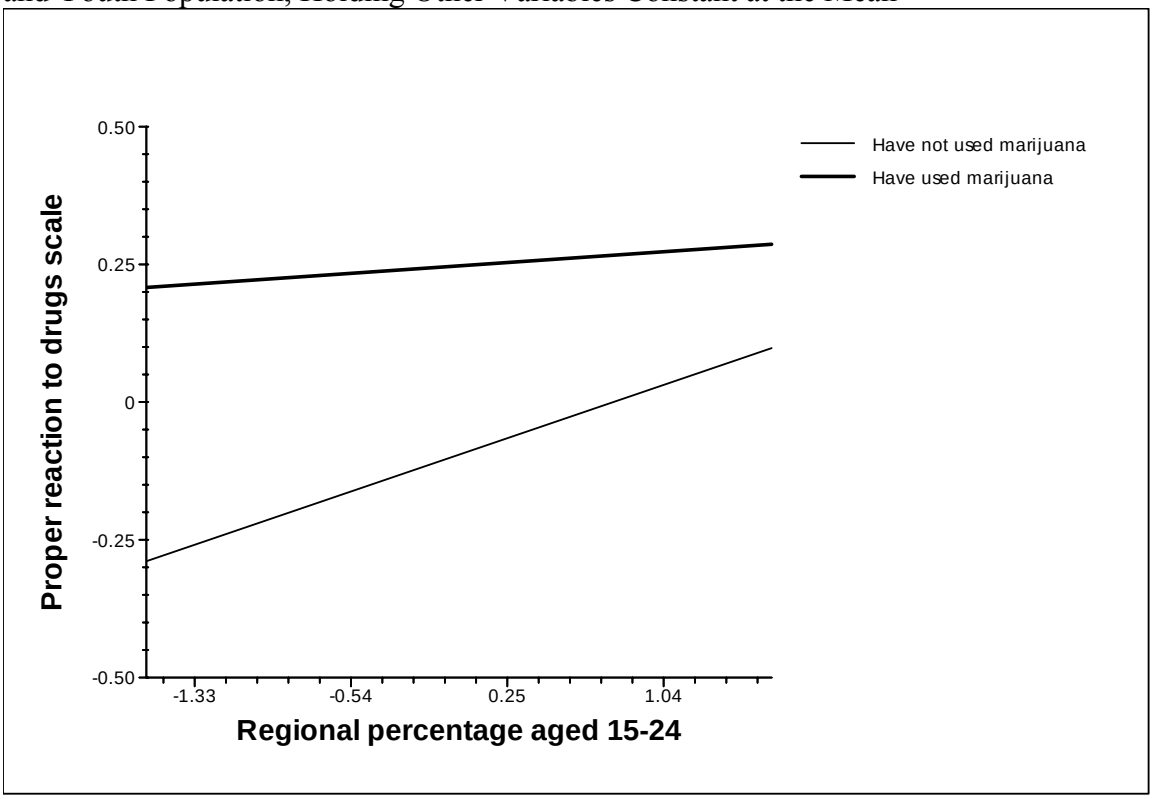


Figure 33: Predicted Probability on Drug Policy Opinion Scale Varying Political Beliefs and GDP Growth, Holding Other Variables Constant at the Mean

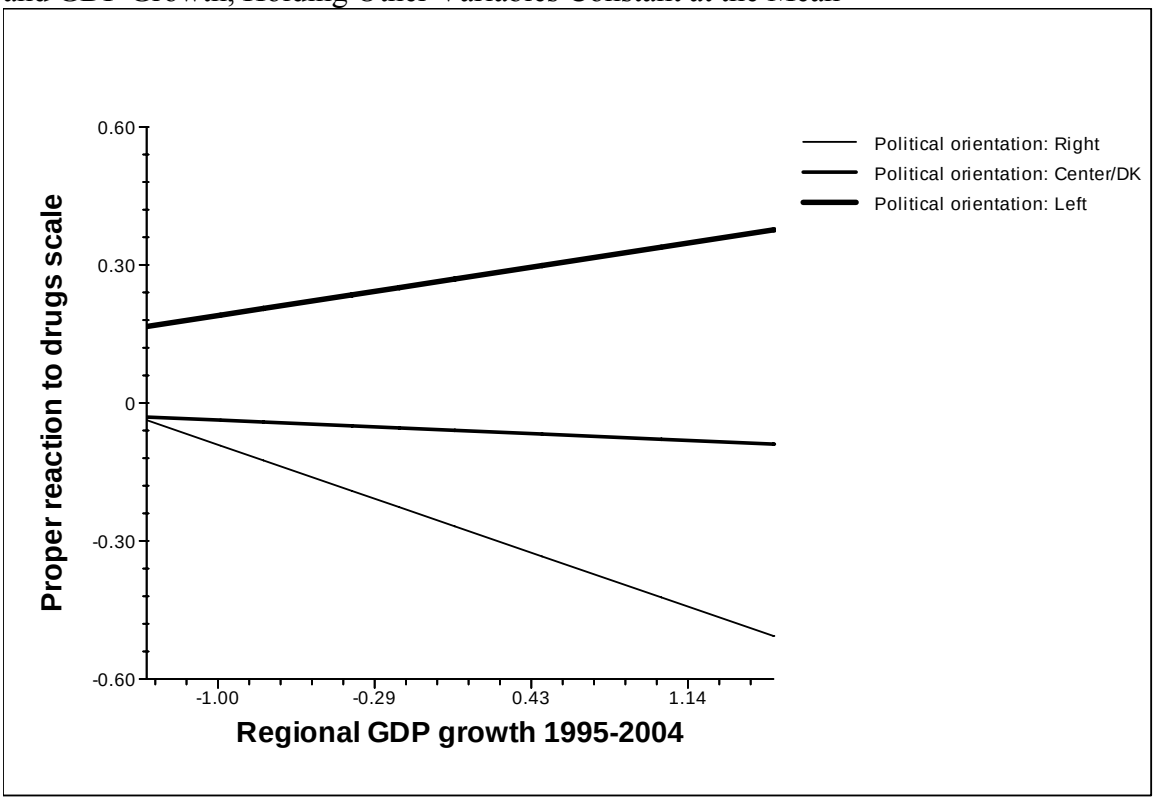


Figure 34: Random Slope for Marijuana Use for Drug Policy Opinion Scale in a Random Draw of 16 Regions

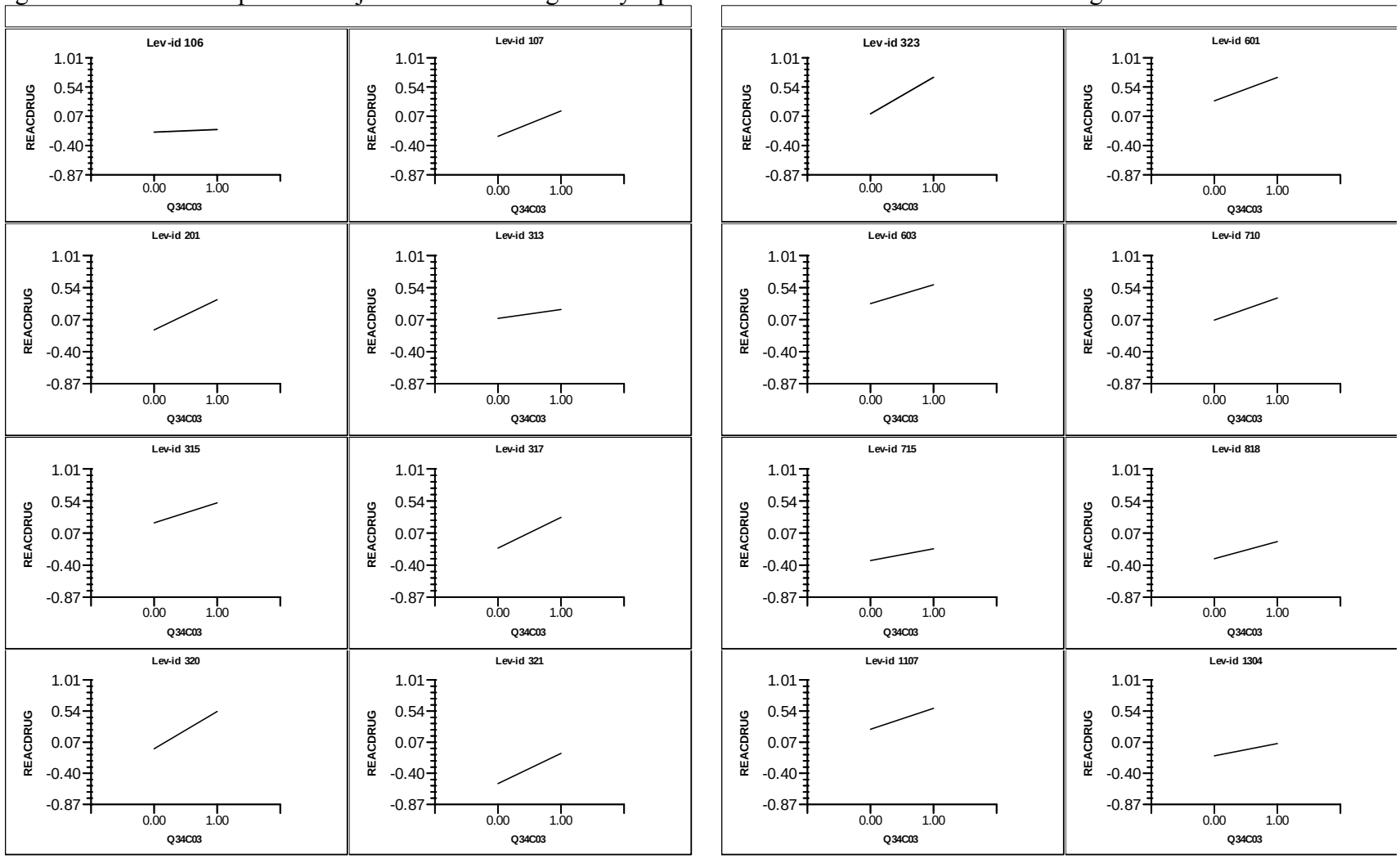


Figure 35: Q-Q Plot of Residuals for HLM of Drug Policy Opinion Scale

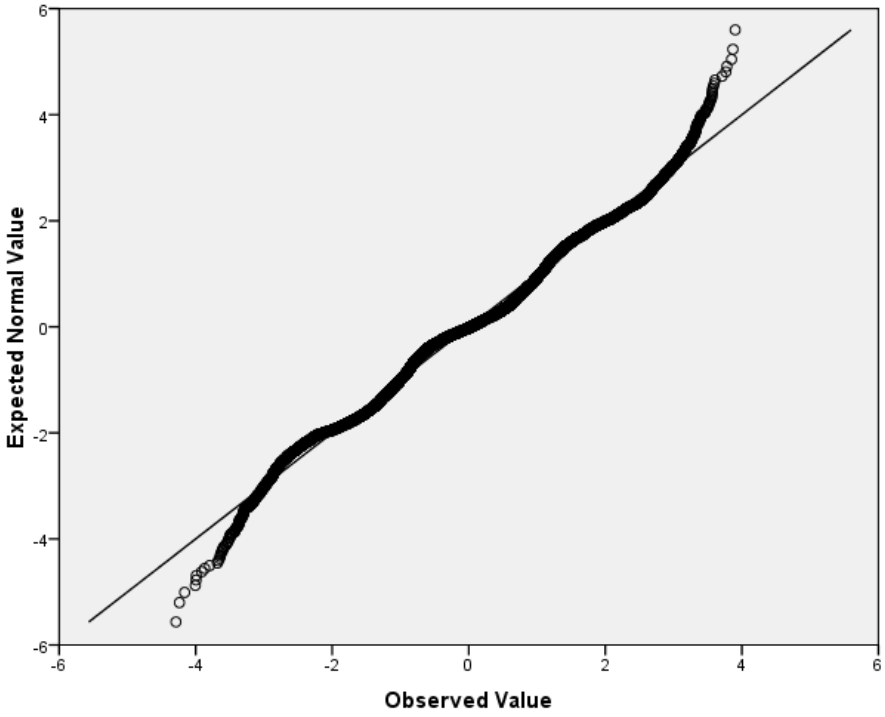
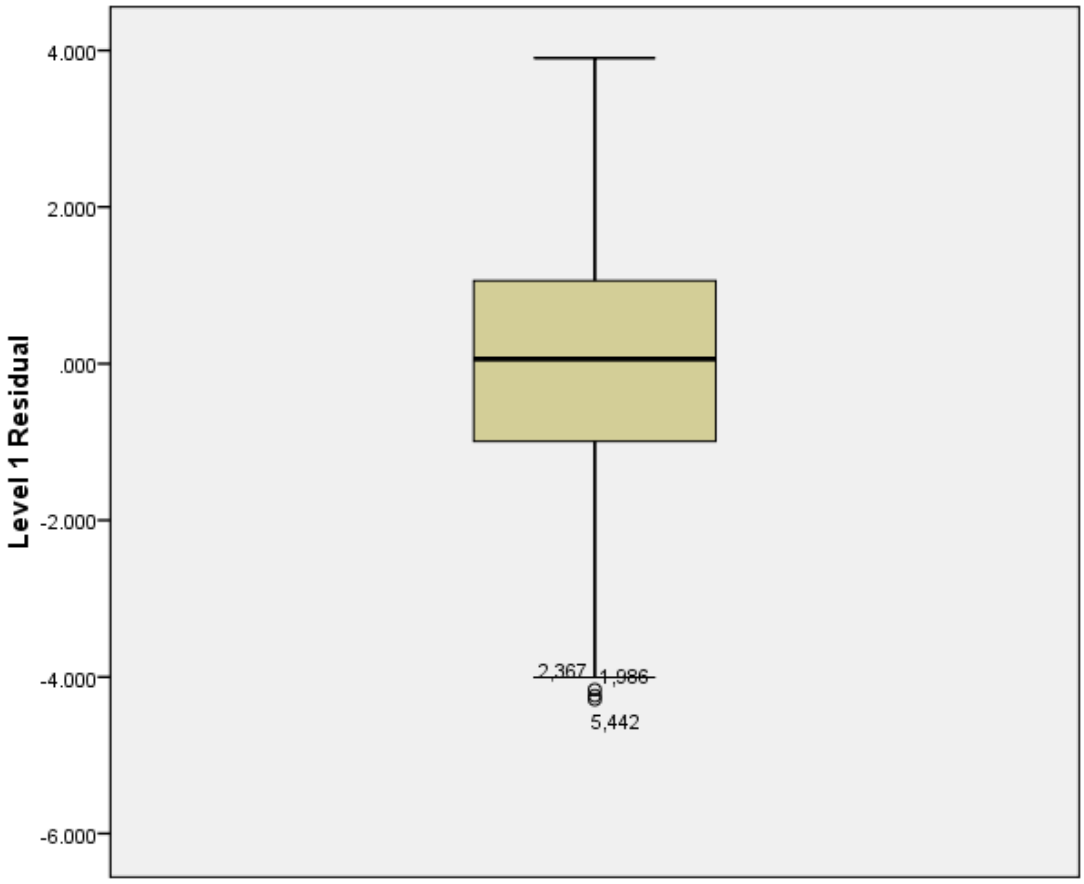


Figure 36: Boxplot of Residuals for HLM of Drug Policy Opinion Scale



Appendix 1: Hierachical Generalized Linear Model for Last Month Marijuana Use

Level 1:

$$P(Y_{ijk} \mid \pi_{ijk}, \beta_{ijk}, \gamma_{ijk}) = \varphi_{ijk}$$

$$\eta_{ijk} = \log\left(\frac{\phi_{ijk}}{1-\phi_{ijk}}\right)$$

$$\begin{aligned}\eta_{ijk} = {} & \pi_{0jk} + \pi_{1jk}(\text{Male})_{ijk} + \pi_{2jk}(\text{HH Occ}:\text{Prof/Mgmt})_{ijk} + \pi_{3jk}(\text{HH Occ}:\text{Not working})_{ijk} \\ & + \pi_{4jk}(\text{Educ}:\text{Some postsec})_{ijk} + \pi_{5jk}(\text{Educ}:\text{Tertiary})_{ijk} + \pi_{6jk}(\text{Educ}:\text{Student})_{ijk} \\ & + \pi_{7jk}(\text{Pol. Beliefs}:\text{Left})_{ijk} + \pi_{8jk}(\text{Know mj user})_{ijk} + \pi_{9jk}(\text{Mj danger})_{ijk}\end{aligned}$$

Level 2:

$$\begin{aligned}\pi_{0jk} = {} & \beta_{00k} + \beta_{01k}(\text{Pop. density})_{jk} + \beta_{02k}(\text{Net migration})_{jk} + \beta_{03k}(\text{Youth pop.})_{jk} \\ & + \beta_{04k}(\text{GDP growth})_{jk} + \beta_{05k}(\text{Homicide rate})_{jk} + r_{0jk}\end{aligned}$$

$$\pi_{1jk} = \beta_{10k} + r_{1jk}$$

$$\pi_{2jk} = \beta_{20k} + \beta_{21k}(\text{Net migration})_{jk}$$

$$\pi_{3jk} = \beta_{30k} + \beta_{31k}(\text{Net migration})_{jk}$$

$$\pi_{4jk} = \beta_{40k} + \beta_{41k}(\text{Pop. density})_{jk} + \beta_{42k}(\text{Youth pop.})_{jk} + \beta_{43k}(\text{GDP growth})_{jk}$$

$$\pi_{5jk} = \beta_{50k} + \beta_{51k}(\text{Pop. density})_{jk} + \beta_{52k}(\text{Youth pop.})_{jk} + \beta_{53k}(\text{GDP growth})_{jk}$$

$$\pi_{6jk} = \beta_{60k} + \beta_{61k}(\text{Pop. density})_{jk} + \beta_{62k}(\text{Youth pop.})_{jk} + \beta_{63k}(\text{GDP growth})_{jk}$$

$$\pi_{7jk} = \beta_{70k} + \beta_{71k}(\text{Homicide rate})_{jk} + r_{7jk}$$

$$\pi_{8jk} = \beta_{80k} + \beta_{81k}(\text{Homicide rate})_{jk}$$

$$\pi_{9jk} = \beta_{90k} + r_{9jk}$$

Level 3:

$$\beta_{00k} = \gamma_{000} + \gamma_{001}(\text{Poss/sale arrests})_k + \gamma_{002}(\text{Subst. rate})_k + u_{00k}$$

$$\beta_{02k} = \gamma_{020} + \gamma_{021}(\text{Poss/sale arrests})_k$$

$$\beta_{pjk} = \gamma_{pj0} \text{ for } p > 0,\ j > 0 \text{ and } j \neq 2$$

Appendix 2: Hierachical Generalized Linear Model for Lifetime Drug Use Other Than Marijuana

Level 1:

$$P(Y_{ijk} \mid \pi_{ijk}, \beta_{ijk}, \gamma_{ijk}) = \varphi_{ijk}$$

$$\eta_{ijk} = \log\left(\frac{\phi_{ijk}}{1-\phi_{ijk}}\right)$$

$$\eta_{ijk} = \pi_{0jk} + \pi_{1jk}(\text{Male})_{ijk} + \pi_{2jk}(\text{Age})_{ijk} + \pi_{3jk}(\text{Head of household})_{ijk} + \pi_{4jk}(\text{Know drug user})_{ijk} + \pi_{5jk}(\text{Obtain drugs easily})_{ijk} + \pi_{6jk}(\text{Cocaine danger})_{ijk}$$

Level 2:

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}(\text{Pop. density})_{jk} + \beta_{02k}(\text{Net migration})_{jk} + \beta_{03k}(\text{Youth pop.})_{jk} + r_{0jk}$$

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}(\text{Pop. density})_{jk} + r_{1jk}$$

$$\pi_{2jk} = \beta_{20k} + \beta_{21k}(\text{Youth pop.})_{jk}$$

$$\pi_{3jk} = \beta_{30k} + \beta_{31k}(\text{Net migration})_{jk}$$

$$\pi_{4jk} = \beta_{40k} + r_{4jk}$$

$$\pi_{5jk} = \beta_{50k} + \beta_{51k}(\text{Pop. density})_{jk}$$

$$\pi_{6jk} = \beta_{60k}$$

Level 3:

$$\beta_{00k} = \gamma_{000} + \gamma_{001}(\text{Seizures})_{k} + \gamma_{002}(\text{Treatment rate})_{k} + u_{00k}$$

$$\beta_{pjk} = \gamma_{pj0} \text{ for } p > 0, j > 0$$

Appendix 3: Hierachical Generalized Linear Model for Regularly Smoking Cigarettes

Level 1 :

$$P(Y_{ijk} \mid \pi_{ijk}, \beta_{ijk}, \gamma_{ijk}) = \varphi_{ijk}$$

$$\eta_{ijk} = \log\left(\frac{\phi_{ijk}}{1-\phi_{ijk}}\right)$$

$$\begin{aligned}\eta_{ijk} &= \pi_{0jk} + \pi_{1jk}(\text{Male})_{ijk} + \pi_{2jk}(\text{Age})_{ijk} + \pi_{3jk}(\text{Income}:\text{Above median})_{ijk} \\ &\quad + \pi_{4jk}(\text{Income}:\text{DK})_{ijk} + \pi_{5jk}(\text{Married})_{ijk} + \pi_{6jk}(\text{Educ}:\text{Sec/some postsec.})_{ijk} \\ &\quad + \pi_{7jk}(\text{Educ}:\text{Tertiary/student})_{ijk} + \pi_{8jk}(\text{Cigarettes danger})_{ijk}\end{aligned}$$

Level 2 :

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}(\text{Pop. density})_{jk} + \beta_{02k}(\text{GDP growth})_{jk} + r_{0jk}$$

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}(\text{Pop. density})_{jk} + r_{1jk}$$

$$\pi_{2jk} = \beta_{20k} + r_{2jk}$$

$$\pi_{3jk} = \beta_{30k} + r_{3jk}$$

$$\pi_{4jk} = \beta_{40k} + r_{4jk}$$

$$\pi_{5jk} = \beta_{50k} + \beta_{51k}(\text{GDP growth})_{jk}$$

$$\pi_{6jk} = \beta_{60k} + r_{6jk}$$

$$\pi_{7jk} = \beta_{70k} + r_{7jk}$$

$$\pi_{8jk} = \beta_{80k} + r_{8jk}$$

Level 3 :

$$\beta_{00k} = \gamma_{000} + \gamma_{001}(\text{No purchase age})_k + \gamma_{002}(\text{Cigarette cost})_k + \gamma_{003}(\text{Tob. action plan})_k + u_{00k}$$

$$\beta_{02k} = \gamma_{020} + \gamma_{021}(\text{Tob. action plan})_k$$

$$\beta_{10k} = \gamma_{100} + \gamma_{101}(\text{Cigarette cost})_k$$

$$\beta_{pjk} = \gamma_{pj0} \text{ for all other } p, j$$

Appendix 4: Hiearchical Linear Model for Drug Policy Opinion Scale

Level 1:

$$Y_{ijk} = \pi_{0jk} + \pi_{1jk}(\text{Male})_{ijk} + \pi_{2jk}(\text{Income}: 2^{nd}\ \text{quart.})_{ijk} + \pi_{3jk}(\text{Income}: 3^{rd}\ \text{quart.})_{ijk}$$
$$+ \pi_{4jk}(\text{Income}: 4^{th}\ \text{quart.})_{ijk} + \pi_{5jk}(\text{Income}: \text{DK})_{ijk} + \pi_{6jk}(\text{Educ}: \text{Tertiary/student})_{ijk}$$
$$+ \pi_{7jk}(\text{Pol. Beliefs}: \text{Center/DK})_{ijk} + \pi_{8jk}(\text{Pol. Beliefs}: \text{Left})_{ijk} + \pi_{9jk}(\text{Mj use})_{ijk}$$
$$+ \pi_{10,jk}(\text{Drug use})_{ijk} + e_{ijk}$$

Level 2:

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}(\text{Youth pop.})_{jk} + \beta_{02k}(\text{GDP growth})_{jk} + \beta_{03k}(\text{Unemployment})_{jk}$$
$$+ \beta_{04k}(\text{Tourism})_{jk} + r_{0jk}$$
$$\pi_{1jk} = \beta_{10k}$$
$$\pi_{2jk} = \beta_{20k} + \beta_{21k}(\text{GDP growth})_{jk} + r_{2jk}$$
$$\pi_{3jk} = \beta_{30k} + \beta_{31k}(\text{GDP growth})_{jk} + r_{3jk}$$
$$\pi_{4jk} = \beta_{40k} + \beta_{41k}(\text{GDP growth})_{jk} + r_{4jk}$$
$$\pi_{5jk} = \beta_{50k} + \beta_{51k}(\text{GDP growth})_{jk} + r_{5jk}$$
$$\pi_{6jk} = \beta_{60k} + r_{6jk}$$
$$\pi_{7jk} = \beta_{70k} + \beta_{71k}(\text{GDP growth})_{jk} + r_{7jk}$$
$$\pi_{8jk} = \beta_{80k} + \beta_{81k}(\text{GDP growth})_{jk}$$
$$\pi_{9jk} = \beta_{90k} + \beta_{91k}(\text{Youth pop.})_{jk} + r_{9jk}$$
$$\pi_{10,jk} = \beta_{10,0k}$$

Level 3:

$$\beta_{00k} = \gamma_{000} + \gamma_{001}(\text{Arrests convicted})_{k} + u_{00k}$$
$$\beta_{pjk} = \gamma_{pj0} \text{ for } p > 0, j > 0$$