

ABSTRACT

Chandler, William Carlton, The Deterrent Effect of the Undercover Compliance Check Strategy to Reduce the Sale of Alcoholic Beverages to Minors in North Carolina: A Quasi-Experimental Design. (Under the direction of Michael L. Vasu and James E. Swiss)

The problem of underaged drinking and efforts to reduce it are examined in this research by: First, assessing the deterrent effect of the widely used undercover compliance check strategy. Secondly, the predictive and explanatory power of identified characteristics of both alcohol sales outlets and individual sellers was assessed. Data was collected using a quasi-experimental design employing compliance checks of a proportionally stratified random sample of alcohol sales outlets across North Carolina. The research objectives were to determine if compliance checks deter minor sales and to assess the utility of using identified characteristics to focus enforcement, training and industry staffing to reduce sales. Multivariate models combining these characteristics were constructed. They were found to provide more information in guiding training and scheduling than in enforcement. The major findings were: the limited-sanction compliance checks employed did not have a statistically significant deterrent effect on future sales; minor sales violations are independent of other ABC offenses; a baseline of a 25% sale to minor rate was established; past enforcement does not predict future offending; present training efforts are not significantly associated with reduced sales; citizen complaints are not associated with actual sales; values of the seller-specific variables are difficult to ascertain and provide little enforcement guidance, but do guide training and staffing; ownership variables are associated with lower sales rates; sellers age 16-21 sell at lower rates than other similarly constructed categories; and many of the traditional beliefs of law enforcement were not confirmed. The study concludes recommending: continuing compliance checks; placing less emphasis on investigating complaints and using complaints as a basis to partner with the industry; update training programs; license sellers, with training being a prerequisite; changing the administrative punishment structure to make it more equitable and establishing a minimum age to sell alcohol.

**The Deterrent Effect of the Undercover Compliance Check Strategy to Reduce
the Sale of Alcoholic Beverages to Minors in North Carolina:
A Quasi-Experimental Design**

by

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DEDICATION

This dissertation is dedicated to the memory of my father, G. Carlton Chandler, Magistrate, farmer and most importantly, friend.

BIOGRAPHY

William Carlton Chandler was born in Danville, Va. on October 13, 1957, the son of the late G. Carlton Chandler and Ruby Shelton Chandler. He grew up on the family farm in Caswell County, North Carolina along with one sister. He graduated from Piedmont Academy in 1975 and entered North Carolina State University that fall. Taking a break from NCSU in March of 1979, he accepted a position with the North Carolina Alcohol Law Enforcement Division in 1979 as an Alcohol Law Enforcement Agent and is still so employed, having been stationed in Roxboro, Chapel Hill, Raleigh and Sanford. Chandler married Anne Lackey Gobble on September 20, 1986. His son Frederick Carlton Chandler (Chip) was born on March 26 1989. He returned to NCSU, finally completing his B.A. in Political Science in May of 1992. He entered the Master of Public Administration Program at NCSU that fall, graduating in December of 1996. He continued his education and was admitted along with the first class of the Ph.D. in Public Administration in 1997. After completion of the Ph.D., he plans to continue his career in law enforcement and after retirement to begin a second career teaching and consulting in the area of public management.

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During the course of this project I have incurred many debts that can never be repaid. So many people have helped with their time and advice that in writing this acknowledgment I fear that I will leave someone out. So if the reader happens to be one of those people, please remember that is not that I do not appreciate your guidance and assistance, it is only that I am getting old and forgetful and it is as I said to my wife the day that I completed the first draft of this dissertation, "my brain is empty."

I do wish to thank Dr. Michael L. Vasu, Co-Chair of my committee, adviser since my undergraduate days, mentor and friend. Without his encouragement I would never have finished my BA, much less have completed a doctoral dissertation. I also wish to thank Dr. Jim Swiss, Co-Chair of the committee, for keeping me grounded in reality during my graduate academic career. I owe a debt to Dr. Joel Rosch for being a sounding board for my ideas for many years, for pointing out my weaknesses and for always encouraging me to work harder.

I owe a great debt to my parents, my father, Carlton Chandler, who passed away in 1998 and my mother Ruby S. Chandler. They encouraged all my educational endeavors and instilled in me the belief that education is the one thing that no one can ever take away from you. I only wish "daddy" could be here to see me graduate.

The most important debts I owe are to my wife, Anne and my son Chip. They have put up with the classes, the papers, the exams, my moodiness and irritability for the entire process, without complaining. They have also been put on hold for far too long and now that this degree is almost finished, I realize that have a lot of catching up to do. I only hope that I have not missed too much during my preoccupation with school and that they do not get tired of having me being around all the time when I no longer have to go to class.

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CHAPTER 1

INTRODUCTION TO THE STUDY

INTRODUCTION

The sale¹ of alcoholic beverages to minors² is a major problem in the United States, and unfortunately, North Carolina is not immune from this problem. Many strategies have been employed over the years to reduce alcohol sales to those under the legal age to purchase. These strategies typically focus on either enforcement or training. Some have been aimed at demand reduction, focusing on the minor who attempts to purchase alcohol. The majority; however, have focused on supply reduction, targeting the individual alcohol seller and licensed retail alcohol sales outlet. For this reason the majority of empirical research in this area has focused on examining those enforcement and training strategies targeting the source of alcohol. These studies have found that one of the most widely used enforcement strategies is the undercover compliance check. This strategy entails having minors, working under the direction and supervision of law enforcement, attempt to purchase alcohol from licensed outlets in an undercover capacity. While this approach has been widely used and has been widely accepted,

¹ *Sale* is defined by North Carolina General Statute 18B-101(13), as any transfer, trade, exchange, or barter, in any manner, by any means for consideration" (Alcoholic Beverage Control Laws, 1999, 566). This definition serves only as the foundation for our operationalization of sale" The term sale will also include the act of giving an alcoholic beverage to an underage person. This distinction is made in General Statute 18B-302(a)(1) which states in part: "...It shall be unlawful for any person to sell or give ...(alcoholic beverages)...to anyone who is less than 21 years old" (Alcoholic Beverage Control Laws, 1997, 575). (The reader should notice that the statute does not delimit a lower age level. This is because it is equally unlawful to sell alcohol to a juvenile, but for reasons which will become clear throughout the reporting of this research, we choose to place a bottom limit on this variable.) The reasoning for the inclusion of the act of "giving" alcohol to an underage person in the definition of sale is based on the author's many years of experience in this field. In a location where a person is served alcohol for consumption on the premise, the actual exchange of consideration may not occur until after the fact or a third party may actually pay for the beverage, or a person other than the server may receive the consideration. For this reason, to close a "loophole," North Carolina law and our operational definition of sale subsumes the act of giving alcohol under our construct *sale*.

² *Minor* and *Underage person* are terms that are used interchangeably. The definition of this variable has its roots in North Carolina General Statute 18B-302(a)(1) which defines *minor* or *underage person* as anyone less than 21 years of age. For this study, the terms underage person or minor will generally refer to those persons who have reached their sixteenth birthday, but not yet reached their twenty-first birthday. The lower limit, which is based on North Carolina law; however, requires explanation. The definition of the lower limit of an underage person used in this research includes only those persons who can be arrested and tried in adult courts for the commission of a criminal offense. In North Carolina, a person over the age of 16 can be arrested, tried and imprisoned as an adult. A person who has not yet reached his or her sixteenth birthday is considered a juvenile and is subject to the provisions of Subchapter XI, North Carolina Juvenile Code and cannot be physically arrested on sight by a law enforcement officer (North Carolina Criminal Law and Procedure, 1997, 118-163). As the reader will discover when reading the review of the literature in the next chapter, other states and countries may use different ages based on their laws and customs to define underage drinking.

little empirical research has been conducted to assess its deterrent effect, leaving law enforcement to accept on blind faith that compliance checks exert the desired deterrent effect. In those few cases where empirical research has been done, it typically focuses on only one or two characteristics of either individual sellers or licensed outlets. To date, no comprehensive effort has been made to examine individual seller or licensed outlet characteristics that can be used to predict sales to minors. Based on these gaps in the research literature our study will first examine the deterrent effect, if any, that the undercover compliance check strategy has on future sales to minor violations. Secondly, we will identify and examine the predictive effects of both individual seller and licensed outlet characteristics to attempt to predict which sellers and outlets are predisposed to sell alcohol to minors. In this time of budget shortfalls, with the public demanding more services and less taxes, the time has come for law enforcement to employ empirical research in an attempt to work more effectively in policy arenas such as underage drinking. This dissertation is a first step in this direction in the area of sales to minors.

OVERVIEW OF THE CHAPTER

In this chapter we begin by setting out the significance of the problem of the sale of alcohol to those less than 21 years of age and the effect it has on society. After establishing that the sale of alcohol to minors is a pressing problem in need of attention, the focus will shift to how the problem has been addressed up to this point. This is followed by a discussion of why our research is important and sets out those specific gaps in the literature it seeks to fill. We next address the contributions to knowledge that this study proposes to make to the field of the prevention of the sale of alcohol to minors. We then tie the importance of our research to the field of public administration. The chapter concludes by providing a roadmap for the rest of the dissertation.

As this study is focused on the State of North Carolina, our operational definitions of the constructs used herein, which will be provided as new terms are introduced, will often have its

basis in North Carolina law. For this reason, many of our definitions and explanations will be taken directly from the North Carolina General Statutes.

SIGNIFICANCE OF THE PROBLEM

It is almost impossible to pick up and read a newspaper or view a television news cast today without seeing tragic reports related to alcohol abuse. Whether a fatal motor vehicle accident, murder, domestic abuse, or some other terrible event, alcohol abuse contributes to many of society's ills. Other than contributing to criminal activity, alcohol abuse also produces adverse social, health and economic consequences. It has been shown to have the potential to act as a gateway to illegal drugs. Its misuse can lead to unprotected sex, often causing unwanted pregnancy, or sexually transmitted disease. Its costs are estimated to be in the hundreds of millions of dollars annually. (O'Malley, Johnson and Bachman 1998, 90; Kumpfer and Chavez, 1999, 23; Kane and Yacoubian, 1999). While it is difficult to accept the serious consequences of alcohol abuse in adults it is even more unsettling to see a young life shattered or lost by the effects of alcohol. It is not only tragic; it is highly preventable, as the purchase and possession of alcoholic beverages by anyone under 21 years of age is illegal in the United States. Beginning in July of 1988, it became illegal to sell alcohol to any person less than 21 years of age in all 50 states and in the District of Columbia. However, in 1999 the Office of Juvenile Justice and Delinquency Prevention and Mothers Against Drunk Driving released a study showing the cost of underage alcohol use in the United States to be in excess of 58 billion dollars a year (OJJDP and MADD, 1999). The disparity between the laws on the books and the realities occurring daily is one of the motivators driving this research.

Underage Alcohol Related Problems in North Carolina

To state the obvious, the mere fact that it is illegal to purchase alcohol does not preclude underage persons from illegally obtaining it, nor does having such a law eliminate the direct sale

of alcohol to those underage persons. This flagrant disregard for the law may follow from the feeling in this country that if 18 year olds can drive cars, vote in elections and risk their lives in the armed services, they should be allowed to purchase, possess or consume alcohol.

Noncompliance may also stem from the fact that the federal government mandated that states restrict alcohol sales and possession through threats of withholding federal funds, raising resentment. Seeing the law as a denial of their individual rights, teens often try to circumvent the law by purchasing alcohol (Johnson, 1997, 8).

The sale of alcohol to minors is a pandemic sweeping the entire nation, and sadly, North Carolina is no exception (Kumpfer and Chavez, 1999; Forster and McGovern, 1994, 700; Wolfson and Toomey, 1996, 590). To illustrate this point, in 1996 there were 1,237 motor vehicle crashes involving underage drinking drivers in North Carolina. Of this number, 12% of the drivers aged 15 to 20 who were killed in motor vehicle accidents had been drinking alcohol. Specifically, 10.7% of those 15 to 17 years of age who were killed had been consuming alcohol and 14.6% of those 18 to 20 killed were using alcohol. In 1995, 25% of the 18 to 20 year olds who died from accidental injuries, other than motor vehicle accidents, had been consuming alcohol. Also in 1995, the North Carolina Office of the Chief Medical Examiner reported that 15% of those under age 21 who died from accidental injuries of all types had alcohol in their blood, with 9% having extremely high blood alcohol concentrations (Beuscher, Alvaraz-Martin and Foss, 1998). While these figures may not be out of line with alcohol related deaths in the general population, the significance of these statistics lies in the fact that any possession or consumption of alcohol by those less than 21 is a criminal offense.

Alcohol Use by Minors

A study conducted in one county in New Jersey in 1994, and followed up by survey research, found that 90% of high school seniors had consumed alcohol at some point in their lives and 80%

believed that alcohol was easy to purchase by underaged persons (O'Leary and Gorman, 1994; 816). The most shocking statistics were reported by Wagenaar and Finnegan in 1993 when they found that in the United States: six percent of 10 and 11 year olds; 25% of 12 to 14 year olds; 55% of 15 to 17 year olds and 92% of high school seniors, had consumed alcohol at some point in their lives (460). In a 1992 research study by Lewinsohn and Rohde it was reported that 88% of high school seniors in the U.S. had experimented with alcohol, with 50% of them having consumed alcohol in the previous 30 days and five percent reporting daily alcohol use (1996, 376). A literature review by O'Malley, Johnson and Bachman (1998) found that a majority of adolescents under 18 years of age have consumed alcohol. They go on to say that 54% of eighth graders had consumed alcohol at least once, rising to 72% for tenth graders and 82% for seniors (1998, 85-86). The use of alcohol by minors is pervasive, but even more shocking is its abuse by those under the legal age to drink.

Alcohol Abuse by Minors

Alcohol abuse by adolescents manifests itself in negative psychological, interpersonal and community consequences (O'Hare, 1998, 1). This issue is addressed by an Office of National Drug Control Policy study in 1996, which reported 9.5 million drinkers aged 12 to 20, with 4.4 million of them classified as binge drinkers (consuming five or more "drinks" at one time) and 1.9 million classified as heavy drinkers (FBI Law Enforcement Bulletin, 1999). The Office of National Drug Control Policy's Director General Barry McCaffrey said in a 1998 news release, "Alcohol is a ...readily available drug that is responsible for more damage in our society than any other drug on the street ...booze is, no question a major problem in our society, 100,000 dead, \$150 billion in damages. It dwarfs the impact currently of the other drugs" (Nations' Health 29, 7). West (1998) reports a strong association between heavy drinking and juvenile delinquency. Examining data from 1970 to 1990, Birckmayer and Henenway (1999) found there was a significant association between alcohol use and suicide by those less than 21. They studied suicides rates in states

where the minimum legal drinking age was being raised and lowered. They found that in states with a minimum legal drinking age of 18, there was an 8% higher youth suicide rate than states with a 21-year-old minimum legal drinking age (1999; 1365). Since the possession and consumption of alcohol by those under 21 years of age is now illegal in all states, minors have been found to drink more heavily during episodes where they are able to obtain alcohol, compensating for the lack of the universal availability of alcohol (Lewinsohn and Rohde, 1996, 383; McKnight, 1993, 79).

RATIONALE FOR A MINIMUM DRINKING AGE

With all the problems associated with stopping those under the age of 21 from buying and consuming alcohol, the question naturally comes to mind: Why have a minimum drinking age? To answer this question, we again turn to the literature. Research has shown that alcohol dependency and abuse begin early in life (Lewinsohn and Rohde, 1996, 376). Williams and Perry (1998) reported that the general population of the United States includes more light to moderate drinkers than heavy drinkers. However, these light and moderate drinkers experience more alcohol related problems than heavy drinkers. They cite a 1992 study that concluded people who began drinking before age 15 were four times more likely to become alcohol dependent than those who put off drinking until age 20. Overall, the use of alcohol by youth has resulted in increases in both morbidity and mortality among this group (Williams and Perry, 1998, 108; Cohen, 1998, 2). These findings have shifted the focus of alcohol abuse prevention from the identification of heavy drinkers to the prevention of alcohol acquisition and use during adolescence. Another related problem is that young people represent the highest risk taking group and alcohol enhances risk taking behavior (Mosher, 1994, 2). Wagenaar and Finnegan conclude that the age of one's first easy access to alcohol is associated with drinking rates later in life. In an earlier study, Wagenaar and O'Malley found that legal access to alcohol at the age of 18 was associated with higher drinking rates later in life. After the drinking age was raised to

21, it not only reduced the rate of drinking of those between 18 and 21 years of age, is also reduced the drinking rates of this same group when they were ages 21 to 25 (Wagenaar and Finnegan, 1993, 460). An Australian study conducted to identify harm reduction strategies associated with alcohol abuse concluded that early intervention and keeping minors from drinking at an young age was highly correlated with reducing alcohol abuse later in life (Reilly and Van Beurden, 1998, 386). Toomey and Rosenfeld (1996) came to a similar conclusion when discussing the history of the minimum legal drinking age and the effect it has had on alcohol abuse. Their literature review concluded that raising the drinking age from 18 to 21 resulted in a lower rate of alcohol abuse among those less than 21 (1996, 215). Wagenaar and Wolfson (1994) reported that raising the minimum legal drinking age to 21 resulted in a 10 to 15% reduction in youth drinking and driving motor vehicle accidents (37-38). Other studies have found that there have been long term beneficial effects associated with raising the minimum drinking age to 21 (Wagenaar, 1991, 192).

Finally, Wagenaar conducted a meta-analysis of 50 empirical studies that focused on the effect of raising the minimum legal drinking age. He concluded that a higher minimum legal drinking age was correlated with a lower number of alcohol related crashes among youth (Toomey and Rosenfeld, 1996, 215).

Viewing these figures, it is apparent that youth access to alcohol is a major problem and it raises the question of where minors obtain their alcohol.

Sources of Alcohol for Minors

Wagenaar and his associates, in studying patterns of acquisition of alcohol by youth, said:

“Results showed that the initial alcohol used by those in their early teens is obtained from parent’s stocks or from older siblings or friends. By the mid-teens, parties ... becomes the major source.

In the mid to late teens, youth purchase alcohol from commercial alcohol outlets, despite the legal age of 21” (Wagenaar and Wolfson, 1994, 38). Many recent studies have pointed to the ease with which underage persons are able to illegally purchase alcohol themselves (Wolfson, Toomey, Forster, Wagenaar, McGovern and Perry, 1995, 670). Studies conducted in Massachusetts and New York found that one-third of high school students had purchased alcohol themselves within the past thirty days. Many of these underaged persons possessed fictitious identification documents, but due to the ready availability of sellers willing to sell alcohol to them, their fake ID’s were often not needed (Grube, 1997, 252).

SPECIFIC NORTH CAROLINA CONCERNS

Based on the problems associated with underage use and abuse of alcohol presented above, it is clear that more action is needed to address this problem; however, in North Carolina, as in other states, there does not seem to be a general consensus as to which strategies should be employed to solve the problem. “It has been suggested that efforts to understand and change the pattern of alcohol use by youth must address characteristics of the supply of alcohol to minors as well as demand or use patterns” (Forster and McGovern, 1994, 700).

While studies have shown that the residents of North Carolina may be divided on what action should be taken to curtail the problem of youth alcohol abuse, they clearly recognize the severity of the problem. A 1997 survey, conducted by Mathematica Data (1998), found that 98% of North Carolina adults surveyed were somewhat or very concerned about teenage drinking. This was compared to 96% percent of the same sample being concerned with teenage sex and pregnancy and 90% being concerned with teenage smoking. Eighty-three percent of the sample respondents believe that licensed retail alcohol sales outlets are not careful enough in preventing sales of alcohol to minors (Mathematica Data, 1999, 2). Clearly North Carolinians see youth

access to alcohol as a serious problem and want something done about it; however, enforcement in this area may be lacking.

Lack of Enforcement

Beuscher, et. al. reported in that in North Carolina in 1997 there were only 749 convictions for selling alcohol to underaged persons³ (Beuscher, Alvaraz-Martin and Foss, 1997, 8). During the same year, there were 220 vehicle-related deaths among the 15 to 20 year old age group, with 57% of these deaths being alcohol related (Kumpfer and Chavez, 1999, 14). Comparing the estimated cost figures of underaged alcohol abuse, presented above, with arrest and conviction rates, there appears to be a lack of enforcement in the area of sales of alcohol to minors.⁴

Recognizing the severity of the problem and increasing penalties may be excellent first steps; however, these initiatives are for naught unless the laws currently on the books are enforced.

The incongruity between the ability of young people to purchase alcohol and sales to minor arrests calls for more aggressive reduction strategies (Beuscher, Alvaraz-Martin and Foss, 1998, 8).

Little and Bishop sum up the enforcement problem succinctly saying: "Simply put, underage drinking is against the law. Yet, in a culture that views alcohol consumption as a part of growing up, even ...(law enforcement)... may overlook violations" (1998, 4). In a review of the literature on the sale of alcohol to minors, Grube (1997) concluded that enforcement of existent underage sales laws is lax. As will be seen in our discussion of morality politics in Chapter Two, Meier concluded that such policies, which include sales to minors, are rarely funded at a level

³This figure underestimates the true total convictions as their data was obtained from the N.C. State Bureau of Investigation's Division of Criminal Information and the N.C. Alcohol Law Enforcement Division, the lead alcohol enforcement agency, did not at that time report its arrest data to the SBI.

⁴ We concede that not all of the alcohol that contributed to the deaths and injuries was directly purchased by underaged person; however, these figures still point to a lack of enforcement in this area.

necessary to achieve total prohibition (1994, 12). This conclusion is borne out when one examines the resources devoted to this activity in North Carolina. The North Carolina Alcohol Law Enforcement Division, the state's lead agency for alcohol enforcement, when at full staff only has about 76 field agents actually enforcing the ABC Laws in the state's more than 15,000 licensed retail alcohol sales outlets. This requires each agent to supervise approximately 200 outlets, which may be spread out over several counties. Having such a large number of outlets to supervise, it is clear that ALE needs proven strategies to focus its sales to minor reduction efforts. We now turn to a discussion of those strategies that are currently in use in this area.

SALES TO MINOR REDUCTION STRATEGIES

The foundation for this discussion was laid when Beuscher, Alvaraz-Martin and Foss said: "Given that underage alcohol use in North Carolina is a large problem with serious health consequences, consideration should be given to strategies to reduce underage drinking and its consequences" (Beuscher, Alvaraz-Martin and Foss, 1998, 8). In an attempt to solve this problem, non-enforcement agencies in North Carolina have attacked the problem with educational strategies aimed at the underaged person. Many studies have concluded that while the education of underage persons about alcohol may be an important strategy, for it to be the most effective, it must be coupled with enforcement to form a comprehensive plan of attack. Unfortunately, at present, no comprehensive youth alcohol abuse prevention program exists in North Carolina. Those programs that do exist are housed in various local and state government agencies. Until these diverse programs are combined under one umbrella where they can be comprehensively evaluated, we must begin by evaluating them individually. North Carolina data points to the conclusion that controlling alcohol sales to underage persons is more effective than those educational strategies focused on the underaged person themselves. Basically, this data points to enforcement as being the more successful of the available strategies (Beuscher, Alvaraz-Martin and Foss, 1998). Our initial task is to identify a specific enforcement strategy or

combination of strategies that seems to hold the most promise in reducing the carnage attributed to underage alcohol abuse.

A major focus of attacking alcohol abuse by underaged persons in the United States has centered on demand reduction, targeting the buyer, either through direct enforcement or public school based educational programs. As said above, the literature recognizes that such approaches have only a limited impact and calls for supply side strategies (O'Leary and Gorman, 1994, 816; Wagenaar, et. al., 1998, 85). While underaged persons are sometimes furnished alcohol by friends or strangers who are over the legal purchasing age, many of these underaged persons obtain alcohol by simply purchasing it themselves from legal retail sales outlets. Underage persons seem to be able to purchase alcoholic beverages from licensed sales outlets at an alarming rate in North Carolina.

Specific North Carolina Sales Reduction Strategies

While the problem of the sale of alcoholic beverages to minors has existed since alcohol sales were authorized in 1938, it became a major issue beginning with the passage of the Safe Roads Act in 1983. As a result of this act, the North Carolina Alcohol Law Enforcement Division (ALE) initiated a number of enforcement strategies to attempt to decrease youth access to alcohol, among them are "... decoy or sting programs..." known in North Carolina as undercover sales to minor campaigns or more recently, compliance checks (Kumpfer and Chavez, 1999, 8).

These compliance checks have been one of North Carolina's primary strategies in attacking sales to minors. Another strategy is the development and presentation of a server training program, originally entitled "Driving Under the Influence Source Prevention Program." This strategy has survived through several iterations and today it is known as "Be A Responsible Seller," better known by its acronym "BARS." A third program was entitled "Outlet Observation Program,"

where randomly chosen outlets were covertly surveilled from inside or outside. While all are still in use in one form or another today, the major focus of our research will involve use of the underage compliance checks.

The Use of the Compliance Check Strategy in North Carolina

Compliance checks came into wide use by local law enforcement agencies in the early 1980's. Interestingly, ALE initially resisted this strategy because in the beginning local law enforcement's use of compliance checks almost always resulted in charges of entrapment, with these allegations often substantiated by the courts. ALE's resistance initially took the form of agency policy. ALE agents were prohibited from conducting these operations themselves or from assisting local agencies in their use of compliance checks. This policy remained in force until it was countermanded by Governor James B. Hunt in 1983. After being ordered to use the strategy, ALE instituted stringent procedures to assure that the entrapment issue could be successfully refuted. Most of these initial policies remain in effect today.

Given the problems associated with alcohol use and abuse by minors and those reduction strategies which have been employed, we now turn to the specific purposes for our study.

PURPOSE OF THE STUDY

Although compliance checks have been widely used by the North Carolina Alcohol Law Enforcement Division since 1983. No systematic review of its efficacy in this state has been undertaken. To address this gap in the literature, the initial focus of this study is to assess the deterrent effect, if any, of the compliance check strategy on the sale of alcoholic beverages⁵ to

⁵ North Carolina General Statute 18B-101(4) defines *Alcoholic Beverage* as any beverage containing at least one-half of one percent (0.5%) alcohol by volume, including malt beverages, unfortified wine, fortified wine spirituous liquor, and mixed beverages. Even though those products known as "near beer" actually include small percentages of alcohol, they are not considered to be an alcoholic beverage and are not included within the legal definition or within our operational definition (North Carolina Criminal Law and Procedure, 1997, p. 566).

minors. While it is important to develop and use efficient enforcement strategies to deter sales to underage persons, it is also important to understand which characteristics of individual sellers and licensed alcohol sales outlets⁶ are associated with their propensity to sell alcohol to underage persons. The second major component of this research is the identification of those characteristics of both licensed alcohol sales outlets and individual alcohol sellers that contribute to sales to minors. These characteristics should aid in targeting scarce enforcement resources.

MAJOR GOALS OF THE RESEARCH

To accomplish our research goals, this study has several distinct, but interrelated, purposes. The first is to determine if the undercover compliance check strategy has a deterrent effect in reducing sales to minors in North Carolina. This analysis and the subsequent discussion of the findings will be grounded in deterrence theory. The compliance check strategy is important because it has been widely used in North Carolina and other states and it was also central to the methodology of this study, as it was the means by which the data was produced. While it has been widely used in this state by the ALE Division and local agencies, there have been no prior studies attempting to determine its deterrent effect. Recognizing this deficiency, the first component of the study is designed to ascertain if this widely used strategy is viable, effective and efficient in its attempt to reduce sales of alcohol to minors and if it serves as a deterrent to individuals and licensed outlets in this area.

Secondly, the study examines specific characteristics of individual alcohol sellers, to determine if these characteristics have utility in predicting who is prone to sell alcohol to minors. As will be seen below and later in Chapter Two, deterrence theory will be used as the basic theoretical foundation for our discussion of the majority of the outlet-related characteristics. Deterrence will

⁶ *Outlets or Licensed Retail Sales Outlets* is defined as only those locations that are licensed by the NC ABC Commission for the retail sale of alcoholic beverages. This research will refer to these licensed locations as "licensed retail alcohol sales outlets", or "licensed retail outlets", or simply "outlets." Any time one of these terms is used, the reader should assume that the reference is to a location licensed for retail sale of alcohol in North Carolina.

also be used to examine several seller-specific variables, namely prior sales to minor charges and seller training. However, many of the individual seller variables do not lend themselves to be discussed in terms of deterrence theory, so a closely related theory, expectancy theory, will be used to frame many of the hypotheses related to the analyses of the data. Expectancy theory serves as a foundation for an attempt to explain the motivation of a seller to make the decision to sell to a minor or refuse the sale.

As to most of the seller characteristics examined, an alternative theory, that related to criminal profiling, provides an alternative basis for making predictions as to the outcomes of the data analysis. Expectancy and deterrence theories, having their basis in rational decision making, hold that most people will make decisions based on past information and will be deterred by past sanctions. Conversely, criminal profiling theory, with its central tenet of persistence of actions, will predict that a person will continue along a set pattern of actions, regardless of available information. We will use the natural tension between these two theoretical bases as the framework to make predictions and discuss the findings of our analysis. These variables will then be combined to construct a statistical model to ascertain if such a model has the ability to explain or predict an individual's propensity to sell alcohol to minors, thereby facilitating the creation of an offender model by which to target future compliance strategies.

Wagenaar said in a 1991 monograph, "Little is known about the nature of the enforcement actions taken by State alcoholic beverage control agencies against retail outlets that sell alcohol to youth" (192). He goes further calling for "...additional analyses ... on what types of outlets and what types of clerks are most likely to sell alcohol to youth," concluding: "Such information will directly inform intervention efforts to reduce the accessibility of alcohol to youth. For example, if certain types of outlets predominate in sales of alcohol to minors, enforcement actions and other

prevention efforts could be targeted to those kinds of outlets” (Wagenaar, 1991, 194). This lays the foundation for our use of the licensed alcohol sales outlet as a unit of analysis.

Given this, next we examine similarly identified characteristics of licensed alcohol sales outlets, both demographic and historical, to ascertain their predictive utility in the area of sales to minors. These analyses and the subsequent discussions of their findings will also be grounded in the deterrence/expectancy theory – criminal profiling theory framework described above, as the specific variables permit. The overall purpose of these analyses will be to identify which of the independent variables have predictive effects as to outlets, as organizations, in selling alcohol to minors. As above, the information provided by these analyses will be discussed as to its utility in guiding enforcement, training and scheduling to reduce sales to minors. These individual variables will also be combined into multivariate models to attempt to construct outlet profiles to be used in directing the scarce enforcement and training resources provided for alcohol sales to minor compliance efforts.

One may consider that it may be redundant to examine both the individual seller and the licensed outlet as independent units of analysis; however, as the data analyses will show, it is important to examine the individual separately from the licensed retail sales outlet as they are distinct entities, each having differing predictive abilities. Therefore, examining only one of these units of analysis would result in a significant loss of information. While the individual variables and the proposed multivariate models associated with the units of analysis of the individual seller and licensed outlet, if successful, could be used independently to predict sales to minors in an attempt to target scarce resources, in practice they would be used together. First those outlet characteristics associated with sales to minors could be used to narrow the enforcement and training efforts from the unscientific, “shotgun,” methods currently in use to identify those outlets most likely to sell to minors, providing the appropriate attention to where it is needed. Then once a particular outlet or

class of outlet is identified, the individual seller characteristics would be used to exclude the identified outlet whose currently working employee does not fit the individual seller profile. The day of the week and time of day variables, which were found to transcend specific inclusion in either of the proposed units of analysis, would also be applied to further narrow enforcement.

Third, we will examine the findings of the analyses of several of the independent variables to attempt to determine if the offense of selling alcohol to minors follows general deterrent or criminal profiling theory models of crime or if it is independent of other crimes generally and other alcohol crimes specifically. Basically, this facet of the study will attempt to ascertain if selling alcohol to a minor is a specific intent crime or if it is a strict liability crime, born of indifference, oversight or carelessness.

SIGNIFICANCE OF THIS STUDY

This study has four strengths that distinguish it from earlier research on this topic:

- (a) It examines multiple independent variables.
- (b) It differentiates between the outlet and individual seller as unit of analysis.
- (c) It examines the deterrent effect of compliance checks on a proportionally stratified random sample of an entire state.
- (d) It uses data produced by a law enforcement agency and was able to use actual minors, not youthful appearing actors as other studies have been forced to do.

Limited Nature of the Current Literature

We have seen above that in the field of reducing the availability of alcohol to minors that the current empirical literature is extremely limited. Researchers have called for methodological improvements and detailed changes that are needed to add to the knowledge base in this important field (Wagenaar, 1999, 9). A study by the University of Minnesota's Division of

Epidemiology called for future studies to include a sample of all types of licensed outlets, with larger numbers of outlets being sampled (Wolfson, Toomey, Forster, Wagenaar, McGovern and Perry, 1995, 673). While empirical research has been conducted in sales to minor reduction, as the literature in the next chapter will show, there has never been a study reported on as large a scale as an entire state. The studies reported in the contemporary literature have reported the effects of using underage undercover agents to attempt alcohol purchases as a deterrent to underage sales. The studies have basically focused on only one or two independent variables. The scope of their studies have also been severely limited, examining a single county, a selected group of cities or counties and the largest looking at 295 counties in four states, which was a small percentage of the total counties represented.

Discovering this gap in the research and being cognizant of the importance of the problem of the sale of alcohol to underage persons, it seems that the results of such a study examining the use of the compliance check strategy across an entire state could be an important contribution to knowledge in this area. While we will make no attempt to attempt to generalize the findings of this study to other states, as North Carolina is our focus, in looking for a full state in which to conduct such a project one could not ask for one better than North Carolina. Because of its cultural, economic and geographical diversity, North Carolina offers an excellent laboratory in which to conduct such a study. Another deficiency in the prior studies is that almost all were conducted by academic researchers independently of state or local law enforcement. As the possession and purchase of alcohol by those less than 21 is illegal in all states, it was necessary for these non-law enforcement researchers to use youthful appearing confederates that were, in fact, over the age of 21. This can cause a problem with a study's validity, in that in reality one is not measuring what he or she intends to measure. The data used herein was produced by a statewide law enforcement agency, and as such, this agency was able to use actual underage persons, thereby increasing its validity (Wagenaar, et. al., 2000, 87).

In an article speaking to the importance of systematic reviews and meta-analyses of already conducted studies in this area, Wagenaar calls for their use because the studies conducted to date have proven to lack sufficient statistical power to adequately detect the small, but potentially important, effects of the variables due to their limited size. In this article, Wagenaar recognized that these problems are "...not always the result of poor research; it is often a result of resource limits that prevent the implementation of the large-scale studies needed to accurately measure the small effects" (1999, 9).

In a 1994 study by Forster and McGovern, detailing the results of a sale to underage undercover operation conducted in New York and the District of Columbia, the authors say, "This important study provides direct evidence that minors can readily purchase alcoholic beverages, and points to the need for intervention with merchants to reduce sales to minors. However, information is needed from other geographic areas and all kinds of outlets, where policies and practices may differ" (1994, p. 698). This quote seems to be the most direct call for the study which follows.

Prior to proceeding with the summary of this chapter and providing a roadmap to the rest of the study, we need to briefly digress and tie the purpose of this dissertation to the field of Public Administration. Most of the prior studies spoken of in this chapter and the next have been found in the fields of epidemiology, public health or harm reduction. While this study could have implications to each of these fields, its purpose is to further the knowledge in the field of Public Administration.

RELEVANCE TO PUBLIC ADMINISTRATION

The field of Public Administration is characterized by a practitioner-academician interface. As a result of this interface, research in this field serves two purposes. First, to improve scholars' understanding of the dynamics of public issues and how they impact clients, employees and

politicians. Secondly, to develop and improve the practice of Public Administration by the identification of theories and models that can be used in real world problem solving. The chapters that follow are an attempt to do just that.

PREVIEW OF UPCOMING CHAPTERS

We will now review the objectives of this research project and chart the course for the rest of the study. This first chapter lays the foundation for the chapters that follow. One can see from the information presented that the use and abuse of alcohol by underaged persons is a tremendous problem across the entire United States and North Carolina is not immune from the death and destruction caused by it. Alcohol use by underaged persons is not merely a moral outrage or a social concern, it is illegal in all fifty states. For this reason our governments not only have a moral duty to act to reduce this problem, but a legal responsibility as well.

While surveys indicate that citizens want something done about the availability of alcohol to underaged persons, there seems no clear consensus about what avenues should be followed or what strategies should be employed and whether they should be focused on the buyer or the seller. The state of North Carolina has relied on a two-pronged enforcement strategy employing the use of underaged undercover agents and the use of random or directed surveillance in an effort to deter the illegal sale and service of alcohol to underaged persons. While North Carolina's strategy may be reasonable, no empirical research has ever been undertaken to assess the efficacy of the compliance check strategy on a scale as large as an entire state. Heretofore, no attempt has been made to attempt to identify variables to construct an offender profile by which to target sales to minor enforcement toward types of individual sellers. No previous study has been conducted to attempt to identify outlets having a propensity to sell alcohol to minors based on demographic data and prior enforcement and training histories. These issues form the foundation for this study. After attempting to assess the efficiency and

effectiveness of the compliance check strategy, this study will separately identify and examine those characteristics of sales outlets and individual sellers which are believed to have explanatory and predictive utility in the area of sales to minors. It will use these findings in an attempt to construct offender models to aid in targeting training and enforcement from a law enforcement point of view and scheduling from an industry perspective to reduce sales to minors. Finally, it will attempt to assess if the offense of sales to minors is independent of other criminal offenses.

Chapter two provides a detailed examination of the literature in the areas related to our research objectives. It presents the historical foundations of the minimum legal drinking age. It discusses the theoretical foundations to be employed to make predictions as to the outcomes of the data analysis. Those prior studies that identify relevant variables are discussed, followed by a history of the use of compliance checks and their utility as a deterrence strategy.

Chapter three sets out and describes the physical steps taken to produce the data and to explain how the empirical analysis of the issues being examined was carried out. It details the pretest, intervention and posttest used. The procedure to choose the undercover minor, the "test instrument," will also be detailed. Then we will describe how the methodology was designed to overcome threats to internal and external validity. The chapter introduces the variables used and the statistical methods employed to analyze them. It also more formally sets out the hypotheses, presented in Chapter Two, upon which this research is based. Lastly, we will explain the statistical analysis procedures used.

In a departure from the convention of presenting the data analysis in one chapter and a discussion of these findings and their implications in another, Chapter Four presents the analysis of those individual variables associated with the retail outlet as the unit of analysis, followed by a discussion of these findings and their implications to enforcement, training and staffing. This is

done for the sake of continuity and to eliminate the potential for confusion due to the large number of variables being examined with each of the units of analysis. This chapter will also include the analysis, discussion and implications of the compliance check as a deterrent strategy.

Chapter Five will present the analysis of those individual variables associated with the alcohol seller and a subsequent discussion of the implications of the analyses to enforcement, training and industry staffing. It is structured following the model set out in Chapter Four.

The final chapter will present a summary of the research findings. It will also identify those questions raised by this research which are in need of further study and present potential avenues to address them. Finally, it will present policy recommendations that, based on the findings of the study, may be important to reducing the sale of alcohol to minors. Those policy recommendations are an important element of the project. This is because traditionally public policy is driven by economic and political factors; however, in the area of alcohol and minors, public policy has a history of being driven by science. This is evidenced by the raising of the minimum legal drinking age, where science won out over economics and politics (Toomey and Rosenfeld, 1996, 213). Hopefully the results of this study will continue this tradition and influence policy in the area of the reduction of the sale of alcohol to minors.

CHAPTER 2

FOUNDATIONS IN THE LITERATURE

INTRODUCTION

This chapter presents the literature necessary to ground this study. It begins by presenting a brief overview of the regulatory literature, which forms the basis for governmental regulation of the sale of alcohol to minors. After having set out why government should step in and regulate this otherwise legal commodity at all, we present a brief history of alcohol age restriction to explain why selling alcohol to minors is a crime today, when less than one hundred years ago it was not. This seemingly arbitrary restriction grounds our hypothesis that alcohol offenses generally and sales to minors specifically may be independent of other types of crime, necessitating non-traditional enforcement strategies to reduce its occurrence. The subsequent section presents a thumbnail sketch of the sometimes opposing theories, whose tensions drive many of the hypotheses set out for this study. Having set out our theoretical framework, we discuss the contemporary literature in sales to minor enforcement to illuminate the use of undercover compliance checks. Due to its rich literature and based on our hypothesis that sales to minors may be independent of other crimes, we present a separate section on alcohol seller training, which is the basis for several independent variables.

To set the stage for this study, we first explore the rationale for government stepping in and regulating a legitimate industry. To this end we present a brief discussion of governmental regulation as it pertains to beverage alcohol.

While we recognize that the sale of alcohol to minors is a problem in need of a solution, we must first ask why does government have to undertake this task. Posed another way, in what way has the free market failed, necessitating governmental intervention? To this point in our presentation

we lack a framework for explaining why government, here the state of North Carolina, should be responsible for attacking this problem.

Why does government exist? While a comprehensive answer to this question would fill many volumes, for the purposes of our research, government exists to solve “wicked problems,” those problems that the “market” cannot or will not solve. Wicked problems are those that are “...ethically deplorable but extremely difficult if not impossible to ‘solve’” (Vasu, 1993, 13).

Introductory Political Science and Public Administration courses teach us that government exists for specific purposes, some of the most important of which are: to provide redistribution, to address market failures, to provide public goods, to control natural monopolies, to control externalities and finally to overcome transaction costs (Vasu, 1993, 5-6; Meier, Garman and Keiser, 1994, 439).

The question that follows naturally from the previous discussion is: How does government accomplish these goals? Each of the above set out reasons for governmental existence has its own answer. In the area of the sale of alcohol to minors, that answer takes the form of regulation. Generally the literature defines regulation as any attempt by a government to control the behaviors of citizens, corporations or other governments. Said in a slightly different way, it is the effort to limit the choices of individuals in society, for what government believes is for their own good. Regulation provides a framework to define acceptable behavior. (Meier, Garman and Keiser, 1998, 1).

Regulatory Facts Revisited

Meier, in his 1998 work, expanded on the first “fact” of regulation, saying that it is the result of complex interactions of the regulated industry, consumers, regulators, and political elites. He discussed the four key actors in terms of what they, hypothetically, should want in the area of

regulation. First, consumer groups are believed to want more regulation, basically they favor regulations that restrict the regulated industry. In studying the sale of alcohol to minors, this actor is represented by Mothers Against Drunk Driving (MADD), Students Against Drunk Driving (SADD) and the Governor's Institute on Alcohol and Substance Abuse's Initiative to Reduce Underage Drinking, among others. In the context of this problem in North Carolina, these groups do not necessarily want more regulations, what they want is more strict enforcement of those regulations already on the books. Secondly, Meier said that bureaucratic actors favor policies that are consistent with their policy goals. Here the bureaucratic actors are ALE agents and their policy goals have mirrored public opinion, which is currently to devote more resources to reducing sales to minors. He goes on to explain that as agency goals are inherent in bureaucracies, that employees become advocates of the agency and its goals. These regulators regulate because they wish to attain the policy goals of their agency. They may employ strategies that appear to outsiders as being random and ineffective. They may also, in their overzealousness, employ strategies that are believed to work, but in reality do not. This may explain why ALE has employed compliance checks for years without knowing whether they exert the desired deterrent effect. Third, is the industry itself. The industry's ability to influence regulation is currently perceived as a function of their political resources, i.e. their size and wealth. As the alcohol industry does not want the negative publicity associated with the sale of alcohol to minors, the industry in North Carolina has actively supported greater restrictions on sales to minors; however, the industry's political clout has been instrumental in increasing penalties for minors who attempt to buy alcohol and those non-industry persons over 21 who furnish alcohol to minors. Finally, as to the political elites, they are seen to have two purposes. First to mediate among the other key actors, i.e. to balance competition of interests and determine winners and losers. Secondly, they are not neutral arbiters, having policy goals of their own (Meier, 1988, 29). In the area of sales of alcohol to minors and the death and destruction that can result from it, political elites cannot lose by strengthening prohibitive policies and encouraging more enforcement.

Alcohol Regulation: Morality Politics

As we have seen from the above sections, the regulation of alcohol, especially in the area of sales to minors does not follow exactly from the general model of regulation presented in the literature. This is because alcohol regulation falls under a sub-field of regulation called by some “morality politics.” This sub-field includes policy areas where one segment of society attempts, by government authority, to impose its values on the rest of society. In the area of sales to minors, there is more than one segment of society, as outlined by Meier’s key players, that want to impose this value. Interest groups, the regulatory agency, the industry and politicians all want the sale of alcohol to minors restricted. The only group that opposes the policy is, perhaps, those minors intent on purchasing and using alcohol, and they traditionally are not organized and lack political clout. Morality politics issues also present no barriers to citizen participation in the policy process. This is because the issues are seen as black and white, which allows everyone interested to have an opinion, as little or no other information is required. The one-sided nature of the sales to minor question basically makes everyone that is interested in the problem an expert and this expertise tears down the barriers usually erected around regulatory policy causing limited participation (Meier, 1994, 4; Meier, Garman and Keiser, 1998,11). This lack of boundaries has led to the current attention the problem of alcohol sales to minors has received from citizens of North Carolina and has caused the issue to gain political attention.

Importance of Regulatory Policy Implementation

Another interesting issue raised by morality related regulation issues is that they are seen as being more discretionary than the enforcement of other regulations. The “victims,” here minors, who by their attempt to purchase alcohol are also committing an illegal act, certainly do not want enforcement and wish to totally avoid contact with law enforcement. That makes the degree of enforcement the most crucial aspect of the policy. As we said above, regulation takes the form of

governmental policy. In the area of the regulation of morality policies, the actual implementation of the policy is the real policy. In other words, the implementation is more important than the actual policy itself. If adequate strategies are not developed and employed and sufficient resources are not devoted to the implementation of the policy, then the actual policies, laws and rules, are worthless (Meier, 1994, 247). This underscores the notion that in North Carolina we do not need new laws or rules to address the problem of sales to minors, but more efficient reduction strategies and potentially more manpower to implement these strategies to achieve the policy goals already set out.

Regulation Based on Deterrence?

Governmental regulation is seen as resting on a foundation of deterrence as Langbein recognized, saying that: "The most common model of the impact of regulatory programs on intended outcomes is based on a standard version of deterrence theory: Firms will increase their compliance to the extent that the expected net costs of compliance are less than the expected net costs of noncompliance... (Langbein, 1994, 545). This statement serves as one of the cornerstones of why parts of this study are grounded in deterrence theory and why a detailed discussion of this theory follows later in this chapter.

While the above discussion of regulation describes the theoretical foundations as to why governments generally regulate the sale of alcohol to minors, it is also important to know the specific, historical reasons for the adoption and enforcement of this policy. For this reason, we now present a brief synopsis of that history below.

HISTORY OF ALCOHOL AGE RESTRICTION

When we think of crime and its deterrence and prevention, what comes to mind are offenses that have some moral basis as to why they are illegal. Murder, larceny and other violent and property

crimes are prohibited based on morality and religion. If one looks at crime generally, it will have its basis in the Judeo-Christian Ten Commandments. When people violate laws having their basis in the Ten Commandments, society inherently recognizes that such an offense is wrong. This is not so with laws regarding alcohol, as was clearly set out in our discussion of regulation. Alcohol is basically a legal commodity and many of the laws and regulations that govern its use are seen by many as being quite arbitrary, an attempt by one segment of society to force its beliefs on others. It is perhaps the seemingly arbitrary nature of alcohol laws that have led to controversy in their enforcement and in the potentially limited effect deterrence has in the area. For these reasons we digress into a brief history of alcohol age restriction hoping it will illuminate the problems associated with the prevention of sales to minors.

Alcohol Restriction in the United States

The prohibitions against youth access to alcohol have mirrored public opinion over time. Opinion as to alcohol in the United States has followed a cyclical trend from tolerance to disapproval. Apparently, the alcohol consumption rates of the adult population also follow these cycles. In the case of youth, these trends differ. Young people in the United States have started drinking at earlier ages as time has progressed. For example, nine percent of youth born between 1919 and 1929 reported using alcohol before age 15, compared with those born between 1971 and 1975, where 33% began using alcohol prior to age 15 (Williams and Perry, 1998; Meier, 1994, 4).

During one of the cycles spoken of above we found the prohibition movement. Those who subscribed to the tenets of this movement decried the use of alcohol and saw it as the basis for many of the ills of society. The movement gained popularity, culminating in the passage of the Eighteenth Amendment to the U.S. Constitution, prohibiting the manufacture, transportation, possession and sale of all forms of alcohol in the United States, effective on January 17, 1920 (Meier, 1994, 138). Prohibition was known as the “great experiment.” An experiment that

attempted to legislate morality, or following the framework of regulation, it was the attempt of one segment of society, the “drys” to impose their beliefs on the rest of society. Prohibition was credited with giving rise to organized crime and it was soon realized that it was an experiment whose costs outweighed its benefits. The Twenty-First Amendment was passed, ending prohibition on December 2, 1933, and giving control of alcohol to the states (Meier, 1994, 155).

History of Regulation of Underage Drinking

Prior to prohibition there was no minimum legal drinking age. When prohibition was repealed in 1933, for the first time all the states set a minimum drinking age. Interestingly when youth access to alcohol was codified it was almost universally set at 21. While people today debate at what age the minimum drinking threshold should be set, from about 1933 to 1971 this was not an issue as the minimum age was set at 21. The debate as to whether the drinking age should be less than 21 began with the ratification of the Twenty-sixth Amendment which lowered the voting age to eighteen. This raised the argument that if a person could serve in the armed forces and vote at 18, they should also be allowed to drink alcohol. Bowing to this argument, beginning in 1970 and continuing until 1975, the minimum drinking age was lowered to 18 in 31 states (Toomey and Rosenfeld, 1996). North Carolina lowered the age to purchase beer and unfortified wine to 18; however, the age to purchase and possess spirituous liquor and fortified wine remained at 21.

The Creation of a Natural Experiment

The national trend to lower the drinking age continued until about 1978 when several states increased their drinking age to 21. This was due, in part, to the proliferation of alcohol related traffic fatalities in the 18 to 21 year old age group (Wolfson and Hourigan, 1997, 1160; Forster and McGovern, 1994, 700; Toomey and Rosenfeld, 1996, 213). It was recognized that the cost of lowering the drinking age to mirror other rights of passage such as voting or military service was greater than any benefit it provided and was having an adverse effect on our society.

Lowering the drinking age created a natural experiment where the injury and death rates due to alcohol before and after lowering the drinking age could be compared. Advocacy groups used this data to lobby state and federal governments to raise the drinking age to 21. Sixteen states raised the drinking age to 21 between 1976 and 1983. The remaining states, bowing to alcohol industry and political pressure left the drinking age at 18. An interesting problem arose as youth between 18 and 21 years of age who were prohibited from buying alcohol in their home state could often travel to a neighboring state and legally obtain it (Toomey and Rosenfeld, 1996). In 1984, after studying alcohol related traffic fatalities and being cognizant of the issues raised above, the United States Congress mandated that all states establish a 21 year old drinking age. This was due to the empirical evidence which showed that the legal availability of alcohol influenced the levels and patterns of alcohol use and abuse (Wolfson and Toomey, 1996, 590). To force the states to comply Congress tied the failure to enact these laws to a reduction in the Federal Highway Funds distributed to the states (Toomey and Rosenfeld, 1996). Bowing to this pressure North Carolina complied with the mandate, raising the minimum age to purchase and possess all forms of alcohol to 21, effective September 1, 1986.

PRESENT STATE OF RESEARCH IN SALES TO MINOR ENFORCEMENT

Having presented the history of alcohol age restrictions and our idea that alcohol enforcement calls for diverse prevention strategies, we now summarize the literature on the present state of sales to minor enforcement and prevention in North Carolina and other states.

Traditional Lack of Sales to Minor Enforcement

The issue has been raised that law enforcement agencies and many individual officers do not make sale to underage person enforcement a priority (Little and Bishop, 1998, 4). This is a conclusion that has been recognized by law enforcement officers themselves for many years, but

has only recently been the subject of empirical research. A recent survey of police officers found underaged alcohol enforcement was rated as one of the lowest priorities of police work. A second study concluded this problem exists because of the legal obstacles inherent in the juvenile justice system, in that officers overlook this behavior because of the time and paperwork necessary to process juveniles through the criminal justice system (Kumpfer and Chavez, 1999). In fact, it has been said that many officers feel that laws prohibiting the sale of alcohol to 18, 19 and 20 year olds was unfair given that people of these age groups can vote and serve in the military (Little and Bishop, 1998, 4).

When looking at the United States as a whole, sales to minor laws are not vigorously enforced. Kumpfer and Chavez cite national crime statistics and population data to estimate that "...only two of every one thousand occasions of youth drinking results in an arrest, and only five of every one hundred thousand youth drinking occasions result in an Alcohol Beverage Control action against an alcohol outlet" (1999, 29). While "...underage drinking is against the law... in a culture that views alcohol consumption as a part of growing up, even...[law enforcement]... may overlook violations" (Little and Bishop, 1998, 4). Given the lack of enforcement in this area it "... is not surprising if servers and management see little chance of being apprehended or prosecuted" (McKnight, 1993, 81). This knowledge about the lack of enforcement is not lost on our youth, as a group of minors participating in a focus group said their expectations about enforcement of sales to minor laws was low (Jones-Webb, et. al., 1997, 224).

Changing Attitudes

While some police officers may hold the opinion that sales to minor enforcement is of little importance, clearly this belief is not shared by the general public. This concern has been manifested in the passage of stronger laws in this area, beginning with the State of Georgia (Little and Bishop, 1998, 1). Since the public is obviously demanding increased sale of alcohol to minor

enforcement, law enforcement has been forced to comply. The problem is that to detect a sale to a minor violation one must be present at an alcohol sales outlet at the precise moment when a minor attempts to make an alcohol purchase. Detection is therefore a time and labor intensive process. This cost both in time and effort is another explanation of why there has traditionally been low levels of enforcement in this area. Society seems, at present, to demand that these laws be enforced in the interest of protecting children, regardless of the opinions of law enforcement officers (McKnight, 1993, 80).

Wagenaar and Finnegan found that it was more difficult for youth to acquire alcohol themselves after the minimum legal drinking age was raised (1993, 460). Availability, being identified as a contributing factor, sparked interest in focusing research on where and how minors were able to obtain alcohol (Wolfson and Toomey, 1996, 590). This increased interest in research caused academicians as well as those governmental agencies charged with enforcing the alcohol laws to look for more efficient strategies to curb the problem.

Other types of crimes have recognized methodologies that are employed in their investigation or prevention. Drug investigators rely on undercover operations; traffic enforcement officers use speed detection devices; homicide investigators use crime scene searches and autopsies; and the list goes on. However, in the area of sales to minor enforcement no single preeminent enforcement strategy has, as yet, emerged.

The Use of Undercover Compliance Checks

One of the most used strategies to apprehend and prosecute those that sell to minors is the use of an underage undercover agent to attempt to buy alcohol in a controlled setting. This enforcement technique is called by various names: i.e. sting, undercover minor operations,

compliance checks, or by some members of the alcohol industry, entrapment. Whatever it is called, the strategy has shown some promise.

In the first year the State of Alabama's Alcoholic Beverage Control enforcement agency began using this tool they recorded a 70% sale rate at off-premise locations. Following several years of compliance checks the rate dropped to 25%. Preusser and Williams (1991) found the areas with the lowest sales to minor rates were those where a recent compliance check operation receiving media attention had occurred (McKnight, 1993, 81). Another study reporting the results of a study in one county in New Jersey using the compliance check strategy concluded its deterrent effect was striking (O'Leary and Gorman, 1994, 817). Finally, a study conducted by the University of North Carolina's Highway Safety Research Center conducted in five North Carolina Counties, using compliance checks, identified a 35% minor sales rate. Their analysis of arrest data did conclude however, that underage alcohol enforcement concentrated on the drinking minor and not on the alcohol seller (Beuscher, et. al. 1998, 8).

Seeing that the strategy holds some promise in sales to minor prevention and attempting to allay the accusations of entrapment, Wagenaar directed a project that developed a compliance check training manual for law enforcement to use nationwide. In preparing the manual a comprehensive review of the literature was conducted. In a section discussing the deterrent effects of compliance checks Wagenaar cited several empirical studies which pointed to the deterrent effect of this strategy. The first was conducted in Sherburne County, Minnesota in 1996-1997. It resulted in much lower sales rates at the posttest after having subjected the outlets to compliance checks at the pretest. Similar results were obtained in 1996 in Clinton County, New York. These studies showed a marked reduction in the sales rates in the second and third rounds of the compliance checks. The weaknesses of these studies was that the Minnesota study examined only 43 cases; the New York study included only 53 cases in its third application,

with fewer outlets being checked during the first and second rounds. Also, each of these studies involved only one county. What is important about these studies to our research is the deterrent effect is credited to the compliance checks and the widespread media attention given the operations. In laying the groundwork for why compliance checks should be conducted, Wagenaar believes the checks sent a strong message due to their being well publicized (Wagenaar, 2000, 7- 8).

In his compliance check procedures manual, Wagenaar lists reasons why compliance checks should be used. First, they may reduce crime and alcohol related problems. Secondly, they are easy to do. Finally, they send a strong message as a good public relations tool (Wagenaar, 2000, 7). The compliance check strategy is already recognized as an excellent research tool because it directly measures the dependent variable, the sale of alcohol to minors. There exists a strong foundation in the literature for the use of the compliance check strategy as a deterrence technique (OJJPD and MADD, 1999). Forster and McGovern said in a 1994 article that to determine sales to minor rates one must use sale to minor undercover operations of one kind or another (710). While all these reasons may be true, they do not focus on whether the checks themselves serve as an effective deterrent to alcohol sellers and outlets in the area of sales to minors. Our study examines this little explicated aspect of the field.

While compliance checks may have some deterrent effect on sales to minors, the literature recognizes that diverse strategies should be combined to attack this problem. Beuscher, et. al., say that their analysis of relevant data "...points to a clear need for greater efforts to prevent the sale of alcohol to underage persons (Beuscher, et. al. 1998, 8). The recognition that simple enforcement alone may not be sufficient to curb underage alcohol sales may directly impact our hypothesis that compliance checks will have a deterrent effect on sales to minors (O'Leary and Gorman, 1994). This conclusion calls for the use of additional strategies to prevent the sale of alcohol to minors. One such strategy, having a rich literature, is alcohol seller training.

Before turning to our discussion of the alcohol training literature, another question is in need of addressing. That is, given the mixed reviews of the efficiency and deterrent effect of compliance checks nationally and the total lack of empirical research as to their efficacy in North Carolina, why are compliance checks so widely used? To answer this question, we turn to our prior discussion of the regulatory literature above.

Lack of Empirical Research as to the Efficiency of Compliance Checks in North Carolina

One might ask why this strategy continues to be used when its deterrent effect, or for that matter its general efficiency, has never been assessed. The answer to this question goes back to our regulatory policy framework. In the area of general alcohol regulation there are advocacy coalitions on both sides of the issue. For example in the area of restricting alcohol sales on Sunday, the industry, both wholesale and retail, advocate allowing alcohol sales on Sunday. Many religious groups, on the other hand, favor a ban on the sale and consumption of alcohol on Sunday. The pressure put on policy makers from these diverse groups has resulted in compromises that have resulted in a partial prohibition on Sunday sales in North Carolina. Here, alcohol cannot be sold between the hours of 2:00 AM and 12:00 noon.

While general alcohol issues have advocacy coalitions on both sides, this is not true in the case of sales to minor prohibitions. When there is only one side to the issue, such as in sales to minors, the regulatory policies have been found to reflect entrepreneurial strategies. The proposals that come from these entrepreneurial policies rarely face serious challenges as to their efficiency or effectiveness (Meier, 1994, xiv). Meier says that morality policies are extremely popular but rarely effective (1994, 4). This is, perhaps, an explanation of why compliance checks have been used in North Carolina without any prior analysis of their efficacy in deterring sales to

minors. While alcohol retailers may not like the strategy, they realize that they cannot openly challenge its use, as they would be branded pro-sales to minors.

ALCOHOL SELLER TRAINING

Sales to minor reduction strategies in North Carolina have closely mirrored those of other states. On the enforcement side, it has employed outlet surveillance and undercover compliance checks. The problem has also been addressed using alcohol seller training, called BARS (Be A Responsible Seller). Seller training has been used in North Carolina for over twenty years; however, empirical studies of its utility in preventing sales to minors are non-existent. This gap in the research literature provides the basis for the use of training as an independent variable in the study reported here.

Alcohol seller training is a much used sales to minors reduction strategy. It is probably second only to compliance checks as the preferred method of sales to minor reduction in the U.S. The extensive literature in this area points to seller training being a viable sales to minor reduction strategy.

History

Historically, alcohol control efforts were focused on the drinker, attempting to alter behavior by a combination of information, persuasion, and threat (deterrence). In the 1980's the focus changed to include studying and controlling the behaviors of alcohol sellers (McKnight, 1993, 76). Initially seller training studies dealt with the effect of training on the reduction of sales to intoxicated persons; however, a 1995 University of Minnesota study recognized that seller training could also have an effect as a deterrent to sales to minors. This study found that seller training was associated with a 19% reduction in purchases rates (Wolfson, Toomey, Forster, Wagenaar, McGovern and Perry, 1995, 670).

Recognizing the potential for these programs to affect alcohol problems, the first statewide alcohol server training program was developed and implemented by the California Alcoholic Beverage Control enforcement agency in 1977 (McKnight, 1993, 79). During the 1980's these types of programs began to proliferate. In 1981, North Carolina joined in with its own program, initially titled "Driving Under the Influence Source Prevention."

Mixed Results

Overall, the purpose of the alcohol seller training programs has been to promote voluntary compliance with laws and regulations intended to curb irresponsible alcohol sales (OJJDP, 1999). In studies reported by Saltz (1987), Russ and Geller (1987), Glicksman and Single (1988), Mosler, et. al. (1989), McKnight (1991), Howard-Pitney, et. al. (1991) and Molof and Kimball (1992) it was found that seller training can modify industry members' knowledge and beliefs about alcohol sales, bringing about behavioral changes that can reduce irresponsible sales (McKnight, 1993, 79). In the beginning these programs focused on the drinking driver, but soon they shifted their emphasis to preventing sales to minors. The general consensus of the studies listed here is that alcohol availability to minors is lessened by responsible service. However, other studies of seller training have led to varying conclusions over time. For instance Howard-Pitney, et. al. (1991), in a study examining the effects of training sellers on age identification, did not find a statistically significant association between training and the ability to identify buyers' ages.

Mandatory Versus Voluntary Training

With the proliferation of seller training in the United States in the 1980's, the problem shifted from the unavailability of training to how to get sellers to attend the programs. Wolfson and Toomey's research found that alcohol sellers were less likely to sell to minors after receiving seller training; however, the training that they examined was mandatory and not voluntary as is the training

measured in our study (Wolfson and Toomey, 1996, 590). Perhaps one explanation for the varied results of empirical research in this area is that for the most part seller training programs around the country have been voluntary. McKnight says that "...purely voluntary safety and health programs typically fail to attract those most in need of them" (1993, 78). To address this problem some localities and states passed legislation requiring training before a person could sell alcohol. This came partly from the realization that alcohol sellers and their managers were not familiar with the alcohol laws (Vaucher and Rehm, 1995, 1623). The State of Oregon was the first state to mandate training for sellers (McKnight, 1993, 78; McKnight 1996). While Oregon does have mandatory training, many sellers there seem to be able to avoid it. To close the holes, Oregon raised its standards by enacting a new rule requiring all sellers to attend the training within 45 days of initial employment. Oregon's regulators seem to have a "buy in" from the establishment owners, but the problem is with the individual sellers trying to skirt the rules (Rose 1998, 30).

In reporting an analysis of a program called "EASY," (Eliminate Alcohol Sales to Youth), Colby details a program wherein those sellers and locations that sold to a minor in a compliance check "sting" received suspended criminal and administrative penalties after completing alcohol seller training. The program evaluation reports that in the initial compliance check phase, 38 outlets out of the 41 checked sold to the minor. All of the outlets, even those that did not sell to the minor agreed to the training, with a total of 150 sellers being trained. The follow up compliance check resulted in 8 of the 41 outlets being cited for selling or an 80% reduction in sales from the pretest (Colby, 1994, 5-8). This study tends to show that mandating training may be necessary for training to achieve its full impact.

Short Term Impact

Vaucher and Rehm, speaking to underage alcohol sales in Switzerland, acknowledged that alleviation of the problem, "...may require special training in skills that they can employ to refuse to serve alcoholic beverages to persons below the legal drinking age" (1995, 1623). Their review of the literature shows that evaluations of training programs show positive behavioral changes in the U.S. and Canada. In explaining why training had less effect in Switzerland, they believe the more stringent legal liabilities in the U.S. better motivate sellers to react positively to the training. While the Swiss training had a less positive effect, they did find clear evidence of a short-term impact. They say that, unfortunately, long term effects have gone unexplained (1995, 1623).

Answering Vaucher and Rehm's challenge to examine the long-term effects of training, Buka and Birdthistle (1999) found that not only did seller training result in higher levels of responsible service, especially in checking identifications, its positive effects was most pronounced in young or inexperienced sellers. This is important to our study because data was collected reflecting the age and the length of time sellers had worked in the alcohol industry and our findings can be compared with those of Buka and Birdthistle's. More importantly, they found that the effects of seller training diminished over time, causing them to advocate periodic refresher training (Buka and Birdthistle, 1999).

Server Training Program Differences

Even though the overall findings are mixed, generally it has been found that seller training has some utility in reducing sales to minors. The reason that the research produces mixed results may be that not all such training is created equal. Toomey and Kilian (1998) recognized this in their qualitative assessment of server training programs. They reviewed prior research, concluding that when examined together these studies produced inconsistent findings. They believe that one reason for the inconsistent findings is that those programs being evaluated were

of poor quality. They found that training programs were not standardized and varied greatly in content, quality and use of behavioral change methods. As no consistent methodology existed to evaluate training, they developed a typology to evaluate these programs. Based on their literature review they identified 10 categories upon which to rate seller training programs. They divided the categories into three areas: content, behavior change elements and communication methods.

Under the heading of Content they identified:

“Legal Issues. The legal framework for selling to minors or intoxicated people (including criminal penalties and ‘dram shop’ or civil liability), which identifies consequences for servers, managers, and owners.

Physiological effects. Brief overview of how alcohol affects the body; skills to recognize cues of intoxication.

Policy Development. Skills to develop and enforce establishment policies to increase responsible service of alcohol.

Social Problems. Health problems associated with alcohol, including traffic crashes, pedestrian injuries, drownings, teen pregnancies, sexually transmitted diseases, suicide, and violence.”

Under Behavior Change Elements they identified:

“Preventing intoxication. Skills to identify obviously intoxicated patrons; skills to prevent intoxication.

Preventing underage drinking. Skills to identify minors; strategies for refusing sales to underage youth.

Behavior change methods. Methods to build skill level and self-efficacy, such as peer leadership, role playing, and group discussion, instead of a simple lecture format.”

Lastly, Communication Methods:

“Realism. Use of real life settings, relevant scenarios, and credible role models.

Respectful of audience. Use of a tone that respects the audience; use of attention – getting techniques such as humor, montage, and musical soundtracks.

Production quality. Overall packing and production values; ease of use; layout and editing” (Toomey and Kilian, 1998, 165).

They conclude that as the purpose of these programs is to alter selling practices either in sales to intoxicated, or as is of interest here, sales to minors, that those training programs not covering the identified content areas are unlikely to achieve their goals (Toomey and Kilian, 1998). As we include prior training relating to outlets and individual sellers provided by ALE and private sources as independent variables, the typology provided above will become important in assessing problems if any of the variables are not found to significantly deter sales to minors.

THEORETICAL GROUNDING OF THE STUDY

The overall topic of this study, alcohol control, is grounded on a framework of regulation. It is recognized that all empirical studies should either be grounded in already recognized theory or should be attempting to propose and test new theory. As we are not attempting to build new theory in this study, current theoretical foundations for our research must be used. In this study we are attempting to determine the deterrent effect of compliance checks, hence our heavy reliance on deterrence theory. Unfortunately, deterrence theory does not provide the basis for all the hypotheses we will present. Some of the independent variables used are based more on proactive decision making than deterrence, necessitating our use of expectancy theory. Finally, to ground our multivariate models we use the literature in the field of criminal profiling. We also use the patterning and persistence tenets of profiling as an alternative basis for making predictions as to many of our independent variables. There exists a natural tension between the rational decision making based theories of deterrence and expectancy and the persistence tenet of profiling, which provides an interesting framework to ground our predictions and subsequent findings.

GROUNDING IN THEORY: EXPECTANCY THEORY

Due to the nature of the alcohol sales business, many sellers are left alone to work without direct supervision. As the direct supervision link may be missing, other factors must be present to

assure that sellers are motivated to make the correct decisions regarding selling alcohol to minors. This can be accomplished by several methods, one of which is training which we have already discussed. Another factor is to attempt to tilt the balance of the seller's decision making process, expressed in terms of economic theory as a cost-benefit analysis, to instill in that seller that making the prohibited sale will incur a greater cost than any benefit realized by making it. This is not to say that alcohol sellers will actually employ a formal cost-benefit analysis each and every time a minor attempts to purchase alcohol; however, when making a conscious decision as to make or refuse a sale, the framework provided by cost-benefit analysis is an apt description of what is going on in the mind of the seller.

In attempting to explain or predict why sales to minors occur, it is necessary to delve into those factors that motivate alcohol sellers to either sell to a minor or refuse the sale. Examining motivation is proper here because motivation is simply "...the study of why people behave the way they do..." (Vasu, Stewart and Garson, 1990, 41). In effect, we are attempting to explain why people, here alcohol sellers, make decisions to either sell or refuse to sell to minors. We believe that those theories flowing from the work of Victor Vroom, specifically expectancy theory, has the most potential to explain why alcohol sellers make the decisions they do in regard to selling to minors.

Tenets of Expectancy Theory

Vroom's expectancy model is based on three concepts: valence, expectancy and force. Valence is defined as the value of an outcome or the anticipated satisfaction resulting from that outcome, which for the purposes of this research is the refusal to sell alcohol to a minor. Expectancy is the probability of achieving a specific outcome, or in the case of selling to minors, avoiding that outcome. Force is the expected value of an act. The value of not selling to a minor is avoidance of the negative consequences accorded to being charged with selling alcohol to minors. Vroom

views behavior as "...subjectively rational and as directed toward attainment of desired outcomes and away from adverse outcomes" (Vasu, Stewart and Garson, 1990, 58). Scholl holds that "When deciding among behavioral options, individuals select the option with the greatest motivation forces" (2001, 1). Vasu, et. al. in their discussion of expectancy theory, say that the behavior being examined is seen as rational and directed toward positive outcomes and away from negative outcomes. For expectancy theory to serve as a foundation for the analysis of some of our independent variables, we must posit that sellers are acting rationally when they make the decision to sell or not to sell to a minor and perhaps more importantly, they are attempting to avoid the sanctions associated with being caught for selling to a minor (Vasu, Stewart, Garson, 1990, 58). As for this research, it is posited that the greatest motivational forces will be directed at the decision not to sell to minors, a decision that results in the avoidance of the consequences of violating the law. This is summed up by Swiss when he says that behaviors will change in response to rewards and punishment (Swiss, 1991, 258).

Basically, expectancy theory is beneficial in explaining the relationship between motivation and achieving organizational goals. Unfortunately, we did not include a measure in our survey to allow us to positively identify what the organizational goal of alcohol outlets, seen as organizations, have as to sales to minors. However, based on expectancy theory and the economics based tool that flows from it, cost-benefit analysis, we can speculate that the overall organizational goal of alcohol sales outlets is to refuse sales to minors.

Cost-Benefit Analysis

Expectancy theory, being grounded in rational decision making, forms the foundation for the economic tool of cost-benefit analysis. At its most basic level, cost-benefit analysis is a decision making tool that says that in making a decision, one examines the costs and benefits of a potential decision, compares those costs and benefits, and if the benefits outweigh the cost, the

decision is made to proceed. At a simple and unrecognized level this should be the process an alcohol seller uses to make a conscious decision as to whether to sell to a minor or not.

In looking at any cost-benefit equation in selling alcohol to minors we must first differentiate between types of sellers. For instance, the benefit that accrues based on selling to a minor is different depending upon the status of the seller, thereby forming the basis for our inclusion of the variable of status, differentiating between owners, managers and clerks. An owner's benefit is the profit realized in making the sale, which is quite small. On the other hand, the cost of being caught raises the potential of being charged criminally, paying a fine, performing community service and paying an administrative penalty, potentially losing their ABC permits⁷ and the public embarrassment of being charged with a crime. Based on this comparison of costs and benefits it seems intuitive that an owner would always decide not to sell; however, the cost detailed above does not come into play each time a sale to minor is made. This idea gives rise to the theory of deterrence, which flows from expectancy theory and will be discussed below. When examining the cost-benefit analysis decision of the non-owning employee several differences arise. First the cost only entails the criminal penalties, which typically cuts the out of pocket expenses in half. However, the seller is subject to the two year prohibition against working in the alcohol sales industry that the owner is not. The benefit side of the equation is also different. As alcohol sellers are usually hourly workers, they realize little or no financial benefit from selling to a minor. Any benefit attained is non-financial. First, some young sellers may sell to their friends as a result of peer pressure or out of a misplaced sense of loyalty. Secondly, they may have a store full of impatient customers and be loathe to request ID and cause a scene. This seller may view it as a benefit to make the sale and clear the line more quickly and not make their customers angry. Or

⁷ *ABC Permit or permit* is defined as: "...any written or printed authorization issued by the Commission pursuant to the provisions of this chapter, other than a purchase-transportation permit. Unless the context clearly requires otherwise, as in the provisions concerning applications for permits, 'ABC permit' or 'permit' means a presently valid permit" (Alcoholic Beverage Control Laws, 1999, 4).

the seller may simply be lazy and see a benefit in making the sale without having to check identification or question the buyer.

Assumptions of Expectancy Theory

Expectancy theory assumes that people make choices about alternative courses of action, here whether they will sell to a minor or not. The theory assumes that choices are based on the preferences of the individual making the decision. It is assumed that an individual would prefer not to be arrested and required to pay substantial fines or to lose his or her ABC permit and possibly his or her livelihood. It assumes that choices are rational and based on the perception of the value of the decision and its expected outcomes. To assess this assumption, we will examine the findings of several independent variables to assess whether sales to minor violations are based on rational decisions or the product of carelessness or inattentiveness (Scholl, 2001, 2).

Expectancy Theory: A Summary

Ratzburg summarizes expectancy theory by saying that behavior results from conscious choices among alternatives. For the purposes of this research this choice is the decision of a seller to sell to a minor or not. The second tenet of the theory is the desire to maximize pleasure and minimize pain. Maximizing pleasure does not attach in our research, but minimizing pain certainly does. One can easily hold that for the individual seller the chance of being arrested, having to attend a court session, the potential of paying fines, performing community service and being barred from working in the alcohol industry for two years is painful. As to the outlet as the unit of analysis, the payment of civil fines and potentially losing the ABC permits can also be viewed as painful. Third, people pursue those activities that result in the greatest reward. This tenet is manifested in our study indirectly by sellers avoiding punishment as with our dichotomous dependent variable, there is no tangible reward (Ratzburg, 2001, 1-6).

Deficiencies of Expectancy Theory

Expectancy theory is held to suffer from two deficiencies. First, it is difficult to accurately assess expectancies. Vasu, Stewart and Garson illuminate this problem saying: "...rather than what we do being determined by what we want, as expectancy theory would suggest, the opposite may be true" (1990, 60). This so-called deficiency is not of consequence to our research because the mainstream idea that sellers' actions as to sales to minors being determined by what they want does not hold true. In fact, as critics espouse, these sellers are motivated by what they do not want to happen. The second problem is that expectancy theory assumes that employees are informed and knowledgeable of potential outcomes. While this issue may or may not attach to our research, based on our methodology, we cannot assess knowledge and merely assume that alcohol sellers are aware of the prohibitions of selling to minors and the consequences associated with it.

Hunt and Hill criticized Vroom's conceptualization of expectancy theory saying that it is a theory of motivation and not of behavior. They believe that the theory is weak because it ignores intervening factors that can occur between the motivation and performance. Later in this chapter we will present Wagenaar and Wolfson's assertion that alcohol related crime may be fundamentally different from other types of crime. If one applies Hunt and Hill's criticism of expectancy theory to Wagenaar and Wolfson's conclusion, we may have the basis for predicting that the offense of sales to minors is certainly independent of other, non-alcohol, crime and is possibly independent of other alcohol related crime (Vasu, Stewart, Garson, 1990, 58-59).

Taking expectancy theory at full face value, one would assume that an alcohol seller conducts a cost-benefit analysis of the decision to make every sale of alcohol that presents itself. This would require us to posit that every illegal sale is made intentionally and based on a careful assessment of the facts being presented. Obviously, this is not true. Expectancy theory, strictly interpreted, would preclude us from considering that sellers could become distracted, that they could be busy

and in a hurry to serve all their customers or that they possess the necessary presence of mind to ask a person their age or request identification at each and every sale. Taking Hunt and Hill's criticism into account allows us to be able to use expectancy theory as a foundation for our predictions here and our discussions of the data analyses to come, and still account for the potential for sales to minors being independent of other crimes, causing the theories that apply to prediction and prevention of other types of crime not to fit so well here.

Porter and Lawler presented a modified expectancy theory model that accounts for the criticisms raised by Hunt and Hill. They add modifiers, which they call intervening factors, to the model to account for other factors interfering with the cost-benefit analysis equation. In their modification they say that motivation or performance may be modified by abilities and traits of the decision maker. They believe that these abilities may be modified by training. They also hold that an employee's role perception, i.e. an individual's subjective definition of the job, may be affected by training. Here theory lays the foundation for us to predict that seller training will have a positive effect in reducing sales to minors (Vasu, Stewart and Garson, 1990).

While expectancy theory is a suitable foundation upon which to ground many of our hypotheses as to individual independent variables, early on we recognized that another theory, namely deterrence was crucial to the investigation of other independent variables and most importantly one of the major purposes of this research, namely the deterrent effect of compliance checks. Now we turn our attention to a discussion of this important theoretical base of this study.

GROUNDING IN THEORY: DETERRENCE THEORY

Deterrence theory will specifically be used to frame the findings and recommendations that flow from the analysis of the effectiveness of the compliance check strategy. Deterrence is the appropriate theory to ground a discussion of the findings of this section of the study because it

underpins the purpose of determining whether compliance checks actually “deter” minor sales. We will also ground the hypotheses as to many of our independent variables in deterrence theory. For this reason, we now present a brief review of the deterrence theory to help the reader understand why this theory forms one of the components of our theoretical framework.

Foundations of Deterrence Theory

The writings of Bentham, Beccaria and Chadwick help lay one corner of the foundation for deterrence theory. They raised the idea that human behavior rests on the avoidance of pain and the pursuit of pleasure. Deterrence, which is also partially grounded in expectancy theory, has its basis in rational choice theory, which holds that individuals are rational decision makers and generally make decisions and behave in accordance with perceived risks and returns, i.e. the cost-benefit analysis that we discussed above. Based on this idea, the only way to deter individuals from committing crime is to impose sanctions increasing the cost or reducing the benefit, or both, of committing that crime (Bodman and Maultby, 1997, 884; Paternoster and Simpson, 1996, 7).

Operant Conditioning

Deterrence theory can also be seen as having a foundation in B.F. Skinner’s seminal work in the area of operant conditioning. Skinner was a pioneer in the acognitive approach to organization theory, which holds that one should examine the relationship between stimulus and response. Operant conditioning’s guiding principle is that behavior is determined by consequences, which are the outcomes of an organism (here, an individual alcohol seller or a licensed outlet as an organization) exploring its environment. The theory posits that the environment acts on an organism either positively, negatively or neutrally. The manner in which the environment acts determines how the organism will act in the future. One of these environmental action consequences is punishment, which is a central tenet of deterrence theory. Consequences act

either affirmatively to reinforce behavior or adversely, i.e. punishment, to control behavior. The key concept of applying operant conditioning to organizations is what has been termed the “reinforcement schedule.” This reinforcement schedule concerns the relationship between environmental consequences and response. Different schedules lead to different behavioral effects. The key schedule germane to our use of deterrence theory in this study is the one termed “intermittent schedule.” The intermittent schedule is operating when the reinforcement of the behavior does not follow each and every response. For the purposes of our study, this speaks to what happens when a seller sells to a minor and the violation is not discovered, so no consequences attach. The principles of operant condition have been used in behavior modification in organizational settings, which forms the part of the basis for our developing models and identifying characteristics of sellers to use in sales to minor reduction efforts (Vasu, Stewart and Garson, 1990, 53-53, 63-65).

General Tenets of Deterrence Theory

In a nutshell, deterrence theory holds that a behavior is deterred in direct proportion to the perceived probability of being discovered, here cited or arrested for selling to a minor, the swiftness of being punished and the severity of the punishment received. In our study the risks are the formal criminal penalties against the alcohol seller and the administrative sanctions against the alcohol sales outlet. The deterrence literature holds that formal sanctions are required and are seen as effective in deterring violations of norms/rules/laws that lack general moral support, as do alcohol laws (Buckley and Wiese, 1998, 287; Hagan, 1982, 55).

General and Specific Deterrence

Traditionally, deterrence has been dichotomized into general and specific deterrence. Overall, to be effective, deterrence theory scholars agree that it is necessary to have certainty, severity and swiftness of punishment and that a lack of any one of these traits can severely limit deterrence

(McQuiston and Zacoks, 1998, 1023). As to general deterrence, it is held that a potential offender refrains from committing a crime because that person has knowledge that another person has been punished for committing a like crime. Specific deterrence speaks to the deterrent effect of personal experience with committing the crime, being discovered and receiving a sanction themselves. Basically the distinction is that in specific deterrence we are speaking about a punished offender. In general deterrence we are speaking about an unpunished offender who is familiar with a punished offender (Piquero and Paternoster, 1998). In an earlier study Piquero and Paternoster, in describing general and specific deterrence, say that people are deterred either by one or the other but usually not both (Paternoster and Piquero, 1995, 253-253).

Assumptions of Deterrence Theory

“The central assumption of deterrence theory is that compliance is promoted when the probability of detecting a violation, multiplied by the penalty imposed, exceeds the violator’s benefit from noncompliance” (Boyer, Meidinger, Thomas and Singh, 1987, 1-2). This quote is very significant to our research in several areas. First in speaking to the probability of detecting a violation. Obviously using random compliance checks increases the probability of detecting violations, as it moves enforcement from being reactive, here waiting for complaints to begin an investigation, to proactive by actively testing to determine if outlets are selling to minors. To address the deterrence theory component of penalty, we will measure the deterrent effect, if any, of an outlet having a prior sales to minor violation or an individual having a prior sales to minor charge on their propensity to sell to minors at the posttest. As to benefit, we must look beyond the actual monetary profit received from an individual sale, as it is inconsequential. We must include non-monetary benefits, such as time saved by making the sale and not tying up a long line of customers, or avoiding a confrontation with a potentially unruly customer.

Becker, in explaining deterrence in terms of economic theory said that an increase in the severity and probability of punishment is equivalent to increasing the cost of the criminal behavior and this increase should operate to reduce the individual's participation in the crime (Bodman and Maultby, 1997).

Deterrence Theory: Reconceptualized

In 1993 Stafford and Warr, in what is now seen as a seminal study, reconceptualized the long held dichotomy into a new model that posited there were actually four classes of experiences by which deterrence operates. They believed that the traditional characterization of specific and general methods had shortcomings and went against the previously held notions that an individual can be deterred by both specific and general forms of deterrence working in concert (Paternoster and Piquero, 1995, 254). The first of these is personal experience with punishment. Secondly, there is personal experience with punishment avoidance. The third is vicarious experience with punishment. Lastly, vicarious experience with punishment avoidance. They posit that deterrence results from the pursuit of pleasure and the avoidance of pain. Based on their reasoning, to deter a violation of the law there must be sanctions that increase costs or reduce benefits (Piquero and Paternoster, 1998). One important aspect of Stafford and Warr's reconceptualization is it takes deterrence theory further than merely looking at punishment after it has occurred. They say that the avoidance of punishment should also be considered (Paternoster and Piquero, 1995, 254). Whether a person violates a law, here selling alcohol to minors, can be influenced by specific deterrence if the person is caught and punished or by general deterrence by the knowledge that another person in a like position has been caught and punished. They argue that persons who have little personal experience with sanctions will be deterred as a function of their vicarious experiences because they have little else on which to base their risk perceptions. Stafford and Warr also warn readers that their reconceptualization can work in reverse if persons are able to violate the law and are not caught or know of peers that

do so. This may result in a lowering of the perceived level of risk (Paternoster and Piquero, 1995, 254-255).

Their warning is germane to this research in the area of conducting random compliance checks. It is possible that an outlet as an organization or an individual seller has been routinely selling to minors and this fact has escaped detection by law enforcement. Those sellers may be encouraged by their being able to avoid confrontation with minors, to quickly clear long lines of customers by not having to ask for ID or question customers and the monetary profit received from the sale. Using random compliance checks increases the potential that this outlet will be checked and discovered and if it becomes widely known that random checks are being employed the general deterrent effect is increased.

Taking their reconceptualization one step further to examine those sellers who were checked and did not sell in the pretest, we would expect that being checked would increase their level of deterrence through punishment avoidance and reinforce their proper behavior. We can examine this idea by looking at those outlets, as our methodology did not allow for identification of specific sellers, that refused sales in the pretest and checking their rates of refusals in the posttest. Based on deterrence theory we would predict that those outlets checked in the pretest and refusing would continue their "good" behavior.

Appropriateness of Deterrence Theory to this Research

Grube relies in part on deterrence theory in the conclusion of his 1997 article when he says: "Importantly, enforcement does appear to have significant deterrent effects on underage sales" (253). Wagenaar and Wolfson raise the issue of the relevance of deterrence theory in their 1995 article where they conclude, "...we know from deterrence literature that the size of the penalty is not as important as the perceived probability of detection" (Wagenaar and Wolfson, 1995, 3).

Unfortunately many state legislatures, North Carolina's included, have heavily depended on increased penalties, both criminal and administrative, to attempt to reduce underage alcohol sales. The North Carolina ABC Commission increased the penalties levied for all ABC Rule violations several years ago. The legislature greatly increased the penalties for selling and giving alcohol to underaged persons in December of 1999. However, based on the deterrence theory literature, this may not be not enough. According to the current literature, higher inspection rates, more non-compliance arrests and more frequent and higher penalties increase the cost of non-compliance. "Deterrence theory, then, implies that enforcement is exogenous and that more of it will bring about more compliance with the regulations, thereby increasing program effectiveness" (Langbein, 1994, 543). Wagenaar, in a 1991 monograph, raised the following questions related to deterrence theory: "Do outlet owners and managers perceive a risk of detection for underage sales? How severe do they believe the consequences will be? Do current statutes and levels of enforcement serve a deterrence function?" (192).

"A law can only be a deterrence if the public believes that violations are likely to be detected and the violators punished" (McKnight, 1993, 80). Therefore, deterrence is also dependent on how extensively the laws are enforced and how visible the enforcement is (McKnight, 1993, 80).

Deterrent Effect of Compliance Checks

Wagenaar and Wolfson raised the idea that the mechanism by which the compliance check strategy will have a positive effect in its ability to deter future sales to minors. They concluded that modestly increasing the resources directed at identified outlets, one can significantly increase the deterrent effect of sales to minor reduction strategies (Wagenaar and Wolfson, 1994, 46).

The relevant literature holds that compliance checks are easy to implement and may serve as an effective deterrent. Grube, in his review of the literature, speaks to a study by Wolfson et. al. in 1996 that concluded that sales outlets that had been recently cited for selling alcohol to minors

were significantly less likely to sell to minors in their experiment (1997, 253). Based on the literature, we would predict that compliance checks would have a deterrent effect on future sales, specifically, those outlets checked in the pretest compliance checks would be deterred from selling at the posttest. This deterrence would be explained by specific deterrence for those sellers who were subjected to both tests. As to the outlets checked in both tests having different sellers, general deterrence should operate to cause lower sales rates. While we follow the tenets of deterrence theory in making our prediction here, profiling or persistence theory, which will be discussed below, would lead to the conclusion that those outlets selling in the pretest would continue their pattern, selling again at the posttest, especially if the same seller was checked in both tests. Unfortunately, due to the anonymity requirement of our methodology, we are unable to examine this idea.

Theoretical Foundation for the Units of Analysis

Based on the information presented to this point it seems that our study's use of the individual and the licensed retail outlet as the units of analysis are appropriate when viewed in light of deterrence theory. First as to the individual, Nagin and Paternoster (1993) say that individual differences distinguish offenders from non-offenders. The decision to sell alcohol to minors is made by individuals and individuals are affected by the context within which they are employed, which are the locations where the crimes are committed. This line of reasoning continues by saying that employees are affected by the characteristics and imperatives of their business organization. So any conscious decision to violate the law is based on risks and benefits, as outlined above in expectancy theory, perceived for themselves, risks and benefits perceived for the business entity and the presence or absence of inducements or restrictions within the organizational context (Paternoster and Simpson, 1996, 552). Langbein (1994) says that "enforcement activity (e.g. on-site inspections and penalties) occurs in firms, and firms make

decisions about levels of compliance... The unit of whose behavior is under study, then, is the firm" (Langbein, 1994, 13).

One cannot lose track of the fact that selling alcohol to minors is a crime in all fifty states. This type of offense falls within the category of business crime. Since the early 1970's, business crime has been studied and explained in terms of a deterrence and rational choice theoretical framework. These are plausible explanations for the offense because business people, which sellers certainly are, have been found to be amenable to the threat of sanctions. These people are seen as being highly sensitive to the threat of punishment because, for the most part, they are not highly committed to crime. As sellers are gainfully employed, whether they are owners, managers or hourly workers, they have a greater stake in a conventional, non-criminal, lifestyle and have much more to lose if they commit a crime and are discovered than do career criminals. For the most part, these sellers are part of the communities within which they work and as a result, should be highly responsive to social censure and embarrassment if an arrest becomes public. This is because most business people highly prize their good name and reputation. While the conscious decision to sell to minors certainly falls within the rational choice model, here the rational choice aspect can be subsumed under deterrence theory. Selling alcohol to minors is a crime that is sensitive to variations in the perceived costs and benefits of not committing the offense. Empirical studies have found that not only the threat of criminal sanctions but the certainty and severity of civil sanctions were effective specific and general deterrents (Paternoster and Simpson, 1996, 2).

Limitations of Deterrence Theory

The issue to overcome in the use of deterrence theory is that it is a hotly debated topic within the criminal justice discipline. While deterrence theory may be controversial, it is obviously seen as having some merit in the academic community given the number of empirical studies that use it

as a foundation. Deterrence is certainly viewed positively by our federal government as it funds many deterrence related studies each year. For example, the U.S. Department of Justice gave the ALE Division over \$160,000 to develop and employ strategies to deter sales to minors, a part of which provided the funding for this research.

While deterrence theory is often seen as controversial and the literature is filled with detractors, it has been used as a basis for prior research to assess whether a specific strategy has an effect on reducing an illegal behavior. Deterrence theory was used in a 1999 study published in the American Journal of Preventive Medicine, where the efficacy of drunken driving “administrative per se” laws were examined in light of their specific deterrence ability. This study attempted to assess whether these laws were more effective than other forms of drunken driving sanctions. This is similar to our study as a significant part of this exercise is to assess the deterrent effects of the compliance check strategy. Their study specifically examined whether those arrested for administrative per se violations were repeat offenders or in other words to determine if this enforcement strategy had a deterrent effect on repeat drunken driving. While the results of the study, which was conducted in several states, were mixed, it did plainly identify that in those instances where the conviction was coupled with a driver license suspension there was a 39% decrease in recidivism. The analysis of their findings can be transposed to our study by not only looking at whether a prior violation or arrest has a deterrent effect, but whether criminal sanctions coupled with administrative action in the form of ABC Permit suspensions or administrative fines have a greater effect on recidivism in the area of the sale of alcohol to minors, thereby applying deterrence theory to both our units of analysis (McArthur and Kraus, 1999, 68-75).

Deterrent Effects of Sales to Minor Enforcement

Wagenaar and Wolfson raised the idea that the mechanism by which the compliance check strategy will have a positive effect is in its deterrent effort. They concluded that modestly

increasing the resources directed at identified outlets, one can significantly increase the deterrent effect of sales to minor reduction strategies (Wagenaar and Wolfson, 1994, 46). The literature in this area holds that the compliance check strategy is easy to implement and may serve as an effective deterrent. Grube, in his review of the literature, speaks to a study by Wolfson et. al. in 1996 that concluded that sales outlets that had been recently cited for selling alcohol to minors were significantly less likely to sell to minors in their experiment (1997, 253).

Another study, also reported in the American Journal of Preventive Medicine, examined the deterrent effects of random alcohol screening in reducing alcohol-related automobile crashes. Like our research, this study looked at a randomly employed enforcement strategies' effects on the deterrence of alcohol law violations. This research examined data from fourteen previously conducted experiments. They found that in all fourteen that random application of the intervention was effective in deterring the crime of interest and resulted in a statistically significant reduction in alcohol related automobile crashes. (Peek-Asa, 1999, 57-67).

Theoretical Basis for Constructing Multivariate Models

The deterrence model assumes that an enforcement agency (in this study the Alcohol Law Enforcement Division) seeks maximal enforcement and the firm (here the licensed retail outlet) seeks minimal or no compliance. This is not seen as rational in the long run. Looking at enforcement and compliance as a repeated game (based on game theory) between an enforcement agency and the firm, it is seen that the more flexibility in enforcement the greater the compliance. Langbein holds that the model is not linear, as deterrence theory has traditionally assumed, and that a non-linear model should be specified between enforcement and compliance (Langbein, 1994, 545). This idea lays the foundation for the construction of mathematical models to be used in predicting crime, here the sale of alcohol to minors. She says that: "The most common model of the impact of regulatory programs on intended outcomes is based on a

standard version of deterrence theory: Firms will increase their compliance to the extent that the expected net costs of compliance are less than the expected net cost of noncompliance...” (Langbein, 1994, 543). According to deterrence theory, more enforcement and higher monetary penalties increase the cost of noncompliance. This seems to say that enforcement is exogenous and that an increase in enforcement will bring about higher rates of compliance. However, the recent literature in the area of regulation shows that moderate enforcement is more cost effective than maximum or no enforcement. This model implies that for every additional unit of enforcement, compliance only increases marginally. This seems to say that there may be an optimal amount of enforcement that engenders compliance and any amount over this amount “costs” more than it benefits. Langbein said that recent advances in theory cast doubt on the validity of deterrence theory as an accurate model of the relationship between enforcement and compliance in regulatory programs. This is because according to a strict interpretation of deterrence theory the more that one increases enforcement the more the “cost” of noncompliance is increased in the firm, which augments the probability of compliance. She believes that flexible levels of enforcement are more probable with enforcement agencies and are more likely to induce compliance than maximal enforcement efforts. This seems to imply that a correctly specified model of enforcement and compliance is non-linear and standard deterrence models are linear (Langbein, 1994). This lays the foundation for using our models to target scarce enforcement and training efforts.

To justify developing offender models in this research, we rely in part on the previous discussion of Langbein’s interpretation of deterrence theory which holds that enforcement (here compliance checks) operates to deter potential violators from committing offenses (sales to minors) only to a certain level, after which an increase in enforcement incurs a greater cost than any benefit it provides. It is also widely known that law enforcement agencies (here the ALE Division) only have limited resources to enforce the laws (here conducting compliance checks). Following

these two ideas, the development of a methodology that would enable a law enforcement agency to scientifically target their scarce resources toward those individuals or outlets that had the greatest propensity to sell to minors would be of great utility. As these models could point out those outlets or individuals which would be the most likely to sell, the greatest specific and general deterrent effect could be realized. The specific deterrent takes the form of charging those offenders who sell to minors and the general deterrent would come from the knowledge that others working for the same organization or in the same vicinity had been charged.

As an additional basis upon which to create our offender models, we rely on the relatively new field of criminal profiling. Basing our models loosely on profiling necessitates that we briefly review this body of literature, which we present in the next section.

CRIMINAL PROFILING: THE PARENT DISCIPLINE OF OFFENDER MODELING

When one hears of criminal profiling, images of the motion picture "Silence of the Lambs" or the television program "Profiler" come to mind. On a negative note, one also thinks of profiling as the basis for the controversial "driving while black" phenomenon. For most lay persons these fictional examples or an occasional news media story about a crime being solved by means of a criminal profile is the only exposure they have ever had or will ever have in this area. Unfortunately, the media exposure that profiling receives is always either extremely positive, when a profile is successful in apprehending a suspect or extremely negative, such as in the "driving while black" controversy.

Due to the limited empirical research in this area and the limited knowledge of the actual process of profiling, we will now define and briefly discuss this topic. An apt definition is: "Offender profiling is the science of making logical deductions about possible suspects for any given crime based on shared patterns of behavior of those who commit certain crimes" (Crane, 1995, 29).

Said in a slightly different manner: “profiling may be defined as ‘a technique for identifying the major personality and behavioral characteristics of an individual based upon an analysis of the crimes he or she has committed’” (Homant and Kennedy, 1998, 319). Homant and Kennedy raise the issue that while profiling has produced a fair amount of literature, it has to date only been done in a journalistic, autobiographical or marginally empirically based nature. They also say those few empirically based studies which have been published in this subject area have been done so without peer review (Homant and Kennedy, 1998). This raises issues of validity in these studies and the conclusions reached in them. The academic literature, not the news media, so far has greatly focused on the successes of profiling, with virtually no mention of its failures. Rossmo (1999) did say that many police agencies and individual officers are reluctant to use profiles because they are probabilistic and police, as they deal with facts, prefer certainties (80-81).

Profiling History

Profiling has a longer history than many may realize. One of the first uses of a criminal profile in law enforcement occurred in “The Mad Bomber” case in New York City during the 1950’s. There a prominent New York psychiatrist, Dr. James A. Brussel, created a profile of the perpetrator of the bombings. His profile turned out to be so accurate that when the suspect was arrested he was wearing the same double-breasted suit, with every button properly buttoned that Dr. Brussel had predicted (O’Toole, 1999, 44-46).

Beginnings of Profiling as an Art and Science: FBI Behavioral Sciences Unit

The Federal Bureau of Investigation is most often credited with developing the art and science of criminal profiling. While this may or may not be true, those investigators who have received training from the FBI have been found to perform better at the task than those without this training (Homant and Kennedy, 1998, 319). The FBI systematically began using the process of profiling

in 1978, having begun their early research in the mid 1970's (O'Toole, 1999, 47). Their process is based on techniques developed by the FBI's Behavioral Science Unit and in its early stages dealt almost exclusively with serial homicide and serial rape cases. Agents began building the science by conducting extensive interviews with incarcerated serial murderers, attempting to determine if they possessed similar traits and characteristics that could be used to identify the type of person who committed these crimes. What they found was that perpetrators followed set patterns in committing crime; and that they exhibit a persistent pattern of behaviors resulting in the person continuing to commit the crime until imprisoned (Homant and Kennedy, 1998, 319; Douglas and Olshaker, 1999, 307; Turvey, 1999, 1-11).

The technique of profiling was originally intended to aid law enforcement in solving difficult crimes by narrowing a long list of suspects in some cases or providing a new direction for a dead end investigation to take (Homant and Kennedy, 1998, 321). It was also used to narrow the parameters of a search for a specific criminal (Canter and Alison, 1999, 23). As a result of these different intended outcomes, several different types of profiling have evolved over time. These include psychological profiling, crime scene profiling and offender profiling (Homant and Kennedy, 1998, 321).

Based on the FBI model, the investigation begins with an analysis of available information, in this research, our independent variables. Using this information, they develop a victim profile and combine all these elements to attempt to construct an offender "profile." This profile consists of a series of descriptive statements, that if used in a social science setting would be seen as hypotheses, much as we will do in positing our hypotheses based on criminal profiling as a theory (Homant and Kennedy, 1998, 320).

Crime Scene Profiling

Homant and Kennedy, in their typology of profiling, also identify another variation known as crime scene profiling. Because offender profiling ends with generalizations about the offender, attempting to distinguish an offending member from all members of a particular class, it became necessary to develop profiles of the actual crime scene to allow the profiler to be able to extrapolate as to the entire lifestyle of the offender. This raises the issue of the incompleteness of the offender profile alone. In speaking of the area of school violence Chris Morris says “Instead of identifying kids who might be problematic, we need to look at the school as a whole...” (Morris, 1999, 2). This line of reasoning gives rise to the development and inclusion of an alcohol sales outlet model to further narrow the search for potential offenders in this area.

Patterns of Offenders: The Beginnings of a Theory of Patterns or Persistence

“Crime Scene Profiling rests on the assumption that ...certain offenders have consistent behavioral traits. This consistency is thought to persist from crime to crime...” (Homant and Kennedy, 1998, 324). Theorists hold that antisocial behavior, of which premeditated sales to minors could be conceivably included, is a stable trait. Here the scholars are speaking to the hypothesis that criminals follow stable patterns. Douglas and Olshaker (1999) conclude that: “What we can say about each of us as human beings is that we establish patterns in our lives. We need them to reach the long term; we need them to get through the day. And if we break those patterns, there’s a particular reason” (308). If a person commits a crime once, he or she will most probably do it again. This gives rise to our idea, taken from a synthesis of the profiling literature, of the persistence of crime. The literature refers to it as pattern theory, holding that despite individual differences, classes of perpetrators follow set patterns which can be readily determined (Godwin, 2001, 52).

Criminal profiling, at the most basic level, rests on the foundation that people are creatures of habit and will continue to follow set patterns. While not as yet recognized by the relevant literature, we believe that, at its most simple level, it posits a theory, that we have chosen to call persistence theory, that those who are “bad” will continue to be “bad.” The idea that offenders adopt fixed behavioral patterns has a long history in criminology, where it is called “M.O.” or modus operandi (Godwin, 2001, 52). It follows from the notion that we are all products of our own pasts (Douglas and Olshaker, 1999, 307). In the context of this study, persistence, recognized by patterns in profiling, equates to the idea that those individuals and the outlets within which they work that sell to minors will continue to sell to minors.

It is the idea that past patterns will continue to be followed that we present our review of the literature on criminal profiling and include it as one of the theoretical foundations for this study. Profiling theory, contrary to deterrence theory, holds that if someone has knowingly committed a sale to minor offense in the past that this person will do it again. In the past, profiling has been used to identify perpetrators who have committed crimes of violence and of such seriousness that once arrested, they many never leave custody again. Our study differs in that the identified offender merely pays a fine, performs community service and is then free of the sanctions and able to commit the offense again. While the literature uses the term pattern theory, we prefer persistence theory, borrowing from economics.

We believe that the persistence tenet of criminal profiling theory can be extended from the individual alcohol seller to the licensed outlet as an organization. Our extension of the belief that patterns of offending persist to the licensed outlet is firmly based in organizational culture theory, a recognized and widely studied component of organization theory generally. Organizational culture theory, in a nutshell, holds that organizations possess distinct beliefs, practices, traits and norms, initially created by those who founded the organization that are passed on to new

members. We posit that those practices, traits and norms can follow set patterns and that organizational behavior, like individual behavior, can be subject to persistence.

Profiling as the Basis for Outlet Related Multivariate Models

Crime scene profiling lays the theoretical foundation for our construction of multivariate models in this research. While our proposed models may not fit precisely within the current uses of criminal profiling, we believe that it is a natural extension of the field. Profiling has followed a natural progression from serious violent crime to white collar crime to computer crime and to school violence (Homant and Kennedy, 1998; Schlarman, 1999; O'Toole, 1999; Morris, 1999). It has developed into several subsets, of which offender profiling is one. This follows an empirical process that does not require making assumptions about the motivation or personality of the offender. This particular process entails producing large amounts of data on the type of person most commonly involved in the offense under investigation. The models may aid in the identification of sellers and locations selling to minors because, as in mainstream profiling, they rest on the assumption that offenders share characteristics. In the mainstream, these characteristics were found to persist from crime to crime and person to person. The characteristics carry over to non-criminal aspects of the perpetrator's personality, making them identifiable (Homant and Kennedy, 1998, 324; O'Toole, 1999, 45).

Profiling as the Basis for Individual Seller Multivariate Models

While the models we propose in this research do not fall precisely within the definition of criminal profiling, the subset of the overall profiling literature dealing with offender profiling best fits our individual seller model. Offender profiling is an empirical process that does not require, as does other types of profiling do, making assumptions about the motivation or personality of the offender. This particular process entails producing large amounts of data on the type of person most commonly involved in the offense under investigation. This type of profiling includes that

which is used to identify drug couriers in airports or on the highways. Homant and Kennedy raise an important issue saying: "This type of profiling has been credited with reducing some types of criminal behavior, but it raises legal and ethical problems when ethnicity, gender, and age are part of the profile" (1998, 323). While our offender models will include gender and age, these variables will not be the cornerstones of the model. They hold no special place of prominence in our hypotheses. Any attempt to elevate these or any other variables over and above the others will be based entirely on the empirical evidence provided by the analysis of the data.

While our use of offender models does not follow directly from mainstream criminal profiling, this is not an offensive departure, as the purpose of our research is to develop tools to be used in deterring the sale of alcoholic beverages to minors. Our proposed models should be seen as just that, tools to be included in the investigator's tool box. They are created to be used in conjunction with other tools such as complaint investigations, routine surveillance and preventive inspections to guide and direct enforcement and training, not as an end in and of themselves (O'Toole, 1999, 44). Beech succinctly speaks to our point saying: "...although profiling may be useful in narrowing down the field of suspects, it cannot reliably identify an individual perpetrator" (Beech, 1995, 8).

The models we propose in this study should work to aid in the identification of alcohol sellers and the locations in which they work because, as in mainstream profiling, they rest on the assumption that offenders, whether individuals or locations, share consistent characteristics. In past research, these characteristics have been found to persist from crime to crime and person to person. The characteristics, or as we have termed them for use in our models – variables – have also been found to infect various non-criminal aspects of the perpetrator's personality and lifestyle, which makes them identifiable (Homant and Kennedy, 1998, 324; O'Toole, 1999, 45).

Potential Pitfalls of Using Profiling Theory to Ground Models

One potential problem is that the variables we measure can be seen as being surface details, not delving into the minds and behaviors of the individual sellers. Douglas and Olshaker (1999) say that one cannot make assumptions based only on surface details (308). Turvey believes that statistical generalizations, as logistic regression models certainly are, and experiential theorizing is incomplete and can serve to mislead an investigation (1999, 30). He further posits that profit motivated crime, of which intentional sales to minors are, do not satisfy the psychological or emotional needs of the perpetrator and as such, do not fit well within current models of profiling (Turvey, 1999, 179).

Extensions of Basic Profiling Theory

While our individual seller and licensed outlet models each have their foundation in the area of criminal profiling, they differ in many important respects. First, traditional profiling is reactive, dealing with crimes after they have been committed. Our models attempt to establish a profile of the type of outlet and individual seller most likely to sell alcohol at a point in the future, moving to a proactive application. This movement can be seen as a natural progression of the investigative tool of profiling. Steve Schlarman, in an article in *Information Systems Security* (1999) acknowledges that criminal profiling has traditionally been used in the area of violent crime. He recognizes that: "With a few twists, this concept may be applied also to computer intrusions (Schlarman, 1999, 21). In his writing, he raised the idea that profiling can be used to establish a generic profile of a computer "hacker" that can be employed in a proactive manner to prevent computer intrusions. His methodology also details how one would create a proactive profile. This profile includes information related to who, when, where and how the crimes will be committed. In our use of two models to focus proactive enforcement and training, we have borrowed from Schlarman's methodology. He identifies what he terms "Pieces of the Puzzle." Transferred to a social science research setting, these pieces are the independent variables. Our research has,

following from Schlarman's model, attempted to break down the offense of selling to a minor into its constituent parts, of which the two most important parts are the individual seller and the location of the sale, i.e. the licensed alcohol sales outlet (Schlarman, 1999).

The idea of law enforcement borrowing techniques from the social sciences is not a new concept. The social sciences have contributed many techniques to law enforcement over the years, including field work methods, interviewing techniques, qualitative analysis and participant observation (Fielding, 1999, 86). Pushing the idea of transferring social science techniques a little further, we provide another cornerstone for our forming of multivariate models.

Another article detailing how offender modeling can be extended beyond violent crime was published in Canada in 1999. It spoke to how offender profiles could be established to proactively identify potential perpetrators of school violence (Morris, 1999). This is but another example of how an investigative tool such as criminal profiling is subject to a natural progression, one that evolves and expands as new uses are found for it. Morris provides an excellent statement of the ability of profiling to be expanded by saying: "Criminal profiling has been used for years to help police track down serial killers, rapists and terrorists and now it's being adapted to meet growing concerns about school violence" (1999, 1). Beech in his 1995 editorial article on profiling speaks to the process of profiling as being an approach that "...brings together the theories and methods of social scientists, especially psychologists, in linking crimes and predicting the likely characteristics of the perpetrator of the offenses through the analysis of its commission" (Beech, 1995, 5). With this foundation having been laid, there seems to be sufficient foundation in the literature on criminal profiling to support our taking what we believe to be one more logical step, i.e. in developing an individual offender model and a location model to focus enforcement and training. Our use of modeling here follows in the footsteps of the models used in school violence.

Profiling theory serves two purposes in our study. First, it forms the foundation for our use of multivariate models. The variables measured should be able to be combined to provide profiles of those outlets and individuals predisposed to sell to minors. Secondly, it provides an alternative theory to compete with deterrence and expectancy theory to explain why some sellers and outlets do not seem to be deterred or to make rational, costs-based, decisions when it comes to selling to minors.

THEORETICAL FRAMEWORK FOR THIS STUDY

Competing Theoretical Framework

In this research, we employ three theories to make predictions as to the outcomes of the data analyses and to ground the discussions of the findings. These three theories form two theoretical bases, first the expectancy theory/deterrence theory base and secondly, the criminal profiling or persistence theory base. Sometimes these two bases agree with our predictions of the data analysis outcomes. More often than not they disagree, as there is an inherent tension between the tenets of the theoretical bases. Each base provides predictions as to how the majority of the independent variables will act on the dependent variable of the sale of alcohol to minors.

Sometimes one theoretical base prevails, other times the other wins out. Providing competing theoretical bases provides a better assessment of the problem of the sale of alcohol to minors and its reduction. The strengths of one theoretical base can compensate for the weaknesses of the other (Meier, 1994, 4).

One can see that there is a basic fundamental tension between these theories. We employ this tension to create a framework by which to make predictions, hypotheses, as to what the analyses of those variables identified below will show. It should be noted that by their nature, some of the variables examined do not lend themselves to be addressed by both theories, especially those

that deal with the licensed outlet as unit of analysis because with those variables we are examining group interactions and not individual actions.

In using the related theories of expectancy and deterrence, we are attempting to assess if the variables that we measured are being incorporated into the decision making processes of those identified individual sellers or into the cultural practices of licensed outlets in their “cost-benefit analyses” of deciding whether or not to sell alcohol to a minor. This is done to assess the deterrent effects of past actions and the explanatory effects of other variables. On the other hand, profiling theory, or persistence theory as we have posed it, is used to assess if individual sellers and outlets, as distinct organizations, follow patterns of offending. The theory also serves as the foundation for our construction of various multivariate models incorporating variables from both units of analysis.

A Caveat

While we use this framework to ground our hypotheses, it requires that we accept the idea that each and every sale of alcohol to minors is based on a conscious decision to do so. Wagenaar and Wolfson raised the issue in their analysis of alcohol enforcement that it may be a distinct entity and not determined by the same factors other crimes (1995, 425). Based on their idea, we offer the caveat, in the form of an alternative hypothesis, that if alcohol crime in general is determined by different factors than traditional crime, and if sales to minors are independent of other alcohol crimes, an issue we will address later, then the traditional theories of expectancy, deterrence and profiling may show little explanatory or predictive value. While this would undercut the utility of using the variables measured in this study to guide enforcement, training and industry staffing to reduce sales to minors, it would be an extremely important finding in and of itself. If the offense of sales to minors is independent of other types of crime and of other

alcohol offenses, then traditional reduction strategies may not be of use and others may need to be proposed.

Having presented the theoretical bases upon which this research will be grounded, it is now time to turn our attention to the specific questions, hypotheses and objectives of this research.

RESEARCH QUESTIONS, HYPOTHESES AND OBJECTIVES

The research purposes of this study will take the form of these questions:

- I. Is the likelihood of a licensed retail alcohol sales outlet committing a sale to underage person violation associated with:

Previous sale to underage person violations.

Previous violations for other than sales to minors.

Previous official warnings for sale to minors.

Previous complaints received of the outlet selling alcohol to minors

Previous BARS training.

Outlet ownership⁸, whether the outlet is an individual ownership, partnership or corporately owned.

Outlet location, whether located in an urban, suburban or rural area.

Time of day of compliance check .

Day of week of compliance check.

⁸ In differentiating the type of ownership of alcohol sales outlets, this study used the conventions used by the N.C. ABC Commission in issuing ABC permits. These are *individual*, *partnership* and *corporation*. These meanings have intuitive definitions in that an individual operation is owned by one person and is often referred to as a sole proprietorship. The classification of partnership included a simple partnership, a general partnership, a limited partnership or limited liability partnership. For the purposes of this research all forms of partnership will be aggregated. The corporate ownership is one which the ABC permit is held by a corporation which is registered with the North Carolina Secretary of State to do business in this state and includes general and limited liability corporations.

(The variables time of day and day of week, while included under the unit of analysis of the licensed outlet, will in reality be dealt with separately in the data analysis and discussion section of this paper.)

II. Is the likelihood of an individual alcohol server/seller selling alcohol to a minor associated with?:

Whether the seller is owner, partner or employee or stockholder.

Whether the non-owning employee is a manager or only a sales clerk.

Whether the clerk is employed full time or part-time.

The length of employment at the outlet that was checked.

The length of employment of the seller in the alcohol industry.

Whether the seller had received ALE BARS⁹ training in the past.

Whether the seller had received other, non-ALE provided, alcohol seller training in the past.

Whether the seller personally consumes alcohol.

The gender of the seller.

The age of the seller.

Whether the seller has been charged with selling alcohol to minors in the past

Or interactions of one or more of these variables acting as an intermediary variable.

III. Based on the methodology employed in this research, does the intervention of conducting an undercover sale to minor compliance check deter the likelihood of a sale to minor violation¹⁰ occurring during the posttest?

⁹ In examining server training herein, we will often refer to *BARS* training. This acronym means "Be A Responsible Server." This refers to a program that is presented by trained ALE Agents during which outlet owners, managers and employees are trained in the responsible sale and service of alcohol.

- IV. Is the offense of the sale of alcohol to minors independent of other types of crime generally and other ABC offenses in particular, thereby warranting the use of new and varied reduction strategies?

To examine the proposed research hypotheses, the study will be divided into three parts, first examining the effect of using the undercover compliance check strategy as a deterrent to selling alcohol to minors as measured by the quasi-experimental design reported herein; secondly, examining identified characteristics of licensed retail alcohol sales outlets as the unit of analysis in their individual and combined explanatory and predictive effect on the dependent variable; and lastly, looking at individual sellers as the unit of analysis for the same purposes as for licensed outlets. While not afforded a separate section in the chapters to come, we will examine our fourth research purpose of assessing whether the offense of the sale of alcohol to minors is independent of other criminal and ABC offenses as it arises in the discussions of the findings of individual independent variables. The basis for this assessment will be taken from findings of the individual and multivariate analyses presented in Chapters Four and Five.

Based on this division, we posit the following hypotheses:

- I. Using the outlet as the unit of analysis.
1. There will be a positive association between a licensed retail alcohol sales outlet's propensity to sell alcohol to minors and a:
 - a. Prior history of the outlet being cited for sale of alcohol to minors
 - b. Prior history of the outlet being cited for ABC violations other than the sale of alcohol to minors

¹⁰ *Violation.* This is a formal report of a transgression of the North Carolina General Statutes or the Alcoholic Beverage Control Commission's Rules committed on an ABC permittee's licensed premises that is submitted to the legal division of the ABC Commission for administrative action against the permittee's ABC permits.

- c. Prior history of sale of alcohol to minors official warnings¹¹
 - d. Prior history of official warnings for ABC violations other than the sale of alcohol to minors
 - e. Prior history of complaints¹² for the sale of alcohol to minors
 - f. Prior history of complaints for violations other than the sale of alcohol to minors¹³
2. Based on the sale to minor compliance check experiment conducted as a part of this research, the intervention of the sales to minor compliance check will result in a decrease in the likelihood of the outlet selling to a minor in the posttest.
3. There will be a negative association between an outlet selling to minors and attendance at ALE BARS Training.

¹¹ *Official warning or warning.* This term refers to a formal, written, notification to an ABC permittee that a violation of the North Carolina General Statutes or the Alcoholic Beverage Control Commission's Rules has been observed, but for one reason or another the decision was made not to submit a report of the violation to the ABC Commission for administrative action. This "official warning" is executed in triplicate with the original being submitted to the ABC Commission for filing in the outlet's master file, a copy being filed in the ALE Division's outlet files and a copy being served upon the manager, permittee or person in charge of the outlet. This instrument serves to put the permittee on notice that irregularities are occurring which should be corrected.

¹² A *complaint* is a report form completed by an ALE employee after receiving information that an outlet or an employee of an outlet has violated a provision of the North Carolina General Statutes or the ABC Commission's Rules. It is forwarded to the appropriate ALE Supervisor who may file the complaint for intelligence, or order an investigation. The completed form is filed in the ALE Division's outlet files, but is not forwarded to the ABC Commission. A substantiated complaint investigation may precipitate the issuance of an official warning or the submission of a violation report to the ABC Commission for administrative action.

¹³ Traditionally, in the alcohol enforcement field it is recognized that there is a progression from receiving a complaint that a violation has occurred, to an outlet receiving an official warning for a weak violation, to an administrative violation being reported to the ABC Commission and the seller being cited to criminal court. It is expected that these variables will have a similar progression in their explanatory value each will have individually and to the model. It is also posited that this progression will be evidenced in the deterrent effect each has on sales to minors. Based on this, we expect a violation reported to the ABC Commission to be a better predictor of and deterrent to future violations than an official warning alone and this action being a better predictor of and deterrent to a complaint alone.

4. Outlets located in urban areas will have a higher incidence of sales of alcohol to minors than those located in suburban areas, and suburban outlets will have a higher incidence of sales of alcohol to minors than those in rural areas.
5. Outlets owned by corporations will have a higher incidence of sales of alcohol to minors than outlets owned by partnerships, and partnerships will have a higher incidence of sales of alcohol to minors than outlets individually owned.
6. There will be an association between sales of alcohol to minors and day of week (with sales occurring more on Friday and Saturday), and time of day, with sales occurring more between 6:00 PM and midnight. (As said above, these variables will be discussed separately from the other units of analysis and the findings will be integrated within those findings of the other units of analysis.)
7. Those outlets who “sold” to the minor in the pretest will be less likely to “sell” to the minor in the posttest. (This variable will be used to assess the deterrent effect of the compliance check intervention.)

II. Using the individual alcohol seller/server as the unit of analysis:

1. A sales clerk having a prior sale of alcohol to minors charge will be negatively associated with the clerk selling during the posttest.
2. Financial interest by the seller in the outlet will have a negative association with sales of alcohol to minors, sellers who own an outlet will be the least likely to sell, employees with no financial interests will have a greater propensity to sell.
3. Full time employees will be less likely to sell to minors than part-time employees.

4. Individual seller attendance at ALE BARS training will have a negative association with selling to minors.
 5. Alcohol consumption by a seller will have no association with selling to minors.
 6. Sellers' age will be associated with sales to minors, with younger sellers being more likely to sell than older ones, especially those less than 21 years of age.
 7. Male sellers will be more likely to sell to minors than females.
 8. Managers will be less likely to sell to minors than will sales clerks.
 9. Length of tenure at one specific outlet will be negatively associated with selling alcohol to minors.
 10. Length of experience selling alcohol will be negatively associated with selling alcohol to minors, but will be less so than length of time at one particular outlet
 11. Non-ALE provided seller training will be negatively associated with selling to minors, but less so than that training provided by ALE
- III. The use of the undercover compliance check strategy will have a positive deterrent effects on alcohol sales outlets' propensity to sell alcohol to minors.
- IV. The offense of the sale of alcohol to minors is independent of other ABC offenses.

CONCLUSION

This chapter began by tracing the history of alcohol age restriction throughout history. Next, we detailed the three major theoretical bases of the study, namely deterrence, expectancy and criminal profiling. This section provides a theoretical framework for making predictions for the outcomes of the data analysis as to the independent variables identified from our review of the literature on sales to minor enforcement.

After laying the proper literary and theoretical foundations for our research, we now turn our attention to how the data to be analyzed was produced.

CHAPTER 3
RESEARCH DESIGN
INTRODUCTION

Enforcement and regulation in the area of sales to minor reduction traditionally can either focus on the buyer or the seller, but the main focus of sales to minor reduction in the United States is on the seller. Based on this precedent, this study examines the problem of the prevention of youth access of alcohol from the perspective of the seller. In studying the literature another dichotomy seemed to emerge, that of whether to focus deterrence efforts toward training or enforcement. While the primary focus of this research is enforcement, using the compliance check strategy as both a deterrent and a data production tool, we do examine server training as one of our independent variables. Our study also attempts to identify other factors, independent variables, that contribute to the individual seller and to the licensed alcohol sales outlet's propensity to sell alcohol to minors. Many of the independent variables were identified through the literature review. However, because there is only a limited literature in this area some of the variables analyzed in this study were identified from the author's more than 20 years of experience in enforcing the alcohol laws.

The purpose of this chapter is describe the physical steps taken to produce the data and to explain how the empirical analysis carried out. We first present the methodology employed in conducting this research and then describe how the methodology was designed to overcome threats to internal and external validity. We then explain the statistical analysis procedures used. And finally, we present the independent variables to be assessed, the literature or experienced-based rationale for their inclusion and the predictions made as to the outcomes of the data analyses.

METHODOLOGY EMPLOYED

This study employed a quasi-experimental design; however, it more closely resembles the true experiment than many social science studies. It has as its foundation a program entitled “Secret Shopper,” carried out by the North Carolina Alcohol Law Enforcement Division in 1999 and 2000. This program was funded by a U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention grant¹⁴. This research was conducted using the classic pretest–posttest design.

We recognize that quasi-experimental designs inherently contain more threats to internal and external validity than do true experiments. With this in mind, this study was designed to reduce many of the threats to validity through its employment of a proportionally stratified random sample. In a further attempt to insure the stability of the design and to control for many threats to validity, a control group which was not part of the pretest was randomly selected for inclusion at the posttest. Our specific methodology is set out below.

PRETEST

The pretest consisted of sending underage persons (minors) into 500 locations, licensed by the North Carolina Alcohol Beverage Control Commission for the retail sale of alcohol, in an attempt to purchase alcohol. These outlets were located throughout the state of North Carolina. Each licensed outlet in the state had a chance of inclusion in the sample. However, as will be seen in a later section, the chance of inclusion was not equal among all the outlets, due to the use of a proportionally stratified random sample. (See sampling procedures section for a detailed explanation of how the sample was constructed.) The stratified sampling methodology has been employed with varying degrees of success in the more limited studies upon which this research was loosely patterned. Here, the sampling design goes one step further by selecting a

¹⁴ The specific grant involved is: “Combating Underage Drinking,” Award Number 98-AH-F8-0037

proportional sample that is also stratified. This design should help overcome many of the problems found in previous studies.

Procedures to Choose Undercover Minors

To attempt to provide for a fair and representative assessment of the rate in which underage persons are able to purchase alcoholic beverages across the state, a rigorous process was developed to insure that the chosen underage undercover agents were representative of the population in question, which is comprised of persons between the ages of 16 and 20 who are potentially attempting to buy alcohol from licensed retail sales outlets. These underage undercover agents were selected and approved by Alcohol Law Enforcement managers after complying with the selection procedures set out below. The major purpose of this elaborate process was to ensure that minors appeared to be their actual age or younger. This was done to guard against the charge of entrapment in a law enforcement setting and served the research purpose by assuring that the pretest was measuring what it was intended to measure and that the minors were representative of the population they were chosen to represent.

The underage undercover agent selection process was carried out as follows. The process first entailed the discovery of a person aged 16, 17 or 18 who was willing to assist in the program. Once this person was located, a meeting was scheduled with the minor's parent(s) or guardian(s) to fully explain the program and the processes to be used and to gain their written permission. When parental permission had been received, an ALE agent performed a thorough background investigation, including a criminal record check and an assessment of the drinking habits of the minor. (The program required that the prospective undercover agent have no criminal record whatsoever.) After having successfully passed the background check, an ALE Agent took the minor to a public place, such as a shopping mall, and randomly stopped ten people and asked them what they perceived the age of the minor to be. The ages were then recorded and

averaged. The average must have been 16, 17 or 18 years, or less for the minor to have received further consideration for inclusion in the program. If the minor's actual age was within this range, the minor was photographed and the photograph submitted to the ALE Division Headquarters for final approval by a deputy director. This approval was based on the background investigation, the random age check and the photograph. If criminal and administrative charges are to be pursued as a result of the compliance check operation, then approval of the minor by way of photograph is required from the ABC Commission's legal staff and by an appropriate representative of the District Attorney's office in the area where the operation will be prosecuted.

A total of 34 minors participated in the compliance checks that were used as the basis for our research. Some were used in both the pretest and posttest, some were used in only one or the other. There was no selection criteria used to decide which approved minor was to be used in which area other than availability. As those minors in the general population that attempt to illegally buy alcohol are randomly distributed by sex, age and race, the fact that there was no specific plan as to which minor to use should present no methodological problem.

Distribution of Minors Used in the Experiment

The minors used in the program were required to be either 16, 17 or 18 years old. At the time of the completion of the posttest, the minors ages were distributed as follows: There were seven who were 16 years of age; 14 who were 17 years of age; and 12 who were 18 years of age. One minor turned 19 years of age between the pretest and posttest and according to program protocol was dropped from the program. Of the 12 minors who were 18 years old at the completion of the posttest, nine were 17 years of age during the pretest. Twenty-two of the minors were males and 12 were female. Twenty-seven were white, five were black, one was Asian and one Hispanic. This equates to approximately 15% of the minors being black, 79% white, three percent Hispanic

and three percent being Asian. This comes close to mirroring North Carolina's 1990 U.S. Census population, which was found to be 75% white, 22% black, .92% Hispanic and .80% Asian (www.census.gov, 2001).

The chart on the next page details the racial, gender and age distribution of the minors used in this research. The age category reflects the age the minor was at the end of the post-test.

Table 3.1
Race and Age of Undercover Minors by ALE District

ALE DISTRICT	MINOR'S RACE	GENDER	AGE AT POSTTEST
I	White	Female	18
I	White	Female	18
II	White	Male	16
II	Black	Male	17
II	Black	Male	17
II	Black	Male	18
II	Black	Male	16
III	White	Female	17
III	White	Female	17
III	White	Male	17
III	White	Male	18
IV	Asian	Male	17
IV	White	Male	17
IV	White	Male	17
V	Hispanic	Female	17
V	White	Female	17
VI	White	Male	16
VI	White	Male	17
VI	White	Male	18
VII	White	Male	16
VIII	White	Female	17
VIII	Black	Female	18
VIII	White	Female	18
VIII	White	Male	19*
IX	White	Female	16
IX	White	Female	17
IX	White	Male	16
IX	White	Male	17
IX	White	Male	18
X	White	Male	16
X	White	Male	18
XI	White	Male	18
XI	White	Male	17
XII	Black	Female	17
XII	White	Male	18

* Minor Turned 19 after Pretest and Was Dropped From the Program

SPECIFIC CONDUCT OF THE PRETEST AND POSTTEST

From the inception of ALE's compliance check program, the undercover minors have been instructed to attempt to purchase only beer. This has traditionally been done for continuity purposes, as it is easier to write reports when the same beverage has been purchased and it is easier for the minor to remember the facts of the case when testifying in a criminal or administrative hearing. In designing the process for this research, we followed the traditional practice and instructed the undercover minors to purchase only beer. While this had been the policy of the ALE Division, the decision was clearly supported by the review of the literature. Toomey and Rosenfeld sum up this line of reasoning saying: "Beer is the alcoholic beverage of choice for most youth" (1996, 215). This conclusion was deduced from an analysis of the rates of beer consumption before and after changes in alcohol laws relevant to age (Toomey and Rosenfeld, 1996, 215).

The compliance check themselves were carried out as follows. After receiving a list of local randomly chosen locations, as will be explained in detail in a subsequent section, two ALE agents accompanied the minor to the location to be tested. Before the minor was allowed to enter the licensed retail alcohol sales outlet he or she was photographed and searched by the agents. The minor was allowed to possess on his or her person only a coupon which is similar in size to US currency which has the message printed on it, "If this sale were allowed to continue, the ALE Agent standing behind me would be arresting you now," and their recently issued, valid, North Carolina Driver License. One of the agents, preferably one who does not normally work in the same area as the outlet being checked, entered the location in an undercover capacity before the minor was allowed to enter. This agent's job was to covertly survey the outlet to gauge how busy the clerk(s) on duty was. If the clerk(s) was very busy, the check was postponed until a later time or replaced with another outlet from the randomly drawn list of alternates. If not, the minor was allowed to enter the store. The undercover agent went to the beer cooler (using the example of

an off premise outlet) and removed a six pack of a pre-determined brand of beer. The minor took the beer to the check out counter and placed the beer onto the counter. The minor was required to present the clerk with their valid driver license upon request and was instructed to answer truthfully as to their age if asked. In the case of an on-premise¹⁵ outlet, an ALE Agent again covertly entered the location to assess how busy the location was. If the location was not busy, the minor was allowed to enter. The minor was instructed to go to a table or the bar and sit alone. He or she then ordered a predetermined brand of beer from the employee on duty. If the seller refused the sale, the ALE agent already in the outlet took charge and congratulated the employee for the refusal. If the employee was prepared to make the sale, the minor handed that employee the coupon referred to earlier and the ALE agent took charge and discussed the violation with the employee and a member of management if present. In either case, the employee was invited to attend a BARS Program. None of the potential sales were consummated and no criminal or administrative charges against the individual seller or the outlet were pursued. The other agent recorded the outcome of the check and was present to assist in case any problems arose.

INTERVENTION

The intervention employed in this research was the undercover compliance check itself. Here the dual role of this enforcement strategy is seen. First, it was used as a data production device. The strategy was also employed with the hope of having a specific deterrent effect on the individual seller that was checked, and a general deterrent effect as to other employees of that and neighboring outlets, once the attempts to purchase became known. Also, when examining

¹⁵ When speaking of an *ABC permit* often this term is accompanied by the modifier *on-premise* or *off-premise*. As the definitions are substantially the same regardless of what type of alcohol the specific permit authorized this definition is taken verbatim from the definitions of Malt Beverage Permits: "An *on-premise* malt beverage permit authorizes the retail sale of malt beverages for consumption on the premises and the retail sale of malt beverages for consumption off the premises." "Off-Premises Malt Beverage Permit. – An *off-premise* malt beverage permit authorized the retail sale of malt beverages in the manufacturer's original container for the consumption off the premises..." (North Carolina Alcoholic Beverage Control Laws, 1999, 87, emphasis added).

the general deterrent on the checked seller, we will examine whether the effect was more pronounced on the seller that “failed” the compliance check and was willing to make the sale. It is postulated that those sellers that “failed” the test and were given a reprieve would be deterred from selling at a greater rate. In other words, of all those checked at the pretest, those who sold should have a significantly lower sales rate at the posttest. While compliance checks were performed both at the pretest and the posttest, the only opportunity the check had to exert a deterrent effect, i.e. to act as an intervention, was during the pretest. It was employed as an attempt to measure the deterrent effect of the undercover compliance check on a licensed outlet’s propensity to sell alcohol to minors at the posttest, based on whether or not the outlet sold to the minor at the pretest, controlled by the inclusion of a control group. As no record was made of the identity of the actual seller during the pretest, it was not possible to measure any deterrent effect on individual sellers as it could not be determined whether the employee checked at the posttest was the same one as at the pretest. Compared to normal undercover checks, this study’s intervention is expected to have smaller than normal general and specific deterrent effects on sales to minor violations here, because for the purposes of this study, those who “sold” to the minor were not cited to criminal court and the outlet did not receive any of a potential host of administrative sanctions by the N.C. ABC Commission for the violation.

Invitation to Training

After the completion of the pretest, the person in charge of the outlet was invited to attend an ALE BARS (Be A Responsible Seller/Server) program, where training in detecting minors and how to refuse service is given. Only a very small number of outlets that were included in the pretest availed themselves of this opportunity, but as ALE has provided this program, in one incarnation or another, since 1982, having attended this program between the pretest and the posttest should provide no significant threat to history in the experiment. Attendance or non-attendance at BARS

training will be included as one of the independent variables in the construction of both the individual and outlet models.

POSTTEST

The posttest was carried out exactly as was the pretest. The only difference was in the manner in which the sample was chosen. Again the grant specifications provided for and funded only 500 checks, as will be explained in the sampling section. All the outlets that “sold” to the minor in the pretest were included in the posttest sample. This group included: thirty-one outlets that “sold” in the pretest and attended BARS Training between the pretest and posttest; 106 outlets that “sold” in the pretest and did not attend the training prior to the posttest; and five cases that did not “sell” to the minor and attended BARS. The posttest group was made up of all the outlets described above and a sufficient number of those other outlets checked in the pretest that did not sell or attend BARS to arrive at 400. The remaining outlets chosen consisted of a control group of 100 new outlets, none of which were included in the pretest. These outlets were included to assess the effect the compliance check itself had on deterring sales to minors.

SURVEYS

At the posttest, the seller was administered a single page survey to attempt to elicit data about the individual seller and the outlet. The survey was offered to the employee regardless of whether a sale was made or not. The first section of the survey which deals with outlet characteristics was completed by the agent most familiar with the location, usually the agent regularly assigned to supervise the particular outlet in question, prior to entering the outlet. The section collecting demographic data on the individual employee was administered by the agent in the store after explaining to the employee that answering the questions on the survey were totally voluntary and the information gathered would be confidential. In designing the pretest such a

survey was strongly suggested; however, those in administrative control of the project refused to allow any survey to be administered, resulting in the loss of valuable and important information.

An example of the post-test survey is provided below.

POSTTEST SECRET SHOPPER SURVEY

Date: _____ Day of Week: _____ Time: _____

OUTLET INFORMATION

Outlet Name _____ District: _____

Address: _____ City: _____ County: _____

Outlet File #: _____ Permits: On ___ Off ___ Mixed Beverages: Yes ___ No ___

Ownership: Individual ___ Partnership ___ Corporation ___ Corporate Name _____

Outlet Location: Urban _____ Suburban _____ Rural _____

EMPLOYEE INFORMATION Sale _____ No Sale _____

Name: _____ Age _____ Sex ___ Race _____

Place of Birth: _____

Is the clerk? Owner _____ Partner _____ Stockholder _____ Employee Only _____

If employee only, is the this person? Manager _____ Clerk _____

Is the clerk employed: Full Time? _____ Part Time? _____

Length of employment at this location ? Years _____ Months _____

Total length of employment in alcohol sales? (At this or any other location) Years ___ Months __

Shift Working Now? First _____ Second _____ Third _____

Has clerk attended ALE BARS Training? Yes _____ No _____

Any other (Non – ALE) alcohol training? Yes ___ No ___

Does clerk consume alcohol? Yes ___ No ___

Has the clerk ever been charged with Sale of Alcohol to Minor in Past? Yes _____ No _____

Figure 3.1. Posttest Secret Shopper Survey

At the conclusion of the posttest, another survey was developed, pilot-tested and sent to the ALE district offices for completion on each of the outlets checked in the pretest and posttests. It

solicited data on past enforcement actions taken against the outlet, complaints received, official warnings received and the outlet's history of attendance at ALE BARS Training Programs. This information was contained in district office files routinely maintained by ALE on each location licensed to sell alcohol in the state. The files in the field offices are considered to be working files and as such are not subject to public inspection. However, most of the information contained in these files is also contained in the outlet master files maintained by the NC ABC Commission and are considered public records. An example of the enforcement/training survey is presented below:

OUTLET ENFORCEMENT/TRAINING SUMMARY

District _____ County _____ Date Permit Originally Issued (Mo/Yr): _____

Trade Name: _____

ENFORCEMENT INFORMATION:

Violations: (Reports Submitted to ABC Commission)

Charge(s) (Brief Summary Only) (Example: A Sale to Minor = STM; Sale to Intoxicated = SIP; etc.)	Date of Violation	Date of Final Action
_____	_____	_____
_____	_____	_____

Warnings: (Written Warnings Only)

Violation Observed (Brief Summary Only)	Date of Warning
_____	_____
_____	_____

Complaints (AL-55's)

Violation Reported (Brief Summary Only)	Date of Complaint
_____	_____
_____	_____

BARS TRAINING

Date of Program	Number Attending (If Specified)
_____	_____
_____	_____

Figure 3.2. OUTLET ENFORCEMENT/TRAINING SUMMARY

The information from the surveys, along with the pretest and posttest data was entered into a spreadsheet in Microsoft Excel for importation into a statistical analysis program for analysis.

LIMITATIONS OF THE RESEARCH DESIGN: Threats to Internal Validity

The research design employed in this study utilized a proportionally stratified random sample of licensed retail alcohol sales outlets. This randomly chosen sample served to mitigate many of the threats to internal validity.

Estimating internal validity in quasi-experiments is a deductive process consisting of: consciously thinking through how each of the relevant threats may have influenced the data and examining the data to test which relevant threats can be ruled out. When all of the potential threats can be plausibly eliminated, then it is possible to arrive at a conclusion that the observed relationship is probably causal. If not, there may not be a causal relationship.

That portion of this study that uses the alcohol sales outlets as the unit of analysis for offender models is fraught with internal validity problems due to the transient nature of alcohol industry employees. Typically the positions of convenience store clerk or restaurant server are entry level positions paying little more than minimum wage. People at this level tend to change jobs frequently and this transience may have a substantial effect on the internal validity threats of history, maturation and testing.

The following sections discuss those threats that have been identified as creating potential problems with the internal validity of this research design. As to the discussions that follow we offer this caveat: Even though these threats are discussed individually, they can, and in practice often do, operate together (Vasu, 2000).

History: The threat of history arises when the observed effect is due to an event that occurs between the pretest and posttest, and is not part of the intervention. In quasi-experimental designs, such as this the one employed herein, one cannot insulate respondents from outside influences.

Here, we must be cognizant that past criminal and administrative enforcement actions may have exerted some effect on whether an individual seller or a particular outlet sold in the pretest. To

attempt to control for enforcement's effect before the experiment began we included a retail outlet survey to assesses enforcement history. Our use of a post-test employee survey identifies if an individual seller has been the subject of enforcement in the past. Despite our attempts to control for history, we recognize that the transient nature of alcohol sellers causes this to be a significant threat to the validity of this study. This is particularly true because there was a period of seven or more months between the pretest and posttest.

Maturation: This threat is defined as the effect of respondents gaining knowledge, skills, strengths and experiences, etc., that are not part of the treatment or intervention that occur between the pretest and posttest.

Maturation is recognized as a significant problem in this study due to there being seven months between the pretest and posttest. This time lapse was partially due to the time required to set up and deliver the posttest. Actually, the post-test was initially planned to be conducted several months earlier; however, the advent of Hurricane Floyd in September of 1999 necessitated the postponement of the posttest as ALE agents were reassigned to humanitarian duties. One also has to take into account that the undercover minor, if in fact the same one was used, had also aged seven months. As alluded to above, one has to recognize the transient nature of alcohol industry employees and factor in the possibility that those employees who received the intervention in the pretest were no longer employed. The fact that all the minors had aged the same rate should have some effect in controlling for the time differential. The post-test employee survey and the outlet survey should also allow the researcher to identify and account for enforcement actions occurring between the pre and post-tests. Interestingly, the transience of alcohol sellers may mitigate maturation, as many employees do not remain at a location long enough to be affected by maturation.

Testing: Testing is defined as the threat that occurs when respondents learn because of the number of times they have taken a particular test.

This threat could have been present at the posttest if other compliance check operations occurred between the pretest and posttest. In fact, this almost occurred, when a memo was sent out to the field offices by an ALE Deputy Director ordering district supervisors to conduct compliance checks at those tested outlets that failed in the pretest. If this had been allowed to occur it would have constituted a serious threat to the internal validity of the entire program which could negate the validity of the subsequent findings. This threat to validity was brought to the attention of management and the memo was rescinded before any compliance checks were conducted. Routine compliance checks were not be seen as a serious threat as ALE routinely conducts these complaint based operations in the normal course of business. Unfortunately, local agencies could have conducted sales to minor undercover campaigns during this time, and ALE would have had no control over this threat. This potential threat can be identified by the use of the outlet survey. In the area of testing, as in maturation, the transient nature of sellers actually helps because of the number of employees that had been hired between the pretest and posttest. Unfortunately, due to ALE management's refusal to approve a pretest seller survey this aspect was unmeasurable.

Instrumentation: This threat arises when there have been changes in the measurement instrument between the pretest and posttest.

This was a potential problem in our research as the primary measurement instrument used in the pretest and post-test was the minor. As there was a seven month period between the pretest and posttest, obviously our minors were maturing. Also in some instances different minors could have been used. This threat was controlled for by the extensive process that was used in selecting

and approving the minors. If a minor aged beyond the age of 18, this minor was dropped from the program. Since the dependent variable in this research is the sale of alcohol to a minor, i.e. whether the outlet employee made the sale or not, and all those undercover agents fit well within the definition of a minor, the instrumentation threat is lessened. As said before, due to the transient nature of alcohol sellers, it would be highly unlikely that the same employee was working at the posttest as was tested at the pretest. Also, since the research design called for the sellers' identity to remain confidential, we have no way of knowing if the same sellers were present for the pretest and posttest.

Selection: Selection is the effect due to differences in the members of the experimental and control groups that is not caused by the treatment. This threat has been found to be pervasive in quasi-experimental research.

In our study the care taken to design the sampling frame and to conduct a random selection of the pretest sample should have gone far to mitigate the effects of selection. The introduction of the control group during the posttest aided in overcoming selection threats to validity.

Mortality: This threat is defined as the effect caused by members of the group being studied, here alcohol sellers and/or licensed outlets, dropping out during the course of the experiment.

The potential of having different sellers present at the pretest and posttest lessened the problem of mortality as a valid threat to internal validity in our research design. Again, the transient nature of alcohol sales employees caused this to be a concern. Due to the anonymity requirement in our research design, we cannot know if sellers dropped out of the study. As we also examined sellers as a group, this lessened the concern with the individual seller. This threat is one reason why our study uses both the individual and the licensed outlet as units of analysis. As the outlets

themselves are one unit of analysis, the effect of experimental mortality is somewhat mitigated in this aspect. The portion of the study using the individual seller as the unit of analysis is an example of a quasi-experimental design where data is collected only at one point in time, so mortality is not a factor here.

LIMITATIONS TO THE RESEARCH DESIGN: Threats to External Validity

While we discuss the threats to generalizability, it should be pointed out that the focus of this study is the state of North Carolina. It is not the intent of researchers to attempt to generalize the findings of this research beyond that state. While the reader may be inclined to attempt to generalize our research findings and implications set out at the end of this study to other states or countries, it was not the express intent of the research design to allow this and the reader does so at his or her own peril, and should be cognizant of those threats listed below.

These threats to external validity are listed and discussed in terms of statistical interaction effects as the tests of generalization across various populations is actually a test of statistical interactions.

Interaction of Selection and Treatment: To eliminate or mitigate this threat, the selection should be designed to make participation in the experiment as convenient as possible. Without taking these precautions the problems of self-selection and volunteering may arise. In our research the initial selection of the cases (outlets) was done randomly, so each outlet in the state had a chance of being chosen. They did not, however, have the same chance of being chosen, as the percentage of outlets chosen per ALE district was in direct proportion to the percentage of “minors” that were believed to reside in that district. The random selection of the cases goes far to mitigate this threat to the ability to generalize the findings of this research to other areas.

Interaction of History and Treatment: In describing this threat one must ask the question: To which periods of time, past and future, can a causal relationship be generalized? It is difficult to control for all factors when trying to generalize over time. Replication of the experiment at several times in history can help to control for history. Also the literature review can be used to search for prior evidence that does not refute the causal relationship. As our literature search did not discover a study carried out exactly as the one being conducted here (at least not to this scale) it will be difficult to compare our study with others as some may have the luxury to do. Replication of the study at various points in time could help control for this threat; however, this is also a luxury that probably will not occur. This study cost \$67,500 and entailed many hundreds of man-hours of time, and the chances of its replication at such a large cost is doubtful. However, the outlet history surveys will go far to explain the enforcement history of the individual outlets.

Having listed and discussed the potential threats to validity, it is now time to turn our attention to how we chose those outlets that would be checked.

SAMPLING DESIGN

Population

The population from which the pretest sample was drawn was the list of all locations in the State of North Carolina licensed by North Carolina's Alcoholic Beverage Control Commission to sell alcoholic beverages at retail. At the time the pretest sample was drawn, this population consisted of approximately 15,700 locations. The sampling universe used was a list provided by the ABC Commission to researchers in January, 1999. The total number of the population is given as approximate because new licensed outlets are being added daily and outlets files are being cancelled daily due to their having gone out of business. As said before, the study reported herein consisted of a pretest that made use of a proportionally stratified random sample of 500 of the possible 15,700 locations. The posttest was designed to consist of approximately 400

locations checked in the pretest and a control group of approximately 100 locations selected by the same process as the pretest, except those outlets chosen in the pretest or as alternates for the pretest were excluded.

Sampling Procedure

As the purposes of this study was to assess the deterrent effect of undercover compliance checks and to explain individual and licensed retail outlet characteristics on the rates of sales of alcohol to minors, the first step in the sampling design was to determine the distribution of minors in the general population and where they resided in the State of North Carolina. To identify the proportion of minors in given geographic areas, first the state had to be subdivided. The most practical way to accomplish this task was to employ the same geographic districts into which the ALE Division was, at the time the sample was designed, divided. This division then consisted of twelve geographic districts located across the state.

To choose the percentages of minors for each ALE district, data was taken from the 1990 U.S. Census. Spread sheets were constructed listing each county and the number of children ages seven to eleven that the 1990 Census reported as residing within the county. The reason for this is that children who were ages seven to eleven in 1990 would have been ages 16 to 20 at the time of the pretest. The individual county percentages of minors were tabulated and the county information was combined to mirror the makeup of the ALE Districts.

At the time of the pretest, using the methodology described above, it was determined that there were approximately 398,800 minors living in North Carolina. The approximate raw numbers of the minors living in each district is provided in the table below.

Table 3.2
Breakdown of Minors Living in North Carolina
By ALE District

District	District Office Location	Number of Minors	Percentage of Minors
I	Edenton	18,730	4%
II	Tarboro	35,590	8%
III	New Bern	22,750	5%
IV	Raleigh	41,150	10%
V	Fayetteville	29,460	7%
VI	Greensboro	44,660	11%
VII	Winston-Salem	23,000	5%
VIII	Charlotte	65,900	16%
IX	Hickory	30,390	7%
X	Asheville	26,040	6%
XI	Wilmington	34,150	8%
XII	Durham	26,980	6%

After determining the approximate percentage of minors residing in each ALE District, this percentage was used to determine the number of outlets to be checked in each district. In other words if 20 percent of the state's minors resided in a given district, then 20 percent of the 500 checks or 100 outlets were chosen for that district.

The list of outlets that was obtained from the ABC Commission was then divided by county and all the outlets were arrayed alphabetically. The lists of outlets in particular counties were combined to form district lists. The outlets on the district list were sequentially numbered from first to last, beginning with one. The random number generator in Microsoft Excel was used to generate twelve lists of numbers based on the percentage of 500 that was representative of the number of minors in a given district. The outlets that corresponded to these numbers were selected for inclusion in the pretest sample.

The sampling frame, at this point, was all the outlets in a particular district, not a particular county. To restate, the actual percentage of outlets chosen in a given district corresponded to the percentage of minors within the entire district, not within each separate county. This was done because some counties do not have alcohol sales. Also in the more rural districts some counties that do have alcohol sales may only have five to ten outlets.

To control for those outlets that may have gone out of business, that were closed when the compliance checks were attempted or some other unavoidable problem, a list of alternates was also randomly constructed for each district at the same time as the pretest list, using the same process. The agents conducting the pretest were instructed to move to the alternates in the order in which they were provided when they found an outlet on the initial list to be closed for any reason. This was done to save time and to defray costs.

The posttest sample also consisted of 500 outlets. This number of outlets was specified by the grant requirements. The methodology for constructing the posttest sample called for 400 of the 500 outlets checked in the pretest to be randomly chosen. Then a control group of 100 outlets was chosen. This control group was chosen using the same sampling methodology as used in the pretest, except that those outlets included in the original 500 or those selected as alternates for the pretest were excluded. This was done to assure that the control group was not affected by the pretest. While the methodology called for the posttest to have a control group of 100 outlets, in reality there were many more outlets included in the control group due to a large number of the outlets checked in the pretest having gone out of business, being temporarily closed or being too busy to check due to the restricted nature of the testing procedure.

Sampling Unit

The sampling unit used in this study was a licensed retail alcohol sales outlet, located within the State of North Carolina. Examples include convenience stores, grocery stores, drug stores, restaurants and private clubs. The outlets included in the sample were chosen irrespective of whether they held on-premise or off premise ABC permits. While the on-premise off-premise dichotomy or whether the outlets held mixed-beverage permits will be used as independent variables, these differences had no effect on the selection of the sample.

Sample Size

As reported, the sample size was 500 outlets in the pretest and 500 outlets in the posttest. The significance of the sample size was tied to the grant requirements. This was an arbitrary number set out in the grant contract. Sufficient funding was provided to conduct this number of checks and no more.

Formation of Subgroups

The samples were broken down into subgroups during the data analysis, using the demographic data produced by the posttest survey and the outlet history survey. The only other sub-grouping of the sample was described above in discussing the methodology of selecting the cases (outlets) for the posttest.

VARIABLES EMPLOYED IN THIS STUDY

The variables chosen for analysis in this research were identified through several methods. First, those suggested by the review of the literature as having some predictive and explanatory value were included. Secondly, the author's twenty years of experiences as an Alcohol Law Enforcement Agent suggested other characteristics of individual sellers and outlets that seemed to correlate with sales to minor violations observed.

INDEPENDENT VARIABLES SUGGESTED BY THE LITERATURE

Reduction strategies, such as compliance checks and seller training have received the most attention in the literature regarding the reduction of the sale of alcohol to minors but we recognize that other factors may hold equal promise in predicting sales to minors. The ability to predict which outlet and which seller has a greater propensity to sell to a minor, or on what day and at what time a sale is more likely to occur, or some other equally illuminating characteristic can be of as much value to reducing the sale of alcohol to minors as the other reduction strategies discussed. Here, we use the existent literature in the area of sales to minor enforcement to identify characteristics or variables that may have utility in predicting or explaining sales to minors. After identifying those relevant variables, using the theoretical foundations presented, we will present predictions as to what we believe the variable analyses will show. Restated methodologically, we will use theory to formulate research hypotheses in regard to the variables identified.

Those prior studies conducted in this area, while they may have been limited, do provide insight into which variables have a statistically significant association with sales to minor prediction, explanation and reduction. After conducting several studies in this area, Wagenaar and Wolfson concluded that additional environmental characteristics must be examined when searching for comprehensive efforts to reduce sales to minors (Wagenaar and Wolfson, 1995, 424-428).

Outlet Location

Meier, in *The Politics of Sin*, raises the issue of a rural-urban dimension to alcohol attitudes. He says that urban lifestyles expose citizens to more varied lifestyles which results in greater tolerance of issues such as alcohol consumption. Conversely, rural residents are seen as being

less tolerant and less liberal and this should be manifested in rural alcohol sellers refusing to sell to minors at a greater rate (1998, 9).

In a monograph, Wagenaar called for research employing the compliance check strategy across diverse sets of outlets across these geographic areas (Wagenaar, 1991, 193). Vaucher and Rehm's Swiss study divided their checks equally between outlets in rural and urban areas. Here, they found no significant statistical difference between the rural and urban areas (Vaucher and Rehm, 1995, 1619-1621). In 1996, Wagner and Wolfson reported that underaged persons living in small towns did not purchase most of the alcohol they consumed, but obtained it through older confederates. They theorized that this was because teens were better known in small towns and found it harder to purchase from sellers they know. Building on their research, we divide our subject outlets into three geographic categories, namely urban, suburban and rural. While our undercover minors were brought in from other areas, it makes intuitive sense that if small town clerks refuse service more, that we should see a lower sales rate among rural outlets (Grube, 1997, 253). Based on the literature, if outlets in rural areas better know their customers they should be more alert to an unknown customer. In either case, expectancy theory would predict that the seller in a rural outlet, by virtue of their having more information on which to base their decision, would recognize the potential for a sanctions and make the decision not to sell. Deterrence theory makes the same prediction, but for a different reason. As there would be fewer outlets in a rural area, the chance of being checked by a compliance check operation confined to the county would be greater. Restated, if ALE were to conduct a random compliance check operation in a specific county and plan to check, say 25 outlets, the chances would be greater for inclusion if there were fewer outlets to choose from. Conversely, profiling theory given its persistence tenet would simply posit that if sellers at an outlet were selling to minors that this practice would continue regardless of its location.

Gender of Seller

In another of their studies, Wagenaar and Wolfson using focus groups of underage drinkers, identified several additional variables which were associated with successful underage alcohol purchase. Among these is searching for male sellers, raising the issue of gender which we address by recording the gender of our sellers and analyzing their propensity to sell based on that variable (Wagenaar and Wolfson, 1994, 38). Based on the criminal profiling literature, if males have been found to sell to minors at a greater rate in the past, it is intuitive that they will continue to do so; therefore, we predict that males sellers will sell at higher rates than females. As the literature only points to minors seeking out male sellers more, we are not as confident about this prediction as we would be if prior literature found a significant association between gender and sales. Deterrence and expectancy theory would not differentiate between the genders in their ability to make an informed decision or to be deterred by past enforcement.

Outlet Ownership

Wagenaar and Wolfson's research also points to convenience-type stores having a larger than average sales to minor rate (1994, 38). While one typically associates these stores with corporate ownership, in their research, they did not capture the ownership variable. Preusser and Williams (1992) did examine the variable of ownership type and found that "chain" stores were less likely to sell alcohol to minors than independently-owned stores. This grounds our use of the variables of outlet type, i.e. whether individually owned, owned by a partnership or corporately owned. Expectancy theory would cause us to predict that ownership would be a significant variable in cost-benefit calculations as to whether to sell to minors or not. An owner would be subject both to the personal criminal sanctions and to the outlet's administrative sanctions. From this we predict that corporations, of which the majority are "chain" stores with a much smaller chance of having an owner working, would sell at a greater rate, as the ownership factor would figure heavily into any calculation to sell or refuse a sale. Profiling or as some call

one of its tenets, persistence theory, would lead to the prediction that employees of outlets, regardless of ownership type, would continue to violate the law if they had done so in the past.

Day of Week and Time of Day

In another focus group study, Wagenaar and Finnegan reported that the young drinkers they interviewed said that their attempts to purchase were more successful on weekends than week days (1993, 464). Following their lead, we include the variable of day of week and to more fully examine when alcohol is sold to minors, we also collected the time of day of all our compliance check attempts. Theoretically, we look to profiling here as no decision on the part of the seller is involved in the day of week or time of day that a minor attempts to purchase. We would predict that weekend sales would be greater as this has been the pattern in the past and profiling is grounded on the persistence of patterns of behavior. The other theoretical basis for the study would lead to the prediction, which we do not follow, that if more sales were occurring on weekends and in the evening hours then expectancy theory would engage and cause the seller to factor this information into their cost-benefit analysis and reason that the cost of selling is increased. From the point of deterrence theory, a seller should know that law enforcement probably has the same information as the seller and will focus more enforcement on those days and times believed to associated with greater sales. Therefore, the seller should feel a greater certainty that he or she will be discovered if a sale is made on these days and times. We wish to caution our reader that this variable only measures the rate at which sellers are making sales on days of the week, not the rate at which minors are attempting to purchase, a variable for which we did not collect data.

Age of Seller

In another of Wagenaar and Wolfson's studies they reported the results of a Department of Health and Human Services survey which concluded that two-thirds of seventh to twelfth grade

students in the U.S., who consume alcohol, reported having purchased the alcohol themselves (1994, 39). Their study identified and measured several variables that played a part in successful alcohol purchases. The first was that prospective purchasers sought out youthful sellers, grounding our use of seller's age. Also speaking to the issue of seller's age, Kumpfer and Chavez, reviewing the literature on alcohol availability by minors, cited a 1991 study by the Office of the Inspector General reporting that employing minors as alcohol sales clerks may facilitate an increase in the direct purchase of alcohol by minors. From this study, they report: "... 3.5 million junior high and high school students reportedly purchased alcohol from a store with young clerks, and almost 3 million students reported that they know the clerk from whom they made the purchase" (1999, 28). We will address the first part of this issue by examining the percentage of sales made by sellers of different age groups. As the undercover minors employed in our study were purposely taken to an area other than where they reside, we will not be able to measure whether knowing the sales clerk results in a greater instance of sales. Again, expectancy theory would predict that in making a cost-benefit calculation as whether to sell, older sellers would incur more cost in making the illegal sale. Older sellers have a greater potential for having families, causing them to depend more on their job. Given the consequence of losing one's job and being barred from working in the alcohol industry for two years, we predict that older categories of sellers will sell at lower rates. Restated, those with more to lose will be more fully deterred in making the sale. Conversely, we predict that younger categories of sellers will sell at higher rates, given that they may, as a group, depend less on the employment and will incur less of a cost by selling and being caught. Profiling, would make the same prediction as the literature provides a pattern of younger sellers being more predisposed to selling to minors, we would expect this pattern to persist.

Past Enforcement Actions

Wagenaar and Wolfson's 1994 study found that minors attempt to purchase at locations having a reputation for selling to minors. This underscores the value of incorporating the variables of the outlets having histories of prior sales to minor violations, official warnings and citizen complaints, both in the areas of sales to minors specifically and other ABC offenses generally (Wagenaar and Wolfson, 1994, 39). More specifically relating to the variable of complaints, Wagenaar and Wolfson specifically call for law enforcement to encourage citizen reporting of outlets having a reputation of selling alcohol to minors (Wagenaar and Wolfson, 1994, 46). The use of these variables ties directly into criminal profiling's idea of a crime scene profile. Based on the persistence tenet of profiling, that crimes follow specific patterns, we would predict that those outlets having prior enforcement actions would be more likely to sell in the future. This is in direct contradiction to deterrence theory, especially in the area of prior violations, as one would hold that having been subjected to prior sanctions associated with a violation that the outlet would be deterred from committing the offense again. The problem with this train of thought is that our unit of analysis is the outlet, not the individual seller. An outlet, not being a living thing, cannot be deterred. If one examines this from an organizational point of view, then it could be postulated that general deterrence would have an effect on other members of the organization even if that person was not the one subjected to the sanction. However, as we have said before, due to the transient nature of alcohol sellers, this argument loses its significance.

Seller Status

A study conducted by the University of Minnesota Department of Epidemiology, reported in 1995, found that having a manager present at a licensed alcohol sales outlet at all times was associated with a 15% reduction in sales to minors (Wolfson, et. al., 1995, 673). As many of the locations chosen for our study had only one employee present, the variable of a manager's presence was measured by determining whether the employee was a manager or a sales clerk. To further

examine if status has an impact on the sale of alcohol to minors, we also included the variable of whether the seller was the owner of the location, a partner in the business, a stockholder in a corporation or merely a sales clerk. Our prediction for the outcome of the analysis of this variable follows from our expectancy theory based argument as to outlet ownership presented above. An owner, either sole owner or partner, would have more to lose than a manager, who would have more to lose than a clerk. Those with more to lose would incur a greater cost and therefore we predict that owners, including partners, will sell at a lower rate than managers. We further predict that managers will sell at a lower rate than clerks. This reasoning follows our prediction that managers will sell at lower rates than clerks in the variable that assesses the status of non-owning employees. As the literature has shown that having a manager present was associated with lower sales rates, we see this as a deterrent and likewise deterrence theory would predict the same outcome of the data analysis. Having no prior data from which to form the basis for a pattern, we make no predictions as to what profiling theory would hold for these variables.

Seller Training

The issue of training was raised in its own section in the literature review. This topic gave rise to our inclusion of the variables of ALE BARS training received by a seller, ALE BARS training received in the past by an outlet, and other non-ALE training received by a seller. Based on Porter and Lawler's modified expectancy theory model, we predict that those individual sellers having been exposed to seller training will sell at lower rates as the training, if correctly conceived and executed, should have modified the abilities and the role perceptions of the seller, causing that seller to be less influenced by intervening factors. Also, using deterrence theory's idea of general deterrence, the area of training that discusses possible sanctions and enforcement strategies, should result in a heightened awareness and therefore serve as a deterrent. Based on the experience of the principle researcher and on the prior literature, we predict that ALE BARS training will have a greater deterrent effect on sales to minors than "in-house" training.

Looking at this variable in terms of profiling or persistence theory, we ordinarily would predict that if a seller or group of sellers at a given outlet had sold in the past they would continue the trend and sell in the future. However, examined in light of our hypothesis that sales to minors may be independent of other offenses, due more to carelessness or apathy; training, if focused on building minor sales avoidance skills or on increasing the awareness of sellers, could function to reduce sales to minors.

OTHER INDEPENDENT VARIABLES

Those variables discussed above were suggested by the literature either directly or tangentially. The variables presented in this section were suggested by the experience of the principal investigator and are factors that have traditionally been taken into account by agents of the ALE Division in making enforcement decisions as to sales to minor enforcement.

Prior Sales to Minor Charges

This variable was included to assess if a seller having been cited for selling in the past has an association with selling to a minor at the posttest. This is another variable where our foundational theories conflict. Based on deterrence theory one would think that a seller that had been sanctioned for selling to a minor would be deterred from selling in the future. Expectancy theory would hold that in employing a cost-benefit analysis of whether to sell to a minor, a seller who had been charged in the past would have more information upon which to base the decision and would refuse the sale. From this argument, we predict that those with prior sales to minor charges would sell to minors at the pretest at a lower rate. Restated, prior sales to minor charges will serve to deter future sales. On the other hand, profiling would suggest the opposite conclusion. If a person had been charged with selling to a minor in the past it is plausible to conclude that, as with other crimes for which profiling is employed, the perpetrator had committed

this crime many times before being charged. This is unless sales to minor violations are independent of other crimes. This would tend to show that the pattern had been established and the seller would continue to sell.

Full Time or Part Time Employment

We included the variable measuring whether the seller was employed full time or part time as a natural progression of measuring whether the seller was owner or employee and if not an owner, if the employee was manager or clerk. Also following from our predictions based on the precursor variables, we believe expectancy theory would predict that full time employees have more to lose and as such, the cost of making the sale increases thereby tipping the scales of the cost-benefit analysis to make full time sellers sell at a lower rate. Restated, full time workers would be more deterred from selling than their part time counterparts. Without prior research in this area to establish a pattern from which to extrapolate, profiling would make no prediction here.

Tenure in the Alcohol Industry

Sales rates, based on time in the industry, can be analyzed in terms of expectancy theory, which holds that motivation to perform an act, here refusing to sell to minors, is based on two expectations. The first is the probability that the effort exerted will lead to the desired performance. Secondly, the probability that a given performance will lead to desired outcomes, which is to keep one's employment and not be arrested. As one progresses in the industry and ages, that person becomes more dependent on their job. They may also seek promotion within the industry. Selling alcohol to minors, being caught and convicted with its accompanying prohibition of working in the alcohol sales industry for two years will result in a loss of present employment and chances for promotion. From this we predict that sellers will sell to minors at a lower rate the longer that they have been employed in the industry. To apply profiling or persistence theory to this variable, one would have to know whether the seller had been selling to

minors in the past. Based on the methodology of this study, profiling offers no guidance to making predictions as to this variable.

Tenure at the Outlet Checked

This variable was included as a natural progression from the previous one. We recognize that it provides less information, as a person could have worked at the outlet checked for less than one month, while having been employed in the industry for many years. Using the same theoretical argument as tenure in the industry, we make the same prediction, but qualify it by saying that we do not feel that it will not provide as much information as tenure in the industry.

Alcohol Consumption by the Seller

Finally, we asked those sellers in the posttest that were surveyed if they personally consumed alcohol. This variable was included merely to satisfy the curiosity of the researcher as the issue has arisen in private conversations among ALE Agents over the years and has no theoretical basis. As such, we posit that it will have no association whatsoever with sales to minors.

COMPETING THEORETICAL FRAMEWORKS

As we have said in the previous chapter, our predictions as to the outcomes of the independent variable analyses are based on the often competing theoretical bases of expectancy/deterrence theory and criminal profiling/persistence theory. The following tables present a summary of what these theoretical bases predict as to each independent variable.

Table 3.3
Competing Theoretical Framework
Hypotheses Suggested by Competing Theories
Using Licensed Outlets as the Unit of Analysis

	EXPECTANCY THEORY OR DETERRENCE THEORY	CRIMINAL PROFILING OR PERSISTENCE THEORY
INDEPENDENT VARIABLE ASSESSED		
Outlet Location	Rural Outlets will sell at a lower rate than suburban, which will sell at lower rates than urban	Outlets selling in the past will continue to sell in the future, regardless of physical location
Outlet having received ALE BARS Training	Outlets having had BARS Training will sell at lower rates	Outlets that have sold in the past will continue to sell regardless of training
Outlet Ownership	Corporations will sell at the highest rates, followed by partnerships and then by individuals	Corporations will sell at the highest rates because prior literature has identified this as a pattern
Prior Sales to Minor Violations	Prior violations will deter future violations	Prior violations will predict future violations
Prior Non-Sale to Minor Violations	Prior violations will deter future violations	Prior violations will predict future violations
Prior Sales to Minor Official Warnings	Prior warnings will deter future sales, but at a lower rate than violations	Prior warnings will predict future violations
Prior Warnings for Non-Sale to Minor Violations	Prior warnings will deter future sales, at a lower rate than sale to minor warnings	Prior warnings will predict future sales
Prior Sales to Minor Citizen Complaints	Prior complaints will deter future sales, but at a still lower rate than warnings or violations	Prior complaints will predict future sales
Prior Complaints for Non-Sale to Minor Violations	Prior complaints will deter future sales, but at a lower rate than sales to minor related enforcement	Prior complaints will predict future sales
Day Of Week	Theory provides no prediction	Evening hours will have the highest sales rates
Time of Day	Theory provides no prediction	Friday and Saturday will have highest sales rates

Table 3.4
Competing Theoretical Framework
Hypotheses Suggested by Competing Theories
Using Individual Seller as the Unit of Analysis

	EXPECTANCY THEORY OR DETERRENCE THEORY	CRIMINAL PROFILING OR PERSISTENCE THEORY
INDEPENDENT VARIABLE ASSESSED		
Seller Status: Is Seller Owner, Partner, Stockholder or Employee	Owners will sell at lowest rates, followed by partner, stockholder and employee	Those who have a history of selling will continue to sell to minors
Is Non-Ownning Employee Manager or Clerk	Managers will sell at lower rates than employees	Those who have a prior history of selling will continue to sell, regardless of status
Is the Seller Full Time or Part Time	Full Time employees will sell at a lower rate than Part Time Employees	Those who have a prior history of selling will continue to sell, regardless of status
Seller's Tenure at Outlet Checked	The longer one has been employed at an outlet, the lower the sales rate will be	Tenure will have no association with selling to minors
Seller's Tenure in Alcohol Industry	The longer one has been employed in the industry, the lower the sales rate will be	Tenure will have no association with selling to minors
Seller's Attendance at ALE BARS Training	Those attending BARS will sell at a lower rate than non-trained sellers	Training will have no association with selling to minors
Seller's Attendance at Non-ALE Training	Non-ALE training will have a negative association with selling, but will be less than ALE Training	Training will have no association with selling to minors
Seller's Gender	Gender will have no association with selling to minors	Male sellers will sell at a higher rate
Seller's Age	Older sellers will sell at a lower rate	Age will not be associated with selling to minors
Prior Charge of Selling to a Minor	Prior charges will serve as a deterrent to future sales	Prior charges will predict future sales
Does Seller Consume Alcohol	Will have no predictive value	Will have no predictive value

DEPENDENT VARIABLE

There is only one dependent variable employed in this research. This variable is the Sale of Alcohol to Underaged Persons. This is a dichotomous variable, taking on the values of sold to the minor in the posttest or refusing to make the sale at the posttest. This variable is used regardless of the unit of analysis.

DATA ANALYSIS PROCEDURES

The effect of our independent variables on the dependent variable will be measured first by use of crosstabulations. The independent variables listed above will be examined by crosstabulation to determine if they are associated with changes in the dependent variable, here the sale of alcohol to minors. The deterrent effect of the compliance checks will also be assessed by using repeated measures ANOVA to analyze the differences between the pretest and posttest compliance checks. Next, these variables will be combined to form multivariate models, which will be analyzed by means of logistic regression modeling to determine what combined effect, if any, they may have on the dependent variable. It will be interesting to see if those individual independent variables that have a significant association with the dependent variable in the crosstabulations are also found to be significant in the multivariate logistic regression models. If a specific independent variable significantly affects the dependent variable in the crosstabulations and does not in the regression model or vice-versa, this would be indicative of an interaction effect caused by another, intervening, variable.

QUESTIONNAIRE METHODOLOGY

The two brief surveys used in this research were employed to produce demographic and statistical data. The first, the Secret Shopper Survey, was completed at the same time that the posttest was carried out. The survey was administered by the ALE agent assigned to supervise the undercover minor and was completed by this agent as soon as the compliance check was

conducted. The questions on the survey were read to the seller and the agent recorded the answers. The outlet employee was informed that he or she was not required to answer the questions and if they chose to answer, their responses would be kept confidential.

The Outlet History Survey was completed by the office assistants in the 12 ALE district offices after the posttest had been conducted. The information was compiled when the office assistants manually searched the outlet files maintained in the ALE district offices. These files contain all the information needed to complete the surveys. These files are set up when the initial application for ABC permits is made and they contain a chronological history of all ALE actions pertinent to the outlet. They are actively maintained as long as the ABC permits are valid.

CONTROL

Physical control for this research was attempted by the random sampling used in the selection of the outlets that were subjected to the pretest. Statistical control was implemented by attempting to hold competing hypotheses constant. This was done by identifying those variables which may have had an effect on the dependent variable. Another reason to identify, measure and explicate threats and to control for them is to further explore the relationships hypothesized and to determine if some other factors could have affected the dependent variable. The identification and use of control variables may and probably will cause some of our original research hypotheses to be modified (Vasu 1999a).

PURPOSE OF DATA ANALYSIS

To ascertain whether compliance checks exert a deterrent effect on sales to minors, we will compare pretest and posttest results, examining whether having “sold” to the minor in the pretest had any effect on whether the seller “sold” in the posttest. We will also assess whether being checked in the pretest and not selling had any effect on future sales as measured by the posttest.

The intervention used here is the compliance check itself and it was administered at the same time as the pretest. To check for validity, we included a control group of outlets in the posttest which were not checked during the pretest. As no survey was allowed by ALE management at the pretest we will be measuring the general deterrent effect the pretest compliance check had on the outlet as an organization. As stated earlier, since the sellers were not arrested and the licensed outlet was not sanctioned administratively, we can expect a lower deterrent effect to be present here than if the enforcement and administrative action had been taken.

The analysis of the deterrent effect of the compliance checks will be conducted first by use of simple crosstabulations. This analysis will examine the differences between those outlets which sold at the pretest and posttests. While not specifically necessary, those outlets included in the study as a control, will be included in one of the crosstabulations. Crosstabs will be used to give the reader a feel for the differing distributions of the cases in the pretest and posttest. This analysis will serve as a foundation for the most important analysis of this issue, which is Repeated Measures Analysis of Variance (ANOVA). This is the appropriate statistical procedure for comparing pretest and posttest differences between members of the same sample. In other words, it is appropriate to use this procedure when looking at the same cases at different points in time (University of Texas, Author Anonymous, 2001, 1).

To attempt to identify those factors that seem to contribute to the propensity of individual sellers and outlets to sell to minors, we will begin with simple crosstabulation analyses between the dependent variable and each of the independent variables to ascertain which of the variables has a significant explanatory value. Crosstabulations, which are also known as contingency tables or bivariate tables, are the appropriate statistical procedure for exploring the relationship between two quantitative variables (Agresti and Finlay, 1997, 248). Crosstabulations are appropriate when both the dependent and independent variables are categorical, as are the majority of those of

interest here. In this form of analysis: “The categories of each variable are laid out in the form of a square...containing rows (representing the categories of one variable) and columns (representing the categories of the second variable). The entries that occur in each cell will be the frequencies representing the number of times that each pair of values... occurs in the sample” (Newton and Rudestam, 1999, 438).

Crosstabulations are a statistical method for detecting and describing associations between two categorical variables. There is an association between two variables when distribution of the dependent variable changes in one way or another as the value of the independent variable changes (Agresti and Finlay, 1997, 248-249). By convention one constructs these tables so the independent variable is on the top (columns) and the dependent variable is at the side (rows). When data is entered into the crosstabulation the analyst is able to judge how the cases are distributed in each of the cells, this after the values have been standardized by converting the figures to percentages, thereby giving the researcher a sense of whether a relationship exists between the two variables (Newton and Rudestam, 1999, 43 - 44). Also, as per convention we will report the chi-square statistic for test of significance and the “p-value” associated with the chi-square (Newton and Rudestam, 1999, 149).

While it is important to calculate and report the significance of the association of the variables in this research, it has been recognized that an association between two variables can have statistical significance but no practical or substantive importance (Vasu, 2000). Conversely, it is also possible for the chi-square test and p-values not to show a high degree of statistical significance and the output of the crosstabulations still be substantively important to the research. In this case, the percentages of cases that fall within certain categories can be reported and discussed.

In our construction of statistical models we will use logistic regression analysis. While we will have already examined the individual independent variables and assessed their individual significance, the models will also take into account interaction effects between the variables. Due to interaction effects, we may find a variable to be non-significant by itself, but significant when combined into a model. The reverse may also be true. Interestingly enough, logistic regression analysis has been used in similar studies reported in the literature review, for instance Grube's 1997 study of alcohol sales to minors in California and South Carolina (1997). The data produced in this study easily fit this procedure as logistic regression analysis is the appropriate method to use when the dependent variable is a dichotomy, (Dependent variable is sale of alcohol to minors, which takes the values sold to minor or did not sell to minor.) and the independent variables are continuous or categorical or both, which all of ours are. Logistic regression estimates the probability of a certain event occurring. This is what our study is attempting to accomplish, to predict whether a given outlet will sell to a minor, based on the compliance checks (www.spss.com/datamine/logistic.htm, 1999, 1).

We use logistic regression because when dealing with a dichotomous dependent variable, as we have here, there will be a heteroscedastic distribution of residual error, which violates a major assumption of regression analysis. Also, a dichotomous dependent variable will not be normally distributed. This will lead to misleading Ordinary Least Squares (OLS) estimates of the sum of the squares, which mean that significance tests and the standard error of regression will be wrong. Another problem is that when we have a dichotomous variable its values are labeled either 0 or 1. Linear regression allows estimates that are below 0 and above 1. Log-linear methods (which include logistic regression) are able to handle non-linear relationships where linear regression methods are not (Garson and Vasu, 2000, 26). Another reason for using logistic regression is that its assumptions are relaxed when compared to OLS regression.

This is because logistic regression:

Does not assume a linear relationship between independent and dependent variables.

Does not assume that the dependent variable is normally distributed.

Does not assume the dependent variable is homoscedastic for each level of the independent variable.

Does not assume normally distributed error terms.

Does not require interval independent variables.

Does not require unbounded independent variables (Vasu and Garson, 2000, 26).

However, one must be careful that when reporting the results of logistic regression to convert its findings to probabilities. This makes the findings comparable across independent variables and "...allows the reader the freedom to determine if the data reject or support the research hypothesis" (Newton and Rudestam, 1999, 293). Also, examining the data in terms of probabilities speaks to the notion of the findings being substantively significant.

Logistic regression is the appropriate statistical analysis to use in this particular research project because we are exploring which of the measured independent variables predict the sale of alcohol to minors. One of the major purposes of logistic regression is in the area of prediction. In this portion of the research we are more concerned with theory testing than with theory construction. This is because there has been limited prior research in this area, so we are not concerned with testing already espoused theory, but in identification of those independent variables that will allow us to predict, either individually or through the interaction effects of a multivariate model, whether an individual seller or a specific sales outlet will sell to a minor when presented such an opportunity. The existing research provides the foundation for inclusion of most of the independent variables used herein; however, no prior research has been discovered

that attempts to construct comprehensive models for the prediction of the sale of alcohol to minors (Menard, 1995, 54-55).

For the purpose of predictive research, the appropriate procedure is stepwise logistic regression, specifically backward elimination. This is because, with the research conducted and reported herein, there is no concern with causality. We seek only to identify a model containing predictors (independent variables) that provide an adequate prediction of selling alcohol to minors. We use backward elimination because one of our independent variables may exhibit a statistically significant predictive effect only when another variable is held constant, i.e. a suppressor effect.

CONCLUSION

In this chapter we have explained the methodology employed to produce the data used in this study. We began by describing the quasi-experimental research design in detail. We then turned our attention to our sampling design. We next listed and described the variables to be studied in the research and presented our theoretically based predictions as to what we believed the data analyses will show. Physical and statistical control issues were explained next. A detailed discussion of how those threats to internal and external validity affected this research was presented, after giving a definition of each individual threat. Those data analysis procedures to be employed in the analysis in the next chapter were listed and reasons for their use were explicated.

CHAPTER 4

ANALYSIS OF THE DATA: THE DETERRENT EFFECT OF THE COMPLIANCE CHECK STRATEGY AND AN EXAMINATION OF THOSE VARIABLES ASSOCIATED WITH THE ALCOHOL SALES OUTLETS AS THE UNIT OF ANALYSIS

INTRODUCTION TO THE OVERALL DATA ANALYSES

This analysis will include both individual and multivariate analyses of variables associated with several distinct units of analysis and will also compare pretest and posttest data to examine the deterrent effect of compliance checks. For this reason we present this information in what we believe will be a more coherent framework. First, we will present the variable or model of interest. Secondly, we present the actual findings of the data analysis. Third, and where we depart from convention, we will discuss in detail what the data analysis findings mean to our study. Here, our findings will be compared to those of past studies, if any and discussed in light of the theoretical framework set out in Chapter Two. Finally the implications of the data analysis findings to the areas of sales to minor law enforcement, alcohol seller training and staffing and training by the alcohol industry will be discussed as appropriate.

Our research objectives, as set out early in this paper, are:

To assess the deterrent effects of the compliance check strategy on future sales of alcohol to minor violations.

To identify and examine alcohol sales outlet characteristics that may explain and predict a propensity to sell alcohol to minors. To construct and analyze multivariate models, based on the individual characteristics to attempt to predict which outlets have a propensity to sell alcohol to minors.

To identify and examine individual seller characteristics that may explain and predict a propensity to sell alcohol to minors. To construct and analyze multivariate models, based on the individual characteristics to predict which sellers will have a propensity to sell alcohol to minors.

To identify a pattern of days of the week and times of day when alcohol sales to underaged persons occur, to better utilize scarce enforcement resources and to serve as a guide to the alcohol industry as when to schedule certain classes of employees based on the above described profile.

To assess, based on the data analysis, if sales to minor offenses are independent of other ABC offenses and other types of crime.

To suggest, based on conclusions reached from the data, public policy changes in the area of youth access to alcohol.

Given these objectives, our research has been subdivided into sections corresponding to the goals. A separate section will explicate the analysis of the data as it pertains to each unit of analysis. Due to the number of variables to be discussed and in light of our departure from convention by fully discussing the results along with the presentations of the analyses, we have chosen to divide the reporting of these analyses and their corresponding discussions into two chapters. This division serves to underscore the differences between the units of analysis and provides the foundation for discussing the multivariate models to be discussed after the individual variable analyses are presented.

INTRODUCTION TO THIS CHAPTER

The focus of this chapter is the unit of analysis of the licensed retail alcohol sales outlet. The data analysis dealing with the individual seller as unit of analysis will be presented in the next chapter. In this chapter we will also describe the comparison and subsequent analysis of the pretest and posttest data to measure the deterrent effect, if any, of the compliance check itself, a major component of this research. The second section of this chapter will present the detailed analysis of each of the outlet-specific variables as compared with our dependent variable of the sale of alcoholic beverages to minors. We will include the analysis and discussions of the implications of the findings of the day of week and time of day variables at the end of the outlet specific variable section. While this is a discrete objective of the research, these variables best fit within the outlet-specific multivariate models. The chapter will conclude with our attempt to construct multivariate models to attempt to predict which specific outlets or classes of outlets will be more predisposed to sell to minors in the future.

DETERRENT EFFECT OF THE COMPLIANCE CHECK

Does the intervention of conducting an undercover compliance check deter the likelihood of a sale to minor violation occurring during the posttest? It is important to begin this section with a caveat. That caveat is that deterrence theory, as discussed in our literature review holds that for general or specific deterrence to succeed the act or omission that one wishes to deter must result in severe, swift and certain consequences. Due to the research design and grant requirements no criminal or administrative action was taken against an individual seller or the alcohol outlet as a result of the compliance checks conducted as a part of this research. Because there were no severe, swift or certain consequences to either of our major units of analyses, we expect that if any deterrent effect is discovered it will be tempered by this lack of sanctions. In a “real world” setting the seller would be cited to court, and upon conviction, be required to pay a \$250 fine, \$90 court cost, perform 25 hours of community service, pay a \$100 fee for the privilege of doing the

community service and be excluded from working at any location that sells or serves alcohol for two years or from obtaining a new ABC permit for two years. Similarly, the permit holder would be cited administratively and if found responsible would suffer a civil penalty of from \$800 to \$5,000, depending on the outlet's past violation history. The ABC Permits could also be suspended or revoked. Based on these possible outcomes, one can expect that a "real world" compliance check should have greater general and specific deterrent effect on sales to minors than those conducted here. Whatever the findings, a major purpose of this research is to explore potential deterrent effects of compliance checks and will also serve as a foundation for future research.

Results of Deterrence Tests

The question of the deterrent effect was addressed by conducting both a set of crosstabulation analyses and by using repeated measures analysis of variance (ANOVA). The second technique is the appropriate statistical method to employ when comparing the same cases over time and when attempting to assess what effect an intervention has on the posttest. The cases employed in this research are the individual alcohol sales outlets, not individual sellers. This is because we were unable to determine whether the seller present at the posttest was the same one checked at the pretest. Due to the transient nature of alcohol sellers and the inability to control for time of day and day of week differences between the pretest and posttest, the chances of the same seller being checked in the pre and posttests would probably be quite small; therefore, if a deterrent effect is found, it will most probably be due more to general than specific deterrence.

Table 4.1
Comparison of Sales to Minor at the Posttest
With Sales to Minors at the Pretest

Was a sale made at Posttest	No Sale at Pretest * (%)	Sale Made at Pretest * (%)	Totals N
No Sale at Posttest	(77.1%)	(67.5%)	187
Sale Made At Posttest	(22.9)	(32.5)	70
Total	(100)	(100)	
N	140	117	257

N = 257 ; $\chi^2 = 2.977$; $df = 1$; $P = .084$; $\Phi = .238$; $P = .084$

* This table includes only those outlets that were checked at the pretest and again checked at the posttest.

Overall Pretest Sample Results

There were 500 outlets checked during the pretest. Of that number 135 sold to the minor and 365 refused to sell. This resulted in an overall sales rate of 27.0%. Due to uncontrollable circumstances such as outlets going out of business, being closed when the posttest check was attempted, or the outlet being too busy to be checked as established by the methodology, only 257 of the original 500 checked in the pretest were again checked at the posttest. As the alcohol business is volatile and unpredictable, these numbers are not surprising.

Overall Posttest Sample Results

In the posttest there were a total of 469 outlets checked. Of those 257 were checked pretest and 212 constituted the control group described in the methodology section. This control group was included to control for the threat to validity of history. The total sales rates, taking into account the full 469 outlets checked, was 25.6%. When compared to the overall pretest sample of 27.0%

we feel confident stating that at the time of this experiment that approximately 26% of licensed alcohol sales outlets in North Carolina would sell alcohol to a minor.

Table 4.2, below, duplicates the information presented in Table 4.1 with the addition of the results of the control group. Our original intent was to include a control group of 100 outlets but due to uncontrollable circumstances it actually resulted in a control group of 212 outlets. The control group sales rate was 23.6%, which is consistent with the sales rates of the pre and posttests.

Table 4.2
Comparison of Sales to Minor at the Posttest
With Sales to Minors at the Pretest, Including Control Group

Was a sale made at Posttest	No Sale at Pretest * (%)	Sale Made at Pretest * (%)	Control Group (%)	Totals N
No Sale at Posttest	(77.1)	(67.5)	(76.4)	349
Sale Made At Posttest	(22.9)	(32.5)	(23.6)	120
Total	(100)	(100)	(100)	
N	140	117	212	469

*N = 469 ; $\chi^2 = 3.913$; *df* = 2; *P* = .141*

* The Pretest portion of this table includes only those outlets that were checked at the pretest and again checked at the posttest.

Crosstabulation Analysis of Pretest and Posttest Sales

To examine the potential deterrent effect of the pretest compliance check on the posttest sample, we begin with simple crosstabulation analyses of the rates of sales and refusals in the pretest and posttests. In Table 4.1 we present the analysis of pretest sale or no-sale versus posttest sale or no-sale (N = 257). We see that the association is not statistically significant (Chi-square – 2.297; *df* – 1; *p* = .084; Phi – .108; *p* = .084). Looking at these frequencies we found that that 108

outlets refused sales both pre and posttest. Seventy-nine of the outlets that sold pretest refused to sell posttest. Thirty-two outlets that refused to sell in the pretest “failed” by selling at the posttest. A total of 38 outlets sold in both pre and posttests.

Of the 140 outlets that refused to sell in the pretest, 32 of them sold in the posttest. Restated in relative frequency terms, 22.9% of pretests refusals resulted in posttest sales. Of the 117 outlets that sold in the pretest, 38 again sold at the posttest, or relatively speaking, 32.5% of pretest “failures” again “failed” in the posttest. When these relative frequencies are compared with the overall sales rates of the pretest which is 27%; the overall sales rate of the posttest which is 25.6%; and the control group sales rate of 23.6%, we conclude that the pretest compliance checks did not have a statistically significant or substantively important deterrent effect on sales to minors. As one can see, the largest frequency spread is about five percent, which due to the possibility of sampling error is not a significant difference.

Anomalous Data

When examining only those outlets checked in the pretest and posttest we detected an anomaly. As said above the overall sales rate, based on several separate analyses, was within a few percentage points of 26%. However, those 257 outlets checked both in the pre and posttests, which can be viewed as a sample of a sample, exhibited a pretest sales rate of 47% and a posttest sales rate of 26%. We are at a loss as to explain why the pretest sample of those outlets sold at a 20% higher rate. As all the other sales rates are similar, we recognize the 47% sales rate as being anomalous and make no conclusions based on it. If the pretest sales rate had been within acceptable limits of the overall 26% rate, then it would have strengthened our conclusion that compliance checks, without normal sanctions attached, had no deterrent effect.

Theoretical Implications

Our findings here are surprising. Even given the lack of sanctions associated with the experimental compliance checks, we posited that some deterrent effect would be found. From a deterrence theory standpoint we should have, as we predicted, seen some deterrent effect, even if muted by the lack of sanction. We also see that of those outlets that refused to sell in the pretest, 22.9% sold in the posttest. This leads to the conclusion that the pretest “successes” had no further deterrent effect here, as was postulated by our attempt at extending Stafford and Warr’s reconceptualization of deterrence theory.

On the other hand, based on criminal profiling, the results are not surprising. The findings uphold the idea that patterns exist in crimes, even in the sale of alcohol to minors, which we posited as being different from other crimes. While, as we may see when analyzing the independent variables, specific individuals and outlets may not be able to be profiled as being potential offenders, the overall patterns tenet of the theory holds true here.

Repeated Measures ANOVA

We included a repeated measures ANOVA test of the data as it is the appropriate test to compare the differences in one group over time after the intervention has been applied. It is appropriate for use here as we are measuring the differences in rates of sale to minors at two points in time for the same cases. Unfortunately, as we concluded above, that group of outlets that was checked at the pretest and posttest was found to have an abnormally high sales rate at the pretest and due to this problem any findings from an analysis that specifically includes only this group, as our repeated measures ANOVA analysis did, would be suspect. We did; however, conduct the analysis and as we suspected, found it to provide the same misleading information as the crosstabulation analysis of this group.

Comparisons with Prior Research

Jones-Webb, et. al. (1997) in studying the deterrent effect of compliance checks said that even conducting a small number of checks in a community and publicizing them will act as a deterrent to future sales. Preusser and Williams (1991) found that the lowest sales rates occurred in those areas that had been recently subjected to compliance checks. Finally, Wagenaar (2000) spoke to the effectiveness of compliance checks in reducing minor sales in Minnesota and New York. As our findings are not consistent with the literature, based on the Jones-Webb, et. al. study, we are lead to question if publicizing the use of compliance checks could have led to a different result.

Implications for Sales to Minor Reduction

Examining our findings in light of profiling theory, we see an important argument to continue the use of compliance checks. If outlets continue to sell to minors over time, conforming to a pattern, then law enforcement can use compliance checks to target enforcement at those outlets that seem to persist in violating the law. Even if compliance checks have no direct deterrent effect, given that there may be fundamental differences in sales to minor offenses and other types of crime, they may still have utility as a device to identify those outlets and sellers who are violating the sales to minor laws. They also present an opportunity to interact on a positive basis with permittees when sales are refused and provide a vehicle by which to offer training.

Having completed the discussion of the analysis of the deterrent effect of compliance checks. It is now time to turn our attention to the analysis of those individual variables or characteristics identified as potentially being associated with alcohol sales outlets' propensity to sell to minors.

EXAMINATION OF OUTLET-SPECIFIC VARIABLES: Contingency Table Analysis

In an earlier chapter we set out the research hypotheses which this study would address, presented the literary basis for their inclusion and our theory driven predictions. To test our

hypotheses, we conducted crosstabulation analyses on each, comparing them with our dependent variable. These analyses were conducted to assess whether each of these variables, independently, had a statistically significant effect on our dependent variable.

The reader will see that many of the bivariate relationships were found not to be statistically significant; however, each of the independent variable analyses do provide some important explanatory information, which is often counter to the conventionally accepted wisdom.

Previous Sales to Minor Violations Reported to the ABC Commission

This variable, as does the next variable examined, involves ABC Violations. As noted in the introductory chapter, a violation refers to a report being submitted to the North Carolina ABC Commission reporting that a transgression of ABC statutory law or Commission administrative rule has been committed. The receipt of this report begins an administrative process that may result in sanctions, whether a monetary penalty or some period of suspension of the ABC permits, that can be seen to have a negative outcome to the permit holder.

This variable was measured to address the following question: Is the likelihood that an alcohol sales outlet will sell to a minor associated with that outlet having had a previous violation(s) for selling to minors? Our hypothesis, following criminal profiling theory, is that there will be a positive association between an outlet's propensity to sell to minors in the future and having a prior history for sales to minor violations. Along with its theoretical basis, this hypothesis is also grounded on our review of the literature. First, Grube's (1997) research reports that prior enforcement does not have a significant effect on whether an outlet sells to minors in the future. Wolfson and Toomey (1996) conducted a survey of alcohol sales outlet managers which reported that those outlets that had been cited for selling to minors in the past were more likely to sell to minors in the future. They attributed this phenomenon to consistency over time, or as we would

argue it is the persistence tenet of criminal profiling. The literature in this area is however, divided. Wolfson, et. al. reported that those outlets that had been recently cited for selling to minors, sold to minors at a lower rate in the compliance checks that were a part of their research than those that had no history of enforcement, thus making a deterrence argument (Wolfson, Toomey, Forster, Wagenaar, McGovern and Perry, 1996).

While it may seem that these findings contradict what would be expected in light of deterrence theory, actually it does follow general deterrence theory's tenets as it relates to sales to minor enforcement. Deterrence theory speaks to deterrence being a product of swift, certain and significant punishment. Given this, one would expect that those outlets that have been cited recently would feel such a deterrent effect, but because of high employee turnover, outlets cited in the non-recent past would not have any "memory" to institutionalize. Given the foundation laid by prior research, now let us turn to our specific findings.

Table 4.3
Comparison of Sales to Minor at Posttest
and History of Having a Prior Sale to Minor Violation

Was a sale made at Posttest	No Prior STM Violation (%)	Prior STM Violation (%)	Totals (%)
No Sale at Posttest	(78.2)	(72.7)	(76.9)
Sale Made At Posttest	(21.8)	(27.3)	(23.1)
Total	(100.0)	(100.0)	(100.0)
N	248	77	325

N = 325; $\chi^2 = 1.001$; *df* = 1; *P* = .457; *Phi* = .055; *P* = .317

Table 4.3 presents the crosstabulation analyses of prior sales to minor violations and the sale to minors at the posttest compliance check. This table examines the effect of having a history of sales to minor violations. During the analysis, we initially conducted a crosstabulation analysis reflecting the actual number of prior sale to minor violations that a licensed outlet had received in its history. However, this analysis was found to be non-significant, most probably due to the small number of outlets having multiple violations. Based on this finding, it was decided to do the analysis on a yes or no only basis. Looking at this crosstabulation table the first thing one notices is that the results are not statistically significant (Chi-square 1.001, $df = 1$, $p = .457$; Phi = .055, $p = .317$). We do see that there is about a six percentage point increase in sales to minors for those outlets that had a prior sale to minor violation. Substantively, this finding lends some support to our hypothesis, but it is not statistically significant. Theoretically we see that prior violations for selling to minors do not deter future violations. While we find some support in using this information to support profiling, it is weak.

The practical importance of this analysis is that if one is attempting to use a history of prior sales to minor violations as a predictor of future sales, whether for enforcement or training, it is not a very powerful predictor. If ALE used the fact that an outlet had a prior sale to minor violation as the basis for preventative enforcement, such as surveillance or compliance checks or for preventive training, the selection based on this criterion would do no better than random selection of any other outlet.

Violations for ABC Offenses other than Sales to Minor Violations

The prior section specifically dealt with a prior ABC violation for selling alcohol to minors. Here, we take this characteristic further by analyzing the effect that having a prior violation for an offense other than sales to minors will have on future sales to minors. Other prior empirical studies have focused only on whether an outlet has a prior sale to minor violation. Here, we want

to examine the effect that any proclivity to violate the ABC laws has, rather than specifically assessing if one sale to minor violation begets another. Restated, we wish to assess whether committing one type of violation increases the potential for committing a different type, here sales to minors. The hypothesis associated with this variable is that there will be a positive association between an outlet's propensity to sell alcohol to minors and a prior history of the outlet being cited for other, non-sales to minor, ABC violations. As with prior sales to minor violations, we base our hypothesis on the persistence or patterning tenet of profiling. Deterrence theory, on the other hand, would predict that any type of enforcement that has the potential to generate negative outcomes for the seller or the outlet itself should deter future ABC violations of which selling to minors is included. This assumption would, of course, be based on those sales to minor crimes being rationally conceived and executed.

This variable was also included in the analysis because when examining the data on sales to minor violations we discovered that those violations were only a small percentage of the total violations reported to the ABC Commission. We included this variable to increase the chances that prior enforcement, in whatever fashion, would be seen as a statistically significant predictor of, and a deterrent to, future sales to minors.

Table 4.4
Comparison of Sales to Minor at Posttest
and History of Having a Prior ABC Violation for Other than a Sale to Minor

Was a sale made at Posttest	No Prior Non-STM Violation (%)	Prior Non-STM Violation (%)	Totals (%)
No Sale at Posttest	(76.2)	(85.0)	(76.8)
Sale Made At Posttest	(23.8)	(15.0)	(23.2)
Total	(100.0)	(100.0)	(100.0)
N	303	20	323
<i>N = 323; $\chi^2 = .808$; $df = 1$; $P = .369$; $Phi = -.050$, $p = .369$</i>			

Here again, we ran the initial analysis based on the number of violations in the outlet's history. The outcome, like that of sales to minor violations previously, came out non-significant, probably also due to the small number of outlets with multiple violations. Based this outcome, we performed the analysis as a yes or no, the results of which are presented in Table 4.4. This relationship turned out to be non-significant as well (Chi-square .808, $df = 1$, $p = .369$; Phi -.050, $p = .369$). Given the small number of outlets with non-sale to minor violations (N = 20), we would not have expected a significant finding. With such low numbers, we are reluctant to attempt to make any substantive finding based on this analysis.

Official Warnings for Sales to Minors

The inclusion of this variable was spurred by the criminal profiling literature. Here, we expect a past action to predict a similar future action. Deterrence theory, on the other hand would cause us to postulate that a past action, such as receiving a warning for sales to minors would have some deterrent effect on future sales. Deterrence theory may not be as relevant here since the

issuance of an official warning does not carry the requisite negative consequences required for deterrence theory to attach.

Our hypothesis is that there will be a positive association between an outlet's propensity to sell alcohol to minors and a having prior history of sales to minor official warnings. This is based on the theory of profiling for basically the same reasons as above in examining sales to minor violations, that prior offenses predict a pattern of future offenses. The question that this variable seeks to answer is: Is the likelihood of an outlet committing a sale to underage person violation associated with a previous official warning(s) for sale to minors?

Table 4.5
Comparison of Sales to Minor at Posttest
and History of Having an Official Warning for Sale to Minor

Was a sale made at Posttest	No Prior STM Warning (%)	Prior STM Warning (%)	Totals (%)
No Sale at Posttest	(76.4)	(86.7)	(76.9)
Sale Made At Posttest	(23.6)	(13.3)	(23.1)
Total	(100.0)	(100.0)	(100.0)
N	309	15	324

N = 324; $\chi^2 = .852$; $df = 1$; $P = .356$; $\Phi = -.051$; $p = .356$

As with the previously discussed variables, the outcome of the crosstabulation analysis proved to be non-significant (Chi square .852, $df = 1$, $p = .356$; $\Phi = -.051$, $p = .356$). This may be attributed to the fact that only 15 of those outlets included in the sample had a prior sale to minor warning. When one examines the percentages of those outlets who had prior sales to minor warnings and those that did not, against whether they sold to the minor in the posttest we observe an

interesting outcome. The finding here is directly opposite of that hypothesized. Those outlets that had a prior warning for selling to minors had a sales rate at the posttest of 13.3%. Those that had no prior warnings sold at a 23.6% rate, almost twice the sales rate of those that had prior sales to minor warnings. Unfortunately, with an “N” of only 15 outlets with prior sales to minor warnings, the findings are not statistically strong enough to allow us to set out any subjective findings. This was disappointing because a warning can be seen as a positive, proactive enforcement tool. The issuance of a warning recognizes that a violation occurred, but sends the message that law enforcement is willing to work with the offender to bring about compliance rather than taking criminal or administrative action.

The implications of this finding for enforcement is that warnings may have a deterrent effect and should be used as a basis for discussions of sales to minor reduction strategies with permittees and employees and as a platform from which to offer training.

Official Warnings for ABC Violations for Other than Sales To Minors

Our search of the literature found no prior study that explored this variable. It was included in this research because it is a natural extension of the prior variable of official warnings for sales to minor. It reflects a similar tack of working with industry members to bring them into compliance with the ABC Laws and rules. It also relates to the long held belief that those outlets that are predisposed to commit violations, as evidenced by having received an official warning and as predicted by the profiling theory literature, will continue this predisposition into minor sales in the future. We include the variable due to an intuitive and experientially based belief that it may be a valid predictor of future sales. In other words based on profiling theory and its teachings that crimes follow specific patterns, we believe that prior indiscretions may have predictive value in the future. Here again, this seems to run counter to deterrence theory; however, strictly following the tenets of deterrence theory it does not, as a warning is only a formal rebuke for having committed

an offense, carrying no sanctions. This does not allow it to rise to the level necessary to effect deterrence.

Our research hypothesis, as explained above based on profiling theory, is: there will be a positive association between an outlet's propensity to sell alcohol to minors and a having a prior history of official warnings for violations other than sales to minors. The research question that this hypothesis seeks to answer is: Does having a prior warning for an ABC violation for any other offense than selling to a minor have an effect on the propensity of the outlet to sell to minors in the future?

Table 4.6
Comparison of Sales to Minor at Posttest
and Having a History of Official Warnings for ABC Violations for Other than Sale to Minor

Was a sale made at Posttest	No Prior Non-STM Warning (%)	Prior Non-STM Warning (%)	Totals (%)
No Sale at Posttest	(77.0)	(76.5)	(76.9)
Sale Made At Posttest	(23.0)	(23.5)	(23.1)
Total	(100.0)	(100.0)	(100.0)
N	257	68	325

N = 325; $\chi^2 = .10$; $df = 1$; $P = .921$; $\Phi = .006$; $P = .921$

As before, we initially conducted a contingency table analysis that included the actual number of warnings received in the past, here from a minimum of zero to a maximum of six. This analysis was also found to be non-significant, probably due to the fact that many of the higher categories had zero values. Based on this problem, we reconstructed the analysis using the values of not having a prior official warning or having a warning. The information from this analysis is

presented in Table 4.6, above. When we conducted this analysis again we found that this variable does not have a significant predicative effect on sales to minors (Chi-square = .010; $df = 1$; $p = .921$; Phi = .006; $p = .921$). This variable was non-significant as was having a prior warning for selling to minors. From this we conclude that having a prior official warning for other ABC offenses has no predictive power as to future sales to minors and the analysis results do not support our hypothesis. This finding was not surprising since it is similar to the outcomes of sales to minor violations and other violations. It does; however, go far to strengthen our hypothesis that sales to minor violations may not be associated with other types of violations. As an individual variable, it is less important to the question of who will sell to minors than having had a past warning for selling to minors. As one can see in Table 4.6, there is only a .5% difference in sales rates between those with and those without a prior official warning. So if an ALE agent in the normal course of his or her duties was attempting to predict which outlets would sell to a minor for enforcement or training purposes, the inclusion of this variable would offer no greater assistance than a guess, i.e. mere chance. The importance of this variable, as said above, is that sales to minor violations do not appear to be associated with other types of violations. This is an interesting finding and one in need of further research.

Complaints for Sales to Minors

The North Carolina Alcohol Law Enforcement Division is a complaint driven agency. The agency prides itself on responding to citizen complaints with timely and thorough investigations. That the agency is complaint driven is partially a reflection of its small size. When there are fewer than 80 ALE agents available to supervise over 15,000 licensed outlets, there must be some criterion used to trigger an investigation. As one of the main tenets of New Public Management is responsiveness to customers, it is natural for ALE to use the concerns of its customers to drive operations. For this reason this variable and the one which follows are examined in this research.

This variable has an important practical foundation for inclusion. Wagenaar and Wolfson (1994) suggest that minors seek out those locations with a reputation for selling to minors. If an outlet has a reputation among youth, it may also have such a reputation among their parents and among the law abiding sellers that are their competitors, thus precipitating a complaint being made.

Our hypothesis, that complaints will be a valid predictor of future sales to minors, is based on profiling theory. Put more formally our hypothesis is that there will be a positive association between an outlet's propensity to sell to minors and a history of complaints for sales to minors. Deterrence theory would offer no different hypothesis because no punishment would be attached to a complaint being received, because if it did, then we would be examining some other, stronger, enforcement outcome. The research question that this variable seeks to answer is: Is the likelihood of an outlet committing a sale to underage person violation associated with having prior complaints that the outlet is selling alcohol to minors?

Table 4.7
Comparison of Sales to Minor at Posttest
and the ALE Division Having Received a Complaint that the Outlet was Selling Alcohol to Minors

Was a sale made at Posttest	No Prior STM Complaint (%)	Prior STM Complaint (%)	Totals (%)
No Sale at Posttest	(77.0)	(75.7)	(76.9)
Sale Made At Posttest	(23.0)	(24.3)	(23.1)
Total	(100.0)	(100.0)	(100.0)
N	287	37	234

N = 324; $\chi^2 = .032$; $df = 1$; $P = .857$; $\Phi = .010$; $p = .857$

As before, when we began to examine this variable, we constructed a contingency table including the number of complaints an outlet file contained. Only a small number of outlets had multiple complaints for selling to minors so the outcome of the analysis was non-significant. As we have done with prior variables, we constructed a contingency table that only looked at whether or not an outlet had a prior complaint for sales to minors or not. Table 4.7 presents the results of this analysis. These findings also turned out to be non-significant (Chi-square = .032; $df = 1$; $p = .857$; Phi = .010; $p = .857$). Leaving statistical significance for a moment and looking at the substantive findings of this analysis, we find that there is also no substantive difference, relatively speaking, (1.4%) between those who had a prior complaint and those who did not and whether they sold at the posttest. It should be noted that there were only a small number of outlets having complaints included in this sample, approximately 11% ($N = 37$). However, as the sample was carefully constructed, it should be representative of the population and therefore we conclude that there are not a tremendous number of sales to minor complaints made. From this analysis we can conclude that having a prior sale to minor complaint in the outlet's file is not a valid predictor of sales to minors in the future. Stated another way, an ALE agent is just as likely to discover a minor sale violation at a randomly chosen outlet as one that has a prior sale to minor complaint.

Looking at this analysis, the question arose of how many outlets had both prior sales to minor complaints and prior sales to minor violations. In answering this question, we constructed a contingency table measuring sales to minors at the posttest and prior sales to minor complaints that controlled for whether or not the outlet had a prior violation. The findings were found to be non-significant (Chi-square = 3.165; $df = 1$; $p = .075$) it did; however, show that there were only a small number of outlets, actually 14, having all three characteristics. In our sample there were 10 outlets that had a prior sale to minor complaint, a prior sale to minor violation and did not sell at the posttest. There were 4 outlets that had a prior sale to minor violation, a prior sale to minor

complaint and also sold in the posttest. This upholds the traditional belief among ALE Agents that a small number of outlets are responsible for the majority of the violations. Given this finding, even in light of the non-significance the analyses, an ALE agent would not be acting recklessly by concentrating enforcement efforts on outlets with prior enforcement histories.

Complaints for ABC Offenses Other than Sales to Minors

We stated above that ALE is a complaint driven agency. These complaints can be for any type of ABC law, ABC Commission Rule or other criminal violation, not only sales to minors. During the design stages of this project and after deciding to include prior sales to minor complaints in the analysis, we also reasoned that an outlet having complaints for other violations could point to a predisposition to commit future violations, including sales to minors. This conclusion was based on the patterning tenet of criminal profiling theory. As no specific sanction accompanies a complaint it was not suspected that prior complaints would have a deterrent effect, especially since in some complaint investigations, those at the outlet are never informed of the complaint.

The research hypothesis that there will be a relationship between an outlet's propensity to sell alcohol to minors and having prior complaints for violations other than minor sales is based on profiling. By examining this variable we seek to answer the question: Is the fact that an outlet has a history of complaints for violations other than minor sales a valid predictor of future sales?

Table 4.8
Comparison of Sales to Minor at Posttest
and the ALE Division Having Received a Complaint that the Outlet had
Committed an ABC Violation for Other than Selling to Minors

Was a sale made at Posttest	No Prior Complaint (%)	Prior Complaint (%)	Totals (%)
No Sale at Posttest	(75.9)	(85.3)	(76.9)
Sale Made At Posttest	(24.1)	(14.7)	(23.1)
Total	(100.0)	(100.0)	(100.0)
N	291	34	325

N = ; 325 $\chi^2 = ; 1.499$ $df = 1$; $P = .221$; $\Phi = -.068$; $p = .221$

As before, we first conducted a contingency table analysis based on the actual numbers of complaints received. Some few of the outlet files contained multiple complaints; however, the number of cases was so small as to provide no predictive ability. So again, we collapsed the data into a yes-no analysis. Table 4.8 presents the analysis of this variable. As the reader can see, this analysis, like the sale to minor complaints analysis that precedes it, provides no predictive information as the results were again found not to be significant (Chi-square – 1.499; $df = 1$; $p = .221$; $\Phi = -.068$; $p = .221$). Based on these results we conclude that this variable provides no predictive information for law enforcement.

An Analysis Combining Violations, Warnings and Complaints

Before turning to the analysis of the next independent variable, it is appropriate to discuss an issue that we first raised in the introduction and discussed more thoroughly in the literature review. We indicated our belief that there was an ordinal process from receiving a complaint that an outlet had committed a violation, to that of an outlet receiving a warning for a violation not

judged sufficient to warrant a report being submitted to the ABC Commission, to a violation substantial enough to cause an administrative violation to be reported to the Commission and the seller being cited to criminal court. We postulated that these variables would have a similar progression in their explanatory value. We expected that a violation reported to the ABC Commission would be a better predictor of future violations than a warning and the warning would be a better predictor than a complaint alone. This idea can be viewed based on both theoretical sides that ground this research. First, looking at criminal profiling we would expect that past acts would show a pattern resulting in further sales being committed. As complaints are not proof that an act has occurred then we would expect that it would not to be a strong predictor of a pattern. Warnings should go further in predicting a pattern because here an actual violation was observed. Likewise, violations would be a stronger predictor as they report a crime that is serious enough to warrant prosecution. Deterrence theory would make the same prediction. A prior violation, resulting in arrest and administrative action should have a greater deterrent effect than being warned of a violation, which carries no sanction, and as those employed at outlets may not even be aware of a complaint it would have no deterrent effect.

It was found that none of these variables were statistically significant predictors of future sales to minors. When comparing these variables, the reader should also keep in mind that the overall rate of sales to minor during the compliance checks for this research was in the neighborhood of 26%. In examining those outlets with prior sales to minor violations we observed a 27.0% sales rate, not large enough to be a predictor. Moving to sales to minor warnings we found a 13.3% sales rate at posttest, which is lower than the sales to minor sales rate. This finding does seem to follow our hypothesis; however, as the number of cases is so low, we are reluctant to make any conclusions from this analysis. Basically, we can conclude that a prior history of enforcement actions, at least as licensed outlets are concerned, provides no predictive ability as to sales to minors whatsoever. The lesson to be learned is that, in the area of sales to minor enforcement or

in choosing outlets to train for sales to minor reduction, that random choice will provide as much guidance as a search through the outlet's file for past actions.

INDEPENDENCE OF SALES TO MINOR VIOLATIONS

Based on the analysis of the previous six variables, we conclude that sales to minor offenses do not fall within the purview of criminal profiling. While profiling has shown promise in violent serial crimes and is showing promise in predicting violent crime, computer crime and white collar crime, it holds no promise in predicting sales to minors. This causes us to make a qualified conclusion, to be strengthened by other analyses to follow, that sales to minor crimes may not be associated with other types of crime. A more definitive assessment will be presented in the form of the multivariate models presented at the end of this and the next chapter.

Outlet Ownership, Whether Individual, Partnership or Corporate Ownership

In North Carolina ABC Permits can basically be issued to three classes of permittees. These are individuals, partnerships and corporations. We say basically because there are several different variations of partnerships and corporations that may be issued permits; however, for the purposes of this research we will speak only to the three main categories.

Given this differentiation and the relative ease with which ownership can be determined, it seemed to be an intuitive characteristic to include in our study. There is also some foundation in the literature for its inclusion. Wagenaar in a 1991 monograph called for the study of sales to minors employing different variables. One that he specifically called for was ownership, focusing on corporate versus individual ownership. Wolfson and Toomey (1996), following Wagenaar's call, studied the relationship of type of ownership and concluded that a location having a chain affiliation (a corporation in our research) had a lower sales rate than other types of ownership. In

a study with similar findings, Jones-Webb, et. al. (1997) concluded that chain stores were less likely to sell to minors.

Another reason to include this variable is that the author's experience in this field runs counter to the generally accepted research literature in this area. It has been the author's experience, as well as that of most of the ALE agents the author has worked with over the years, that corporately owned outlets seem to sell at a greater rate than other ownership categories. This notion gave rise to the hypothesis that was put forth earlier, which was that outlets owned by corporations will have a higher incidence of sales to minors than outlets owned by partnerships, and partnerships will have a higher incidence of sales to minors than outlets which are individually owned. This hypothesis has its theoretical basis in expectancy theory and its notion of cost-benefit analysis, where we would predict that ownership would be a significant variable in any analysis. While experience would predict that corporations sell at higher rates, no one has previously examined the relative frequencies of ownership types as we do here. The research question to be answered is: Is outlet ownership associated with sales to minor rates?

Table 4.9
Comparison of Sales to Minor at Posttest
and Ownership of the Outlet

Was a sale made at Posttest	Individual (%)	Partnership (%)	Corporation (%)	Totals (%)
No Sale at Posttest	(72.2)	(70.4)	(75.2)	(74.3)
Sale Made At Posttest	(27.8)	(29.6)	(24.8)	(100.0)
Total	(100.0)	(100.0)	(100.0)	(100.0)
N	97	27	331	455

N = 455; $\chi^2 = .598$; $df = 2$; $P = .741$; $Phi = -.036$; $p = .741$

Table 4.9 presents the results of our analysis of this variable when compared to sales to minors at the posttest. As the reader can see, the results are not statistically significant (Chi-square - .598; $df = 2$; $p = .741$; Phi - .036; $p = .741$). Again, while the findings are not statistically significant, the analysis provides valuable information. Our hypothesis was not merely unsupported, but the data tended to support the alternative hypothesis suggested by the literature, albeit barely. There was a three percent difference between corporations and individuals and just over four percent when corporations were compared to partnerships. One reason that the findings are not significant is that the partnership category has only 27 cases. While this is a low number, based on our sampling methodology, it should correctly represent the population as the instance of partnerships in the overall population is much lower than the other categories.

Given the small number of cases in the partnership category, we modified our analysis to include only two categories as had been done by other researchers. The new analysis examined ownership with the categories of corporate versus non-corporate ownership. Again the results were not significant (Chi-square - .563; $df = 1$; $p = .453$; Phi -.035; $p = .453$). The non-corporate sales rate, which is a function of averaging the individual and partnership categories, was 28.2%.

While the corporate sales rate was lower in North Carolina as it was in Wolfson and Toomey's sample, it was so close to the other types of ownership as to provide no practical predictive power. Looking at the raw numbers, one finds that corporations outnumber other ownership categories in our sample by almost three to one. Based on this fact it follows that while corporations may sell at slightly lower rates than the others, their sheer numbers will account for a majority of the total sales to minor violations. This observation may explain why the author and

other ALE agents have traditionally believed that corporations sell to minors at higher rates than other ownership categories. The importance of this finding for the ALE Division is that when attempting to predict which outlet will sell to a minor in either an enforcement or training setting, that there will be no significant difference based on ownership. We can also explain why theory did not correctly predict this outcome. For our theoretical prediction to come true, we would have to know whether the seller was the owner or merely an employee, as expectancy theory would predict that an owner would sell at a lower rate. We leave this issue for now and will revisit it in the next chapter when we specifically examine sales based on the status of the individual seller.

Outlet Location, Whether Located in an Urban, Suburban or Rural Area

The variable of outlet location has a solid foundation in the literature. Wagenaar, et. al. reported in 1996 that underaged persons from small towns purchase alcohol less frequently than their large town or city peers. They conclude this is because kids in small towns are more well known by alcohol sellers. They do not say that these small town minors abuse alcohol at a lower rate than their urban peers, only that they purchase it less frequently themselves (Grube, 1997, 253). Forster, McGovern, Wagenaar, Perry and Anstine (1994) included outlet location in their multivariate logistic regression model but did not find it statistically significant in explaining sales to minors. Vaucher and Rehm (1995) used location, specifically the difference between urban and rural settings, to attempt to explain sales to minors; however, they found that sales rates did not differ in a statistically significant manner. Finally, Wagenaar and Wolfson (1995) call for further research in the area of sales to minors and state a need to examine the variable of outlet location, specifically those located in urban, suburban and rural areas.

Based on expectancy theory we would predict that rural outlet employees, using their potential for greater knowledge of their customers in any cost-benefit analysis, would sell at lower rates.

Likewise, suburban outlets would sell at lower rates than urban outlets because they too should have a greater knowledge of their customer base.

Table 4.10
Comparison of Sales to Minor at Posttest
and Whether the Outlet is Located in an Urban, Suburban or Rural Area

Was a sale made at Posttest	Urban (%)	Suburban (%)	Rural (%)	Total (%)
No Sale at Posttest	(74.0)	(71.8)	(80.0)	(74.4)
Sale Made At Posttest	(26.0)	(28.2)	(20.0)	(25.6)
Total	(100.0)	(100.0)	(100.0)	(100.0)
N	277	117	70	464

N = 464 ; $\chi^2 = 1.589$; $df = 2$; $P = .452$; $Phi = .059$; $P = .452$

Like all the variables to this point, this one does not have a statistically significant association with sales to minors at the posttest (Chi-square – 1.589, $df = 2$; $p = .452$; Phi – .059; $p = .452$). The frequencies of sales, presented in Table 4.10, do suggest that outlets located in rural areas were slightly less likely to sell to minors, at least in this sample. Where the findings depart from our hypothesis is when we look at the percentages of sales of urban and suburban outlets. We believed that urban outlets would sell at a greater rate, but found that suburban outlets sold at a slightly higher rate (2.2%). These rates are not large enough to make valid conclusions about the differences in sales rates. The substantive importance of our analysis of this variable is that location is not a statistically significant predictor of sales to minors, but one can expect those outlets located in rural areas to sell at a slightly lower rate.

The enforcement and training implications for this variable are that it should not be relied heavily upon when making enforcement or training decisions. The one important finding is that rural areas sell at slightly lower levels, but not enough lower to be excluded from enforcement.

BARS Programs Received

As was seen in the literature review, there is an extensive literature on the effect of alcohol seller training on future violations of ABC laws and regulations. This literature provided a sufficient foundation for inclusion of this variable in our analysis. On a more practical level the ALE Division has been engaged in seller training since the early 1980's. The agency has devoted a great deal of time to developing training programs and promoting this training to alcohol permittees and employees. The ALE Division has proceeded on faith for the past twenty years that the program has a positive deterrent effect on sales to minors and other violations. This research provided the opportunity to assess what, if any, effect training has on licensed outlets in the area of sales to minors. This chapter will explore the effect that training has on the licensed outlet and in the next chapter we will examine training's effect on individual sellers.

One might question why we would examine server training at the outlet level, since common sense and our own arguments would tell the reader that individual sellers do not remain at an outlet long enough after receiving training to have a substantial deterrent effect. However, it is possible that outlets that have been exposed to training may possibly have a culture that discourages violating the law. Since seller training in North Carolina, as opposed to some other states, is strictly voluntary we feel that those outlets that request and attend training are already possessed of a positive, compliant culture, and as profiling would teach us, there may be a pattern here. While the individual employee that was exposed to training may have left employment, the employee may have had the opportunity to discuss the training with other employees and our analysis of this variable seeks to explain whether or not training has affected

the organization vicariously by representatives of the outlet having received the training. The theoretical basis for this vicarious effect is general deterrence.

Our research hypothesis, that there will be a negative correlation between an outlet selling to minors and attendance at ALE BARS Training, is based on Porter and Lawler's modification of expectancy theory, in that training has the potential to modify the abilities and role perceptions of employees. The question the analysis of this variable seeks to answer is: Is the likelihood of a licensed retail alcohol sales outlet committing a sale to minor violation associated with previous ALE provided BARS training?

Table 4.11
Comparison of Sales to Minor at Posttest
and Whether the Outlet has received BARS Training

Was a sale made at Posttest	No BARS (%)	Had BARS Training (%)	Totals (%)
No Sale at Posttest	(76.9)	(77.0)	(76.9)
Sale Made At Posttest	(23.1)	(23.0)	(23.1)
Total	(100.0)	(100.0)	(100.0)
N	212	113	325

N = 325; $\chi^2 = .000$; $df = 1$; $P = .983$; $\Phi = -.001$; $P = .983$

Based on the hypothesis presented, we expected to see a much lower sales rate at the posttest of those outlets that had received ALE BARS training in the past. Unfortunately this was not the case. First, the analysis turned out to be non-significant (Chi-square - .000; $df = 1$; $p = .983$; $\Phi = -.001$; $p = .983$). When looking at the frequency distributions, we see that there is only .1% difference between sales rates of those outlets that had received ALE BARS training than those

that had not. Looking specifically at the analysis, we can conclude in our posttest sample, that having had BARS training in the past had no effect on whether sales to minors were made or not. We can also conclude that having BARS Training in the past has not had the anticipated effect on the culture of the outlet. Theoretically, the findings lead us to conclude, based on Porter and Lawler's modification of expectancy theory that BARS training, at least in the sample studied here, had no effect on the abilities and role perceptions of the employees trained at these outlets.

These findings run counter to the literature in the field. Colby (1994) found that outlets had an 80% reduction in rate of sale after having received server training in his experiment. Wolfson, et. al. (1995) concluded that server training acted as a deterrent to selling to minors and that outlets that had server training in the past had a 19% reduction in sales rates.

Our research findings were especially surprising given that seller training in North Carolina is strictly voluntary. McKnight (1993) found that when seller training was voluntary it tended to attract those who were already predisposed to obeying the law at a higher rate. In other words, those who show up for the training traditionally have been viewed as those who need it the least.

The findings that ALE BARS training had no significant effect on whether outlets sold in the posttest may be partially explained by virtue of the fact that the ALE BARS program, as presently constituted, does not contain all the elements identified by Toomey and Kilian in their analysis of effective seller training programs presented in the literature review. Using Toomey and Kilian's ten strategies evaluative framework to assess the effectiveness of the program, we find that ALE BARS training only partially addresses four of the identified categories. This issue will be further discussed in the recommendations section of Chapter Six.

Day of Week and Time of Day of Sales to Minors

Our last two variables may be viewed as being hybrids. They could easily fit within either of the units of analysis of the outlet or the individual seller or they could be identified as separate units of analysis. Regardless, we will present them here between the main two units of analysis.

The variable of time of day was included in the research design because it is perceived to be important by ALE agents and because it has been identified as being significant in at least one prior study. Traditionally, ALE agents differentiate between what they term “administrative duties” and “enforcement.” When performing administrative duties, such as writing reports, investigating ABC Permit Applications, inspecting licensed outlets for compliance with rules and conducting employment background investigations, agents routinely work 8:00 AM to 5:00 PM shifts. When performing enforcement duties, including both overt and undercover outlet surveillance, investigating complaints, conducting sales to minor compliance checks, and making routine enforcement checks at outlets, agents customarily work afternoon or evening shifts. These shifts are not officially set by policy, but have grown to be a part of the culture of the agency. On average, when an agent is planning to enforce the sales to minor laws, he or she will come to work no earlier than 3:00 PM on a weekday and either 5:00 PM or 6:00 PM on weekends.

These variables also have a basis in the literature as Forster, McGovern, Wagenaar, Wolfson, Perry and Anstine (1994) included time of day as one of their variables in their a regression analysis of contributing characteristics to sales to minors. They found that attempts after 3:00 PM were more successful than those before this time.

Our original hypothesis combined time of day and day of week. While we will explore this hypothesis after the discussions of time of day and day of week, we decided after the research was completed to separate the variables. Therefore, we modify our original hypothesis as follows: Licensed outlets will sell at a greater rate after 6:00 PM. This is based on profiling

theory, as the literature seems to point to evenings as being the most prevalent time for sales and traditionally, members of the ALE Division have subscribed to this notion. If this has been the times that sales have occurred in the past, they should persist in this trend. This variable, given its unique nature, as will also be the case with day of week, does not lend itself to be discussed in terms of deterrence theory. Therefore, we analyze the data produced as to this variable to answer the research question: Is the likelihood of a licensed retail alcohol sales outlet committing a sale to underage person violation associated with the time of day of the compliance check?

If found to be significant, this variable can be used as a device to guide enforcement and training. It can also be used by the alcohol industry in scheduling those employees found to be less likely to sell to minors at times when the most attempts to purchase are occurring.

Table 4.12
Comparison of Sales to Minor at Posttest
and Time of Day of the Attempted Purchase

Sale made at Posttest	9A-12Noon (%)	12:01P-3:00P (%)	3:01P-5:00P (%)	5:01P-7:00P (%)	7:01P> (%)	Totals (%)
No Sale at Posttest	(82.2)	(76.8)	(72.6)	(68.8)	(68.9)	(74.2)
Sale Made At Posttest	(17.8)	(23.2)	(27.4)	(31.3)	(31.1)	(25.8)
Total	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
N	73	138	106	96	45	458

N = 458; $\chi^2 = 5.219$; $df = 4$; $P = .177$; $\Phi = .107$; $P = .226$

Looking at Table 4.12 we find that the results of the contingency table analysis are non-significant (Chi-square – 7.643; $df = 5$; $p = .177$; $\Phi = .107$; $p = .226$). When looking at the percentages of the frequency distributions we observe that the time period from 5:01 PM to 7:00 PM has the

largest percentage of sales, although just barely. There is a very small difference between this time period and that after 7:01 PM. (Actually in our initial analysis, we included a category of after 9:00 PM and it had a sale rate of 60%, but as the category only had five cases, it was combined in the analysis presented.) While the percentages are somewhat different, the results of this analysis, although not statistically significant, shows that sales to minors are occurring during all the categories that we measured. Since ALE Agents have traditionally worked evening shifts when performing enforcement duties, the practical implications of the analysis of this variable is that an agent should be cognizant of the potential for sales to minors to occur at any time. It points to the need for the agency to change its culture from differentiating between administrative and enforcement duties. It also points to the need for agents to target sales to minor enforcement at earlier times. The times of sale that were observed in this research make intuitive sense when one considers the population of potential purchasers. Those that fit within the operational definition of “minor” for this study will, for the most part, either be in high school or college. They will not be available to attempt purchases until they are out of school, which will certainly be before 5:00 PM or 6:00 PM, when agents working “enforcement” traditionally begin their shift.

Since the initial crosstabulations were found to be non-significant, we decided to further collapse our time of day categories to reflect arbitrary morning (before 12 Noon), afternoon (12:01 PM to 5:00 PM) and evening (after 5:01 PM). These findings did turn out to be more significant than the prior analysis (Chi-square – 4.673; *df* – 2; *p* = .097; Phi – .101; *p* = .097). Had we not conformed to convention and held all our analyses to the 0.05 significance level and increased it to the 0.10 level, this finding would have been significant. This analysis reflected that 17.8% of the compliance checks conducted before noon resulted in a sale to minor. This is compared to 25.0% of sales in the afternoon and 31.2% of sales in the evening. When examined based on these categories, we find that illegal sales do seem to increase as the day progresses; however,

the differences are not large enough to discount the earlier times and not to focus resources on these times as well.

The significance of this finding is that, when coupled with the information provided by the outlet history variable analyses, we see a stronger case for our hypothesis that sales to minors may be independent of other crimes. If criminal profiling held true, we would have expected to see a distinct pattern as to time of sales; however, no such clear pattern appears. The practical implication of our finding is that time of day cannot be used as a predictive tool for law enforcement or as a scheduling tool for the alcohol industry.

Day of Week of the Compliance Check

The sub-hypothesis developed for this variables is that outlets will be more predisposed to sell to minors on weekends. As discussed above, this is based on profiling theory as prior empirical research and the beliefs of ALE Agents hold that more sales occur on weekends. It stands to reason that minors will attempt to purchase alcohol at a greater rate when they are out of school or work, as many are on weekends. This hypothesis has its basis in profiling's tenet of patterning. If the pattern for sales to minors has historically been on weekends, based on this theory, it should persist with most sales occurring during the weekend.

The sale of alcohol to minors is a crime that can only be committed when another person commits a crime. Analysis of prior variables seems to point to the idea that purchasing alcohol by minors is a crime of opportunity and minors will purchase when they find a location willing to sell. Therefore the crime will occur at greater rates when more minors are available to attempt purchases, which intuitively will be on weekends. Common sense would suggest if a minor wants alcohol from an off premise outlet, he or she will attempt the purchase early in the weekend so as to be assured of a ready supply of alcohol. Based on this reasoning, we hypothesized that more

attempts to purchase should be made on weekends and specifically Friday should have the largest rate of sales. It should be noted that this hypothesis was based on the beliefs of those who work in the field and not on data provided by this research.

Past experience in enforcement of the sales to minors laws points to the idea that weekends are the opportune time to purchase alcohol in North Carolina. The relevant literature on this issue seems to agree, but it is divided as to which days of the weekend that sales are most prevalent. Forster, et. al. (1994), found in their research using actors posing as minors that purchase attempts on Fridays were more successful than on Sunday. An earlier qualitative study conducted by Wagenaar, et. al. (1993), using focus groups of minors found that minors were better able to purchase alcohol on weekends, irrespective of day. Accordingly we decided to examine day of week to ascertain, at least in North Carolina at the time of our posttest, if day of the week is a valid predictor of rates of sales of alcohol to minors.

Table 4.13
Comparison of Sales to Minor at Posttest
and the Day of the Week of the Attempted Purchase

Posttest Sale	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Totals
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
No Sale at Posttest	(77.8)	(74.2)	(90.0)	(75.4)	(65.7)	(79.7)	(51.2)	(74.4)
Sale Made At Posttest	(22.2)	(25.8)	(10.0)	(24.6)	(34.3)	(20.3)	(48.8)	(25.6)
Total	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
N	63	62	40	65	70	128	41	469
<i>N = 469; $\chi^2 = 21.749$; <i>df</i> = 6; <i>P</i> = .001; <i>Phi</i> = .215; <i>P</i> = .001</i>								

The analysis of this variable is presented in Table 4.13. This relationship was found to be statistically significant (Chi-square – 21.592, $df = 6$, $p = .001$; Phi – .215; $p = .001$). The findings support our hypothesis that weekends have the greatest frequency of sales to minors. While this does support our hypothesis, validating our theoretical foundation of profiling theory and its tenet of persistence, it was surprising that Saturday had the second lowest sales rate behind Wednesday. This is especially interesting given the number of compliance checks that occurred on Saturday. (There were 128 checks on Saturday out of a total of 469). Friday had the second largest rate of sales.

The most surprising finding of this analysis was that Sunday was the largest day, with a sales rate of 48.8%. This is interesting as ALE agents *rarely work on Sundays* and when they do, the enforcement is most often directed at discovering violations of the of Sunday morning sales prohibition. While this was an unexpected finding, a proposed explanation can be put forth. This explanation is geared more toward the individual seller unit of analysis and its rationale will become more obvious when the reader begins the next chapter. Our belief is that Sundays are traditionally seen as a day of rest and owners or managers most probably do not work on Sunday. On Sundays in North Carolina alcohol cannot legally be sold until 12 noon, and therefore owners and managers may feel comfortable having less experienced employees working. Those left to work on Sundays may be seen to have the least amount of “ownership” in the outlet. (A term that the reader will become familiar with in the next chapter).

While our analysis of the data does show that the largest percentage of sales occurred on Sunday in the posttest, it should be noted that this may not be a correct representation of reality. There is one variable that we were unable to control for in this research, and the needed data to adequately control for it has not been produced. This variable is the rate at which minors attempt to purchase on Sundays, or for that matter any specific day of the week. While the potential for

selling to minors is obviously, based on our data, greater on Sunday, we do not know the rate at which minors are attempting to purchase on Sunday.

As far as the management implications from the analysis of this variable, we need the reader to take into account the inability to control for the rate at which minors are attempting to purchase alcohol on Sunday when making scheduling decisions. More research is needed before enforcement is stepped up on Sundays, as this act may cause resources to be needlessly wasted if minors are not attempting to purchase on Sundays in numbers similar to the other days of the week. Clearly the data points to the ALE Division continuing to target sales to minor enforcement on Fridays, but may speak to de-emphasizing this type of enforcement on Saturday.

Our original research hypothesis was that there would be an association between sales to minors and day of week (with sales occurring more on Friday and Saturday), and time of day (with sales occurring more between 6:00 PM and midnight.) The rationale for inclusion of these variables had already been presented in the individual variable analyses. To assess these two variables together, we conducted a crosstabulation analysis of sales to minor by day of week, controlled for time of day. The results of the combined analysis were found to be non-significant (Chi-square - 4.767, $df = 4$; $p = .312$). The first part of the hypothesis was shown to be partially correct, with Friday having the second highest sales to minor rates. Where the data depart from our hypothesis is that it shows that Saturday was the second lowest day for sales and Sunday had the largest percentage of sales in the posttest. As for times of day, during the analysis we chose to use different time categories than the hypothesis specified. This was done because no attempts to purchase occurred after 10:00 PM. However, when examining the data during the 6:00 PM to midnight time periods, we found that the highest sales rates did occur during this category. Even though only day of week was found to be statistically significant, both these

variables do provide valuable information both to the ALE Division and to the alcohol industry as to when the most sales to minor violations are occurring.

OUTLET OFFENDER PROFILE MODELS

To this point, we have examined outlet variables individually. While some of the variables provided substantive information marginally useful in predicting sales to minors, the only statistically significant variable was day of week. We now turn our attention to what was conceived as a major part of this research, the attempt to construct multivariate models to use in predicting which licensed outlets will sell alcohol to minors. The construction of multivariate models has its theoretical basis in criminal profiling, specifically the type of profiling known as offender modeling. Offender modeling is based on an evaluation of characteristic data and does not attempt to identify a specific perpetrator, but to develop a profile of the type of person who commits a particular crime. As said earlier, we are attempting to extend this tenet of profiling theory to include the licensed outlet as an organization.

While all the variables, save one, were found to be non-statistically significant, it is still possible that through interaction effects some of the variables may be found to have a statistically significant relationship in predicting which outlets will sell alcohol to minors.

In this section, we describe our attempts to construct logistic regression models that can aid in predicting minor sales. In our methodology chapter we set out the rationale for using logistic regression. As we presented a detailed description of the basic procedure there, it is not necessary to repeat it here. We will; however, explain our rationale for using Backward Stepwise Logistic Regression analysis. Backward Stepwise Logistic Regression is used when we are testing a preconceived model, as we are doing here. The “Enter” method or “Forward Stepwise Logistic Regression” is used when one is attempting to develop theory. In the procedure we are

using, we begin by including all the variables that we hypothesized as having predictive value as to sales to minors. An additional reason for using this method is that one of the requirements for using multivariate logistic regression modeling is correct model specification. This simply means that all the available relevant variables must be included in the model. This grounds our inclusion of two variables that were not initially included in our individual hypotheses.

As such, we began this statistical analysis by positing a model that included all the variables presented and discussed above, along with several others that will be described below. We then constructed a separate model that contained only those independent variables of an historical nature, such as violations, warnings, complaints and BARS training that occurred in the past.

Our multivariate models contain several variables not included in the individual variables analyses presented above. These variables, which will be discussed below, were included for data production for the purpose of follow up studies and future research that uses our current findings as a foundation. While they were not specifically included in our hypotheses and subsequently in the individual variable discussions, they were subjected to crosstabulation analysis and their significance levels will be reported when they are discussed.

Our full outlet model was constructed as defined in the following logistic regression equation.

$$\log \left(\frac{\pi}{1 - \pi} \right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \epsilon$$

Our research hypothesis was: $\beta \neq 0$

Our null hypothesis was : $\beta = 0$

Our full model contained the following independent variables identified and discussed above:

- β_1 BARS Programs in the Past
- β_2 Sales to Minor Violations in the Past

β_3	Violations for Other than Sales to Minor in the Past
β_4	Sales to Minor Official Warnings in the Past
β_5	Official Warnings for Other than Sales to Minor Violations
β_6	Sales to Minor Complaints Received
β_7	Complaints Received for Other than Sales to Minor Violations
β_8	Ownership of Outlet: Individual, Partnership or Corporation
β_9	Day of Week of Sale
β_{10}	Time of Day of Sale
β_{11}	Outlet Location: Urban, Suburban, Rural

Variables included that have not been identified and discussed (along with Crosstabulation significance levels)

β_{12}	Type of ABC Permit: On or Off Premises (Chi-square - .927; $df = 1$; $p = .336$)
β_{13}	If Outlet Holds a Mixed Beverage Permit (Chi-square - 1.037; $df = 1$; $p = .309$)

It was our hope in conducting the multivariate analysis that some of those variables that were not found to be significant alone in the univariate analyses would combine with other variables to produce an interaction effect and subsequently would be of value in predicting which outlets or classes of outlets would be predisposed to selling to minors. This, unfortunately, was not the case. As with the crosstabulation analyses, only day of the week was found to be significant.

We began by entering all the variables into the logistic regression equation for analysis. The analysis was conducted and at each step one of the variables was eliminated due to its non-significant contribution to the model, until 13 steps had been conducted, leaving only the day of week variable. The overall model had a significance level of $p = .695$, which is not statistically significant. We would have expected a significant model with sufficient predictive power to produce a table that would show that the equation was predicting most of the cases to be in the "sold to minor" category. Here, all the cases were predicted to be in the "no-sale at posttest" category, another indication that the model has no predictive value. In logistic regression, there is no exact statistical test analogous to Pearson's R-Square. There is one test, Nagelkerke R-Square, that comes close to providing the information contained in R-Square. This measure is

intended to predict the amount of variation the model explains. Here, the Nagelkerke R-Square is given as .000. If we take some license and make a direct comparison of this test to Pearson's R-Square, we see this model explains none of the variance observed in the model. Finally, when examining the "Variables in the Equation" chart produced by the logistic regression software, we see that the model went through ten iterations. At each iteration, the least significant variable was dropped. Here, on the tenth iteration, all the variables had been eliminated as not contributing to the model and we were left with only the constant.

Historical Multivariate Model

We next constructed an historical model, based on the data collected from the outlet history surveys that were conducted at the end of the posttest compliance checks. This model included prior sales to minor violations, other violations, sales to minor warnings, other warnings, sales to minor complaints and other complaints. As would be expected from the discussion of the full model above, this model was also non-significant. As it did not include day of week, the entire model was found to be non-significant. Again, the Classification Table predicted that all cases would be no-sales and we are interested in predicting those cases that did, in fact, sell to the minor. This model ran through six iterations and again dropped all the variables entered into it. The final model contained only the constant. As would be expected with a model devoid of variables, the model predicts none of the variance observed (Nagelkerke R-Square = .000)

From this analysis we can conclude, as we did by examining each of the variables independently, that an outlet's history of not following the ABC Law or Commission Rules has no more predictive ability in the area of selling alcohol to minors than an ALE agent randomly choosing an outlet for enforcement activity.

Based on these analyses, we conclude that multivariate statistical modeling is not a useful method here in predicting which individual outlet or class of outlets will sell alcohol to minors. Our conclusions here lead us to believe that we cannot extend offender modeling from the individual to the organization here. This may or may not be due to the offense of sales to minors being independent of other crimes. Based on the potential for this explanation being true, we do not advocate outright dismissal of the general hypothesis of being to predict an organizations' propensity to offend without subsequent research using a different type of offense.

CONCLUSION

In this chapter we presented the independent analysis of our variables and the logistic regression analyses of models related to the licensed alcohol sales outlet as the unit of analysis. We also presented the results of a repeated measures ANOVA analysis to assess the deterrent effect of the undercover minor sales compliance checks conducted in this research.

Based on the crosstabulation and repeated measures ANOVA analysis on the pretest and posttest compliance check data we concluded that the pretest compliance checks, performed as a part of this research, had no deterrent effect on sales to minors at the posttest. We postulated that, because in our research we declined to take either criminal or administrative action against the employees or the outlets that sold to the minor, there would be either no deterrent effect or a greatly reduced effect as a result of the compliance check. We found that this speculation was true as the pretest compliance checks did not have a statistically significant effect on posttest sales to minors. Based on deterrence theory, we would predict that the compliance checks may have some deterrent effect when all the tenets of deterrence are met.

In our crosstabulation analyses of the individual independent variables, we discovered that only one, day of the week, was statistically significant. Interestingly enough, this variable is more of a

hybrid which could conceivably be included in either of our units of analysis or as a separate section, and as such was included as a separate research objective along with time of day. The findings of non-significance might seem to suggest that this component of the research was a failure, but findings are of value to the North Carolina ALE Division and to the beverage alcohol industry in this state. Several of these analyses pointed to the futility of using a particular variable as the basis for training or enforcement in the area of sales to minors, which in fact the agency has been using for many years.

Finally, this chapter presented the results of our statistical analyses of two multivariate outlet models. We found that the information provided by the models did not differ from, or add to, the information provided by the individual analyses. These findings lay the foundation for a discussion of the use of statistical modeling in criminal profiling of non-predatory crime, which will be undertaken in the concluding chapter after the individual seller models are explored in the next chapter.

We now turn our attention to the analyses of those independent variables associated with the individual alcohol seller. It will proceed in much the same form as did this chapter.

CHAPTER 5

ANALYSIS OF THE DATA: THE INDIVIDUAL SELLER AS UNIT OF ANALYSIS

INTRODUCTION

The previous chapter analyzed those characteristics that dealt with the alcohol sales outlet as the unit of analysis. This chapter analyzes variables associated with the individual seller as the unit of analysis. The analyses will examine the variables separately and then combined as multivariate models as we did with the previous unit of analysis. This data was produced during the posttest compliance checks and comes from information produced by the "Secret Shopper Survey," which was completed by an ALE agent present during the purchase attempt.

This chapter progresses much as did Chapter Four. It begins by examining the independent variables separately using contingency table analysis. After explaining why the variable was chosen for analysis, we will present our a priori hypothesis and the theoretical and literary basis for the hypothesis. Next, we present the research question that the inclusion and analysis of the variable hopes to answer, followed by a presentation and discussion of the statistical analysis of the variable. From there, we will discuss the substantive information the analysis provides. Having done this, the findings will be discussed in terms of their potential relevance to one of the theoretical bases of the study. Lastly, implications of the findings for predicting, explaining, or deterring the sale of alcohol to minors will be presented.

After having presented the individual analyses, we will then present the construction and analysis of the multivariate overall seller model.

A Warning to the Reader

To be able to fully assess the impact of criminal profiling theory on many of the variables relating to the individual seller as the unit of analysis, necessitates our controlling for whether the seller

had been charged with selling to a minor in the past. Unfortunately there were only 12 individuals included in the sample that had been so charged. This is not surprising as there are not many sales to minor arrests made annually and also because of the two year prohibition on working in the alcohol industry upon conviction. Having such a small number of sellers with prior sale to minor charges has greatly lessened our ability to use criminal profiling theory in making actual predictions as to the outcomes of the analyses of many of the variables in this chapter. While not specifically as to individual sellers, we were able to use the findings reported in the relevant literature in a general manner to make predictions as to some of the variables.

EXAMINATION OF SELLER-SPECIFIC VARIABLES: Contingency Table Analysis

Status: Whether the Seller is Owner, Partner, Stockholder or Employee Only

The first variable to be examined is that of status. This variable describes whether the specific seller checked during the posttest compliance check was the outlet owner, a partner in the business, a stockholder in a corporate ownership or a non-owning employee. This variable was chosen for analysis due to our belief that expectancy theory, being a product of economics, and financial interest can be construed to be similar. In our discussion of expectancy theory, we postulated that the more “ownership,” a seller has in the business, the more the cost of selling to a minor will factor into any decision that the seller makes when confronted with a minor attempting to buy alcohol. This variable was included to measure the overlap between financial interest and expectancy theory. Recognizing that deterrence theory has a common foundation with expectancy theory, we would hypothesize that a person would be more deterred from violating the law based on the amount of financial interest the person has in the outlet. If one looks at sales to minors from a cost-benefit standpoint, those seen as having a “stake” in that organization, the founder, owners, or those who have a long tenure in the organization should recognize more cost being involved in selling to minors. This should be analogous to anyone who has a financial “stake” in the organization. From this we predict that outlet owners, by virtue

of their increased stake, should refuse sales to minors at a higher rate than the other categories because of the financial and legal consequences involved in such behavior. Likewise, partners should have a similar stake and should also sell at a lower rate. A stockholder in a corporation will have more of a sense of ownership and is predicted to sell at a lower rate than an employee, but not being the sole or equal owner may tend to sell at a higher rate than full owners or partners. Those who merely work at such an outlet, given the transient nature of that population and the ready supply of similar low paying jobs, should sell at a much higher rate if our application of expectancy and deterrence theories hold true here.

Another reason that we expect to see lower sales rates in the owner classification is based on their socio-economic status. Owners would be seen as having a higher status, probably more education, more stability and more of a solid reputation in the community. Based on this, they would have more to lose from a cost-benefit standpoint and would be more deterred from selling to minors.

Profiling theory, based on its tenet of persistence of criminal activity would predict that a seller would continue to sell, regardless of his or her status. To assess this prediction would necessitate conducting the analysis of this variable controlling for whether the seller had a prior charge of selling to a minor in the past. Unfortunately due to the small number of sellers with a prior sales to minor charge, this was not possible.

Based on this line of reasoning we formed our hypothesis that financial interest by the seller in the outlet will have a negative association with selling alcohol to minors. We further posit that sellers who own an outlet will be the least likely to sell and employees with no financial interests will have the greatest propensity to sell. The research question posed is: Is the likelihood of an

individual alcohol seller selling alcohol to a minor associated with whether the seller is owner, partner or stockholder or employee?

Table 5.1
Comparison of Sales to Minor at Posttest
and Status of the Seller

Was a sale made at Posttest	Owner (%)	Partner (%)	Stockholder (%)	Employee (%)	Average (%)
No Sale at Posttest	(93.9)	(57.1)	(100.0)	(72.2)	(74.3)
Sale Made At Posttest	(6.1)	(42.9)	(0)	(27.8)	(25.7)
Total	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
N	49	14	4	280	388

N = 388; $\chi^2 = 14.298$; $df = 3$; $P = .003$; $\Phi = .177$; $P = .003$

We conducted a crosstabulation or contingency table analysis of this variable as compared to the dependent variable of selling alcohol to minors, which is presented in Table 5.1. The results of this analysis were statistically significant (Chi-square 14.298; $df = 3$; $p = .003$; $\Phi = .177$; $p = .003$). Based on these results, our hypothesis was partially supported. We say partially because our partnership category resulted in a 42.9% sales rate. This may have been because there were only 14 cases where a partner was tested and this is not a large enough number from which to draw valid conclusions. While it had no detrimental effect on our hypothesis, there were only four cases where the seller was a stockholder. Interestingly, none of the stockholders sold.

Based on the low number of cases in the middle two categories, for the purposes of discussion, we will speak only to the owner and employee categories. We observed that only 6.1% of our

sample's owners sold to the minor at the posttest. This is compared with 27.8% of employees without a financial interest in the outlet selling to the minor. Using these two categories, the data supports our hypothesis. The results of our analysis leads to the conclusion that financial interest in a licensed outlet factors highly in a seller's decisional process when confronted with selling to a minor, as both expectancy theory and deterrence theory predicted.

Having arrived at this conclusion, we now turn to what, if any, implications these findings have to reducing the sale of alcohol to underage persons. First, in a law enforcement setting if an ALE agent is attempting to predict which outlets will sell in an attempt to plan for enforcement purposes, he or she could reasonably exclude any outlet from enforcement when the owner was observed to be working. While, based on our data, 6.1% of the owners will sell to the minor, they are only one-third as likely to sell as non-owners. From an efficiency standpoint the agent should target those outlets where a non-owning employee is working. As the ALE Division has regulatory duties, which include investigating initial applications for permits and routinely inspecting these outlets, individual agents are familiar with the owners and the general operations of those licensed outlets in their own assigned areas. This knowledge of the outlet coupled with the information provided by the analysis of this variable should allow an agent to more efficiently plan his or her enforcement activities to reduce sales to minors. The downside to the information provided by this analysis is that an agent must exert quite a bit of effort to determine if an owner is working. Examining the information provided by this analysis in a training setting, an agent should encourage the owner to send his or her employees to ALE BARS training, as the owners have been shown to sell at a much lower rate and appear to be less in need of training. The agent could suggest that the owner work while all his or her employees are being trained. As to scheduling, this information could be provided to owners and they could schedule themselves to work on those days and at those times which this research has identified as being associated with sales to minors.

Whether a Non-Ownning Seller is a Manager or Clerk

We found that ownership is related to selling to minors, or more precisely, the refusal to sell.

Taking this idea to its natural progression, we would want to know whether being a manager can be construed to convey a greater sense of “ownership,” in the outlet and carries more weight in any cost-benefit analysis performed when confronted by a minor attempting to purchase. It would be assumed that a manager would have more responsibility for the outlet and could be seen as having a larger stake in its operation than a mere clerk and also would be more financially dependent on the job. Therefore based on expectancy theory a manager should sell at a lower rate. As the findings of the analysis of the ownership variable above had several important implications for enforcement, training and scheduling in the area of sales to minor reduction, we wish to take the idea one step further and examine the manager versus clerk variable.

There is also a literary basis for inclusion of this variable. Forster and McGovern (1994) found in a research project using sales to minor compliance checks and follow up surveys that merely having a manager present on the premises during the check resulted in a significant association with lower sales rates. This finding was especially true at those outlets having on-premise permits. Likewise, Wolfson, et. al. (1995) also found that having a manager present on the premises resulted in a lower sales rate.

Based on the rationale for inclusion of this variable, our research hypothesis, again based on expectancy theory, is that managers will sell to minors at a lower rate than those who are employees only. Our analysis seeks to answer the research question: Is the likelihood that an individual alcohol seller selling alcohol to a minor associated with whether the non-owning employee is a manager or only a sales clerk?

Table 5.2
Comparison of Sales to Minor at Posttest
and Whether the Seller is Manager or Only a Sales Clerk

Was a sale made at Posttest	Manager (%)	Clerk (%)	Average (%)
No Sale at Posttest	(85.9)	(71.3)	(74.2)
Sale Made At Posttest	(14.1)	(28.7)	(25.8)
Total	(100.0)	(100.0)	(100)
N	92	362	

N = 454; $\chi^2 = 8.173$; $df = 1$; $P = .004$; $\Phi = .134$; $P = .004$

The results of our analysis is presented above in Table 5.2. It was found that whether the seller is a manager or clerk is significantly associated with whether this person sold to the minor in the posttest (Chi-square - 8.173; $df = 1$; $p = .004$; $\Phi = .134$; $p = .004$). Looking at the frequency distributions, we observe that clerks sell at a rate of two to one when compared with managers. This finding upholds our hypothesis and directly speaks to the issue of ownership or stake being a part of the calculus in making the decision not to sell to a minor. One can surmise that a manager would have a greater financial stake in whether an outlet does well or not, which can affect his or her cost-benefit analysis. While not measured, we hypothesize that managers are more familiar with the ABC laws and ALE Division operations and have a larger basis for deterrence, in the general sense. What this tells us is that economic interest matters when we combine the findings here with those of the prior independent variable.

Having shown a significant association between this variable and sales to minors, we now turn to the practical implications of this significance. We see that following outlet owners, managers sell at the lowest rates. When planning enforcement or training, an agent should take this variable

into account for its predictive power. If the agent learns that a manager is working, it would be more productive, in the sense of enforcing the sales to minor laws, to move on to another outlet where a non-managing employee was working. The downside to this variable's predictive power, as before, is that it requires an agent to travel to the outlet or use some other investigative tool to ascertain the status of the working employee. It also requires that an agent have a good knowledge of his or her assigned area, which is not necessarily a bad thing; however, due to the transient nature of alcohol sellers and also managers, it may be difficult to easily ascertain this information. Simply restated, our concern as to the law enforcement implications of this variable is that it may take an inordinate amount of time to discover the necessary information to implement its use as a predictor, thereby wasting valuable time and reducing its potential for efficiency gains.

In the area of training, this variable follows closely that of being an owner. An ALE agent should focus on convincing employees, not managers, to attend training. In attempting to set up training, the agent could suggest that the manager work and allow his or her employees to attend the training. This variable could also have an industry implication in that those outlets owned by corporations could schedule managers to work at those times and days identified as being significantly associated with more sales to minors.

Full Time or Part Time Employment

With the inclusion of this variable, we take the reasoning presented above one step further. As the analysis of the prior variables has tended to show, ownership or stake does point to a reduction in sales to minors. We have seen that employees having no financial or managerial stake in the business sell at a higher rate. The variable of whether the employee is full time or part time was included in the analysis to ascertain if the degree of dependence on the job is also associated with a reduction in selling to minors. Intuitively, those working part time depend less

on their job and probably feel less of an “ownership” stake in the outlet, corresponding to being seen as a less a part of the organization’s culture.

Based on this rationale, we included this variable and posed the hypothesis that full time employees will be less likely to sell alcohol to minors than part time employees. The research question to be answered is: Is the likelihood of an individual seller selling alcohol to a minor associated with whether the clerk is employed full time or part time?

Table 5.3
Comparison of Sales to Minor at Posttest
and Whether the Seller is Employed Full Time or Part Time

Was a sale made at Posttest	Full Time Employee (%)	Part Time Employee (%)	Average (%)
No Sale at Posttest	(78.9)	(62.6)	(47.1)
Sale Made At Posttest	(21.1)	(37.4)	(25.9)
Total	(100.0)	(100.0)	(100.0)
N	317	131	
<i>N = 448; $\chi^2 = 12.786$; $df = 1$; $P < .0005$; $\Phi = .169$; $P < .0005$</i>			

Table 5.3 presents the analysis of this variable. The contingency table analysis was found to be significant (Chi-square – 12.786; $df = 1$; $p < .0005$; $\Phi = .169$; $p < .0005$) From this analysis we see that full time employees sell at a 21.2% rate, which is much too high in and of itself; however, it pales in comparison to the 37.6% sales to minor rate of part time employees. Looking at our findings that full time employment is associated with selling to minors at a lower rate than part time employment in terms of expectancy theory, we predict that those working only part time will see the consequences associated with selling to a minor as being less of a cost. This conclusion

is based on our prior conclusion associated with outlet ownership, that socio-economic status, stability and position in the community has a reduction effect on selling to minors

Having shown a statistically significant association, we now turn to the practical implications of this information. Granted that employment status is clearly related to sales to minor rates, but this variable is still problematic in its ability to be used as an enforcement profiling tool. An agent is unlikely to know whether the employee that is working is full or part time. While its value as an enforcement tool may be compromised, it still has the potential for predictive utility in training and scheduling. It can be a factor taken into account by an ALE agent when attempting to set up training, by the agent emphasizing to management that part time employees should also be trained and in actuality should receive training before full time employees. This variable too is invaluable to the alcohol industry in terms of scheduling employees. Management could look at using part time employees at times and on days when it has been shown that sales occur the least. They could be scheduled to work during hours when alcoholic beverages cannot lawfully be sold, such as on Sunday mornings or between 2:00 AM and 7:00 AM each day of the week other than Sunday.

Length of Employment at the Outlet Being Checked

The length of time that an employee has worked at a specific outlet is important in light of the literature on organizational culture that we use to ground our attempt to extend profiling theory from the individual to the outlet as an organization. This literature holds that acculturation into the specific culture of the organization is a function of several variables, not the least of which is tenure in the organization. From the foundation laid by the literature, we include this variable to test the proposition that tenure at the outlet is associated with expectancy and deterrence theories in that the longer one works at an outlet the more that person has to lose by violating the sales to minor prohibition. Profiling theory would posit that if a person was one that sells to

minors, that the instances of selling would increase with time, unfortunately, this is one of the variables that, not being able to control for prior sales charges, we are unable to assess using this theory. In deciding to include this variable we realized that another function of length of time at an outlet also increases the chances that a seller will sell to a minor at some point and be caught at it. This is why no attempt to compare this variable with the outlet's history of sales to minor violations should be made. As the variable is presently constituted, analyzed and discussed, it should not suffer from this problem.

Based on this reasoning, we adopted the research hypothesis that length of tenure at one specific outlet will be negatively associated with sales to minors or restated, based on expectancy theory, the longer one is employed at a specific outlet the more the sales to minor rate will decline. This variable seeks to answer the question: Is the likelihood of an individual seller selling alcohol to a minor associated with the length of employment at the outlet that was checked?

Table 5.4
Comparison of Sales to Minor at Posttest
and Length of Tenure at the Outlet Which Was Checked
(Given in Months)

Sale at Posttest	<1	1-6	7-12	13-24	25-36	37-48	49-60	61-120	>121	Ave.
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
No Sale at Posttest	(49.1)	(65.6)	(76.5)	(80.6)	(80.0)	(77.8)	(78.6)	(84.9)	(85.7)	(74.4)
Sale Made At Posttest	(50.9)	(34.4)	(23.5)	(19.4)	(20.0)	(22.2)	(21.4)	(15.1)	(14.3)	(25.6)
Total	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
N	53	96	51	72	35	27	17	86	35	

*N = 469; $\chi^2 = 31.493$; *df* = 8; *P* < .0005; *Phi* = .259; *P* < .0005*

The table above shows the results of the contingency table analysis conducted on this variable and the dependent variable of sales to minor. It should be noted that the categories reflect employment in months, not years. As can be seen, this variable was found to have a statistically significant association (Chi-square – 31.493; $df = 8$; $p < .0005$; Phi – .259; $p < .0005$). It basically shows that the longer one is employed at a specific outlet, the lower the rate of selling to minors. This trend does not follow this pattern exactly, but it is quite close. The most interesting finding is that of those employees that have worked at an outlet less than one month, over half sold to the minor. During the period from one to six months the rate is one-third and after six months it drops to about 20% and this level is maintained until the employee has been there for five years, then it drops again. These findings do support our expectancy theory based hypothesis and the answer to the research question is that there is definitely a negative association between tenure at a given outlet and sales rates.

The results obtained here closely follow what would be expected examining the variable in light of expectancy theory. One would expect that as a seller became more dependent on employment at the outlet, over time, that the sales rates would drop, and in this sample they did. One would also expect that those who had just joined the organization would sell at the highest rates through not having been there long enough to become dependent on the organization. The findings support our hypothesis that the rate of sales will decline with experience at the outlet. The research question of whether there is an association between tenure at a specific outlet and sales to minors is answered in the affirmative both by the statistical significance of the analysis and the substantive information provided.

Having decided that the variable is significant, we turn to a discussion as to whether it provides information that will be useful in our overall goal of reducing the sale of alcohol to minors. Again, as a predictive tool to be used by law enforcement little assistance is provided by inclusion of this

variable. On the other hand, knowing that longer tenured employees are subject to a lower rate of sales, training can be targeted toward those who have just begun their employment at the outlet. As for policy implications, which will be thoroughly explicated in the final chapter, the information provided by this variable suggests to requiring that new employees be subjected to training early in their careers or prior to beginning work. While the value of the training variable has yet to be discussed, the mere fact that some type of early intervention has occurred may operate to lessen the likelihood of sales to minors.

For the same reasons as listed above, this variable can be valuable to the alcohol industry in its scheduling of employees. Knowing that new employees, i.e. those employed less than one month, have almost a 50% sales to minor rate can be factored in to the scheduling of such employees, allowing them to gain experience during times when the sales to minors rates have been found to be lower. Industry members can also provide more initial in-house training for new employees. Organizations can also pair newly hired employees with a more experienced peer, thereby accelerating the acculturation process.

Length of Employment in the Alcohol Industry

This variable was included to correct for the potentially misleading information provided by the previous one. Just because the seller tested had been employed at the outlet that was tested for one month, this does not preclude the person from having been employed at other outlets for many years. For this reason, this variable provides a truer assessment of how experience in alcohol sales is associated with sales to minors. To attempt to assess this difference, we asked sellers that were checked how long they had been employed in the alcohol industry, as well as how long they had been at the outlet where the check took place.

Our research hypothesis for this variable is that length of experience selling alcohol will be negatively associated with selling alcohol to minors, but will be less so than length of time at one particular outlet. The theoretical basis for this hypothesis is the same as that proposed for the previous variable. The research question addressed herein is: Is the likelihood of an individual seller selling alcohol to a minor associated with the length of employment in the alcohol industry?

Table 5.5
Comparison of Sales to Minor at Posttest
and Length of Time Employed in the Alcohol Industry
(Given in Months)

Sale made/no At Posttest	<1 (%)	1-6 (%)	7-12 (%)	13-24 (%)	25-36 (%)	37-48 (%)	49-60 (%)	61-120 (%)	>121 (%)	Ave. (%)
No Sale at Posttest	(39.4)	(64.2)	(82.9)	(73.6)	(83.8)	(79.3)	(78.9)	(81.4)	(78.4)	(74.4)
Sale Made At Posttest	(60.6)	(35.8)	(17.1)	(26.4)	(16.2)	(20.7)	(21.1)	(18.6)	(21.6)	(6.6)
Total	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
N	33	67	35	72	37	28	19	102	75	

N = 468; $\chi^2 = 31.713$; $df = 8$; $P < .0005$; $\Phi = -.262$; $P < .0005$

The results of our contingency table analysis is presented above in Table 5.5. When compared to sales to minors, we found that experience in the alcohol industry was a statistically significant variable (Chi-square – 31.713; $df = 8$; $p < .0005$; $\Phi = .262$; $p < .0005$). As one can see, the differences in the significance levels of this variable, when compared to the specific outlet tenure variable is negligible. When examining the relative frequencies we do see that any actual differences are in the hypothesized direction. In the first category (less than one month experience) there is a 60.6% sales rate compared to a 50.9% sales rate for the prior variable. As we said earlier, this is a truer measure of experience, as an employee who was checked and

reported being at a specific outlet for less than one month could conceivably have many years experience in the industry, having only recently changed employment. As to the other categories, while all are different, examined together they prove to be quite similar. The time in the industry variable has a higher rate of sales percentages in five of the nine categories. In two of the categories the differences are negligible. Only in the 7 to 12 month and 25 to 36 month categories is there enough of a difference (6.4% and 3.8% respectively) to cause concern. To examine the part of the hypothesis that asks whether the sales rate for tenure in the industry will be lower than tenure at a specific outlet, we look at the overall average of sales to minors. As to the time at one outlet variable, the sales rate is 25.6%. This is compared to 26.6% in the time in industry variable. Given the amount of possible error associated with sampling, we cannot conclude that this portion of the hypothesis is supported. The initial part of the hypothesis is; however, supported by the data analysis.

The findings of this analysis, when compared to the prior variable, are supported by expectancy theory. This is because one's benefit from not selling and maintaining employment would be more related to employment at a specific outlet than time in the industry. An employee who has worked at a specific outlet for a long period of time should feel more "ownership" in their employment, which should figure into their decisional calculus.

As we cannot say that there is a real difference shown between these two variables, we concede that those practical implications set out for the prior variable hold true here. We can see no more information provided by this analysis than presented by the analysis of the first variable.

ALE BARS Training in the Past

We have noted previously that there is a great deal of interest in training alcohol servers and sellers. Many of the studies presented have found a significant and substantial association

between having had alcohol seller training and reductions in subsequent sales to minors. This variable has a strong foundation in the literature.

The ALE Division has been engaged in seller training since the early 1980's. Interestingly, while the development of this training, in all of its iterations, has been funded by various organizations based on the belief that it has a positive effect on sales to minor reduction, there has never been an evaluation of its efficacy. The grants received have merely required reporting how many sessions were provided, how many outlets were involved and how many sellers were trained. Until now there has been no attempt to assess what effect, if any, that the training has had on outlets or individuals as to their adherence to the laws. While the current research limits this examination to only one issue, namely sales to minors, no one can argue that this is an insignificant area on which to focus.

Based on the review of the literature detailing the efficacy of similar training programs across the United States, we formed our research hypothesis that individual seller attendance at ALE BARS training will be negatively associated with sales to minors at the posttest. This hypothesis is based on expectancy theory and its notion that training can modify the abilities and role perceptions of sellers. It also follows from the general deterrence portion of deterrence theory, in that much of the training focuses on punishment for violations of the ABC laws and past experiences of sellers who have violated the ABC law. Again the distribution of the data precludes us from making a prediction based on profiling theory. The empirical question that this analysis seeks to answer is: Is the likelihood of an individual seller violating the sales to minor laws associated with attendance at ALE BARS training in the past?

Table 5.6
Comparison of Sales to Minor at Posttest
and Whether the Seller has Received ALE BARS Training

Was a sale made at Posttest	No BARS (%)	Attended BARS (%)	Average (%)
No Sale at Posttest	(72.3)	(82.0)	(74.2)
Sale Made At Posttest	(27.7)	(18.0)	(25.8)
Total	(100.0)	(100.0)	(100.0)
N	364	89	

N = 453; $\chi^2 = 3.563$; $df = 1$; $P = .059$; $\Phi = -.089$; $P = .059$

We conducted a simple contingency table analysis of this independent variable compared with selling to a minor at the posttest. We found that this analysis produced no statistically significant association with sales to minors (Chi-square-3.536; $df = 1$; $p = .059$; $\Phi = -.089$; $p = .059$). While the association is not significant at the .05 level, it is much closer to our chosen cutoff point than the analysis of outlet training, which was $p = .983$. We do see that in our sample there was a noticeable difference between those who sold and had BARS Training and those who did not. Those who had no prior training sold at a 27.7% rate and those with training dropped to an 18.0% level. From this we can conclude that attendance at BARS training does have some effect on whether an individual sells to minors, but has little or no effect on other sellers at the outlet who may not have been exposed to training. This leads to the conclusion that for BARS training to have the full effect on reducing sales to minors, all the employees must be trained.

Our findings are different from the conventional wisdom in the literature. Buka and Birdthistle (1999) found that seller training was significantly associated with reduced sales to minor rates. They found this to be particularly true in the categories of young and inexperienced sellers. In an

attempt to explain why our findings were not as significant as those in prior studies, we believe that time may be the factor that we are not measuring. In most of the other studies the sellers were measured at a specific time after receiving training. Our study did not collect data as to when the seller had received the training. One possible hypothesis is that the effect of training on sales to minors may be time sensitive. If so, this could call for refresher training. Another possible explanation is provided by an Office of Juvenile Justice and Delinquency Prevention study (1999) which recognized that training alone is not sufficient to reduce sales to minors. This study said that training had to be coupled with a vigorous enforcement program to be effective.

These findings have practical implications for training, but not for compliance checks. We know that having attend ALE BARS Training is weakly associated with reductions in minor sales. However, using these variables requires the agent to know in advance which employee will be working and whether that seller has attended training in the past. Therefore, this variable provides no practical guidance to ALE in targeting particular outlets.

As to training, the fact that the association is only moderately significant should not discourage the continuation of the program, but as will be more fully addressed in the final chapter, it may necessitate an overhaul. Also, based on information provided by studies from other states and the relative frequencies of refusals to sell in our research, the training program should continue.

Non-ALE Provided Seller Training in the Past

ALE Agents are frequently told by outlet owners and managers that they provide their own training to employees and do not want or need training by ALE. As training is not mandated in North Carolina, as it is in other states, the ALE Division can only offer to make the training available to alcohol sellers.

While we produced data as to whether or not a seller had non-ALE provided training, due to the potential for diverse types of training, its analysis would not provide valid data. Therefore, we chose not to report the results of the analysis and make no findings from them.

Alcohol Consumption by the Seller

While there is no previous research to draw upon we were curious as to whether a person's personal consumption of alcohol could be related to their likelihood of selling to minors. If significant, this variable could spark interest and serve as a foundation for further research. We included this variable based only on curiosity and it has no theoretical foundations for its inclusion. Based on the fact that there is no literary or theoretical basis for its use, we predict that it will have no association with sales to minors

As was predicted, this variable was found to be non-significant statistically (Chi-square – .218; df – 1; $p = .640$; Phi Phi – -.019; $p = .692$). Examining the relative frequencies provided in Table 5.7, we observe that there is little difference in whether a person consumes alcohol and rate of sale to minors.

Table 5.7
Comparison of Sales to Minor at Posttest
and Whether the Seller Consumes Alcoholic Beverages

Was a sale made at Posttest	No Alcohol Consumed (%)	Drinks Alcohol (%)	Average (%)
No Sale at Posttest	(73.8)	(75.4)	(74.4)
Sale Made At Posttest	(26.2)	(24.6)	(25.6)
Total	(100.0)	(100.0)	(100.0)
N	282	167	

N = 449; $\chi^2 = .218$; *df* = 1; *P* = .640; *Phi* = -.019; *P* = .692

Seller's Gender

Most research projects that examine individuals include gender in their analysis. It is an intuitively interesting variable as gender does account for differences in many areas. It is also an easy variable on which to produce data. It requires no probing questions or invasions of privacy. Typically the data can be recorded by sight. There is also a precedent for inclusion of this variable in studies examining sales of alcohol to minors. Forster, et. al. (1994) examined gender in their analysis. They found that there were only two percentage points difference in sales to minors when compared with gender and concluded there was no significant difference.

Wagenaar, et. al. (1993), in conducting a qualitative research project using focus groups made up of minors who attempt to purchase alcohol, concluded that males were more likely to sell to minors than females. In 1996, Wolfson and Toomey found that females were less likely to sell to minors than males, but acknowledged that the findings were not statistically significant.

Our hypothesis, relative to this variable, is that male sellers will be more likely to sell to minors in our posttest sample than females. We based this hypothesis solely on the prior literature, as it

has identified somewhat of a pattern. We set out to answer the research question: Is the likelihood an individual seller will sell to a minor associated with the gender of the seller?

Table 5.8
Comparison of Sales to Minor at Posttest
and the Seller's Gender

Was a sale made at Posttest	Male (%)	Female (%)	Totals (%)
No Sale at Posttest	(76.4)	(73.1)	(74.3)
Sale Made At Posttest	(23.6)	(26.9)	(25.7)
Total	(100.0)	(100.0)	(100.0)
N	165	290	

N = 455; $\chi^2 = .585$; $df = 1$; $P = .444$; $\Phi = .036$; $P = .444$

Our contingency table analysis resulted in a non-significant finding (Chi-square - .585; $df = 1$; $p = .444$; $\Phi = .036$; $p = .444$). When examining the relative frequencies of those that sold in the sample we found that females sold at a higher rate than males, thereby not supporting our hypothesis. We answer the research question by concluding that gender is not associated with selling alcohol to minors and provides little if any predictive power in the areas of enforcement, training or industry staffing.

Seller's Age

Age has received much attention in the area of sales to minors specifically and crime in general in the relevant literature. This literature speaks to the idea of personal capital and how personal capital increases with age. A person is believed to acquire more personal capital as he or she

ages. Personal capital operates to cement one's ties to conventionality. The literature points to this diminishing one's propensity for involvement in illegal behavior (Piquero and Paternoster, 1999, 286). The idea of personal capital ties directly with expectancy theory because it suggests that a person will have more cost associated with an illegal act as they progress in age. Based on this theory we posit that the propensity to sell to minors should decrease with age. Again, the deficiencies in the sampling in including a sufficient number of sellers with prior charges precludes us from applying profiling theory here. The research question explored herein is: Is the likelihood of an individual seller selling to minors associated with the age of the seller?

The sales to minor literature also provided impetus for inclusion of the age of seller variable. Wagenaar and Wolfson (1999) reported in the Health and Human Services study involving a survey of 12th graders that respondents reported looking for youthful sellers when attempting to buy alcohol. Kumpfer and Chavez (1999) cite a study by the U.S. Office of the Inspector General that found that employing minors to sell alcohol may increase direct purchases by minors.

For the purposes of examining this variable we divided the sample into seven age categories, set out in Table 5.9 below. First we looked at those sellers less than 16 years of age. North Carolina Law allows for those less than the lawful age to purchase and possess alcohol to sell under certain circumstances. These rules allow a person less than 16 years old to sell alcohol at an off-premise sales outlet when a manager over the age of 18 is present. In North Carolina a person is considered to be an adult at 16 for the purposes of being arrested and tried in adult court. For this reason we were interested in what rate those not able to be physically arrested were selling alcohol. While it would have been useful to examine this category more fully, unfortunately there were only two cases present, making any analysis useless. The next category, ages 16 to 21 should be intuitive. Those past their 16th birthday can be arrested, so this is the rationale for the

bottom limit. The upper limit of this category is the age when one can purchase, possess and consume alcohol legally. The other categories merely reflect decades.

Table 5.9
Comparison of Sales to Minor at Posttest
and the Seller's Age

Was a sale made at Posttest	<16 (%)	17-21 (%)	22-30 (%)	31-40 (%)	41-50 (%)	51-60 (%)	>61 (%)	Average (%)
No Sale at Posttest	(0)	(76.8)	(70.3)	(71.3)	(79.4)	(80.0)	(73.1)	(73.9)
Sale Made At Posttest	(100.0)	(23.3)	(29.7)	(28.7)	(20.6)	(20.0)	(26.9)	(26.1)
Total	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
N	2	95	111	101	63	35	26	

N = 433; $\chi^2 = 8.865$; $df = 6$; $P = .181$; $Gamma = .143$; $P = .181$

Our contingency table analysis reflected a non-significant association between age and sales to minors (Chi-square – 8.865; $df = 6$; $p = .181$; Phi – .143; $p = .181$). When the relative frequencies were examined, several interesting findings emerge. In the less than 16 years old category there were only two cases, but both of these sold to the minor. While we would like to read some importance into this finding, the fact that there were only two cases causes us to drop this finding from further discussion. The second category sold at a rate of 23.3%. This was lower than four of the six other categories and consistent with the overall sales rates reported above. Sales in the 22 to 40 ages increase and then with the age 41 group they fall off. The sales rates again increase with the over 61 group.

This variable also provides little enforcement guidance. While not statistically significant, the examination of the relative frequencies does provide some guidance to training. It would point to training younger sellers as soon as possible.

Prior Sales to Minor Criminal Charges

Another issue that has gained much attention in the criminal justice literature is recidivism. We examine this issue by including the variable of whether the seller has been charged with selling alcohol to minors in the past. Deterrence theory is based, in part, on effect of prior sanctions affecting future actions. Nagin and Paternoster (1993) reported the results of a study that concluded that the perceptions of certainty of formal and informal sanctions and self-imposed shame were effective in controlling incentives to offend (479). The deterrence theory literature points to the idea that severity of sanctions, not the certainty and swiftness, had more deterrent effect against offenders, but only on those that had prior violations and suffered prior sanctions.

Profiling theory would be in direct contradiction to deterrence theory as to predictions of the analysis of this variable. Profiling would predict that if a person offended in the past that this person would continue the pattern and offend again. This would have been an excellent venue to directly test these opposing theories as they pertain to sales to minor offenses, had there been a sample obtained that had a relatively equal number of sellers with past charges for selling to minors and those who had not. As said, this did not happen here, but it does call for further research in this area.

Based on the literature and deterrence theory we formed the hypothesis that a seller having a prior sale to minor charge would be negatively associated with selling during the posttest. Our research question is: Is the likelihood of an individual seller selling alcohol to a minor associated with whether the seller has been charged with selling alcohol to a minor in the past?

Table 5.10
Comparison of Sales to Minor at Posttest
and Past Sale of Alcohol to a Minor Criminal Charge

Was a sale made at Posttest	No Prior STM Charges	Prior STM Charge	Totals
	(%)	(%)	(%)
No Sale at Posttest	(74.2)	(91.7)	(74.7)
Sale Made At Posttest	(25.8)	(8.3)	(25.3)
Total	(100.0)	(100.0)	(100.0)
N	438	12	

N = 453; $\chi^2 = 1.190$; $df = 1$; $P = .275$; $\Phi = -.065$; $P = .170$

Our analysis of this variable resulted in a non-significant association (Chi-square – 1.190; $df = 1$; $p = .275$; $\Phi = -.065$; $p = .170$). This may be due to the low numbers of those with prior charges. There were only 12 sellers reporting a prior charge of selling to a minor in the past, and there was only one case where a person had a prior charge and sold to the minor in the posttest. As there was such a small number of cases that had prior sales charges, we decline to make any findings based on this analysis.

Having completed the analysis of the individual characteristics on which we produced data, we now turn our attention to constructing multivariate models based on them in an attempt to provide individual offender models to guide enforcement and training and to more effectively and efficiently use the scarce alcohol enforcement resources.

INDIVIDUAL SELLER OFFENDER PROFILE MODELS

We set out at as one of our goals to examine individual seller characteristics to determine which of these characteristics are associated with selling alcohol to minors. The identification of those relevant characteristics will now be used to develop an offender profile of those individual sellers most likely to sell alcohol to underaged persons. The model is constructed for use by law enforcement to allocate scarce resources and potentially by the alcohol industry as the foundation for a screening device to identify potential violators.

To reiterate our theoretical basis for constructing models, we ground their construction on the tenet of offender profiling that holds that offenders will persist in their deviant behavior.

As our main focus is the attempt to predict an event, sales to minors by an individual seller, we again employ Backward Stepwise Logistic Regression analysis. As the reader will recall, this procedure begins with the full model, including all relevant variables and then conducts calculations dropping the least significant variable from the model and beginning again until an overall statistically significant model is found. We already know from the preceding analyses which variables are independently significant; however, interaction effects may cause an individually non-significant variable to be significant or vice-versa.

FULL SELLER MODEL

The first model posited and analyzed is a full seller model. This model contains all the variables discussed in this chapter. The only difference is that four of the variables were extended to account for the separate categories that comprise them. For example, in the variable of seller's age, it was expanded into six additional variables, to include each age category that we examined. Since the other variables were simply yes or no, adjustment was not required.

Our full seller model was constructed as defined in the following logistic regression equation.

Due to the categorical nature of four of the variables, the full model is initially comprised of 38 independent variables.

$$\log \left(\frac{\pi}{1 - \pi} \right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \dots + \beta_{38} x_{38} + \varepsilon$$

Our research hypothesis was: $\beta \neq 0$

Our null hypothesis was : $\beta = 0$

Our full model contained the following independent variables that have already been identified and discussed above:

β_1	If the Seller Consumes Alcohol
β_2	Sales to Minor Charges in the Past
β_3	Other Server Training in the Past
β_4	Seller's Gender
β_5	Whether Seller is Manager or Clerk
β_6	Whether Seller is Full Time or Part Time
β_7	ALE BARS Programs in the Past
β_8	ALE BARS Programs in the Past (1 Program)
β_9	ALE BARS Programs in the Past (More than 1 Program)
β_{10}	Seller's Age
β_{11}	Seller's Age (Category 1)
β_{12}	Seller's Age (Category 2)
β_{13}	Seller's Age (Category 3)
β_{14}	Seller's Age (Category 4)
β_{15}	Seller's Age (Category 5)
β_{16}	Seller's Age (Category 6)
β_{17}	Seller's Status
β_{18}	Status = Owner
β_{19}	Status = Partner
β_{20}	Status = Stockholder
β_{21}	Status = Employee
β_{22}	Time at Outlet
β_{23}	Time at Outlet (Category 1)
β_{24}	Time at Outlet (Category 2)
β_{25}	Time at Outlet (Category 3)
β_{26}	Time at Outlet (Category 4)
β_{27}	Time at Outlet (Category 5)
β_{28}	Time at Outlet (Category 6)
β_{29}	Time at Outlet (Category 7)

β_{30}	Time at Outlet (Category 8)
β_{31}	Time in Industry
β_{31}	Time in Industry (Category 1)
β_{32}	Time in Industry (Category 2)
β_{33}	Time in Industry (Category 3)
β_{34}	Time in Industry (Category 4)
β_{35}	Time in Industry (Category 5)
β_{36}	Time in Industry (Category 6)
β_{37}	Time in Industry (Category 7)
β_{38}	Time in Industry (Category 8)

The regression analysis was performed using SPSS (Version 10.0). When the model analysis was complete we found that the model had gone through eight iterations. Table 5.11 shows the full model containing all the variables along with their corresponding Wald statistic and significance level and the log odds. The final iteration contained 21 of the original 38 variables. Of the 21 remaining, six were found to be independently significant using the Wald statistic and its associated significance level. These variables along with their associated significance levels are listed below in Table 5.12.

Table 5.11
Significant Variables in the Full Seller Model
with Accompanying Significance Levels

Variable	Wald Statistic	Significance	Log Odds Exp (B)
Seller Age(Category 1)	.059	.807	226.808
Seller Age(Category 2)	6.097	.014	.210
Seller Age (Category 3)	.391	.532	.690
Seller Age (Category 4)	.327	.567	.715
Seller Age (Category 5)	.116	.734	.807
Seller Age (Category 6)	.000	.989	.990
Gender	.001	.973	.990
Status (Original Variable)	9.987	.019	
Status (Owner)	3.302	.069	.194
Status (Partner)	4.007	.045	4.589
Status (Employee)	.242	.622	.005
If the Seller Consumes Alcohol	.752	.386	1.271
Sales to Minor Charges in the Past	.660	.416	2.534
Other Server Training in the Past	.446	.504	1.209
Whether Seller is Manager or Clerk	.485	.486	.688
Whether Seller is Full Time or Part Time	9.059	.003	
ALE BARS	1.987	.370	
ALE BARS (1 Program)	.792	.374	.248
ALE BARS (More than 1 Program)	1.271	.260	.165
Time at Outlet	5.556	.684	
Time at Outlet (Category 1)	.580	.556	1.876
Time at Outlet (Category 2)	.336	.562	1.529
Time at Outlet (Category 3)	.465	.495	1.724
Time at Outlet (Category 4)	.260	.610	.682
Time at Outlet (Category 5)	.124	.725	1.356
Time at Outlet (Category 6)	.000	.992	.990
Time at Outlet (Category 7)	.198	.656	1.613
Time at Outlet (Category 8)	.191	.662	.575
Time in Industry	7.012	.535	
Time in Industry (Category 1)	1.876	.171	2.946
Time in Industry (Category 2)	.114	.735	1.230
Time in Industry (Category 3)	1.385	.239	.410
Time in Industry (Category 4)	.149	.700	1.249
Time in Industry (Category 5)	1.113	.291	.469
Time in Industry (Category 6)	.079	.779	.781
Time in Industry (Category 7)	.198	.656	.700
Time in Industry (Category 8)	.191	.662	.781

Table 5.12
Significant Variables in the Full Seller Model
with Accompanying Significance Levels

Variable	Wald Statistic	Significance	Log Odds Exp (B)
Seller (Category 2)	5.524	.019	.240
Status (Original Variable)	10.336	.016	
Status (Owner)	6.579	.010	.139
Full Time or Part Time Employment	9.059	.003	.436
Time at Outlet (Original Variable)	22.597	.004	
Time at Outlet (Category 1)	10.642	.001	6.278

The overall model remaining after the eighth step was found to be significant at the $p < .0005$ level. The Hosmer and Lemeshow Test, which measures the goodness of fit of the model, was .858. For this to be a well fitting model we want this figure to be greater than .05. On their face, these tests seem to suggest that we have produced a statistically significant model. However, when we examine all the tests that the data analysis output produces, we begin to notice specific problems. First, when we examine the Nagelkerke R-Square we find that the model produces a statistic of 0.196. By taking certain liberties with this statistical test in interpreting it as being analogous to Pearson's R-Square we observe that the model is only predicting 19.6% of the variance observed in the model. Next, examining the Classification Table, reported below in Table 5.13, we see that the model predicts 75.2% of the cases correctly. While this seems to be an adequate percentage, after performing the necessary calculations, we find that we could have predicted 74.03% of the cases correctly just by making a blind estimate that all the cases fit in the non-selling category. Based on this calculation, our model only predicts sales to minors only 1.17% better than chance.

Table 5.13
Significant Logistic Regression Model Classification Table

Observed	Predicted		Percentage Correct
	No Sale at Posttest	Sold at Posttest	
No Sale at Posttest	289	16	94.8
Sold to Minor at Posttest	86	21	19.6
Overall Percentage			75.2

In Chapter Four, we found many variables that had no statistical significance but that when closely examined, were found to contain valuable substantive information. Here, we come to the opposite conclusion. We have a statistically significant model that does not do a very good job of predicting sales to minors. While this is problematic, it does not mean that we should totally dismiss the model. It does produce several valid points that can be used in the effort to deter the sale of alcohol to minors.

Those variables found to be significant in the model do provide some explanatory or predictive information. Examining the “Variables in the Equation” table produced by SPSS, and performing a mathematical calculation, we are able to obtain the odds ratio that the independent variable exerts on the dependent variable. In other words, this information shows the odds of the dependent variable being “1,” which in this case equates to being a sale to minor. To more fully explain, this column lists a value for the independent variable. If this value is below 1.0, then to obtain the odds, one subtracts the given value from 1, and the resulting number is the percent reduction. If the value is greater than 1, then when subtracted from 1, we obtain the percent increase the variable predicts.

The second Seller category contains those sellers that are over 16 years of age, but less than 21.

Based on the calculation described above, being in this group results in a 76% decrease in selling to minors. The variable "Status 1", denoting the owner of the outlet, results in an 86.1% decrease in the odds of the seller violating the sales to minor prohibition. Likewise, being a full time employee is associated with a 56.4% decrease in minor sales. Perhaps, the most striking information provided by this section is that falling into "Category 1" of time in the alcohol industry (having been employed less than one month) results in a 527.8% increase in the odds of selling alcohol to a minor. This says that in the first month of employment selling alcohol a person is five and one-quarter times more likely to sell to a minor. Unfortunately, the value of this finding is tempered by the small size of the sample.

Practical Implications

In looking at this model we find several interesting, but opposing points. First, the model is statistically significant. Unfortunately, it only predicts sales to minors 1.17% better than an educated guess. Secondly, it shows that age, ownership status, full time employment and time selling alcohol in the industry (as opposed to one specific outlet), most importantly less than one month, are significant predictors of future sales to minors. While these findings are important, they carry few practical implications for our purpose, which is developing a model to identify sellers for enforcement or training purposes. The reason that these variables carry no substantive importance in our efforts is that prior to actually going to the outlet an agent will not know who is working. Specifically without first travelling to the location, an ALE agent will not know the age, ownership status, employment status or length of tenure in the alcohol industry of the seller on duty at the time. The information provided by this model would require the agent in question to be intimately familiar with the operation of the outlet to know even part of the information provided. Even if the agent were this intimately familiar with the outlet, he or she would not be able to predict, in advance, which employee would be working.

While the information provided is of little value to ALE agents conducting enforcement, it does provide important information as to training and more importantly, the findings have important implications to the alcohol industry. First, as to training, the agent can use the information gleaned by this model to suggest to permittees and managers which of their employees should receive training first. Based on the model an employer should schedule training for employees who have no financial interest in the outlet, are very young, employed only part time and have been working at the outlet for less than one month. This information, coupled with the outlet specific information discussed in Chapter Four, could guide permittees or corporate managers in scheduling certain classes of employees at specific times and days for work in an effort to reduce sales to minors.

EXPECTANCY THEORY MODEL

Expectancy theory is an important foundation of this study. The ideas flowing from the application of this theory to the problem of sales to minors gave rise to the model presented below. We examined those variables on which we produced data and decided that the variables of Status, Whether the Seller is a Manager or Clerk, and Time Employed at the Outlet were the most relevant to expectancy theory. These variables were the ones that were associated with a seller having a “stake” in the business in which he or she worked. It was hypothesized that these variables contributed most to a seller’ cost-benefit analysis calculations when making a conscious decision as whether to sell to a minor or refuse the sale. We took these variables and combined them into a logistic regression model. As before, since we were trying to predict which of these variables were associated with selling to minors and not attempting to develop theory, we used Back Stepwise Logistic Regression Analysis.

The full expectancy theory model is depicted by the logistic regression equation set out below.

Our research and null hypotheses were the same as in the full seller model given above and will not be repeated here.

$$\log \left(\frac{\pi}{1 - \pi} \right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \dots + \beta_{25} X_{25} + \varepsilon$$

The regression analysis was again performed using SPSS (Version 10.0). It went through three steps before arriving at a statistically significant model (Chi-square – 18.338; *df* – 2; *p* < .0005).

The final model contained the variables of Status and Employment. In other words whether the seller was owner, partner, stockholder, or clerk and whether the seller was employed full time or part time. The individual significance of the variables as found by this model is presented in Table 5.12 below. The Hosmer and Lemeshow Test was .070, which is above the .05 level as we would want a significant model to be.

Table 5.14
Significant Variables in the Expectancy Theory Model
with Accompanying Significance Levels

Variable	Wald Statistic	Significance	Log Odds Exp (B)
Status	4.742	.029	1.405
Full Time or Part Time Employment	8.380	.004	1.962

However, when we more closely examined the analysis output we began to observe problems with the model. First, the Nagelkerke R-Square was .059. This statistic when used as an analogue to Pearson’s R-Square (which is not totally appropriate but when used in conjunction with other tests is within the permissible range) says the model only accounts for 5.9% of the

variance observed in the model. More importantly, the Classification Table shows the model predicts 74% of the cases correctly. When performing the required calculations, we find that we could have predicted 74.04% of the cases correctly by guessing. So our model predicts sales to minors .04% less well than randomly assigning cases to one of the two categories.

Again, we do not want to automatically dismiss the findings as there is some information to be taken from the analysis of the model. First, knowing the seller's status is associated with a 40.5% increase in the odds of predicting a sale to minor. In other words, if we know the status of the seller that is working, we have a 40% better chance of predicting whether that seller will sell to the minor. Secondly, knowing whether the employee is a full or part time is associated with a 96.2% increase in the odds of predicting a sale to minor. When examining this finding in conjunction with the contingency table analysis, we can conclude that when we know if the seller is full time or part time, we have a 96% chance of correctly predicting whether he or she will sell to a minor. The findings here bring us to the same conclusions as produced by the full seller model as to the implications the model provides to enforcement, training and industry staffing.

This model does give some support to expectancy theory. These variables lead us to conclude that if sellers have a sense of ownership, whether financial or not, in the outlet as an organization, they will have a greater tie to that organization and in a theoretical cost-benefit analysis, the cost of selling to a minor will outweigh any benefits associated with making a sale. How a person fits into the categories of these two variables reflects the amount of stake they have in the outlet.

CONCLUSION

In this chapter we presented the analysis of individual seller variables. As before, we began with contingency table analyses of the independent variables compared with the dependent variable of sales to minors. Here, unlike in the previous chapter, many of the variables had a statistically

significant association with minor sales. Upon first glance they all, save two, seemed to have important predictive power. It was here that the importance of the difference between statistical significance and substantive importance became clear once again. Previously, our non-statistically significant findings provided important substantive information in the contingency table analysis. In this chapter we found that statistically significant findings provided important information that should be able to be used in accurately predicting whether an individual will sell to a minor. The problem arose when we saw the amount of effort required in obtaining the information necessary to employ the variables as predictors. As law enforcement resources in general and alcohol enforcement resources in particular are strained to the limits, we need not only a valid predictor of potential violations, but a readily available one. Unfortunately the variables identified in this chapter do not provide this readily accessible information for use in enforcement.

However, our multivariate model does have some practical utility for training. In North Carolina, ALE agents provide training and, as it is not mandatory, the owners and managers of outlets decide whether to avail themselves of the training and if so, which employees to send to the training. Agents can use the information provided herein to make owners and managers aware of whom they most need to send to training.

The findings of this chapter, both the individual analyses and the multivariate models, have important implications for the alcohol industry. As reported above, these findings are important to training, but they provide more important information to industry members in scheduling employees. Where employees fit within these variables, coupled with the information provided by the time of day and day of week information presented earlier, can provide valuable information as to whom to schedule, at what times and on what days to reduce sales to minors.

With this, we conclude the analysis and discussion of the independent variables and models presented in this research. We now turn our attention to a discussion of why this research matters. In the last chapter we will review our main findings, set out areas for further research in the field and suggest policy recommendations based on our findings.

CHAPTER 6

PREDICTING, EXPLAINING AND DETERRING ALCOHOL SALES TO MINORS: OVERALL IMPLICATIONS, RECOMMENDATIONS AND CONCLUSIONS

INTRODUCTION

This study began simply, by attempting to identify those variables associated with explaining, predicting and reducing the sale of alcohol to minors in North Carolina. While the idea may be simple, the problem it addresses is not. Underage drinking is an overwhelming problem resulting in deaths, injuries and billions of dollars in costs each year. A literature review was conducted to assess the state of knowledge in this field. Early on in this process it was discovered that there has not been an enormous amount written about reducing alcohol sales to minors. Interestingly, what had been written is attributed, for the most part, to a group of scholars who teach at, or received their training from, the University of Minnesota. While this group's research has been of an exceptionally high quality, due to the small number of people conducting research in this field, we found many opportunities to build upon the foundation that they have laid. They have done an excellent job in pointing out deficiencies in the body of research and noted many gaps in need of study. The literature review discovered that the sale of alcohol to minor literature did not include a statewide study. The literature specifically excluded extensive research in the state of North Carolina. None of the prior studies grounded their hypotheses in deterrence theory, expectancy or criminal profiling. While the relevant literature did focus on both sellers and the licensed outlet as units of analysis, none examined both in one study. The majority of the prior studies only examined a small number of characteristics of whichever unit of analysis they chose to study. Most importantly, no prior study framed its findings or made recommendations in such a manner as to specifically shape public policy to reduce the sale of alcohol to minors through enforcement, training or partnering with the alcohol sales industry.

The theoretical foundation for this study was based on the tension between the expectancy-deterrence theories' tenet of "ownership" characteristics coming to bear on the decision making process and prior enforcement actions operating to deter the sale of alcohol to minors and criminal profiling's tenet of persistence of actions, where a person or outlet that had sold in the past would continue to do so in the future.

The units of analysis examined were the licensed retail alcohol sales outlet and the individual alcohol seller. We also included a "hybrid" set of variables, namely time of day and day of week that could be used with either unit of analysis, but fit perfectly with neither. Those variables believed to have explanatory and predictive ability in the sale of alcohol to minors were identified through prior empirical research studies and the more than twenty years of experience in the field of the author. Research hypotheses were formulated for all the variables. Having the hypotheses in mind, research questions were formed to guide the research. The variables were then combined into a formal series of objectives, which for sake of continuity are repeated here. These objectives were:

To assess the deterrent effect of undercover compliance checks on future sales of alcohol to minor violations.

To identify characteristics of licensed alcohol sales outlets that are significantly associated with the outlet's propensity to sell alcohol to minors. These variables will be combined to develop offender models to identify outlets that are most likely to sell to minors, to allow the efficient allocation of scarce enforcement and training resources.

To identify individual seller characteristics to determine which are associated with sales to minors. Those significant characteristics will be used to develop offender models to identify sellers most likely to sell to minors. These models may also be used by law enforcement to

allocate scarce enforcement and training resources and by the alcohol industry to provide guidance as to scheduling employees for work and training.

To identify a pattern of days of the week and times of day when sales to minors occur to better target enforcement resources and to serve as a guide to the alcohol industry in scheduling employees.

To assess whether sales to minor offenses are independent of other types of crime generally and other alcohol offenses specifically.

To suggest, based on conclusions reached from the data, public policy changes in the area of youth access to alcohol.

This study's methodology had its basis in a program funded by the U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention entitled "Combating Underage Drinking. The specific portion of the program that produced the data used herein was called "Secret Shopper." This program consisted of sending carefully selected minors into a proportionally stratified random sample of alcohol sales outlets to attempt to purchase alcohol. This quasi-experimental design included a pretest-intervention and a posttest. During the posttest a survey producing data on the alcohol outlet and individual seller was completed. After the posttest was completed another survey detailing the enforcement and training history of each outlet was completed.

After this data was produced and compiled, it was analyzed based on the research hypotheses and questions set out earlier. The analysis, the discussion of its results and implications of the findings to enforcement, training and staffing were presented in the preceding two chapters.

We will now summarize those findings and implications that were provided in the preceding analysis and discussion chapters. While this information has already been presented in detail, a more concise summary presented here may help provide a clear overview. Only those variables that provided important information having serious implications to the topic of interest are summarized below.

REVIEW OF THE MAJOR FINDINGS: The Deterrent Effect of Compliance Checks

The data analysis began by assessing of the deterrent effects, if any, of the compliance checks on licensed outlets in the posttest. This was done by comparing the pretest and posttest sales data, by contingency table and repeated measures ANOVA analyses. The purpose was to compare the same group of outlets, pretest and posttest, to determine whether exposure to the compliance check in the pretest had a deterrent effect on sales at the posttest. It was postulated that any potential deterrent effect would be tempered by the fact that none of the usual consequences associated with violating the sales to minor laws were attached to the experiment. No statistically significant deterrent effect was found. This finding was not totally surprising for the reason provided above. The lack of deterrent effect is contrary to the literature in the area and raises many questions. The lack of sanctions probably goes far to explain the departure from the literature in our sample; however, this can only be assessed by future research where the compliance checks carry the full measure of sanctions.

Policy Implications

What policy implications does our finding raise as to compliance checks? Although the checks associated with this research carry no deterrent effect, most probably based on their carrying no sanctions, we do not advocate the abandonment of their use without further study. We do; however, recommend replicating this research with full consequence compliance checks.

Minor Sales Rates

In an attempt to rule out competing hypotheses that other factors could have intervened between the pretest and posttest, a control group was included at the posttest. While this was the initial purpose of using a control group, it provided additional important information. In the pretest, 500 compliance checks were performed, resulting in a 27.0% sales to minor rate. The full posttest sample, including those checked at the pretest and the control group (N = 469), resulted in a 25.6% sales to minor rate. The control group, taken alone (N = 212), resulted in a 23.6% sales rate. This data, gathered at two points in time, of three independent random samples, taken together suggests a 25.4% sales to minor rate. From this analysis, we conclude that approximately one-quarter of licensed outlets in North Carolina will sell to minor at any given time.

REVIEW OF THE MAJOR FINDINGS OF THIS STUDY: Licensed Outlet as Unit of Analysis

Using the licensed sales outlet as the unit of analysis, a number of characteristics were identified as having explanatory potential. Those of substantive importance are presented below.

Prior Sales to Minor Violations

The first variable examined was a history of having prior sales to minor violations. It was discovered that this variable was not an efficient predictor of future sales to minors. The fact that past violations do not predict future violations may have its basis in deterrence theory. First, deterrence theory states for an event to be a deterrent it must be associated with a swift, certain and severe punishment or consequence. As was said in the initial discussion of this variable's analysis, the ABC Commission, through no fault of its own, is not able to bring the violation cases to closure in a timely manner. While the present punishment structure is reasonably certain, it is may not be seen as severe by some classes of permit holders. The general first time punishment for this type of violation is an \$800 fine accompanied by an inactive suspension of the ABC

permits. While this may be severe for a “mom and pop” operation, many of the alcohol outlets in North Carolina are owned by multi-billion dollar corporations who may see the fine as another cost of doing business. Deterrence theory would suggest that if reducing sales to minors in an important public policy objective the severity of consequences need to be substantially increased. While a monetary penalty may not adequately deter all permittees at the same level, as was explained above, perhaps policy makers should examine changing policy to forego the monetary fines in favor of only suspending the outlet’s ABC Permits. This would seem to be a fairer way to deal with permittees across the board, as the amount of alcohol revenue loss would be directly proportional to the amount of alcohol the outlet normally sold.

Such a change has a theoretical basis in all of the theories used in this study. First, losing one’s ABC permits for a period of time would result in a monetary cost that would be equal to the amount of alcohol sold during that period. As to expectancy theory, this would increase the “cost” portion of the decisional process involved in selling to a minor. The more certain and severe punishment should operate to increase deterrence. Finally, if the persistence tenet of profiling theory holds true, those outlets that routinely offend would be made to pay a higher price as traditionally the penalties increase with the number of violations. As to our intervention of compliance checks, with a more severe and certain punishment, the knowledge that compliance checks are being routinely conducted should have more of a deterrent effect on sales to minors.

Prior Non-Sale to Minor Violations

The variable of non-sale to minor ABC Violations had no predictive value, but more surprisingly, the offense of selling alcohol to minors was found to be independent of other ABC violations.

While our research does not explain why this is the case, we can suggest a possible hypothesis for future research: that sales to minors are not always a the result of a premeditated or intentional act. Sales to minors may occur due to oversight or other cause, not clearly criminal.

In the state of North Carolina sales to minor violations are a strict liability offense, much like speeding, in that no showing of criminal intent is required for conviction. Our data suggests sales to minor crimes may often be more the product of oversight or carelessness rather than criminal intent. This may explain why it is statistically independent of ABC violations requiring premeditation or intent to commit. If this is true, it may have far reaching implications for the effort to reduce sales to minors, and may serve to refocus the efforts in a new direction. This line of reasoning is surely one worthy of further research.

Prior Sales to Minor Official Warnings

Official warnings for selling to minors had a non-statistically significant relationship to sales in the posttests. While not significant statistically, an examination of the relative frequencies does point to those outlets with a prior warning selling at a lower rate at the posttest. This may point to some deterrent effect being provided by official warnings. This finding raises an interesting hypothesis, that a warning, while clearly an enforcement tool, may also be viewed as an attempt by law enforcement to partner with the alcohol industry to reduce sales to minors. As was said earlier, these findings may lead to the idea that more compliance can be obtained with a carrot than a stick. If sales to minors are more a product of carelessness than intent, then a warning may serve to put the outlet on notice that its employees have to be more careful. It should be pointed out that this research only points to this conclusion and does not provide absolute proof. This issue is left to others to explore.

Non-Sale to Minor Official Warnings

Official warnings for non-sale to minor offenses also had no predictive value as to sales to minors. However, when one combines the information provided by analysis of this variable with that above of non-sale to minor violations, the idea that the crime of sales to minors is not associated with other alcohol related crimes is strengthened. Such a finding clearly warrants

further research because traditionally selling alcohol to minors has been treated like other offenses from an enforcement point of view. If it is true that this offense is in some way fundamentally different from other ABC Law violations, then new and varied enforcement strategies are warranted.

Seller Training

The training variable analysis found no significant association with reduced sales to minors at the posttest. This finding is contrary to the literature in the field and points to several implications. First, the ALE BARS program as presently constituted may be in need of revision. It stands to reason that if training has resulted in a deterrent effect in other states, it should have a similar effect in North Carolina. Secondly, since North Carolina does not mandate seller training, those in the greatest need of that training may not be receiving it. The ALE Division may, in effect, be training those sellers that are least in need of it. Perhaps if this information is viewed in light of the conclusion that sales to minors are independent of other offenses, being more of a crime of omission more than a crime of commission, then if the BARS program is updated it should take this conclusion into account. The BARS program, as it relates to sales to minors, should incorporate as its overall goal, that of instilling the idea in alcohol sellers that they have to be alert and properly ascertain the age of all who wish to purchase alcohol.

Day of Week of Attempt to Purchase

The day of week variable was the first to be found to have a statistically significant association with sales to minors. While the information it provided basically followed the research hypotheses, it did provide interesting findings. Law enforcement culture has held for many years that minors buy alcohol on weekends and this belief, coupled with prior research, formed the basis of the research hypothesis that the most sales would occur on weekends, specifically on Friday. Examining the relative frequencies of sales to minors we observed that Friday had a

sales rate of 34.3%, Saturday had a rate of 20.3% and Sunday's was 48.8%. The mean sales rate was 25.6%. The biggest surprise of the data analysis to the author, given his twenty-plus years of experience, was that Sunday recorded the largest sales rate. This is one point where the reader has to be careful in interpreting what the data is pointing to. The data merely says that the *sales* rate is higher on Sunday. Our study did not measure purchase rates. As sales to minor offenses cannot occur without a willing underage buyer, we have to be careful as to what conclusions to draw from our data when applying the findings to policy implications. While there may be a higher potential for *sales* on Sunday, as the data herein shows, what is not known is at what rate minors are attempting to *buy* on Sunday. Here again our research has raised more questions than it answers. While these findings may have serious implications for the culture of the Alcohol Law Enforcement Division and probably for those other agencies concerned with alcohol enforcement, they must be viewed in their proper perspective. The main issue is that there is no currently available data to show at what rates minors are attempting to purchase alcohol on various days of the week.

Time of Day of Attempt to Purchase

Times of day of minor sales was found not to have a statistically significant association with sales to minors. It does provide substantive information that also causes those of us in this field to question the currently accepted conventional wisdom. When the data was divided into morning, afternoon and evenings, the analysis indicated that sales occur at a higher rate in the afternoons and slightly higher in the evening hours. This makes sense given that minors are out of school at these times and are available to purchase. What this data also implies is that minors buy alcohol at any time that the opportunity exists. They do not buy during the mornings or early afternoons of week days generally, because they are not available at those times to buy. Traditionally law enforcement efforts at sales to minor enforcement concentrate on the evening hours. This has been incorporated into the culture of ALE by the differentiation in "administrative duties" and

“enforcement.” These terms have become so ingrained in the culture of ALE that they are placed on an agent’s weekly report to denote what he or she did during the work day. As said in the original discussions in Chapter Four, agents typically work “enforcement” during later shifts and coupling this variable with the previous ones, typically on the weekends. What this analysis tends to show is that minors attempt to purchase when the opportunity arises and sales to minor enforcement should not be specifically targeted at times of day, unless the agent can articulate specific reasons why underaged persons are readily available to attempt to purchase.

REVIEW OF THE MAJOR FINDINGS OF THIS STUDY: Criminal Profiling Models

The literature on criminal profiling seemed to point to a natural progression of the field to be able to predict offenses such as sales to minors. While the theory seemed sound, in reality, at least in the case of trying to predict which outlets would sell to minors, it was not successful. Perhaps the prior discussions provide a foundation for discussing why this was found to be true. In criminal profiling, all those offenses, murders, rapes, arsons, financial crimes, etc., are criminal intent offenses. The perpetrator must form the intent to commit the crime, prior to actually committing that specific crime. Our data analysis points to the offense of selling alcohol to a minor as being a strict liability crime, one born more of carelessness and oversight than criminal intent and one that is not necessarily premeditated and being independent of other alcohol related crimes. If this conclusion is true and if none of those characteristics identified has specific predictive or deterrent power, then it naturally follows that sales to minors is an offense that will not be susceptible to prediction using the currently accepted tenets of profiling. While the construction of an outlet offender model or profile was initially a major component of this research, we concluded that licensed alcohol sales outlets do not fit within its parameters.

REVIEW OF THE MAJOR FINDINGS OF THIS STUDY: Individual Seller as the Unit of

Analysis

Status

Now it is time to turn our attention to the outcomes of the analyses of those characteristics associated with the individual alcohol seller. The status of the seller, specifically whether the seller was the owner, partner, stockholder or employee only of the outlet, was significantly associated with sales to minors. The findings, that owners sell at a much lower rate and those with no financial interest in the business, were framed in terms of expectancy theory. It was hypothesized that those with more of a "stake" in the business see a greater cost to violating the sales to minor laws. The owner, who incurs the most cost when a sales to minor violation occurs, sells at a lower rate. While statistically significant as a predictor of sales to minors, this variable has limited utility as an enforcement tool because an ALE agent will not readily know when the owner is working and in some cases may not know the identity of the owner. Its importance to the issue of reducing sales to minors is in the areas of training and staffing. Combining the findings here with those of day of week, owners can schedule themselves to work at those times when minor sales rates are the highest. The utility of this finding to training is that when training industry members, it is now known that owners are the least in need of training, but that they should be encouraged to seek training for their employees. While this variable does provide additional explanatory information, the importance of this information will be better illustrated by combining the effects of this variable with several of those that follow.

Class of Employee: Manager or Clerk

Having shown that employees sell to minors at greater rates than owners, the next logical step is to ascertain if there are any difference among employee classes, here whether that employee is a manager or merely a seller. Following from the findings of the analysis of the prior variable, and here again couched in terms of expectancy theory, it follows that managers, while having more of

a stake in the organization, should sell at a lower rate than non-managing employees. This hypothesis was borne out as managers sold to the minor at a significantly lower rate. This finding goes further toward showing that having more of a stake in the organization goes hand in hand with increased levels of deterrence, and results in managers selling to minors at a lower rate.

Employment: Full Time or Part Time

Whether a non-managerial worker is employed full time or part time was also found to have a statistically significant association with sales to minors. As we predicted, following from the findings of the other analyses, the results reflect that part time employees sold at a higher rate than their full time counterparts. From an expectancy theory perspective this was expected as those who work part time, having less of a stake in the operation of the outlet have less to lose by selling to a minor.

Value of the Findings

While the findings associated with this series of variables are significant, they provide little assistance to enforcement planning. This is because it is difficult to know, without going to the outlet and interviewing the working employee what his or her status as it relates to these variables are. They do provide valuable information as to training, because knowing which classes of employees tend to sell at higher rates provides guidance as to which employees should receive training and which should receive priority in that training. Equally important are the implications to the industry in the scheduling of employees.

Employee Tenure at the Outlet Checked

The next variable examined was tenure of the employee at the specific outlet checked. The findings show generally that employees sell at a lower rate as their time at the outlet progresses. The most significant finding was that those with less than one month at the outlet sold at greater

than a 50% rate. These findings also lend credence to our expectancy theory argument, as dependence on the employment should increase with tenure. Again we have a variable that provides information that can aid in the decision processes in training and staffing; however, due to the difficulty in ascertaining the seller's tenure, it provides little enforcement guidance.

Employee Tenure in the Alcohol Industry

A related variable is how long a seller had been employed in the alcohol sales industry was looked at next. The sales rates are extremely high for those just beginning in the industry. As they progress in time, the rates drop and then level off.

Seller Training: ALE BARS Training

As with the earlier examination of training as it pertained to outlet, the findings of the analysis of training dealing with the individual was not statistically significant. While not statistically significant at the .05 level, at $p = .059$, it was extremely close. While it was disappointing that training was not found to be more significant, still one cannot dismiss the overall conclusions of the literature that training does matter. From the analyses of these variables it is seen that training has more of an effect on the individual attending training than on the outlet as a whole. From this it we conclude that there is little or no vicarious effect of training on those working in the same organization as sellers who have been trained. This points to the notion of training all sellers, not just a percentage of employees from each outlet, in hopes that the effects will "rub off." If training has any deterrent effect on sales to minors, then these findings lead us to conclude that training is more of a specific deterrent, reducing sales to minor rates in those who actually receive training rather than a general deterrent in reducing sales in those who work at outlets that have received training and have not been personally exposed to the training.

Seller Training: Non-ALE Training

As before, attendance at non-ALE provided training was examined and was found not to be statistically significant, and in fact sellers exposed to non-ALE training sold at a higher level.

Taking these two variables together it is surmised that while ALE BARS training may not be a statistically significant deterrent to selling to minors, it holds more promise than the non-ALE training when examined.

Age of Seller

The age of the seller was the next characteristic of interest analyzed. Again the findings while not being statistically significant did provide some valuable information about how the ages of sellers are associated with sales to minors. This analysis indicates that those in the 16 to 21 year old age group do not sell at a significantly higher rate than those above the legal drinking age.

Gender of Seller and Prior Sale to Minor Charges

The final two variables examined were the gender of the seller and whether the seller had been previously charged with selling to minors. These variables are discussed together because neither provided any predictive or explanatory information whatsoever. Alcohol sellers violate the sales to minor laws at the same rates irrespective of whether they are male or female or whether or not they have been charged with selling to a minor in the past.

While the number of those with prior sales to minor charges, exactly 12, is too small to provide significant information, the fact that those few in our sample that had prior charges were not more greatly deterred is interesting. A possible explanation for the small number is that those convicted of this offense are prohibited, although not an absolute prohibition, from working in the alcohol sales industry for two years. The lack of a deterrent effect is surprising and may be the product of a violation of the deterrence tenet of severity. At the time this research was

undertaken, there was no severe penalty associated with this offense. While it did require a mandatory court appearance, it carried little more sanctions than a traffic ticket. In December of 1999 the penalties increased and judges' discretion was severely limited in these cases. It would be interesting to compare the deterrent effect of sales to minor convictions before and after the mandatory minimum punishments were

Overall Comparisons of the Independent Variables

The matrix in Table 6.1 below shows under which theoretical base the original predictions made in this research fall. As the reader can see, the majority of the outlet related variables were predicted by profiling or persistence theory. Conversely, deterrence or expectancy predicts the majority of the individual variables. Those variables found to be significant (of which all were individual seller or the hybrid) are approximately evenly distributed between the two theoretical bases, which supports our use of these theories to underpin our research hypotheses. Based on the interpretation of this matrix, we see that profiling theory looks at past events to predict the future, with a few exceptions. Again, conversely, deterrence theory looks at present characteristics to predict the future.

**Table 6.1
Unit of Analysis and Theoretical Base Matrix**

Predictive Theoretical Bases	Deterrence/Expectancy Theoretical Base	Profiling/Persistence Theoretical Base
Unit of Analysis		
Licensed Outlets	Outlet Ownership Outlet Location BARS Training	Prior STM Violations Prior Non-STM Violations Prior STM Warnings Prior Non-STM Warnings Prior STM Complaints Prior Non-STM Complaints Day of Week of Attempt * Time of Day of Attempt *
Individual Sellers	Seller Status Manager or Clerk Full Time/Part Time BARS Training Non-BARS Training Seller Age	Tenure at Outlet Checked Tenure in Alcohol Industry Seller Gender Prior Sales to Minor Charge Alcohol Consumption by Seller **

* Hybrid Variables that Could Be Included in Either Unit of Analysis

** Exploratory Variable: Having No Theoretical Base

Overall, we conclude that outlet related variables are not significant predictors of future sales.

This is unfortunate because they are the easiest characteristics to ascertain. On the other hand, the individual seller related variables are, for the most part, significantly associated with predicting future sales to minors, but are difficult to verify without extensive knowledge and without going to the outlet to personally observe the employee(s) working. These conclusions set the stage for combining these variables into multivariate models to determine if interaction effects caused by the combination may do a better job in providing a useful predictive model to reduce minor sales.

MULTIVARIATE MODELS

After completion of the individual analyses, two multivariate models were constructed, using those variables associated with the individual seller. The first was a full seller model containing all those variables discussed above. The second was a model referred to as the expectancy theory model, that contained those variables believed to be the most significantly related to an individual seller's decisional process that would hold that the cost of selling to a minor outweighs the benefits of violating the law.

While both these models were found to be statistically significant, they show little substantive significance. They predicted that all the cases would fall within the "refused to sell to minor" category, the opposite of what was being modeled. Both of these models predicted sales to minors at virtually the same rate as would be obtained by making an educated guess. Another deficiency of both, when taken in view of guiding enforcement, is that those characteristics that were found to be significant in the models are those that are difficult to ascertain, such as whether the seller is full or part time or how long the seller has worked at the outlet. While the models do provide some guidance in the areas of which sellers to train and schedule, they provided no more information than already gleaned from the contingency table analyses.

Importance of Models

During the planning stages of this research it was greatly hoped that the models would be both statistically and substantively significant and would provide guidance to the North Carolina Alcohol Law Enforcement Division and other alcohol enforcement agencies in the state in the areas of enforcement and training. These models were grounded in that body of literature dealing with offender modeling or profiling. The way in which the field has progressed offered encouragement that the models developed herein would be successful. It was realized that what was done here was taking the state of the art in offender profiling down a new avenue that it had

not been before and as such was a gamble. While it was disappointing to discover that the models do not work, it was not totally unexpected given the literary foundation in the area of sales to minor enforcement. Forster, et. al. (1994) used logistic regression modeling to attempt to identify what variables contributed to successful underage alcohol purchases. It resulted in a model where only the age of the buyer and the specific community the outlet was located in were significant, again providing little guidance in enforcement. Also Wolfson and Toomey (1996) constructed a similar multivariate model attempting to identify explanatory outlet characteristics and found that only being a member of a general business association and those locations that derived a larger portion of their profits from alcohol were significant. The characteristics that they found to be significant, much like those we found to be significant in our seller model, are those that require as much or more time and effort to illuminate as could be saved by their knowledge.

Independence of Sales to Minor Violations

Based on the analyses of many of the independent variables examined in this research, we came to the conclusion that sales to minor violations are independent of other types of crime, including other ABC offenses. This conclusion was based on the findings of no association of any of the prior enforcement variables with sales to minors at the pretest. We found that the compliance checks conducted as a part of this research had no deterrent effect on sales at the posttest. This finding is contrary to what we would have expected predicated on deterrence theory. We also found no set patterns of sales to minors based on analysis of the independent variables associated with outlets as the unit of analysis as profiling theory would suggest. For deterrence theory or profiling theory to operate herein, we had to follow the assumption that sales to minor violations are premeditated and based on rational decisions. The analyses of the data collected on the variables in this study would lead us to conclude that sales to minors are, for the most part, not based on conscious action, but on carelessness, apathy and a general failure to assess the costs and benefits of one's actions. If this conclusion is true, it will go far to explain why the

compliance checks in this study had no deterrent effect and why seller training was also not associated with a reduction in sales to minors at the posttest.

RESEARCH QUESTIONS SUGGESTED BY THIS RESEARCH

It has been said many times in the foregoing summary of the findings study that this research has raised more questions than it has answered. Such is the nature of research. What follows is a summary of those research questions that were raised herein and are in need of future study.

Non-Association of Sales to Minors with other ABC Offenses

The interpretation of several of the variables analyzed herein seem to point to the notion that the offense of selling alcohol to minors is not associated with other types of ABC violations. The data analyses lead to a preliminary conclusion that sales to minor violations are independent of other ABC offenses and to the research question: Is the offense of the sales to minors independent of other ABC offenses? If our preliminary conclusion is found to be true, it could have serious implications in the area of alcohol policy and enforcement and as such is in need of further study.

Non-Traditional Strategies

The next research question follows from the previously identified research gap. This question is: What additional strategies should be employed to reduce sales to minor violations, given that this offense is a strict liability, not a specific intent crime? This question follows from the one posed above and would build on research aimed at answering that question. Earlier we raised the notion that the sale of alcohol to minors is seen as a strict liability offense, not one necessarily one given to premeditation and deliberation. Given that the offense is not always committed deliberately, possibly a new tack should be taken in the attempt to reduce sales to minors. This idea needs to be explored further to ascertain if additional strategies such as a positive partnering

with members of the alcohol industry can have a more significant effect on reducing sales to minors than those strategies now employed.

Seller Training Questions

This research raised several questions in the area of alcohol seller training. The findings here were not as significant as prior studies, which in and of itself raises questions. First as the data analysis here shows that seller training has no vicarious effect on those employees of outlets that do not directly receive the training we pose the research question: Does seller training have a vicarious effect on those organizational members not receiving training? Another issue raised here and in the prior literature is: how long does alcohol seller training operate to reduce the rate of sales to minors? While our research did not directly measure when sellers and outlets received their training, the question did arise in mind of the author when the data did not confirm a significant association between seller training and a reduction in sales to minors. As we recommend updating North Carolina's BARS training program, we pose the question for further research: Does seller training based on Toomey and Kilian's typology provide the necessary skills to reduce sales to minors?

Age Restrictions on Sellers

The data analyzed in this study found that those from ages 16 to 21 did not sell to minors at a higher rate than older sellers. As seller's age this has become a hot button issue, we suggest the following research question. Should those less than the legal age to purchase, possess and consume alcohol be allowed to sell it, and does this group sell to minors at a greater, lesser or equal rate than other age groups? This avenue of research is grounded on the idea that it may be sending a mixed message to allow those who cannot use a substance to sell it; however, eliminating those less than 21 from selling alcohol could have a severe economic effect on this

segment of the population. Before making such a controversial decision, one way or the other, more research is warranted.

Deterrent Effect of Full-Consequence Compliance Checks

The findings here do not directly support the deterrent effect of those undercover compliance checks lacking the usual consequences of non-experimental compliance checks. This finding raises the question of whether compliance checks that have the usual consequences will have a deterrent effect? These operations are costly in manpower and time and due to those extreme controls placed on the operations to ensure their fairness, they are difficult to conduct. This is a question that begs to be answered and for a law enforcement agency to utilize its resources as effectively and efficiently as possible, it is one that would be well worth the effort in answering.

Day of Week and Time of Day that Minors are Attempting to Purchase

This study went far in identifying on what days of the week sales to minors are occurring. This information is important in all the areas of interest here, enforcement, training and staffing. We may now know when the sales take place, but we have one missing variable, namely the minor. While we know what days sellers are more likely to sell, the question in need of research is: On what days of the week are minors more predisposed to attempt to purchase alcohol? This question probably could be answered by the use of focus groups of youth less than 21 or by administering surveys to this group. This information, if known, would be much more valuable to enforcement, training and scheduling than on what days sellers are more predisposed to sell.

Traditional Beliefs of ALE Agents

Finally, based on the experiences of the author and those preconceived notions that he and many other members of the N.C. Alcohol Law Enforcement Division share and that have become ingrained in the traditions and culture of that organization, many of the results of the data

analyses were of a great surprise. Those included are day of week and time of day of sales; the lack of predictive information given by past violations, warnings and complaints; the fact that gender is not associated with sales and the lack of deterrent effect of sales to minor charges. Given this, it would be of great utility to survey the members of the ALE Division and pose the overall research question: How do the beliefs of ALE Agents as to the variables examined in this research compare with the data analysis findings, and what implications do the differences between beliefs and reality have for future sales to minor enforcement? The answers to these questions could go far in changing the culture, beliefs and attitudes of the agency, which could manifest itself in a better, more responsive, effective and efficient response to reducing the problem of selling alcohol to minors.

POLICY RECOMMENDATIONS

Given the findings presented above, the following recommendations are proposed. While the purpose of a dissertation is to make a contribution to knowledge, that contribution is for naught unless the findings are put to practical use.

Continuation of Compliance Checks

It is apparent that offender and outlet specific profiles will not work to drive enforcement in the area of sales to minors. Given our conclusion that sales to minors are independent of other types of crime and are most probably the result of carelessness and oversight than premeditation, it is believed that random interdiction would be a more efficient strategy than attempting to predict which outlet or seller is going to sell alcohol to a minor. Given this, we recommend the continued use of random compliance checks. While they were not found to be a statistically significant deterrent to future sales to minors in this research, those that received the check in the pretest were slightly less inclined to sell at the posttest and given that the full range of sanctions available to real world checks did not attach here, it is felt that full effect checks will have a greater

deterrent effect. This notion is grounded in the research literature where compliance checks did have a significant deterrent effect on future sales. Wagenaar and Wolfson said that “With modest additional resources, sources of alcohol could be effectively targeted, significantly increasing deterrence of selling to minors” (1994, 46). While their use has been controversial, the prior research studies show that it can be an effective law enforcement strategy and its utility as a data gathering device cannot be doubted, as this research would not have existed without their use. Compliance checks also provide an opportunity to conduct proactive enforcement, in that when a location refuses to sell alcohol to a minor an opportunity is provided to congratulate the seller and the owner for doing a good job and to offer training.

Changes in Punishment

We saw that past sale to minor violations do not deter future sales. Examining this finding in light of deterrence theory we see that the problem may be that two of deterrence theory’s main tenets, those of swiftness and severity of action, are violated. As explained above, what may be severe for one permit holder may be insignificant to another. However, the playing field can be leveled by making the punishment equivalent across all classes of alcohol sales permit holders. What is recommended is that permit suspensions, which are used on a limited basis today, totally replace monetary penalties. If this were to be adopted, then a specific term of suspension would have the same effect on the “mom and pop” operation as the corporate outlet, as the punishment would be the denial of potential alcohol sales profits for the designated term. Swiftness in reaching a final outcome in an ABC violation is also an area in need of addressing. Presently, the time from a violation’s discovery to final disposition is excessive. It is recognized that the wheels of justice turn slowly; however, this violation of one of the major tenets of deterrence theory greatly reduces the effect that having a prior sale to minor violation has on future sales to minors. It is recommended that those in policy making positions study this issue and suggest policy changes that will allow the swiftness tenet of deterrence theory to attach.

BARS Training Updates

Based on the findings that ALE BARS training does not significantly reduce sales to minors, we recommend the BARS program be reexamined and updated, using the evaluative framework provided by Toomey and Kilian in their article, which was discussed in the literature review. Given the conclusion that sales to minors offenses may be more of a crime of omission, one caused by carelessness or oversight, other skills, for example checking the identification documents of all purchasers, need to be included in BARS training.

Mandatory BARS Training

Following from the previous recommendation, it is recommended that once the training is updated that it be made mandatory. While our findings were inconclusive as to training, the literature is filled with studies where training was found to be a significant factor in sales to minor reduction, especially when this training is mandated. We did see, from the previous literature, that in areas where training is voluntary, those who need the training the most will not take advantage of it and making it mandatory may be the only way to assure that those most in need of training receive it.

Seller Licensing

The next recommendation is also tied to the previous one. It is based on our findings that a sense of ownership is associated with reductions in sales to minor violations. This idea is based on expectancy theory and its notion of people making conscious decisions based on cost-benefit analysis. We have posited that ownership, whether literal or figurative, increases the cost and decreased the benefit associated with selling to minors. While we do not advocate that all sellers be given an ownership stake in the outlet they work in, perhaps we can create a condition whereby the seller does feel some sense of ownership, thereby increasing the cost associated with selling to minors. This could be accomplished by requiring all sellers to be licensed by the

state prior to selling alcohol. While the seller would not own the license, as an ABC permit holder does not own the permit, the fact that the state could take this license away and thereby take the person's livelihood away, a sense of ownership is created.

Deterrence theory could also be brought to bear on this proposal. As with other state granted licenses, violation of rules and laws could entail a suspension or revocation of the license in addition to criminal penalties. This would increase the perceived deterrent tenets of certainty and severity as applied to individual sellers.

BARS Requirement for Licensing and Retraining for License Renewal

Following from the previous recommendation and those that precede it, we recommend that prior to granting such a license the seller must attend ALE BARS training and pass a test. If this state does not allow a person to drive a car without having training, passing a test and obtaining a license, why should we allow someone to take on the immense responsibility of selling alcohol with all its possible negative consequences, only by virtue of their being able to operate a cash register. We also tentatively make the recommendation that alcohol sellers have to renew these permits at specified time intervals and become re-certified by taking refresher training and passing another test. This recommendation is tentatively made pending empirical evidence of the time period that training operates to lessen sales to minors.

Seller Age Restrictions

Again following from the licensing recommendation, we also recommend a minimum age to obtain an alcohol seller license. We do not pretend to be qualified to recommend at what age the license should be issued, but given the research findings herein, and given the age at which we allow youth to drive a car, 16 seems the appropriate age at which to begin the discussion. If this recommendation is studied by those in a policy making position, we wish to remind them that the

findings of the logistic regression model did point out that those in the age 16 to 21 year old group were associated with a 76% decrease in sales to minors when compared to other groups.

Sunday Sales to Minor Enforcement

Finally, this research has shown that Sunday has the second largest sales to minor rate. ALE agents rarely work on Sunday and when they do they are usually enforcing the prohibition against alcohol sales before 12:00 Noon. While, as acknowledged before, this research does not answer the question as to what days of the week minors are attempting to purchase alcohol, clearly we have found that sellers are more predisposed to sell to those minors attempting to purchase on Sundays. From this we recommend that the ALE Division place more emphasis on enforcing the sales to minor laws on Sundays. If this is done and adequate records are maintained, then the data produced can be used to answer the research question of whether minors are attempting to purchase on Sundays at as great a rate as the sellers seem ready to sell to them.

We said in the introduction to this work that alcohol policy has been one area where science has won out over economics and politics and has driven policy making. By presenting these recommendations it is hoped that the results of this study will continue this tradition and influence policy in the area of the control of underaged sales of alcohol.

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