

TOBACCO VENDOR COMPLIANCE CHECKS: AN ANALYSIS OF VARIABLES THAT
PREDICT CLERK BEHAVIOR

BY

NICOLE RENAE HILLIER

DISSERTATION

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Doctoral Committee:

Professor Janet Mildred Reis, Chair
Peter F. Mulhall, Director for Prevention Research and
Development
Professor Reginald J. Alston
Stephen John Notaro, Lecturer

ABSTRACT

Preventing tobacco vendors from selling tobacco to youth is part of a comprehensive approach to combat youth smoking. The literature shows that clerks who ask for identification tend to refuse sales to minors. The current study examines which factors predicted whether a clerk sold under a variety of scenarios. The study also examined which factors predicted whether a clerk asked for identification since asking for identification consistently predicts selling in the literature.

Over the course of 8 years, the local health department conducted 2717 compliance checks on local tobacco vendors using purchase attempts by youth 14-17 years old. For the current study, 2122 of the cases were analyzed.

Logistic regression was performed using different predictor variables. Background variables included operation type, town size, and per capita income of the neighborhood. Event variables included clerk gender, youth age, youth race, youth gender, whether the clerk asked for identification, whether the youth provided identification.

Asking for identification and youth age predicted selling. Youth age, clerk gender, and being a liquor store predicted asking. Selling after asking for identification was predicted by the youth providing identification and being a bar/restaurant. Selling after identification was provided upon request was predicted by being a bar/restaurant. Age was the only predictor for selling without requesting identification.

Asking for identification is the key to compliance. Clerks who did not ask were 45 times more likely to sell tobacco products. However, asking for identification is only the first step in denying the sale. Because youth who provided ID were more likely to be sold to than those who did not, it is clear that clerks must follow through by looking at

the ID card and accurately calculating age. Clerks may assume someone is old enough just because the patron presents identification, even though the ID card proves the youth is under 18. It seems as though clerks who do not ask for identification assume that they can effectively determine age by the way someone looks. If a youth is older, they are more likely to appear as though they are 18, so the clerk is less likely to verify age.

Recommendations include training clerks to effectively verify age for everyone, even if they appear old enough. Tobacco licensing is also recommended, as well as consequences for the establishment, not just the clerk because if management was more concerned about illegal sales perhaps the culture of the store could influence clerk behavior, and clerk behavior is the key to compliance. Future directions for research include continuing to monitor tobacco sales to minors using mixed methods of research. Several methods of data collection are necessary to have a clear picture of tobacco sales to minors to in turn affect youth access to tobacco commercially. Several methods should be utilized to gather information from youth smokers and clerks, as well as continued compliance checks.

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CHAPTER 1: INTRODUCTION

Chapter Overview

Chapter 1 is divided into six sections. The first section provides a background and introduction to the study. The second section is a description of the overall design of the study. The third section discusses the purpose of the study. The fourth section introduces the research questions. The next section highlights the assumptions behind the study. The final section presents the limitations of the study.

Background

Youth tobacco use has been on a steady decline from the late 1990s until 2003. Since 2003, the decline has come to a standstill (Center for Disease Control and Prevention [CDC], 2008b). Nearly 20% of youth smoke, about the same percentage as adults who smoke (Center for Disease Control and Prevention [CDC], 2008a; CDC, 2008b).

Even though most are aware of the dangers of tobacco use, about 20% of high school students smoke. Among seniors, about 26% smoke (CDC, 2008b). The statistics on youth smoking may leave adults wondering how youth who smoke get tobacco products. Youth have several means of acquiring tobacco products. Their sources may be commercial or social. Commercial sources include stealing tobacco products, buying them illegally, or asking strangers outside of stores to purchase cigarettes. Social sources include using friends or family members to access tobacco products. Friends or family members may give the cigarettes to the youth or purchase the tobacco products for them. Another social source reported is stealing from parents. While social sources prove a little more challenging to control, ways of curbing

commercial access include increasing the price of tobacco or increasing taxes on tobacco products so that youth cannot afford these products; removal of vending machines or installing locks on vending machines; placing tobacco products behind a counter or locked case, so that they cannot be stolen and so that the youth must interact with the clerk to obtain the product; and finally, increasing the number of clerks who comply with the law and refuse to sell tobacco products to minors.

It is illegal to sell tobacco products to minors in every state. To enforce compliance with these laws, local law enforcement and health authorities conduct compliance checks with local vendors, and introduce penalties for those who are non-compliant. Compliance checks also give a picture of how youth smokers might access tobacco using commercial sources. Having information on how youth access tobacco products commercially in a given community can help develop policies and training to limit commercial sources as a source of tobacco for youth.

There have been several studies on clerks' adherence to youth access laws. From this research, some clear patterns of completed purchases are clear. There are certain variables with each purchase attempt that can help or hinder the likelihood of sale. For example, the gender of the clerk may play a role. Men are more likely to sell than women (Ma, Shive, Legos, & Tan, 2003; Klonoff, Landrine, & Alcaraz, 1997). Clerk behavior plays a major role in compliance. If the clerks question the minor or ask for identification, they are less likely to sell tobacco products to minors (Curie, Pokorny, Jason, Schoeny, & Townsend, 2002; Jason, Billows, Schnopp-Wyatt, & King, 1996; Klonoff & Landrine, 2004; Levinston, Hendershott, & Byers, 2002; Arday et al., 1997).

The current study attempted to identify factors that predict illegal sales to minors. The study assessed characteristics of the store and the community around the store, as well as youth and clerk characteristics and behaviors. Once the factors that predict sales are realized, the findings can be used to guide training, policy, and future research in order to decrease youth access.

Design of the Study

The current study assessed tobacco sales to minors from 1997-2005 through compliance checks conducted by the local health department. The compliance checks were conducted in a mid-sized Midwest county. The county has a diversity of communities. The county is home to a college community. There is ethnic diversity in three of the cities in the county. The rest of the county is made up of small towns with little ethnic diversity.

The current study attempted to assess variables that may influence the likelihood of tobacco sales by examining data collected from compliance checks conducted by the local health department. Several characteristics of the establishment were assessed as well as event characteristics.

Background variables are attributes of the store and the neighborhood where the store is located. For the current study, background variables include the following: operation type, town size, and per capita income of the neighborhood.

Event variables are variables that characterize the specific traits and behaviors of the clerk and the youth involved in a given compliance check. For the current study, event variables include the following: clerk gender, youth age, youth race, youth gender, if the clerk asked for identification, and if the youth provided identification. The

current study may shed some light on some ways to increase compliance overall and to limit commercial access to tobacco products for youth smokers.

Purpose

The purpose of the study was to identify which variables predicted selling tobacco to minors. With the knowledge that asking for identification predicts selling, variables that predicted asking were also assessed. Through statistical analysis, variables that predicted selling and asking for identification were discovered. The current study contributes to the literature by revealing important factors that predicted whether a clerk sells tobacco illegally to a minor. Another contribution is finding what factors influence a sale when the clerk requested identification.

Research Questions

1. Which variables predicted whether there was a sale?
2. Which variables predicted whether the clerk asked for identification?
3. Which variables predicted whether there was a sale when the clerk asked for identification?
4. Which variables predicted whether there was a sale when the clerk asked for identification and the youth provided identification?
5. Which variables predicted whether there was a sale when the clerk did not ask for identification?

Assumptions

1. Events were reported accurately on the reporting form.
2. Reporting forms were entered without error.

Limitations

1. Early reporting forms did not include the question, "Did the clerk ask for ID?", so for some of the compliance checks it is unknown whether the clerk asked for identification.
2. Some variables were not accessed in a controlled way. For example, if a clerk asked for identification, the youth had the choice of providing it or replying that s/he did not have it.
3. Enforcement may be an important variable that was not assessed for the current study.

Chapter Conclusion

The purpose of the study was to identify which factors may play a role in tobacco sales to minors. Finding which variables predict selling tobacco to minors or asking for identification can be valuable in limiting commercial access of tobacco for youth. In the following chapter, the literature review will outline statistics on current tobacco use and sources of tobacco for youth. Chapter 2 will also highlight the effectiveness of compliance checks, and reveal the findings of several studies designed to find variables that play a role in compliance. Chapter 2 will also provide a framework for organizing the variables. Based on the literature review, specific questions are presented in the context of the problem of youth access to tobacco products.

CHAPTER 2: REVIEW OF LITERATURE

Chapter Overview

This chapter will address the existing research surrounding tobacco sales to youth. First, the prevalence and obvious dangers of tobacco use will be reviewed as well as the addictive nature of tobacco and the importance of delaying or preventing the initial cigarette. Second, youth sources for tobacco will be presented. Third, approaches for preventing or delaying initial tobacco use will be briefly addressed. Fourth, tobacco compliance checks will be highlighted as a method of prevention and their effectiveness will be reviewed. The fourth section will focus on Rational Choice Theory and its components. Also, in this section, the rest of the literature will be presented using Rational Choice Theory as a guide. Finally, the research will be summarized and the direction of the current study will be presented.

Prevalence and Effects of Tobacco Use

Tobacco use remains a significant public and personal health problem. According to the Center for Disease Control and Prevention (CDC, 2004), smoking cigarettes accounts for more than 438,000 deaths in the United States each year. Smoking also accounts for 5.5 million years of potential life lost, which means that many people are dying sooner than they should. These numbers do not even include diseases caused by smokeless tobacco, just smoking. Smoking is associated with chronic lung disease, lung and other cancers, stroke, coronary heart disease and many other deadly conditions.

The burden of the health problems associated with tobacco use is further delineated with examination of the demographic characteristics of those Americans who

smoke. In the U.S., 20.6% of adults smoke. About 23% of men smoke, and about one fifth of women smoke. Those living below poverty level are more likely to smoke than those who live at or above poverty level (31.5% vs. 19.6%). Native American adults have the highest rates of smoking (32.4%), followed by Whites (22.0%), African Americans (21.3%), Hispanics (15.8%), and Asians (9.9%). Among adults, after 25 as age increases, rates of smoking decrease. Most adult smokers were smoking by the time they were able to legally purchase tobacco (Health and Human Services, 1994). That most adult smokers initiated smoking in their teenage years highlights the need for prevention efforts including limiting youth access to tobacco products. This will be examined further in the next section.

The statistics on youth smoking mirror the demographic profile of adult smokers and underscore the potential utility of limiting access to tobacco in decreasing use. According to the CDC (2008b), 20.0% of high school students smoke. For adolescent males, 21.3% smoke, while 18.7% of females smoke. In contrast to adults, White youth have the highest rates of smoking at 23.2% (although the sample was too small to report smoking by Native American or Asian youth), followed by Hispanic youth at 16.7%, then African Americans 11.6% (CDC, 2008b).

Similar to adults, youth coming from low socioeconomic backgrounds are more likely to smoke than those who come from higher income brackets. Youth are more likely to smoke if their siblings or peers approve of the use of tobacco or if their parents smoke. While youth smoking in adolescence is currently declining after two decades of increasing, still approximately 1 in 5 youth smoke.

While young people might not experience immediate health effects from smoking, the prevalence of smoking in youth and the recent trends in youth tobacco use are particularly salient because youthful experimentation can quickly turn into addiction, and they must endure the lifelong health consequences of use. Smoking is not the same as making other poor decisions as a consequence of youth because of the addictive nature of nicotine. Once a person matures and realizes that smoking is not worth the health consequences, they are already hooked. Therefore, support for effective prevention efforts is essential. If 1 in 5 youth smoke, the question becomes where do they get the tobacco products they use.

Youth Sources for Tobacco

Youth have a range of points of access for tobacco products. These sources can be commercial or social. Seven studies will be reviewed that examine where children get tobacco products. One of these studies assessed commercial and non-commercial tobacco sources by surveying youth who smoke. Similarly, another study divided sources by home sources, school sources and store sources and asked youth about their perceived access to tobacco using these sources. Another study used a focus group of smokers living in a community with high compliance rates to uncover youth smokers' sources for tobacco products. Other research involved assessing adults' willingness to purchase tobacco products for youth they did not know. Along the same lines, another study surveyed college students on their willingness to purchase tobacco products for minors. The final two studies to be reviewed conducted compliance checks with Internet tobacco sales.

The study that assessed sources from youth smokers used self-reports from a sample of 133,794 sixth, ninth, and twelfth graders in Minnesota to determine sources for tobacco products by gender and by different types of smokers (Harrison, Fulkerson, & Park, 2000). Commercial sources included getting tobacco products from vending machines, and buying or stealing them from any retail outlet. Social sources included getting or taking from friends or family, or having someone purchase the tobacco products for them. Harrison et al. (2000) found that non-commercial sources seemed to be the primary way for accessing tobacco. Therefore, limiting access to tobacco products through measures such as tobacco vendor compliance checks would seem less effective. Further, limiting access seems more challenging if youth access tobacco products through means other than retail sources. Retail sources seem somewhat simple to monitor. Private interactions would be more of a challenge to monitor. However, while youth rely mostly on non-commercial sources, about 47% of all youth smokers have used commercial sources at some point to get cigarettes. They also found that youth who smoked the most were the most likely to buy cigarettes. More than 70% of youth who smoked 10 cigarettes a day or more used commercial sources, and about 80% of one-pack-a-day youth smokers used commercial sources (Harrison et al., 2000). Minors who smoked more were more likely to access tobacco products through commercial sources. The clerks interacted with the youth who smoked the most, probably the most addicted youth.

The next study surveyed middle school students on their perceived access to tobacco in their home, schools, and the stores. Researchers surveyed 9,123 middle school students about how easy they thought it was to get tobacco products from home,

school, and the store. Those who had parents, siblings, or peers who smoked were more likely to perceive access in the home as easy compared to those who did not have parents, siblings or peers who smoked. If they lived with their mother only, they were less likely to perceive access as easy compared to those who lived in two-parent households. Girls were more likely than boys to perceive home access as easy. Eighth graders were more likely than sixth graders to perceive home access as easy. Current smokers or those who ever smoked were more likely to perceive home access as easy compared to never smokers (Speizer, Bean, Obando, & Fries, 2008).

As far as school access, boys were more likely than girls to rate as easy. Eighth graders were more likely than sixth or seventh graders to report school access as easy. Youth who had mothers with at least a high school education were more likely to report school access as easy than those who had mothers with less than a high school education. If they had friends who smoked or perceived that any youth in the community smoked, they were more likely to perceive school access as easy. Those who thought school performance was very important were less likely to perceive school access as easy. Those who had ever smoked were more likely to perceive access at school as easy compared to never smokers (Speizer et al., 2008).

When it came to access to tobacco in stores (commercial access), boys were more likely than girls to perceive as easy. Non-Whites were more likely than Whites to perceive store access as easy. If they had friends who smoked or perceived that 50% or more of the youth in the community smoked, they were more likely to perceive store access as easy. Current smokers were more likely than never smokers to report store access as easy (Speizer et al., 2008).

Keeping cigarettes from minors may be difficult since youth use a variety of commercial and non-commercial sources to obtain tobacco. Little can be done from an ordinance viewpoint to control the purchasing behavior and subsequent sharing of tobacco products by friends and/or family, so it is important to attempt to control what can be controlled in terms of access-commercial sources, even if it may not be the most likely method for youth to access tobacco.

Social sources are probably utilized even more when establishments that sell tobacco products comply with the law and refuse tobacco sales to minors. When most clerks are not selling to minors, youth may have to find other ways of accessing tobacco products. DiFranza and Coleman (2001) surveyed 68 youth smokers who lived in areas with 90% compliance rates about how they get tobacco products. After the survey, the 68 youth were assigned to a focus group. This study included youth ages 12-19. However, it should be noted that 18 and 19-year-olds can legally purchase tobacco products. When asked, "Have you ever gotten a cigarette from any of these sources?", more than 50% reported yes to the following sources: 1) friends (99%), 2) gave someone over 18 money to buy them (94%), 3) bought from a store (excluded 18- and 19-year-olds) (89%), 4) gave money to a stranger to buy for me (72%), 5) relative other than parents or siblings (69%), 6) gave a minor money to buy (68%), 7) from brother or sister (60%), or 8) stole from parent (59%). The lowest source was my parent gave to me, and 42% had used that source before. This question was a measurement of whether these sources had been utilized ever. They were also asked how often they used certain methods. The most common methods were 1) friends, 2) gave someone money, 3) bought myself, or 4) asked an adult stranger to buy them. From this study, it

can be concluded that youth use a combination of commercial and social sources for getting tobacco, and compliance checks can be used to identify which outlets engage in illegal sales, and clerks can be more thoroughly trained in order to limit commercial access.

Klonoff, Landrine, Lang, Alcaraz, and Figueroa-Moseley (2001) examined a variable also examined by DiFranza and Coleman (2001), but not categorized by Harrison et al. (2000): asking an adult stranger entering the store to purchase tobacco products. Klonoff et al. (2001) examined a sample of 223 stores in 22 California cities. Sixteen youth aged 15-17 went in pairs to ask strangers who were entering the store to buy cigarettes for them. They stayed at each store for two hours. Thirty-two percent of adult strangers asked agreed to purchase cigarettes for minors (Klonoff et al., 2001).

To examine this issue from a different perspective, the adult perspective, Shive, Ma, and Shive (2001) surveyed 250 college students to see if they had ever had a minor ask them to provide tobacco to them, and if so, whether they complied with the request. This study provides a glimpse into real sources for youth in that adults were asked about their experiences with having actual youth smokers ask them to provide tobacco to them. The independent variables they investigated included the following: major in college, gender, race, college year, smoking status, age, attitudes toward youth restriction policy, and intention to give tobacco products to minors in the future. The dependent variable was being approached by a minor. A second analysis was done with the dependent variable being whether they gave the tobacco product to the minor. Most minors asked the adults to buy the tobacco for them and gave them money to purchase it. Most of the students who reported providing tobacco products to minors

typically took the money and purchased the product for them. The second most common method was giving it to them for free. Adults were most likely approached at a convenience store, followed by gas stations, then at home, in malls, in grocery stores, on the sidewalk, and at bars. The youth were most likely friends, followed by strangers, and then family members.

Freshmen and those 18-19 years of age were more likely to be approached than older students. Those 18-19 years of age were more likely to provide tobacco than those who were older. Smokers were also more likely than non-smokers to be approached and more likely to provide the tobacco to the minor. They compared health majors with other majors and found no difference in being approached or willingness to provide tobacco products.

After the regression analysis, with the dependent variable providing tobacco to a minor, the only significant predictor was the intention to give in the future. If they would consider giving it to a minor in the future, they were more likely to have provided a youth with tobacco. They were even more likely to have provided tobacco to a minor if they reported that they would definitely give it to them in the future.

Finally, a more recent method of purchase that has yet to be fully explored is Internet sales to minors. The research on Internet sales makes it clear that youth can easily purchase cigarettes online. Ribisl, Williams, and Kim (2003) used four decoy adolescents, age 11-15, to attempt Internet purchases. There were 83 purchase attempts from 55 vendors. They assessed the rates of complying with laws making it illegal to sell tobacco to minors for several methods of purchase. The compliance rate, not selling to the minor, when the youth used a credit card was 6.4%. The compliance

rate with a money order was 11.1%. While it is not difficult for youth to purchase tobacco products from the Internet, this may or may not be an actual source that youth smokers use to purchase tobacco products.

One other study assessed Internet sales to minors. The researchers used four adults who look young and are frequently carded to purchase money orders under 32 different names. Age was not verified when the money orders were purchased. Four were rejected because of lack of proof of age. Four were rejected for other reasons. Four never made it to the vendor. Twenty of the 28 orders placed were filled. The second part of the study tested the efficacy of two Internet filtering programs, not the Internet tobacco vendor sites. The two programs filtered 84% and 94% of the websites. If Internet purchases become a source for youth to access tobacco, perhaps filtering software could prevent this access point (Bryant, Cody, & Murphy, 2002). Again, it would probably not be difficult for youth to purchase tobacco products online, but we do not know if this is an actual source that they use.

The above studies show that youth access may be difficult to control in terms of non-commercial access without developing penalties for the adults who give tobacco products to minors. Since social sources for tobacco, such as getting from another adult or a friend, are private interactions, they are too difficult, if not impossible, to monitor. Because those interactions are so difficult to monitor, commercial sales tend to be monitored as those interactions occur in public. Although it is illegal in all 50 states, many underage smokers get cigarettes from purchasing tobacco products on their own or from a combination of both commercial and social sources. While youth rely mostly on non-commercial sources, about 89% of all youth smokers have used commercial

sources at some point to get cigarettes (DiFranza & Coleman, 2001). While Harrison et al. (2000) found lower numbers of youth using commercial sources, they also found that the youth who smoked the most were more likely to use commercial methods for access. It would seem by the numbers on use and source that the youth who are more addicted are those who use commercial sources (DiFranza & Coleman, 2001). The fact that illegal sales continue and that allowing such sales encourages the addiction makes it important to further investigate factors that inhibit or facilitate such sales, but first, prevention methods including compliance monitoring will be reviewed, and the effectiveness of these policies will be addressed.

Tobacco Prevention Approaches

After reviewing the serious consequences of tobacco use, the detrimental effects of addiction, and the sheer prevalence of smoking even though it is generally accepted that smoking is harmful, it is clear that a comprehensive approach is necessary. Education alone cannot prevent youth smoking, nor can tobacco sales monitoring alone. The pieces of a comprehensive effort to prevent tobacco use in youth will be presented. A brief review of demand approaches to control the use of tobacco will be presented, followed by a brief summary of supply (or limiting access) approaches, highlighting tobacco sales monitoring. Because the focus of the current study is controlling youth access to tobacco, more time will be dedicated to those efforts of curtailment.

Clearly, because of the addictiveness of tobacco, the best way to limit tobacco use is to insure that people do not start. One way to encourage young people not to start using tobacco is to reduce the demand for the product. Demand approaches to

prevention focus on reducing young people's curiosity regarding tobacco and desire for tobacco products. These measures include education and changes in marketing policy.

Education

Educating youth on the dangers of tobacco use is an important part of any tobacco control plan. Most educational approaches are school-based and implemented by teachers (Lynch & Bonnie, 1995). In their literature analysis, Lynch and Bonnie (1995) assert that the most effective demand approaches use a variety of methods. These methods include the following: information on the short-term consequences of tobacco use, social norms of making students understand that most students do not smoke and most people do not smoke, refusal skills, and life-skills training. Lynch and Bonnie (1995) also recommend community-wide interventions versus school-based only. Community-wide interventions would incorporate counter-market advertising, with parental and faith-based education, so that the whole community is getting/giving the message, not just something children learn about in school. Flay (2009) reviewed several school-based tobacco prevention programs that fit certain criteria: having at least 15 sessions, insuring some of the sessions occur in high school, including lessons on refusal skills as well as social norming. The author concluded that prevention programs that meet the criteria tend to be effective in preventing the onset of smoking. Demand reduction efforts seem effective in delaying initiation or delaying regular smoking, which may help reducing smoking overall. Clearly, education programs should be part of any plan to prevent tobacco use.

Policies

Policy changes are also part of reducing demand. Restrictions on where tobacco products can be advertised, and what methods tobacco companies can use to market their product contribute to reducing youth interest in tobacco products. There were clear reductions in smoking initiation when tobacco advertisements were banned from television. Since, other limits have been placed on tobacco marketers, and these limits seem to be part of the declines in smoking (Dobson, 2006). Demand approaches that include policy and programs should be part of a comprehensive approach to tobacco prevention. Efforts should be started when people are young, and they should continue through high school.

Another piece of a comprehensive tobacco prevention plan is to reduce the supply of (or access to) tobacco products. Almost all methods for reducing supply rely on policy interventions. Access approaches attempt to limit youth access to tobacco products usually through community policy by increasing taxes, removing vending machines or placing locks on them, and/or monitoring tobacco sales to minors.

Taxes

Increasing taxes makes cigarettes more expensive, making them less accessible to minors (or anyone). While taxation seems to be a major factor for decreasing adult smoking rates, it does not seem to be a factor in delaying smoking initiation in 8th-12th graders (DeCicca, Kenkel, & Mathios, 2001). Although DiFranza, Savageau, and Fletcher (2009) found in their national study on compliance rates and youth smoking rates that the price of cigarettes may have accounted for a 47% decrease in the odds of

daily smoking for youth. This conclusion makes it seem as though price (which could be increased with taxes) may have an effect on youth smoking at a national level.

Removal of vending machines or vending machine locks

The removal of vending machines would seem to limit access, in that vending machines by design are not monitored by a person. With vending machines, there may not be a person monitoring the machine, so youth could access the machine when it is not being monitored. Removal of vending machines or placement of locks on vending machines is an effective policy for increasing compliance. DiFranza, Savageau, and Aisquith (1996) used 12 minors to conduct 480 compliance checks in Massachusetts. They compared over-the-counter sales with typical vending machines and vending machines with remote lock-out devices. They found that establishments that had the machines with the devices were as compliant as the establishments with over-the-counter sales, and youth were more likely to obtain tobacco products from the vending machines without devices.

In Minnesota a community passed a law that placed restrictions on vending machine sales (Forster, Hourigan, & Kelder, 1992). Merchants who used vending machines to sell tobacco were required to either: stop selling tobacco products altogether, sell tobacco products over-the-counter only, or put a locking device on the vending machines. The researchers found that those who complied the most were those who stopped selling tobacco products, obviously, followed by those who switched to over-the-counter sales, followed by those who used a locking device, and finally, those who did nothing (continued to use the illegal vending machines) (Forster et al., 1992).

While research supports the idea that removal of vending machines or placing locks on them limit access, other studies show that youth find other sources, commercial and otherwise, once removal of tobacco vending machines become a barrier, so the locks really make no difference in decreasing youth smoking. Schneider, Meyer, Yamamoto, and Solle (2009) conducted a study in Germany once they required locking devices on vending machines, and found that rates of youth using vending machines as a source for tobacco decreased significantly, but sources like friends and kiosks increased significantly.

Similarly, moving tobacco products behind the counter would seem to have the effect of decreasing youth access, although there is no literature on this effort. Research was conducted on self-service versus behind-the-counter sales. Youth could purchase tobacco products more easily when they were self-service (Teall & Graham, 2001). If tobacco products were behind the counter, purchasers would have to ask someone for the product, giving the clerk an opportunity to ask for identification before handing off the product, a policy which would also seem to prevent theft.

Tobacco Sales Monitoring

The above policies are all part of changes executed to decrease youth access to tobacco. Tobacco vendor compliance checks or tobacco sales monitoring is another method implemented in an attempt to decrease youth access. Tobacco sales monitoring involves figuring out which stores or clerks sell tobacco products to minors and assigning consequences for those who sell. Tobacco sales monitoring serves two purposes. First, it is a way to observe what happens when youth attempt to purchase tobacco products. It is an attempt to assess the landscape for young smokers who

attempt to get tobacco from commercial sources. Details of the interaction can be recorded and changes can be made to insure that fewer sales occur. Secondly, monitoring is a way for law enforcement to detect who sells tobacco products illegally and levy penalties for the illegal sales in the hopes that the penalties will decrease the likelihood of sales to minors. The typical methods of discovering which outlets or clerks sell to minors are explained later in the discussion.

Evidence of effectiveness of tobacco vendor compliance checks in reducing youth access to tobacco

It would be assumed that youth in communities with tobacco access ordinances would have a more difficult time obtaining tobacco from commercial sources. To test this assumption, four studies have been conducted. One study assessed youth-perceived availability of different sources of tobacco. Another study compared two groups of communities: one with strict tobacco access ordinances and one without. Another study conducted over 6,000 compliance checks and assessed compliance after law enforcement had fined an establishment. A final study will be reviewed that assessed compliance before and after issuing citations.

Ma et al. (2003) attempted to assess only perceived availability and its effect on access. They surveyed 645 eighth through tenth grade students about their knowledge of tobacco access ordinances and (perceived) availability of tobacco products. It was found that youth perceived no difference in ease of getting tobacco from any source: friends, purchasing, or stealing. Since direct sales are controlled by an employee of the outlet (as opposed to friend or family member), access through commercial sources *should be* more difficult than non-commercial sources, but the youth in the study did not

see it that way. Again, this study focused only on perceived access. The following studies attempted to gauge actual access by conducting compliance checks.

To test if ordinances actually decrease access, Forster et al. (1998) studied 14 intervention and control communities in Minnesota. Intervention communities had passed strict tobacco access ordinances. Control communities did not pass ordinances, or if they did, they were much weaker and less comprehensive than the intervention communities. Interestingly, the researchers found that the clerks complied equally whether there was a strict ordinance or not. However, there were differences in youth smoking between the communities, which will be covered in the following section.

Tangirala, Lisako, McKyer, Goetze, and McCarthy-Jean (2006) found that compliance checks were successful at increasing compliance. They checked 3,980 establishments twice. The establishments that sold to youth were fined during each check. They were interested to see if violators would be less likely to sell after an initial violation. They found that clerks were significantly less likely to sell if they had received an initial violation.

In Sydney, Australia, health officials conducted compliance checks by using minors to stage purchases and gave tickets upon failure after one "warning" round (Staff, Bennett, & Angel, 2003). After monitoring and enforcing compliance with the law, there was a significant decrease from 34% to 28% for completed sales to minors. Compliance checks with enforcement increased compliance in this study. The authors also found changes in youth smoking, and that is explored in the following section. The literature on the effectiveness of tobacco vendor compliance checks in limiting access is equivocal. Youth do not perceive commercial sources as difficult methods of obtaining

tobacco products, which they should if tobacco vendor compliance checks are effective. Two studies support the idea that tobacco ordinances and compliance checks are effective at limiting youth access, while two studies show that they are ineffective at coercing clerks to comply. The following section examines the findings on the effectiveness of ordinances and monitoring on youth smoking. Because there is overlap, some of the studies in this section will be reviewed in the following section.

Evidence on the effectiveness of tobacco vendor compliance checks in reducing youth smoking

If commercial access to tobacco was limited, it would be more difficult for youth to obtain tobacco products and therefore reduce youth smoking. Evaluations of programs designed to decrease access have produced equivocal evidence on the impact of such efforts, which may be expected since youth use both commercial and social sources for tobacco, or it could be because (as presented in the previous section), compliance monitoring has a checkered impact on youth access to tobacco. Seven studies will be reviewed in this section related to the association between compliance checks and youth smoking. The literature spans 10 years and 33 communities.

Altman, Wheelis, McFarlane, Hye-ryeon, and Fortmann (1999) used four communities to test for compliance with laws forbidding clerks to sell tobacco to youth and rates of youth smoking. Two communities were intervention communities and two were control. Intervention communities engaged in voluntary policy changes, community education, and vendor training. Compliance with the law increased in all communities. The intervention communities had a compliance rate of 100%. Did the

change in compliance affect youth smoking? There was a significant difference for smoking in seventh graders between the control and intervention communities. However, there was no significant difference between 9th and 11th graders between the two types of communities. Researchers believe the lack of difference for the older students could have been because the high compliance rates were not reached until the end of the study, so the full effects may not have been realized. It could also be that older youth have more access outlets, so they can use other sources for tobacco once commercial sources are unavailable to them.

Biglan and Dent (2004) surveyed over 10,000 eighth and 11th graders about their smoking behavior and assessed compliance in the communities in which the surveyed students lived. They found that the higher the compliance was, the lower the smoking for 11th graders. The change is very small because youth adjust their sources when compliance increased. For every 10% increase in sales, there was a .04% increase in daily smoking for youth and .08% increase in 30 day smoking in tobacco use. Therefore, communities would need to make great reductions in compliance before they see even a small decrease in tobacco use.

DiFranza et al. (2009) reviewed national data on youth tobacco use and state compliance rates. They controlled for variables that might have an effect on youth smoking: cigarette prices, state restaurant smoking policies, anti-tobacco media, and demographic variables. They found for every 1% increase in compliance, the odds ratio for youth daily smoking decreased by 2%. The study shows that nationally compliance checks can work to help reduce youth smoking. However, communities are all different, so these changes might not be observed in every community.

Forster et al. (1998) studied 14 communities with strict access ordinances and weak or non-existent access ordinances in Minnesota. The clerks complied equally regardless of ordinance. The clerks in communities that had strict access ordinances sold as often as those with no ordinances. The ordinances had no effect on clerk behavior. However, youth daily, weekly, and monthly smoking for both intervention and control groups was assessed twice, once in 1993 and once in 1996, and differences were found in the communities. Even though smoking increased for all communities, there was less of an increase in the intervention communities. Adolescent smoking in the control communities increased more drastically over the course of the study than in those communities which passed ordinances. This finding is thought to be due to the minors in the community *believing* that access was more limited, even though the clerks in the community with the stricter ordinance sold tobacco products illegally to minors as often as those in the control community.

The sales behavior of the clerks in the two types of communities illustrates the difficulties of imposing an effective restrictive sales ordinance. For access ordinances to be directly effective, clerks must adhere to them. If, as in Forster et al. (1998), the adherence to the law was the same regardless of the presence of a strict local ordinance, some indirect factor must be at play influencing the initiation of smoking behavior of the adolescent population. The authors thought that it might be that youths' awareness of the ordinance made them less likely to attempt to purchase tobacco products, resulting in reduced access, and thus reducing smoking. The ordinance seemed to have an effect, but that effect was obviously not directly tied to clerk compliance.

Evidence for a more direct effect between enforcement and youth smoking is found in several other studies. In Sydney, Australia, health officials conducted compliance checks by using minors to stage purchases and gave tickets upon failure after one "warning" round (Staff et al., 2003). After monitoring and enforcing compliance with the law, there was a decrease from 34% to 28% for completed sales to minors. One might assume that if access were limited, smoking would decrease. If youth do not have access to tobacco, they cannot use tobacco. However, the authors found no change in the categories of current smoker versus non-smoker, but did find an increase in those who never smoked versus those who had ever smoked. These results point to the effectiveness of enforcement for these types of violations in that more minors had never smoked after enforcement began.

Porkorny, Jason, and Schoeny (2003) had similar results when comparing communities in terms of the level of retail access. Those with low retail access decreased the odds of initiating smoking, but not continued smoking. This study involved 11 towns in Illinois. Retail access was assessed by having police conduct compliance checks with 15- and 16-year-old girls, and retail access was computed by the number of sales to minors during the compliance checks per 1000 youth age 10-17 in that community. If low retail access decreased the likelihood of initiating tobacco use, then it can be a helpful tool to reduce youth smoking overall.

Jason, Berk, Schnopp-Wyatt, and Talbot (1999) surveyed tenth graders in two Illinois towns with regular compliance checks and in three Illinois communities without regular compliance checks, and found that the two communities with enforcement had fewer regular smokers (8.3% and 7.1%) than the communities without monitoring

(13.4%, 31.3%, and 18.2%). These studies suggest that controlling access might be important for preventing youth tobacco use, and that a means of control may be monitoring through compliance checks. There are other reasons to conduct compliance checks.

Controlling minors' access to tobacco is one reason to conduct compliance checks, but compliance checks can also provide an idea as to how clerks typically behave when a minor enters the establishment and attempts to purchase tobacco products. If clerks could accurately calculate age *and* would verify age every time someone attempts to purchase, even if the customer seems "old enough," then it would eliminate this source for minors as well as eliminate the fine that the clerk would receive for making the illegal sale. However, this is not always the case. Many youth admit that commercial access is their way of obtaining cigarettes. During compliance checks, there are factors that increase or decrease the likelihood of the sale. These factors need to be examined to understand what factors must be manipulated in order to decrease commercial sales as a source of tobacco products for minors.

One more reason tobacco compliance checks are important is the dangerous nature of tobacco. Whether tobacco vendor compliance checks are effective at reducing youth tobacco use or youth access, selling tobacco to minors is illegal. Even if monitoring sales does not limit youth smoking or youth access, compliance checks are necessary because youth should not have unrestricted access to a product that is so addictive and extremely dangerous.

Because there are factors that increase or decrease the likelihood of tobacco sales to minors, it is important to use an organizing theoretical framework to look at the

potential factors that may play a role in selling tobacco to minors. Further, because youth should not have unrestricted access to tobacco and selling tobacco to minors is an illegal act, Rational Choice Theory may provide the framework necessary to assess the factors. The application of Rational Choice Theory to tobacco sales to minors is presented in the following section.

Rational Choice Theory

Theories of behavior have been used to study deliberate actions or to examine why people choose to participate in certain behaviors. When the behavior violates the law, such as selling tobacco to minors, because it is a crime, criminology becomes a domain that may offer a helpful paradigm for study. Sociologists have used Rational Choice Theory for decades to explain criminal behavior, but there has been little integration of theories of criminal behavior with tobacco sales to minors. Many social scientists have studied clerks' willingness to sell tobacco products to minors; only one study appears to have provided a theoretical lens to explain clerk behavior. O'Grady, Asbridge, and Abernathy (2000), in consideration of the fact that selling tobacco to minors is a criminal act, applied Rational Choice Theory in an attempt to explain the clerks' illegal behavior.

The longstanding theories of criminal behavior used by O'Grady et al. (2000) postulate that illegal acts can be classified by level of commitment to crime and type of criminal behavior. Level of commitment to crime can be categorized as high or low. Those who are highly committed to crime commit crimes as a way of life, and they have support in committing these crimes. These are people who know there is a constant risk of being caught and punished. In contrast, those who have a low commitment to crime

are people who do not view their acts as criminal and probably do not have a network of assistance or cooperation for their behavior (Chambliss, 1975 as cited in O'Grady et al., 2000).

Theories of criminal behavior further propose that there are two types of crimes: expressive and instrumental. Expressive crimes are "crimes of passion" so to speak, crimes that may involve emotion and violence such as assault or murder. Instrumental crimes are crimes that are committed to gain money or something of value, like drugs. Instrumental crimes involve weighing of potential consequences (Chambliss, 1975 as cited in O'Grady et al., 2000).

O'Grady et al. (2000) used Chambliss (1975) to attempt to frame tobacco vendor (clerk) behavior, and noted that clerks fall into the category of people with a low commitment to crime who commit instrumental crimes. People who fall into these concurrent categories (low commitment/ instrumental crimes) are more likely to be discouraged by a high fine or financial penalty. Conversely, people who have a high commitment to crime may know the risk, but because they are dedicated to crime as a lifestyle, a severe punishment does not dissuade them. People who commit instrumental crimes spend time weighing the cost and the benefits; therefore, severe punishments should play a role in deterring them from committing crimes.

The circumstances in Canada allowed O'Grady et al. (2000) to test Rational Choice Theory in its application with clerks who sell to minors. In Canada, clerks who sell tobacco to minors may have to pay a minimum fine of \$500 and a maximum fine of \$2,000 for their first offense (O'Grady et al., 2000). Further, the establishment can receive a severe financial penalty (O'Grady et al., 2000). Because high fines should be

a deterrent for those who sell tobacco products to minors, and because of the high fine structure in Canada, Rational Choice Theory might be particularly useful in predicting behavior. If there is any chance of authorities detecting the illegal sale, the fear of a \$2,000 fine should deter the sale.

To determine why sales continued under such a severe fine structure, O'Grady et al. (2000) tested three factors: enforcement, background, and event factors.

Enforcement was determined by a variable called active enforcement activity, assessed by the number of charges/100,000 people. Background variables included store type and rural versus urban areas. Event factors included factors that might vary by checks at the same establishment, like time of day or gender of the minor. By looking at variables that are particular to each transaction, it may be possible to predict the likelihood and reasons for an illegal sale.

Looking at the landscape of the field, we can see an organization of factors that emerge: enforcement, background, and event factors. The status of understanding each factor is essential. Throughout the literature, there is no other organizing paradigm to study the status of the work conducted to date. As previously outlined, selling tobacco products to minors is a complicated behavior. An adult deciding to sell cigarettes illegally has multiple dimensions. Understanding these dimensions could help eliminate tobacco sales to minors. Decreasing those sales would play a role in preventing youth smoking. To prevent these illegal transactions, it is important to have a theoretical leg to stand on in terms of understanding and prioritizing the factors that play a role in clerk behavior. This understanding can help policy makers manipulate the

factors involved in tobacco sales to decrease the number of tobacco products that get into the hands of minors.

While no other study has applied Rational Choice Theory to selling tobacco to minors, 17 studies will be reviewed that addressed variables similar to O'Grady et al. (2000). These factors have been researched, but they have never been pulled together and woven into a theoretical framework. The next few sections will outline the findings of the studies that assessed enforcement, background, and event factors in a straightforward empirical fashion. Although these studies have no theoretical framework, empirically they offer further insight into the social dynamic of tobacco sales to minors, thus allowing a better understanding of why an adult chooses to sell without age verification.

For several reasons explored in the next section, the current study does not utilize Rational Choice Theory as a theory, but as an organizing paradigm to present the literature and conduct the analysis. In the following section, the literature will be reviewed in the context of the Rational Choice Theory components.

Enforcement factors

In most communities with tobacco access ordinances, the mechanism for monitoring and enforcement of the ordinance are compliance checks. Compliance checks usually involve recruiting youth, and training them to purchase tobacco products and complete a survey after each retail outlet is checked. Compliance is usually a percentage of the number of denied sales to minors out of the number of retail outlets checked. Operation of these checks may take a number of different forms. Some communities use the local law enforcement to recruit volunteers and conduct checks.

Others use health authorities to conduct the checks and have ordinances that offer a "warning" or practice round, and then only recheck those who failed the first time. In all communities with ordinances, a certain number of prescribed infractions against the ordinance triggers a fine and/or license suspension or revocation. Recording the details of an illegal sale presents another opportunity to better understand the interaction occurring between a given clerk and potential purchasers.

Having outlined the mechanisms of compliance checks, it is important to turn to the empirical research on the outcomes of enforcement. Most studies attempt to observe enforcement's effect on youth tobacco use as measured by self-report, but a few studies do look at enforcement's effect on increasing or decreasing sales. Five studies will be presented on the effects of enforcement on sales. If the likelihood of getting caught increases (more enforcement) or the fine structure is high, then adherence to the law should also increase.

O'Grady et al. (2000) defined enforcement as number of citations per 100,000 population. When looking at the first model, enforcement seemed to be an important factor for predicting sale. However, as the researchers added other variables to the model in blocks, they found that enforcement had no effect. The authors found that other factors played more of a role than enforcement.

Again, enforcement should be a factor because if the likelihood of getting caught increases, the likelihood of selling to minors should decrease. However, one study found that even when the community ordinances were stricter, adherence was the same. Forster et al. (1998) compared 14 communities that had strong youth access

ordinances with communities who had weak or no ordinances. They found no difference in compliance between the two types of communities.

Another study was conducted in Sidney, Australia. One compliance check was conducted and warnings were issued. After the warnings were issued, a second round of compliance checks was completed. Then, a third round was completed and compared, and the researchers found that compliance increased after they leveled fines on the clerks (Staff et al., 2003).

Tangirala et al. (2006) had similar findings on only two compliance checks. They found that clerks were less likely to sell if they had been in violation in the previous check. They concluded that those in violation learned their lesson.

Jason et al. (1996) found that compliance checks were more effective if they were conducted more often. The more enforcement an establishment faced (the likelihood of getting caught), the more compliant vendors were. They conducted compliance checks over the course of a year on different schedules. While they checked for compliance each month, the laws were only enforced on certain scheduled checks. They conducted an enforced (fineable) check every two months for some establishments, every four months for others, and every six months for others. There was also a control group. The intent of the study was to find which schedule would be most cost-effective for keeping compliance high. They also assessed warning signs, asking for identification, and gender. They found that the two-month enforcement schedule was the best way to keep compliance high. The fines issued were \$200, and if the fines were not paid, they would be unable to renew their tobacco vendor license.

This seems to show that with proper and frequent enforcement compliance will increase.

As summarized in Table 2.1, O'Grady et al. (2000) found that other factors played more of a role than enforcement. Forster et al. (1998) found that enforcement had no effect. Staff et al. (2003) found that enforcement helped to reduce sales to minors. Tangirala et al. (2006) found that violators were less likely to sell after one initial enforcement. Jason et al. (1996) found that sales decreased with proper and frequent enforcement. Communities impose ordinances because they believe that *if* adults are selling to minors, that it is wrong, and that local enforcement may work to decrease this behavior in adults. However, from the equivocal findings outlined above, it is clear further research is necessary to determine if enforcement has any effect on sales to minors.

Table 2.1: ENFORCEMENT FACTORS

Sources	Design	Variables	Results/Conclusion
Forster et al. (1998)	Using 14 control and experimental communities, they observed ordinances' effects on smoking and compliance.	Sales Youth smoking	-No significant difference between communities for youth successful purchases
Jason et al. (1996)	Using varying schedules of enforcement, compliance checks were conducted monthly.	Frequency of enforcement Sales	-As the frequency of enforcement increased, compliance increased
O'Grady et al. (2000)	Using compliance checks, they observed several variables and their effect on vendor compliance.	Enforcement (number of charges/100,000 population)	-The effect on enforcement became non-significant once event factors were considered
Staff et al. (2003)	Using surveys, they asked students about smoking and purchasing behavior before and after the introduction of a strengthened tobacco access policy.	Minors' purchasing behavior Sales Youth smoking	-Youth rated every source for purchasing tobacco more difficult after the intervention period -Compliance increased after enforcement
Tangirala et al. (2006)	Using random compliance checks on 3,980 establishments twice, they tested compliance after the first violation.	Sales	-Sales decreased after receiving one citation

Background factors

In addition to the enforcement factors, the environment in which the transaction occurs may enter into the exchange. The various environments that the transactions take place are background factors. Background factors are factors that are attributable to the store regardless of who enters or exits. These factors include the store type, being rural/urban, size of the town, being a tobacco producing region or not, signage, selling alcohol, local store/national chain, tobacco product placement, tobacco ads, and the neighborhood of the establishment. The findings for background variables are complicated by event variables, but there is some consistency in the findings for the influence of background variables on sales to minors.

Five studies have tested store type as a variable that may play a role in the likelihood of completed sales to minors. Store type can be categorized in different ways. Operation type involves classifying an establishment as a gas station, convenience store, grocery store, or some other type of establishment. Another way to classify store type is by whether the establishment sells alcohol. A third method of classifying outlets by type is by classifying each establishment as a national chain or a local store. Arday et al. (1997) used 17 minors to check 165 establishments for compliance. The variables examined were store type and location, warning signs, whether the store also sold alcoholic beverages, whether the clerk questioned the buyer, and the clerk's gender and apparent age. The researchers found that stores that also sold alcohol were 29% less likely to sell to the minor. One could assume that this is true for two reasons; clerks who sell liquor are used to asking for identification, so it might come more naturally. Also, clerks might suspect the youth as a decoy since it is unusual for someone to purchase

cigarettes without purchasing alcohol at a liquor store. Arday et al. (1997) also used logistic regression and tested operation type, and categorized each establishment as convenience store, supermarket, drug store or other. They found that the type of store did not affect the likelihood of the sale, but that whether the store sells alcohol affected the sale. This suggests that stores that sell alcohol provide an environment that encourages refusing to sell to minors. They also found that liquor stores were more likely to question minors, which was the best predictor for selling. However, it was not an independent predictor in the regression model when they used questioning the minor as the dependent variable.

Although Arday et al. (1997) found that store type was not a factor, another study found a slight trend for store type and compliance. Drug store, gas station, grocery/supermarket, newsstand, restaurants, and Laundromat outlets were assessed by Ma, Shive, and Tracy (2001). This study reviewed compliance from 1994-1998 by using 15 youth age 14-17, and surveying 1,649 stores. A pattern for type of establishment and sales over the years was not found, except that Laundromats and newsstands saw an increase in sales to minors over the years, while the other types of establishments saw a decrease.

Curie et al. (2002) investigated factors that may have had an effect on illegal sales to minors and had different findings. The researchers included store characteristics such as store type, chain or local store, tobacco product placement, tobacco advertisements and the type of tobacco advertisements, and warning signs. Thirty-seven 15- and 16-year-old girls went to 11 towns and made 314 purchase attempts. The authors found the only store characteristic to have an effect on the

likelihood of sale was store type. Convenience stores were most likely to sell.

However, once they controlled for town effects, it was no longer a factor for selling tobacco to minors.

Hoppoch and Houston (1990) used a 12-year-old and a 15-year-old to attempt to purchase tobacco from 67 establishments and 10 vending machines. They found that grocery stores sold the most at 50% of grocery stores selling, followed by convenience stores at 37%. The results were only descriptive, not comparative, so it is unknown whether the differences were significant.

Hanson, Hatsukami, Boyle, and Brown (2000) were interested in smokeless tobacco sales. They used two boys to each make purchase attempts at 90 different establishments for a total of 180 compliance checks. Half of the establishments were independently owned stores, and half were chains. They found that those that were chain stores were less likely to sell. The researchers also found that asking for identification was a significant predictor of whether the clerk sold, and found that chains were more likely to ask for identification than independently owned establishments. This is only one of three studies to test what might predict asking for identification.

Another background variable tested to see if there is an effect on tobacco sales to minors was if warning signs were posted. O'Grady et al. (2000) observed this variable, but categorized it as an event characteristic. The reason it was categorized that way was because the researchers conceived a variable called the legal compliance index, which was measured by assessing three variables: 1) if the establishment has signage, 2) if the clerk asked for identification, and 3) if the clerk asked for age (clerk

behaviors). Because this variable was tangled with two other variables to create the measure legal compliance index, it is unknown if signage had an effect alone or not. However, other researchers found if warning signs were posted, the clerk was just as likely to sell (Vorhees et al., 1997; Jason et al., 1996; Hanson et al., 2000; Curie et al., 2000). Arday et al. (1997) actually found that if there was signage, they were more likely to sell. The researchers thought this was probably due to chance as there is not a logical explanation. Most states require signage, so the assumption would be that if an establishment complies with the law that requires signage, they would also comply with the law that requires refusing sales to minors, but that was not the case.

There are variables that describe the area, neighborhood, or community that a given establishment is in. Characteristics such as urban/rural, town size, income of the neighborhood, or ethnicity of the neighborhood describe the surrounding community. One study found that establishments in urban areas had a higher sales rate. Arday et al. (1997) found that stores in the metropolitan area had a significantly higher sales rate than the rural stores. However, when O'Grady et al. (2000) tested urban/rural as a predictor, with other background variables, it made no difference in sales rate. It seems as though the urban/rural characteristic may predict sales in certain areas and not others.

The primary ethnicity of neighborhood that an establishment is in provides a context for the attempted purchase. Neighborhood type is a background variable, as it is something consistent with each purchase at the establishment. Researchers have assessed neighborhood type by the ethnicity of the neighborhood and the income of the neighborhood.

Hoppock and Houston (1990) found that stores in low-income neighborhoods were more likely to sell than those in working-class neighborhoods. However, this analysis was only descriptive.

Jason et al. (1996) assessed several variables in a 12-month study conducting compliance checks once each month. Ethnicity of the neighborhood was assessed; they found the ethnicity of the neighborhood played no role in compliance.

In a final consideration of the potential impact of the environment on illegal sales, Landrine, Klonoff, and Alcaraz (1997) used eight Black and eight White children to assess differences in sales between White and Black neighborhoods. While they found that Black youth were more likely to be sold to in Black neighborhoods, they found that Black youth were most often sold to by non-Black clerks. A similar study by Klonoff et al. (1997) found no difference in sale by type of neighborhood, when White, Black, and Latino neighborhoods were tested using 18 boys and 18 girls in equal number of youths age 10, 14, and 16; and an equal number of Blacks, Whites, and Latinos of each age and gender. The Klonoff et al. (1997) analysis used 36 youth: two ten-year-old Latina females, two ten-year-old Black females, two ten-year-old White females, two ten-year-old Latino males, two ten-year-old Black males, and two ten-year-old White males. The same demographics were the same at age 14 and 16. The study included 72 stores equally distributed in Latino, Black, and White communities. Each youth checked each of the 72 stores, and there was no difference in sale by type of neighborhood.

In an earlier investigation of the dynamics of tobacco purchasing, Voorhees et al. (1997) collected data from 52 corner stores in a low-income African American community, and 31 corner stores in a low-income White community by using six

confederates: two Black females, two White females, and two Black males age 14-16. The dependent variable was sale or no sale. Voorhees et al. (1997) found no difference between Black and White communities in terms of selling to minors. Because both of these neighborhoods were low-income neighborhoods, it might be that neighborhood income is more important than racial breakdown of the neighborhood. Vorhees et al. (1997) also assessed the number of tobacco advertisements at a store and found that stores having five or more advertisements were less likely to comply, making it seem as though some stores do have a propensity to push tobacco sales regardless of purchaser. Further, this study found more interesting and significant results in terms of race while assessing event factors, which will be explored in the next section.

While the research supports the idea that neighborhood type plays little or no role in tobacco sales to minors, Landrine et al. (1997) did find a difference for Black youth, but that difference may have been attributed to the clerks' race since the clerk race was so highly correlated with the neighborhood of the store. Further, other literature has suggested that Black clerks are the least likely to sell, and that Black youth are more likely to be sold to than White youth. This could account for Landrine et al. (1997) finding differences by neighborhood; it might have had more to do with the clerk-youth race disconcordance (clerk race being different than youth race) than the neighborhood in which they were sold. However, the above studies illustrate how background and event factors may interact to influence potential illegal sales.

From all the previous outlined findings, it seems as though background factors lack consistency. Store type had an effect in one study. It seemed that convenience

stores were more likely to sell in one study, but after town effects were controlled for it was no longer a factor. Operation type had no effect in two studies. Stores that sold alcohol complied more. Being in an urban/rural area was assessed in two studies. One study found that if a store was in a metropolitan area, the rate of illegal sales to minors tended to be higher than in a rural area. The other study reported no difference. Being a chain store versus being an independently owned establishment made no difference in one study; and chains were more likely to question the purchaser and more likely to comply in another study. Finally, research on neighborhoods is complicated by the race of the youth and the clerk, and the income level of the neighborhood, so it is challenging to conclude exactly what played a role in the completed sale. These varying findings may be because other factors are important. On the other hand, it may be due to the fact that these studies take place in different environments, and certain factors may play a role in some environments and not in others.

Table 2.2: BACKGROUND FACTORS

Source	Design	Independent Variables	Results/Conclusion
Arday et al. (1997)	Using seventeen youth, compliance checks were conducted in 165 establishments.	Type of store Signage If establishment also sells alcohol Urban or rural area	-Clerks at establishments that also sell alcohol are less likely to sell -Clerks in metropolitan areas are more likely to sell -Signage was not a factor
Curie et al. (2002)	Using 37 15- and 16-year-old females, compliance checks were conducted surveying 314 establishments in 11 different towns.	Type of store	-Convenience stores were most likely to sell
Hanson et al. (2000)	Using two boys, 180 compliance checks were conducted.	Independent stores/chains	-Chains were more likely to comply -Chains were more likely to question youth
Hoppock and Houston (1990)	Using 12- and 15-year-old boys, compliance checks were conducted surveying 67 establishments and 10 vending machines.	Type of Store Income of neighborhood	-Grocery stores sold the most -Low income neighborhoods were more likely to sell -Descriptive statistics only
Jason et al. (1996)	Using varying schedules of enforcement, compliance checks were conducted monthly.	Ethnicity of neighborhood	-Ethnicity had no effect on compliance

Table 2.2: BACKGROUND FACTORS (continued)

Source	Design	Independent Variables	Results/Conclusion
Klonoff et al. (1997)	Using 18 dyads matched by age, gender, and race, each dyad checked 72 stores in Latino, Black, and White communities.	Ethnicity of neighborhood	-No difference in neighborhoods
Landrine et al. (1997)	Using eight Black and eight White youths, compliance checks were conducted individually by each of the youth at 36 stores.	Ethnicity of neighborhood	-Non-Black clerks were more likely to sell to Black youth than Black clerks in Black neighborhoods
Ma et al. (2001)	Using fifteen youth age 14-17, compliance checks were conducted by surveying 1,649 stores over five years.	Type of store Gender Signage	-Places with signage were less likely to sell -Some trends in store type
O'Grady et al. (2000)	Using compliance checks, they observed several variables and their effect on vendor compliance.	Type of establishment Urban or rural area Tobacco producing region	- No background factors were significant
Voorhees et al. (1997)	Using two Black females, two White females, and two Black males age 14-16, compliance checks were conducted on 52 corner stores in a low-income African-American community, and 31 corner stores in a low-income White community.	Number of advertisements Neighborhood type	- No difference in neighborhood type -Having five or fewer advertisements decreased the likelihood of sale

Event factors

Event factors include dynamics that may change with each clerk-customer interaction. Event factors include clerk characteristics and/or clerk behaviors, youth characteristics and/or youth behaviors. Most researchers who study tobacco sales to minors include event factors in their investigations.

This section is divided into two sections. One section reviews studies on youth characteristics and behaviors, and the second section reviews studies on clerk characteristics and behaviors. Most studies assess both.

Youth characteristics and behaviors. The importance of knowing which youth are more likely to complete sales is reflected in the fact that most youth who smoke have purchased cigarettes at some point. If youth factors that influence sales can be identified, changes in training and policy can be made to limit youth access. Many of the following studies have been previously reviewed in other sections because these studies also included enforcement or background factors as well as event factors.

With a sample of 17 youth in Austin, Texas, Arday et al. (1997) found that there was no difference in completed sales by gender, race, apparent age, or actual age of the youth. However, Ma et al. (2001) conducted a longitudinal study in Philadelphia involving 1,649 stores and found that female youth were consistently more likely to complete the purchase than males, as did Klonoff et al. (1997).

O'Grady et al. (2000) assessed a variable called gender composition. There were teams of youth who attempted to purchase. They found that the girl/boy dyad was most likely to be sold to, followed by the girl/girl dyad, and finally the boy/boy dyad.

They also found that age predicted sale. The older the youth was, the more likely the clerk was to sell.

Klonoff et al. (1997) also found that Blacks were most likely to be sold to, followed by Whites and then Latinos. Several interactions were also observed. In descending order of completed purchases by race and gender, Black males completed the most sales, followed by Latina females, Black females, White females, White males, and finally Latino males. For the gender by age interaction, 16-year-old boys completed a slightly higher percentage of sales than 16-year-old girls. In contrast for the 10- and 14- year-old age groups, girls completed a far higher percentage of the sales than did the boys. There was also an ethnicity by age interaction for the 16-year-olds. Black youth were most likely to be sold to, followed by Whites and then Latinos. With 14-year-olds, Whites were most likely to complete the sale, followed by Blacks and then Latinos. Finally, among the 10-year-olds, Latinos were sold to the most, followed by Whites, and then Blacks.

In the same community using the same 72 stores, Landrine, Klonoff, Campbell, and Reina-Patton (2000) found no difference in a five-year follow-up to Klonoff et al. (1997) in terms of gender of the youth, but did find again that minority youth were more likely to be sold cigarettes than White youth. This study was a little different than the original study because only 12 youth were used: two Latina females, two Black females, and two White females, with the same racial breakdown for males, but all participants were 16 years old. The authors concluded that since compliance had increased, the other factors (gender and age) were no longer relevant factors for the likelihood of the sale.

In several studies, the older the buyer was the more likely a youth was to complete the sale (O'Grady et al., 2000; Ma et al., 2001; Klonoff et al. 1997; Landrine & Klonoff, 2003; Levinston et al. 2002). Curie et al. (2002) found that age was a factor, but after controlling for other factors, it did not improve the likelihood of the sale. Arday et al. (1997) did not find age or apparent age as a factor, but the study asserts that it may be due to small sample size. The closer a person is to being "of age," the older they look, typically.

Differentials in successful illegal purchase extend beyond the age, race and ethnicity of the young customer. Some studies have outlined methods of manipulation youth can use to purchase cigarettes, like lying about age, presenting identification even though they are not old enough to purchase cigarettes, purchasing other items or bringing in a note from a parent. Youth who used manipulation were more likely to be sold to than those who did not, with the exception of having a parental note which actually decreased the likelihood of sale. For example, 21 youth age 15-17 checked 232 stores. Some youth used no manipulation: they could not lie about their age; they had to say the cigarettes were for themselves. Others were instructed to use manipulation: they asked for cigarettes and insisted they were old enough; some brought a note from a parent saying the cigarettes were for the parent; some used a technique called "foot-in-the-door" in which the youth grabbed a few items for purchase and then asked for a pack of cigarettes as the clerk was ringing up the order. When youth lied about their age, or picked out several other items for purchase, they were more likely to complete the sale than when they did not use these methods. The note from the parent made the clerk less likely to sell. (Klonoff & Landrine, 2004).

Another somewhat deceitful method of getting cigarettes, which was proven more successful than just attempting to purchase, involves making several trips to the same convenience store. Compliance checks were conducted using 18 youth to check 232 stores. Landrine and Klonoff (2003) referred to a method of purchase called the "familiarity effect" when the youth entered the store four times and purchased non-tobacco items. The fifth time they entered the store they attempted to purchase tobacco products, and they were 5.5 times more likely to complete the sale.

Finally, Levinston et al. (2002) used 16 minors to conduct over 1,200 compliance checks. Half of the time minors carried their valid ID and produced it if asked. The other half of the time, the minors had no ID, and if they were asked said they did not have it. Clerks were six times more likely to complete the sale if the youth showed their valid ID proving they were underage. Therefore, it seems if youth used some method of manipulation, it tended to increase the likelihood of the sale.

Clearly, there are youth characteristics and behaviors that may influence the illegal sale. The interactions between age, race, and gender can be complicated. Further complicating the situation are the background factors that may play a role, and most importantly the role the clerk plays during the transaction. The clerk characteristics and behaviors are discussed in the following section.

Table 2.3: EVENT FACTORS: YOUTH VARIABLES

Sources	Design	Independent Variables	Results/Conclusion
Arday et al. (1997)	Using 17 youth, compliance checks were conducted in 165 establishments.	Gender Actual and apparent age Race	-No difference by gender, actual or apparent age, gender, race -Youth who used manipulative techniques were more likely to be sold to
Klonoff and Landrine (2004)	Using 15 to 17-year-olds, 232 stores were checked using various methods of manipulation and no manipulation.	Methods of manipulation: note from parent, lying about age, purchasing other items	
Klonoff et al. (1997)	Using 18 dyads matched by age, gender, and race, each dyad checked 72 stores in Latino, Black, and White communities.	Gender Age Race	-Females were more likely to be sold to overall -Blacks were most likely to be sold to, then Whites, then Latinos -Complex interactions of race, gender and age -Older youth were sold to more often than younger youth
Landrine and Klonoff (2003)	Using 18 youth to check 232 stores, the familiarity technique was used and a control protocol was used.	Familiarity effect	-Youth were 5.5 times more likely to be sold to when they used the familiarity technique

Table 2.3: EVENT FACTORS: YOUTH VARIABLES (continued)

Source	Design	Independent Variables	Results/Conclusion
Landrine et al. (2000)	Using six dyads of 16-year-olds matched by race and gender, compliance checks were conducted in 72 stores in Latino, Black, and White communities.	Gender Race	-Minority youth were sold to more often than White youth
Levinston et al. (2002)	Using compliance checks, youth would show identification if asked half the time and say they did not have ID the other times.	Showing ID when asked Gender Race Age	-Youth who showed ID were more likely to be sold to -The effects increased with age
Ma et al. (2001)	Using 15 youth age 14-17, compliance checks were conducted by surveying 1,649 stores over 5 years.	Youth gender Age of buyer	-Older youth were sold to more often than younger youth -Females were sold to more often than males
O'Grady et al. (2000)	Using compliance checks, they observed several variables and their effect on vendor compliance.	Composite gender of youth teams Age Time of day	-Girl/boy dyads were sold to the most, then girl/girl, then boy/boy -Older youth were sold to more -Sales increased later in the day

Clerk characteristics and behaviors. While the characteristics of the youth are important, it is also important to consider the characteristics and actions of the salespeople who complete the illegal sales. These are also event factors. Eight studies that examine the role of clerk characteristics will be reviewed.

Voorhees et al. (1997) found that racial discordance (i.e. clerks selling to youth of a different ethnic background than themselves) best predicted the sale to an underage youth in the regression model. The results of this analysis are, however, limited because the race of the attendant was usually Asian, so it is difficult to tell if Asian clerks were more likely to sell to all minors or only those of other races, since there were no Asian youth in the study. When Asian, coded as clerk race Asian or not, was substituted for racial discordance in the regression model, the results were nearly the same as racial discordance. Asian clerks were more likely to sell to White youth than White or Black clerks, and they were more likely to sell to Black youth than White or Black clerks. Again, it could have been that racial discordance predicted the sale, or having an Asian clerk predicted the sale.

In a parallel study, Landrine et al. (1997) found non-Black clerks were more likely to sell to Black youth. Another study on race and tobacco sales had similar findings. Ma et al. (2001) found White clerks were more likely to sell to minors overall than Black clerks, but Asian and Hispanic clerks were more likely to sell overall than White clerks. Klonoff et al. (1997) also reported that Asians had the highest rates of sales to minors, and Black clerks had the lowest. Therefore, there is some consistency for the findings on clerk race and racial discordance.

In terms of gender, male clerks were consistently more likely to sell overall (Ma et al., 2001; Klonoff et al., 1997). Ma et al. (2001) found in five years of compliance checks that women sold more than men only during the first year. In subsequent years, the men sold more than the women with an odds ratio of 1.21 overall. Klonoff et al. (1997) found that men sold 46% of the time, and women sold 31% of the time. Arday et al. (1997) found that 67.1% of male clerks sold and 57.0% of female clerks sold, but that difference was not significant.

In terms of clerk behavior, Curie et al. (2002) found that clerks who do not ask for age or identification were most likely to sell to minors. Arday et al. (1997) also found those who questioned the minors were more likely to deny the sale. Many other studies came to the same conclusion: clerks who question youth are less likely to sell (Jason et al. 1996; Levinston et al., 2002; Hanson et al., 2000; Klonoff & Landrine, 2004).

Interestingly, Klonoff and Landrine (2004), who were testing different manipulative strategies, did find that clerks who asked were less likely to sell and when youth used manipulative techniques, clerks were less likely to ask. Clearly, clerks who asked for identification would be most likely to figure out that the youth is underage and deny the sale. The clerks might have still sold the product if the youth lied about their age, or if the youth presented identification and the clerk did not check it or did not check it properly, but asking for identification seemed to help decrease the likelihood of the sale (Levinston et al., 2002).

O'Grady et al. (2000) tested the event variables in a block. Independent variables included the following: legal compliance index (again, a measure of signage, asking for identification, and asking age), time of day, age of youth, and gender

composition of the youth teams. The legal compliance index is coded based on three measures: signage, asking for identification, asking age (clerk behaviors). All of these factors played a role in the sale. Sales were least likely in the morning, and compliance decreased throughout the day. The gender composition of the two person team played a role as discussed previously. The girl/boy dyad was most likely to be sold to, followed by the girl/girl dyad, and finally the boy/boy dyad. As discussed previously, as age increased, so did the likelihood of the sale. Sales were more likely when legal compliance index was low; if a clerk did not ask for identification (legal compliance), they would be more likely to sell.

The review of literature on clerks shows that Black clerks tended to sell tobacco products to minors the least, followed by White clerks. Asian and Latino clerks were more likely to sell than White clerks. Further, men were more likely to sell than women, and asking for identification decreased the likelihood of the sale.

Table 2.4: EVENT FACTORS: CLERK VARIABLES

Source	Design	Independent Variables	Results/Conclusion
Arday et al. (1997)	Using seventeen youth, compliance checks were conducted in 165 establishments.	Clerk gender Clerk asked for age/ID	-No significant difference for clerk gender -Likelihood of the sale decreased if the clerk questioned the minor
Curie et al. (2002)	Using 37 15- and 16-year-old females, compliance checks were conducted surveying 314 establishments in 11 different towns.	Clerk age Clerk gender Clerk asking for age/ ID	-Clerks who did not ask for age or ID were more likely to sell -Convenience stores were most likely to sell
Hanson et al. (2000)	Using two boys, 180 compliance checks were conducted.	Questioning	-Questioning youth predicted not selling -Chains were more likely to question youth
Jason et al. (1996)	Using varying schedules of enforcement, compliance checks were conducted monthly.	Asking	-Asking decreased the likelihood of the sale
Klonoff et al. (1997)	Using 18 dyads matched by age, gender, and race, each dyad checked 72 stores in Latino, Black, and White communities.	Clerk race Clerk gender	-Asians have the highest rates of sales to minors -Black clerks have the lowest -Males sold to minors more often than women

Table 2.4: EVENT FACTORS: CLERK VARIABLES (continued)

Source	Design	Independent Variables	Results/Conclusion
Klonoff and Landrine (2004)	Using 15 to 17-year-olds, 232 stores were checked using various methods of manipulation and no manipulation.	Methods of manipulation: note from parent, lying about age, purchasing other items	-Questioning youth decreases likelihood of sale -Using manipulative techniques, decreases the likelihood of asking
Landrine et al. (1997)	Using eight Black and eight White youths, compliance checks were conducted individually by each of the youth at 36 stores.	Clerk race	-Non-Black clerks were more likely to sell to Black youth than Black clerks in Black neighborhoods
Levinston et al. (2002)	Using compliance checks, youth would show identification if asked half the time and say the did not have ID the other times	Asking for ID	-Clerks who asked were less likely to sell, but when youth showed ID when asked, they were more likely to sell than when they did not have one
Ma et al. (2001)	Using fifteen youth ages 14-17, compliance checks were conducted by surveying 1,649 stores over five years.	Clerk gender Clerk age Clerk race of clerk	-Asian and Latino clerks were more likely to sell than White clerks -White clerks were more likely to sell than Black clerks -Males were more likely to sell to minors overall
O'Grady et al. (2000)	Using compliance checks, they observed several variables and their effect on vendor compliance.	Clerk asking for age/ ID	-Clerks who asked for ID were less likely to sell

Table 2.4: EVENT FACTORS: CLERK VARIABLES (continued)

Source	Design	Independent Variables	Results/Conclusion
Voorhees et al. (1997)	Using two Black females, two White females, and two Black males age 14-16, compliance checks were conducted on 52 corner stores in a low-income African American community, and 31 corner stores in a low-income White community.	Race Gender Advertisements	-Clerks tended to sell to those who were of another race than themselves -Asian clerks were more likely to sell than White or Black clerks

The Current Study

The research supports the idea that event factors tend to play the largest role in predicting sales. Interestingly, event factors include an obvious variable: asking for identification. All but one study supports the finding that asking for identification makes a clerk less likely to sell. There has only been one study in all of the literature that assessed age verification and found that it did not significantly predict selling, and it was conducted before it was illegal to sell tobacco products to minors in the study community (Voorhees et al., 1997). This event variable clearly and consistently predicts compliance. Therefore, the more appropriate question seems, if asking for identification predicts whether a clerk illegally sells tobacco to minors, what predicts whether a clerk asks for identification. This variable has been analyzed as a dependent variable in three studies.

When Hanson et al. (2000) tested stores to find whether chains or independently owned establishments were more likely to sell, they found that chains were less likely to sell, that clerks who questioned minors were less likely to sell, and that being a chain store predicted asking. Arday et al. (1997) found that asking predicted selling, and with a Chi square analysis found that being a liquor store made clerks more likely to ask. However, when questioning the minor was analyzed as the dependent variable, they could not find any independent predictors. Finally, Landrine and Klonoff (2003) tested youth manipulation as a predictor of selling. Most types of manipulation increased the sale. They also found that asking made clerks less likely to sell. However, they also found that using manipulation made clerks less likely to question the minor.

The current study addresses the issue of asking for identification and selling tobacco to minors in the context of Rational Choice Theory. Rational Choice Theory is used only as a framework, not as a theory, for a few reasons. First, the current study lacks all the pieces to complete the Rational Choice Theory analysis. Second, the basic assumption behind the theory is controversial. Lastly, the current study analyzes selling tobacco to minors as a dependent variable, but also analyzes asking as a dependent variable. O'Grady et al. (2000) only included asking as part of a predictor variable.

The first reason Rational Choice Theory is not used as a theory in the current study is because it lacks all the variables considered in O'Grady et al. (2000). O'Grady et al. (2000) analyzed enforcement as a predictor variable, and when no other variables were presented, it was a significant predictor of selling tobacco to minors. Enforcement, for the current study, simply was not accessible. This is a minor issue because after including event variables in the analysis, O'Grady et al. (2000) found that enforcement was not a significant predictor of selling. However, because enforcement was not collected as a predictor variable, the study is not a replication of the O'Grady et al. (2000) study.

Another reason that Rational Choice Theory is only being used to organize the research is the underlying assumption behind the theory. The theory looks at selling tobacco to minors as criminal behavior. The assumption that someone who sells tobacco to a minor is a criminal is inconsistent with the typical image of a criminal. Typically, infractions are treated slightly more seriously than a speeding ticket, as there is a fine and at times a notice to appear in court but never jail time. Further, it is unknown why clerks sell to minors. Reasons could include lack of training, inability to

calculate age, indifference to youth tobacco use, feeling rushed due to a long line, but not a sinister crime. It seems unlikely that clerks would be pushing tobacco sales to addict children in order to insure steady employment. Therefore, while the framework is helpful, the underlying assumptions of Rational Choice Theory may not apply to clerks to who sell tobacco to minors.

Finally, the current study focuses on tobacco sales to minors by analyzing asking for identification in a variety of ways. Asking is analyzed as a predictor variable for selling, as a dependent variable, and as a selection variable (If the clerk asked for identification, what predicted the sale?). O'Grady et al. (2000) analyzed asking as a piece of a predictor variable, legal compliance index. Legal compliance index was conceived by assessing three measures: signage, asking for age, and asking for identification. Since they found that legal compliance index predicted sale, the current study analyzes predictors of asking (one of the pieces of legal compliance index). Because asking is analyzed differently in both studies, O'Grady et al. (2000) is not replicated or tested in the current study, but used to organize and guide the analyses.

Even though the study lacks all of the concepts to test Rational Choice Theory, the assumptions behind the theory are questionable when applied to tobacco vendors, and the current study analyzes asking for identification as a dependent variable, the theory offers an organizing framework through which tobacco sales to minors can be organized. Rational Choice Theory can be used as a lens because, conceptually, it provides an existing paradigm for categorizing the variables. The study uses pieces of Rational Choice Theory to organize a model to predict, not only sales, but asking for identification. The study further examines differences in the dependent variable (sale)

when identification was requested and when it was not. The study also examines differences when identification was requested and provided. These differences are examined by analyzing data collected by the local health department over the course of eight years. The local health department is charged with checking each tobacco vendor in the county three times each year. The procedure for how the compliance checks were conducted is presented in the next chapter. Chapter 3 also explains how variables were assessed and grouped to organize the analyses. Finally, the methods for collecting, entering, and analyzing the data are presented.

CHAPTER 3: METHODOLOGY

Chapter Overview

Chapter 3 is divided into five sections. The first section presents the background for the study including information on the study community, the local health department, and a description of the data. The second section of the chapter highlights the methods through which compliance checks were conducted by the local health department. The third chapter section presents the definition of variables, how they compare to O'Grady et al. (2000), and how the variables were categorized for data analyses. The fourth section discusses the reliability and validity of the data. The final section of the chapter describes the research questions and the data analysis.

Study Background

The current study is based on a data set assembled from tobacco vendor compliance checks between 1997 and 2005. The compliance checks were conducted in a mid-sized county in the Midwest. According to the 2000 Census, the two largest cities in the county have populations of approximately 67,500 and 36,400; and the population of the entire county is approximately 179,700. There are 24 towns in the county where the data were collected. Thirteen towns were included in the study, as they all had establishments in them that sold tobacco. Besides the two largest communities mentioned, the other 11 towns where compliance checks were conducted had populations that ranged from 521-12,918. There were three towns with less than 1,000; five towns that had populations of 1,001-2,000; three towns with populations of 2,001-3,000; one community had a population of 4,877; and another had a population of 12,918. Aside from the three largest communities in the study, the communities offered

little racial diversity. However, the population of the county is diverse in that there are two colleges in the two largest towns. The other larger town had several industries leave the town, so the community is characterized by mobility and poverty. Other communities are commuter communities that have grown because of urban sprawl. University and hospital employees moved to the smaller towns for a different school district, or more reasonable housing. There are other small communities where farming families live, and other tight-knit communities where everyone knows everyone.

There were a range of establishments checked. Most were gas stations (36.9%), followed by convenience stores (22%), then grocery stores (19.3%), bars/restaurants (10.5%), liquor stores (7.2%) and smoke shops (3.4%). Throughout the data collection, places would go out of business or change names, or new places would pop up. There has never been any type of tobacco licensing in the study community, so it was difficult for the local health department to keep track of all the changes. Annually, the local health department attempts to visually survey all potential places that may sell tobacco in the county as there is no license necessary to sell tobacco and no registry for tobacco vendors. The driving visual survey was all that could be done to reasonably assure nearly every tobacco vendor in the county was included in the study. Approximately 115 establishments were checked three times each year by the local health department.

The local health department is made up of five divisions: Environmental Health, Maternal and Child Health, Wellness and Health Promotion, Infectious Disease, and Administration. The tobacco programs are housed in the Division of Wellness and Health Promotion. In the Division of Wellness and Health Promotion, health educators implement tobacco prevention programs, tobacco cessation programs, and tobacco

policy initiatives. Tobacco vendor compliance checks are a piece of tobacco prevention, so the tobacco vendor compliance program was housed in the Division of Wellness and Health Promotion. The Division of Wellness and Health Promotion conducted compliance checks and collected the data for the current study.

Over the course of eight years, 2,717 compliance checks were conducted by about 225 14-17 year-olds (91 boys, 131 girls, three were missing). Sixty-two of the youth volunteers were African American, four were Asian American, two were Hispanic, and the remaining six were other or missing according to the reporting forms.

The data analysis used 10 variables: operation type (type of store), town size, per capita income of neighborhood, gender of the youth, age of the youth, race of the youth, gender of the clerk, if the clerk asked for identification, if the youth provided identification, and sale. The data set included 2,717 cases, of which 2,122 cases were used. Reasons for the missing data are explained in Chapter 4.

Methods for Compliance Checks

In 1997 the local health department began the NOT HERE program which involved conducting tobacco compliance checks. The motivation for the compliance checks was to ensure that minors were not being sold to in more than 20% of purchase attempts. This mandate occurred due to the Synar Amendment to the 1992 Federal Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act. Under the Synar Amendment, states must conduct compliance checks on a sample of the state's tobacco vendors. States with compliance below 80% can lose a percentage of their federal Substance Abuse Prevention and Treatment (SAPT) Block Grant funds. The state of Illinois receives approximately \$70 million each fiscal year through SAPT Block

Grants. The manner in which the sample size was determined for Illinois was complicated by the fact that there is no tobacco vendor licensing. With the unavailability of a master list of vendors, a contracted business firm created a list of likely tobacco vendors. The business firm approximated the number of tobacco vendors in Illinois, and through statistical formulas estimated the number of establishments that should be sampled. The sample size changes each year depending on the approximated number of tobacco vendors. To be clear, the checks completed for the Synar Amendment are not the same checks completed by the local health department. The local health department was charged with conducting checks so vendors would get used to being monitored, get used to complying, and if the clerks were ever in one of the stores targeted for the Synar check, they would hopefully pass. The following is a description of the compliance checks conducted by the local health department.

Youth were recruited from a variety of sources. Children of employees of the local health department were used, as well as children of colleagues in the prevention field. Teachers in the local high schools were contacted and asked to let their students know about the compliance checks. Letters were sent to the parents of the youth volunteers explaining the program and the expectations for the youth, the parent, and the local health department. (See Appendix A.) The youth volunteers could earn \$20 for participating. Youth arrived at the local health department for training the day of the compliance check. Youth had to present a signed behavioral agreement (see Appendix B) and a consent form signed by the youth and the parent (see Appendix C), and the youth must have had some form of identification with their date of birth on it.

Youth were required to dress in a manner appropriate for their age. The youth were informed of the dress code in advance in the behavioral agreement they signed (see Appendix B). The program coordinator evaluated the attire of each of the youth volunteers. If she felt the youth were wearing clothes that made them look older than they were, they would have to change clothes or leave. For example, if a youth was wearing a business suit or college gear, s/he would be asked to change or be sent home. Youth were also asked not to wear gear with their high school name.

Training

During the training the youth and adult volunteers learned the history, rationale, and procedure for the NOT HERE program. Youth volunteers were instructed to go directly to the targeted merchandise and then directly to the check-out. At no time were they to try and persuade the clerk to complete the sale. They were directed to speak only as necessary. The youth were not allowed to use deceit. If asked about age, they were to reply with the correct age, and if they were asked for identification, they could have presented the previously approved identification if they felt comfortable in doing so. If they did not wish to provide identification when asked, they replied that they did not have identification with them. If there was no sale and the youth volunteers felt comfortable in doing so, they could present the clerk with a “Kids can’t buy ’em here” pin. Adult volunteers were asked to drive. They were to enter the store with the youth to witness the transaction. If it would be too obvious for the adult to enter the store with the youth or immediately after, the adult would not have to enter the establishment, but they would have to be in a position to witness the transaction, and then complete the reporting form for each establishment immediately after the event. (See Appendix D.)

Tobacco Purchase Attempts

No less than one week before the compliance check, each establishment was sent a “warning letter.” (See Appendix E.) The day of the compliance check, the adult volunteers left with groups of 1-4 youth volunteers and a list of vendors to check. The adult had to enter the store with the youth or at least be able to witness the transaction from their position. The adult then completed the reporting for each vendor immediately following the check. Most vendors were checked three times per year, barring some unusual circumstances. Checks were not carried out in one case because the team reported not being able to find the establishment, and another time because the youth did not feel comfortable entering the establishment. Because missing a check happened so infrequently, no attempt was made to recheck until the next round of compliance checks.

Post Compliance Checks

If a particular vendor passed, the youth or adult volunteer could present the clerk who refused the sale with a pin that says “Kids can’t buy ‘em here.” Pins were not inventoried, and volunteers were not asked to report whether they rewarded the clerk with a pin. If they completed the sale, it was indicated on the survey, and upon return to the health department headquarters, the surveys and illegally sold tobacco products were presented to the program coordinator. The coordinator sent letters to all the establishments indicating whether the clerk passed or failed. Those who failed were forwarded to law enforcement, so law enforcement could conduct their own compliance checks.

Data Entry

The data were entered into SPSS by two undergraduate students as part of an independent study. The students had to enter data at the local health department to ensure confidentiality of the youth and businesses involved. One student entered all the data on each reporting form. The other student had to figure and enter neighborhood variables, discussed later.

Definition of Variables

The current study used O'Grady et al. (2000) as a guiding framework to organize the data. Five of the variables match up closely with O'Grady et al. (2000) in terms of categorization: operation type, town size, youth gender, youth age and asking for identification. The current study defines operation type similar to O'Grady et al. (2000), and town size is defined as the same in both studies. Youth gender and age were determined by only one youth in the current study, and O'Grady et al. (2000) used teams of youth volunteers, so both genders were documented and their ages were averaged. Asking for identification was included in the current study, and it was included in O'Grady et al. (2000) as part of a measure called legal compliance index, which also included asking age and signage.

Three variables were inaccessible or impractical for the current study including enforcement, being a tobacco producing region, and time of day. Enforcement was not available for the study. A background variable included by O'Grady et al. (2000) and not in the current study was being a tobacco producing region, which would be a constant in the study community because none of the communities in the current study would be categorized as a tobacco producing region, so it was not included. O'Grady et

al. (2000) included an event variable for time of sales event. Time of day was not included in the current study. Most checks were conducted from 4-7 p.m. during the week, so little variety would be expected. See Table 3.1 for a summary of the variables.

There are four other variables analyzed in the current study that were not in O'Grady et al. (2000), but they can be organized within the framework in terms of being an enforcement variable, a background variable, or an event variable. The variables included in the current study but not in O'Grady et al. (2000) include per capita income of the neighborhood, youth race, clerk gender, and youth providing identification. See Table 3.1 for a summary of the variables.

Background Variables

Background variables involve variables that are unique to each store, but the same for each transaction at a given store. They included the following: operation type, town size, and per capita income of the surrounding neighborhood.

Operation type. Establishments were categorized as the following: gas station, convenience store, grocery store, liquor store, bar/restaurant, smoke shop. There were no criteria for operation type. Most people can look at a place and know which of the categories it falls into. The undergraduate student who entered the data was asked to identify places based on what she knew from living in the community for three years. Everyone knows that BP is a gas station, and that Colonial Pantry is a convenience store. Obviously, Ingold's Grocery is a grocery store. The student was less familiar with small town, independently owned establishments, and needed help with places that had names such as Harper's on the Way. The principal investigator was familiar with each place checked, so she corrected or advised on the places the student was

unfamiliar with. The program coordinator agreed with the principal investigator on the places that were unknown to the student. The number of places unknown to the student was not documented, but it was fewer than five.

Town size. Urban was defined as towns with 5,000 or more people. Rural was defined as towns with less than 5,000.

Per capita income of the neighborhood. One of the undergraduate students entered the data from each reporting form; the other student added the variables of percent minority (not used) and per capita income of the neighborhood taken from the 2000 Census data. The method for determining neighborhood income and percent minority involved entering each address into factfinder on the Census website. There are datasets with thematic maps available for public use. The calculations are generated, not from a complete Census, but from a sample of the population. Maps could be displayed at various levels: the state, the county, the county subdivision, the census tract, the block group, and the block. Per capita income and percent minority were displayed by Census tract. Census tracts are small, relatively stable geographic subdivisions of a county used to provide geographic units with semi-permanent boundaries. Census tracts seemed to be the best level of maps to use for determining neighborhood variables because of their stable boundaries.

Per capita income is generated by the “average obtained by dividing aggregate income by total population of an area.” (U.S. Census Bureau, 2006). Addresses of all the establishments were entered and the per capita income of the surrounding neighborhood was entered into the SPSS data file. Percent minority of the

neighborhood was entered by subtracting the percent of the neighborhood that was identified as “White only” from 100.

Because neighborhood income was highly correlated with percent minority of the neighborhood, percent minority of the neighborhood was eliminated in the analysis.

Event Variables

Event variables involve variables that may change for each event, even if they occur at the same establishment. Event variables included the following: youth gender, youth age, youth race, clerk gender, clerk asking for identification, and youth producing identification.

Youth gender. Youth gender was not listed on the reporting form, but youth name is required. The program coordinator could recall the gender of most of the youth volunteers by name. Since age verification is required to participate in compliance checks, birth certificates, drivers’ licenses, and identification cards were used to recall the youth gender and affirm the program coordinator’s recall.

Youth age. Youth age was requested on the youth reporting forms. Youth ranged in age from 14-17.

Youth race. Youth race was self-reported on the reporting forms. Race was categorized as Caucasian, African American, Asian, Hispanic, Other. Because there were so few checks completed by Hispanic youth (n=13), Hispanic was used as the reference variable for the analysis, except for the last analysis. In the final analysis Hispanic, Asian and Other were collapsed (n=6) to be the reference variable due to the small sample size.

Clerk gender. The reporting form required recording which gender the clerk was. The adult volunteers were responsible for completing the reporting form, so the adult volunteers had to mark which gender the clerk was.

Clerk asking for identification. Whether the clerk asked for identification was reported on the reporting forms by the adult volunteer who witnessed the transaction.

Youth providing identification. If youth were asked for identification, they had the personal option of showing their approved form of identification, or replying that they did not have it. Whether the youth showed identification was reported on the reporting form by the adult volunteer who witnessed the transaction.

Table 3.1: VARIABLES IN THE CURRENT STUDY COMPARED TO O'GRADY ET AL. (2000)

Variable Categories	Variables in the current study	Coded	Variables in O'Grady et al. (2000)	Defined by
Enforcement	NA	NA	Enforcement	Number of charges against merchants per 100,000 people
Background	Operation Type	1=Gas station 2=Convenience store 3= Grocery store 4=Liquor store 5= Bar/restaurant 6= Smoke shop*	Operation Type	gas stations convenience stores restaurants grocery stores other
	Town Size	Rural- less than 5,000 Urban- 5,000 or more	Urban/Rural	Rural- less than 5,000 Urban- 5,000 or more
	Per Capita Income of Neighborhood	dividing aggregate income by total population of an area	NA	NA
	NA	NA	Tobacco Producing Region	Yes No
Event	Youth Gender	0=Girl 1=Boy	Gender Composition of Teams	Girl/Girl Boy/Boy Girl/Boy
	Youth Age	14-17	Average Age	Mean= 15.35
	Youth Race	1=African American 2=Asian 3=White 4=Other 5= Hispanic*	NA	NA
	Clerk Gender	0=Man 1=Woman	NA	NA
	Clerk Asking	1=Yes 0=No	Legal Compliance Index:	All 3 criteria were met Less than all 3 were met
	Youth Providing Identification	1=Yes 0=No		
	NA	NA	Time of Sales Event	6:00 a.m. - 11:59 a.m. Noon- 5:59 p.m. 6:00 p.m.-11:59 p.m.

*Reference category

Reliability and Validity of the Data

Concerns about the reliability and validity of the data would be related to how the data were collected or entered. Reliability involves ensuring that the measurement measures consistently each time. Validity involves the correctness of the measurement. Reliability and validity were ensured through the methods of the compliance checks and the design of the reporting form. The accuracy of the data entry was ensured through random cross checking.

Only smoke-free youth were asked to participate to ensure honesty and to ensure that they would turn in the tobacco products purchased and report accurately and honestly. Further, the adult volunteers always had to witness the transaction, so that there was the recount of at least two witnesses, one of which was an adult. Unless there were not enough volunteers present, there were usually three people present for each check, even if one person was only waiting in the vehicle. The agreement between individuals speaks to the reliability of the reporting of the transaction.

Further, surveys were completed immediately after checking each establishment so answers were fresh in the recorder's mind. The questions are very straightforward, and the survey was discussed thoroughly during the training. There was also a space for comments for anything that might have been confusing during the check.

A description of the clerk was provided or the clerk name was obtained if a name tag was present. Recording a description of a clerk or recording her/his name helps verify that the event did occur. If a manager called the local health department to assert that the volunteers or the health department was lying, the reply could be that the name of the clerk was logged. Such information would not be available if the checks did not

occur. Further proof that the compliance checks occurred is that the local health department collects the illegally purchased tobacco products as evidence.

To assure consistency of reporting across time, the same survey was used each time, although throughout the years two questions were removed and one was added. The original surveys asked if there was a vending machine present. Since there eventually came to be no vending machines in the study community, the question was removed. The original surveys also asked the volunteers to categorize the clerk as an adult or minor, and no one could accurately “guess” someone else’s age, so that question was also eliminated. Early reporting forms did not include the question “Did the clerk ask for ID?”, although some groups reported the answer to this question even when the question was omitted.

To ensure data were entered properly, while the undergraduate student was entering data, the principal investigator checked 20 cases against the hard copy recording sheets weekly. One hundred cases overall were checked and all the data on the reporting forms matched the data in the data file. The principal investigator was generally present for the student to ask questions if something was confusing.

Operation type was not recorded on the reporting form, only the name of the establishment, so the student entering the data was asked to use her best judgment for categorizing establishments. The student did not have knowledge of the entire study community or the establishments on the list. The principal investigator had assisted with later compliance checks, and was familiar with every establishment on the list. When the principal investigator looked over the data for the category of operation type, she found some issues as the undergraduate student was unfamiliar with some of the

smaller towns in the study community. Less than five operation types had to be reentered because they were incorrectly categorized. The program coordinator, who also assisted with compliance checks, cross-checked the categories and agreed with each, so the categorization of operation type is accurate and reliable.

To ensure the Census data were entered correctly for the variables per capita income and percent minority, the principal investigator checked for the accuracy of the data entry by selecting 20 cases at random and re-checking them. They were all correct.

Research Questions and Data Analysis

For most of the research questions, the set of predictors was the same. Background characteristics included were the following: operation type, town size, and per capita income of the neighborhood. Event characteristics included the following: youth gender, youth race, youth age, clerk gender, and whether the clerk asked for identification.

RQ 1: Which variables predicted whether there was a sale?

Logistic regression was used to predict whether a clerk sold. The dichotomous dependent variable was sale or no sale.

RQ 2: Which variables predicted whether the clerk asked for identification?

Logistic regression was used to predict whether a clerk asked for identification. Obviously, asking for identification was not included as a predictor variable for this analysis. The dichotomous dependent variable was asking for identification or not asking for identification.

RQ 3: Which variables predicted whether there was a sale when the clerk asked for identification?

Selecting only the cases when the clerk asked for identification, logistic regression was used to predict whether a clerk sold. An additional event variable was included in the analysis: whether the youth provided identification. The dichotomous dependent variable was sale or no sale.

RQ 4: Which variables predicted whether there was a sale when the clerk asked for identification and the youth provided identification?

Selecting only the cases when the clerk asked for identification and the youth provided identification, logistic regression was used to predict whether a clerk sold. The dichotomous dependent variable was sale or no sale.

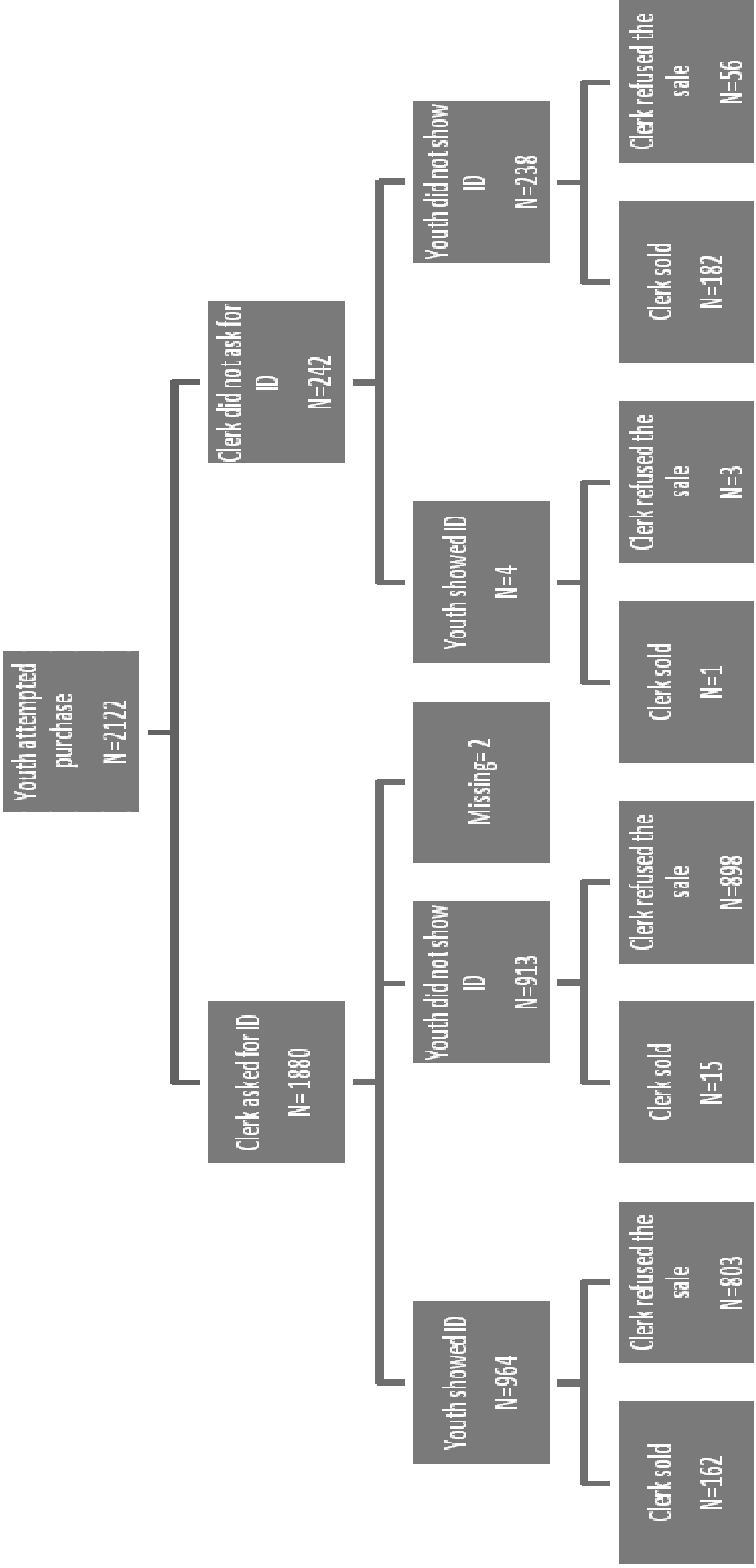
RQ 5: Which variables predicted whether there was a sale when the clerk did not ask for identification?

Selecting only the cases when the clerk did not ask for identification, logistic regression was used to predict whether a clerk sold. The dichotomous dependent variable was sale or no sale.

The dependent measures were dichotomous in that one of two outcomes could have occurred for each scenario. The clerk may have requested identification or not. The clerk may have sold or not. Each question frames the transaction under a different set of circumstances. See Figure 3.1 for an explanation of what occurred for each recorded transaction. All data analyses procedures were performed using SPSS 17. The enter method of logistic regression was used. Variables were entered in blocks,

such that each block included background variables or event variables. The data analysis and results of the analyses are reported in Chapter 4.

Figure 3.1: OUTCOMES OF EACH TRANSACTION



CHAPTER 4: RESULTS

Chapter Overview

Chapter 4 is divided into four sections. The first section presents the descriptive findings including the characteristics of the youth volunteers, the clerks, the establishments, and elements of each transaction. The second part explains the missing data. The third section presents the statistical assumptions made for the analysis and why certain analyses were completed. The final section reviews the research questions, and reveals the results of each logistic regression analysis with tables.

Descriptive Statistics

From November 1997 to December 2005, there were 2,717 tobacco purchase attempts by youth to check for compliance in the study community. Each year, the local health department checked every tobacco vendor in the county three times. Of those attempts, there were 669 sales, a compliance rate of 75.4%. In 2001, an independent agency conducted compliance checks at 32 establishments in the county and 28 complied, a compliance rate slightly higher, 87.5%, but the youth could not present identification if asked during those checks, so the higher compliance rate seems reasonable and seems to support the validity of the compliance rate. Of the 2,717 attempts, slightly more were completed by girls (57.0%). In terms of race, most attempts were completed by White youth volunteers (65.2%), and nearly a third were completed by African American youth volunteers (29.9%). While these demographics do not reflect the population of the county exactly, some studies have suggested that while African American youth are less likely to start smoking, they are more likely to be

sold to, so it can be assumed that the over sampling of African American youth did not affect the application of the research (Landrine et al., 2000). The youth volunteers ranged in age from 14-17 years old, with a mean age of 16.12. Using 14-17 year-old minors was the protocol of the local health department, and while it is unknown at what age youth make their first attempt to purchase tobacco products, very few recent studies use youth younger than 14 years of age for compliance checks. More of the clerks were female (59.3%). Most of the clerks asked for identification (88.6%). In terms of operation type, most were gas stations (36.8%), followed by convenience stores (22.7%), grocery stores (19.3%), bars/restaurants (10.7%), liquor stores (7.2%) and smoke shops (3.4%). See Table 4.1 for frequencies.

Table 4.1: DESCRIPTIVE STATISTICS FOR TRANSACTIONS

Variable	Missing	N	Percent	Valid Percent
Youth Race	485			
African American		668	24.6	29.9
White		1455	53.6	65.2
Asian		48	1.8	2.2
Hispanic*		18	.7	.8
Other		43	1.6	1.9
Youth Gender	26			
Male		1156	42.5	43.0
Female		1535	56.5	57.0
Youth Age	492			
14		5	.2	.2
15		635	23.4	28.5
16		674	24.8	30.3
17		911	33.5	40.9
Clerk Gender	43			
Male		1087	40.0	40.7
Female		1587	58.4	59.3
Ask ID	571			
Yes		1880	69.2	88.6
No		242	8.9	11.4

Table 4.1: DESCRIPTIVE STATISTICS FOR TRANSACTIONS (continued)

Town Size	0			
Under 5,000		550	20.2	20.2
Over 5,000		2167	79.8	79.8
Operation Type	0			
Gas station		781	36.8	36.8
Convenience		481	22.7	22.7
Grocery store		409	19.3	19.3
Liquor store		153	7.2	7.2
Bar/restaurant		226	10.3	10.3
Smoke Shop*		72	3.4	3.4

*Reference category for the analysis

The percent minority of the neighborhood was assessed as well as the per capita income of the neighborhood using census data. These variables were highly correlated, so only the per capita income of the neighborhood was used for the regression analysis. The methods for the assessment were covered in Chapter 3. The range and mean for income and percent minority of the neighborhood are reported in Table 4.2.

Table 4.2: MEANS OF STORE CHARACTERISTICS

Variable	Minimum	Maximum	Mean
Percent Minority of Neighborhood	.60	97.8	24.5
Average per Capita Income of Neighborhood	1,718	37,081	18,669

Missing Cases

For all 2,717 cases, participants recorded whether there was a sale for each compliance check. The earlier reporting forms did not require that participants record whether the clerk asked for identification. Therefore, a request for identification was not reported for all cases. It should be noted that some participants did report whether the clerk asked, despite the fact that the reporting form did not require it. Therefore, there

are 595 missing cases, so for analysis, 2,122 of the purchase attempts were analyzed. Other information may be missing because volunteers neglected to complete certain parts of the form or it was illegible. Figure 3.1 explained what occurred during each of the transaction.

Logistic Regression and Statistical Assumptions

Whether there was a sale was assessed for each transaction, and various other predictor variables were assessed as well. Linear regression assumes that the dependent variable is normally distributed. In the current study, the dependent variables were dichotomous variables (sale or no sale; asking or not asking), and therefore lack a normal distribution. Logistic regression logarithmically converts a dichotomous variable into a continuous variable by making the variable a probability and changing the way it is distributed, so the probability that a purchase attempt results in asking for identification (or selling) is a number between 0 and 1.

Predictor variables were entered in two blocks: store characteristics and event characteristics. The blocks were chosen to reflect the variables in O'Grady et al. (2000). The comparison variables were presented in Chapter 3. Store characteristics included the operation type, the per capita income of the neighborhood and town size. Event characteristics included youth age, race and gender; clerk gender; clerk asking for identification (when it was not a dependent variable); and providing identification (if asked). Logistic regression was used to assess which variables best predicted sales, and which variables best predicted whether the clerk asked for identification. Logistic regression was also used to assess which variables predicted sales when the clerk asked for identification, and when the youth presented identification upon request. Finally, logistic regression analysis was used to assess which variables predicted a sale

when the clerk did not ask for identification. SPSS (version 17) was used for all analyses.

The statistical assumptions for logistic regression include the following:

- (1) The true conditional probabilities are a logistic function of the independent variables.
- (2) No important variables are omitted. The literature review suggests that this is the case, with the exception of enforcement variables, which is beyond the scope of the data and the statistical analysis.
- (3) No extraneous variables are included. The variables included are all theoretically relevant.
- (4) The independent variables are measured without error. This is assumed to be the case.
- (5) The observations are independent. This is also assumed to be the case.
- (6) The independent variables are not linear combinations of each other. The continuous independent variables were tested for co-linearity. If variables were intercorrelated, one was eliminated.

Research Questions

Research questions included the following:

RQ1: Which variables predicted whether there was a sale?

RQ2: Which variables predicted whether the clerk asked for identification?

RQ 3: Which variables predicted whether there was a sale when the clerk asked for identification?

RQ4: Which variables predicted whether there was a sale when the clerk asked for identification and the youth provided identification?

RQ5: Which variables predicted whether there was a sale when the clerk did not ask for identification?

RQ1: Which variables predicted whether there was a sale?

Binary logistic regression was completed with two blocks of variables to predict the dependent variable sale (no sale=0; sale=1). The enter method of logistic regression was used, which is the default in SPSS, and applicable to exploratory research. The analysis included 2,016 cases. Variables were entered in blocks. The first block entered included the establishment variables: operation type, per capita income of the neighborhood and town size. As shown in Table 4.3, the step, block and model were not significant at $p < .05$. This would indicate that none of the establishment variables contributed to the model alone or in blocks. The next block included the event variables: youth age, youth gender, youth race, clerk gender, and whether the clerk asked for identification. As shown in Table 4.3, the step, block and model were significant at $p < .01$ with a Chi-square of 589.539 for the block and the step, and a Chi-square of 600.635 for the model. The step, block and model were significant because at least one of the predictor variables in this step significantly increased the likelihood of a sale. The Nagelkerke R square states the percentage of variance explained by the given model, and it was small in the first block ($R^2 = .009$), but it was .431 in the second block, indicating that the variables in the block accounted for 43% of the variance.

When O'Grady et al. (2000) assessed the effect of enforcement, background and event characteristics on sales, the background factors barely contributed to the model ($R^2 = .046$), so that background variables were not predictive was not surprising. Event factors with enforcement factors accounted for much of the variance ($R^2 = .58$), in

O'Grady et al. (2000), similar to the model in the current study ($R^2=.431$). As discussed in Chapters 2 and 3, O'Grady et al. (2000) included an event factor called *legal compliance index*, measured by the following: signage, *asking for identification* and asking for age. Asking for identification was included in the model as an event factor, and it significantly helped to predict the model as did age, similar to the current study.

Two variables were significantly related to the likelihood of selling in the current study. The coefficient for age (.810) was positive and significant, indicating that age was predictive of selling in that clerks were more likely to sell to older youth. For every one year increase in youth age, clerks were 2.249 times more likely to sell. This was expected as older youth tend to appear older, so a clerk would be more likely to sell to them because they might assume they are "old enough."

The coefficient for asking for identification (-3.797) was negative and significant, indicating that asking for identification was predictive of selling, in that clerks were more likely to sell if they did not ask for identification. In fact, clerks are forty-five times more likely to sell if they do not ask for identification. This finding was expected and consistent with the literature (Arday et al., 1997; Curie et al., 2002; Jason et al., 1996; Klonoff & Landrine, 2004; Levinston et al., 2002).

If a clerk does nothing to verify age, how can s/he refuse the sale? The first step in refusing the sale is asking for identification. The process can vary from that point forward. Youth can present identification and the clerk may refuse the sale; the youth may say they do not have identification and the clerk may deny the sale, or go ahead and sell the product, but the first step in any refusal is typically age verification. (See Table 4.3 for a summary of the statistics.)

Table 4.3: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING SELLING

Result of logistic regression for selling

Variable	B	S.E.	Sig.	Exp (b)
Town size	-.318	.187	.088	.727
Neighborhood income	.000	.000	.241	1.000
Gas station	.945	.524	.071	2.574
Convenience store	.712	.535	.183	2.038
Grocery store	.895	.539	.097	2.448
Liquor store	.796	.589	.177	2.216
Bar/restaurant	.910	.551	.099	2.484
Youth gender	-.198	.154	.198	.820
Youth age*	.810	.107	.000	2.249
African American	.058	1.069	.957	1.060
White	.649	1.056	.539	1.914
Asian	-.057	1.206	.962	.945
Other	.795	1.165	.495	2.215
Clerk gender	-.022	.158	.890	.978
Asking for identification*	-3.797	.201	.000	.022

*statistically significant

Measure of Model Strength (Block 1)

Variable	Chi-square	df	Sig.
Step	11.085	7	.135
Block	11.085	7	.135
Model	11.085	7	.135

Model summary of model predicting asking (Block 1)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1827.936*	.005	.009

*Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Measure of Model Strength (Block 2)

Variable	Chi-square	df	Sig.
Step	589.539	8	.000
Block	589.539	8	.000
Model	600.625	15	.000

Table 4.3: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING SELLING (continued)

Model summary of model predicting asking (Block 2)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1238.396*	.258	.431

*Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

RQ2: Which variables predicted whether the clerk asked for identification?

Binary logistic regression was completed with two blocks of variables to predict the dependent variable asking (no ask=0; ask=1). The enter method of logistic regression was used, which is the default in SPSS, and applicable to exploratory research. The analysis included 2,016 cases. Variables were entered in blocks. The first block entered included the establishment variables: operation type, per capita income of the neighborhood and town size. As shown in Table 4.4, the step, block and model were significant at $p < .05$ with a Chi-square of 19.430. Because the variables were entered in blocks, the block and step are the same and are significant because most clerks ask for identification, so predicting that the clerk asked for identification each time would be correct 88.2% of the time. The model was significant because one of the predictor variables significantly increased the likelihood of asking for identification. The next block included the event variables: youth age, youth gender, youth race and clerk gender. As shown in Table 4.4, the step, block and model were significant at $p < .01$ with a Chi-square of 31.894 for the block and the step, and a Chi-square of 51.324 for the model. The block and step are the same and are significant because most clerks ask for identification, so predicting that the clerk asked for identification each time would be correct 88.2% of the time. The model was significant because at

least one of the predictor variables significantly increased the likelihood of asking for identification. The Nagelkerke R square states the percentage of variance explained by the given model, and it was small in both blocks (Block 1: $R^2=.019$; Block 2: $R^2=.049$), which was to be expected.

In O'Grady et al. (2000), when they assessed the effect of enforcement, background, and event characteristics on sales (*not* asking for identification) the background factors barely contributed to the model ($R^2=.046$), so the minimal effect of the background characteristics was not surprising. Still, event factors with enforcement factors accounted for much of the variance $R^2=.58$ in O'Grady et al. (2000). However, one of their event factors was the legal compliance index. As discussed in Chapters 2 and 3 the legal compliance index in the O'Grady study was measured by: signage, *asking for identification* and asking for age. Of course, asking for identification would make a clerk more likely to refuse a sale. Further, it makes sense that the event characteristics in this model accounted for only a small amount of the variance because this model is predicting asking, not sales, and less is known about why a clerk asks for identification.

Three variables significantly predicted the likelihood of asking for identification. The coefficient for being a liquor store (1.307) was positive and significant, indicating that being a liquor store was predictive of asking for identification in that clerks in liquor stores were more likely to ask for identification than clerks in other types of establishments. Because liquor stores are used to asking for identification for almost every purchase, this was expected. The coefficient for youth age (-.334) was negative and significant, indicating that youth age was predictive of asking for identification, in

that clerks were more likely to ask for identification from younger youth volunteers. Youth who are younger, tend to appear younger, so it would make sense to ask for identification from those who are younger while neglecting to ask for identification from those who may appear as though they are of age.

The coefficient for clerk gender (0=male; 1=female) (.356) was positive and significant, indicating that clerk gender was predictive of asking for identification. Because it was positive, the indication is that female clerks were more likely to ask for identification. The literature supports the notion that men are more likely to sell to minors. It may be because male clerks are less likely to ask for identification as seen in this model. (See Table 4.4 for a summary of the statistics.)

Table 4.4: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING ASKING FOR IDENTIFICATION

Result of logistic regression for asking

Variable	B	S.E.	Sig.	Exp (b)
Town size	-.152	.187	.088	.727
Neighborhood income	.000	.000	.917	1.000
Gas station	-.281	.381	.460	.755
Convenience store	-.025	.396	.950	.976
Grocery store	.166	.405	.683	1.180
Liquor store*	1.307	.552	.018	3.697
Bar/restaurant	-.008	.423	.985	.992
Youth gender	-.046	.142	.749	.955
Youth age*	-.334	.090	.000	.716
African American	-19.780	11428.306	.999	.000
White	-19.267	11428.306	.999	.000
Asian	-19.069	11428.306	.999	.000
Other	-.18.479	11428.306	.999	.000
Clerk gender*	.358	.143	.012	1.431

*statistically significant

Measure of Model Strength (Block 1)

Variable	Chi-square	df	Sig.
Step	19.430	7	.007
Block	19.430	7	.007
Model	19.430	7	.007

Table 4.4: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING ASKING FOR IDENTIFICATION (continued)

Model summary of model predicting asking (Block 1)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1444.318*	.101	.019

*Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Measure of Model Strength (Block 2)

Variable	Chi-square	Df	Sig.
Step	31.894	7	.000
Block	31.894	7	.000
Model	51.324	14	.000

Model summary of model predicting asking (Block 2)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1412.424*	.025	.049

*Estimation terminated at iteration number 20 because maximum iteration has been reached. Final solution cannot be found.

RQ3: Which variables predicted whether there was a sale when the clerk asked for identification?

The first step in denying the sale is verifying age, but what happens after the clerk asks for identification? In the current study, the youth could have presented identification upon request or not. Only cases when the clerk asked for identification were selected. Binary logistic regression was completed with two blocks of variables to predict the dependent variable sale (no sale=0; sale=1) when identification was requested. The enter method of logistic regression was used, which is the default in SPSS, and applicable to exploratory research. The analysis included 1,776 cases. Variables were entered in blocks. The first block entered included the establishment variables: operation type, per capita income of the neighborhood and town size. As

shown in Table 4.5, the step, block and model were significant at $p < .01$ with a Chi-square of 22.875 for the step, block and model. The step, block and model were significant because at least one of the predictor variables in this step significantly increased the likelihood of selling when identification was requested.

The next block included the event variables: youth age, youth gender, youth race, clerk gender, and whether the youth showed identification. As shown in Table 4.5, the step, block and model were significant at $p < .01$ with a Chi-square of 159.891 for the block and the step, and a Chi-square of 182.767 for the model. The step, block and model were significant because at least one of the predictor variables in this step significantly increased the likelihood of selling when identification was requested. The Nagelkerke R square states the percentage of variance explained by the given model, and it was small in the first block (Block 1: $R^2 = .028$), but it was larger in the second block (Block 2: $R^2 = .214$), indicating that the variables in the second block accounted for 21.4% of the variance.

One background variable and two event variables were predictive of selling when identification was requested. The coefficient for being a bar/restaurant (2.107) was positive and significant, indicating that being a bar/restaurant was predictive of selling when clerks requested identification. This will be examined further in the next analysis.

The coefficient for age (.464) was positive and significant, indicating that the older the youth, the more likely the clerk was to sell when identification was requested. This makes sense because clerks were more likely to sell to older youth anyway.

The coefficient for showing identification (2.167) was positive and significant, indicating that producing identification when asked was predictive of selling, in that

clerks were more likely to sell when they asked for identification and identification was produced even if the identification revealed the youth was not old enough to purchase tobacco products. Youth who showed identification upon request were 8.7 times more likely to be sold to than those who did not. This supports the idea that when clerks requested identification, they were more likely to sell when the minor produced identification than when they did not. Two other studies have observed this same effect (Klonoff & Landrine, 2004; Levinston et al., 2002). This was not observed in O’Grady et al. (2000), as only clerk behaviors were considered when they assessed event characteristics. (See Table 4.5 for a summary of the statistics.)

Table 4.5: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING SELLING WHEN IDENTIFICATION WAS REQUESTED

Result of logistic regression for selling when identification was requested

Variable	B	S.E.	Sig.	Exp (b)
Town size	.353	.208	.089	.703
Neighborhood income	.000	.000	.222	1.000
Gas station	1.739	1.033	.092	5.693
Convenience store	1.803	1.039	.083	6.066
Grocery store	1.940	1.040	.062	6.958
Liquor store	1.725	1.069	.107	5.612
Bar/restaurant*	2.107	1.044	.043	8.227
Youth gender	-.109	.180	.544	896
Youth age*	.464	.141	.001	1.591
African American	.129	1.093	.906	1.137
White	.689	1.070	.514	2.010
Asian	-.976	1.483	.510	.377
Other	.564	1.205	.640	1.758
Clerk gender	.034	.185	.853	1.035
Showing for identification*	2.167	.306	.000	8.728

*statistically significant

Measure of Model Strength (Block 1)

Variable	Chi-square	df	Sig.
Step	22.875	7	.002
Block	22.875	7	.002
Model	22.875	7	.002

Table 4.5: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING SELLING WHEN IDENTIFICATION WAS REQUESTED (continued)

Model summary of model predicting selling (Block 1)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1061.702*	.013	.028

*Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Measure of Model Strength (Block 2)

Variable	Chi-square	df	Sig.
Step	159.891	8	.000
Block	159.891	8	.000
Model	182.767	15	.000

Model summary of model predicting asking (Block 2)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	901.811*	.098	.214

*Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

RQ 4: Which variables predicted whether there was a sale when the clerk asked for identification and the youth provided identification?

The only cases that were selected for the analysis were the cases in which the clerk asked for identification, and the youth presented identification. Binary logistic regression was completed with two blocks of variables to predict the dependent variable selling (no sale=0; sale=1). The enter method of logistic regression was used. The analysis included 892 cases. The first block entered included the establishment variables: operation type, per capita income of the neighborhood and town size. As shown in Table 4.6, the step, block and model were significant at $p < .05$ with a Chi-square of 14.369. Because the variables were entered in blocks, the block and step are the same and are significant, because most clerks who ask for identification do not sell

even when the youth presents identification. Therefore, predicting that the clerk refused the sale upon presentation of identification each time would be correct 83.3% of the time. The model was significant because at least one of the predictor variables significantly increased the likelihood of asking for identification. The next block included the event variables: youth age, youth gender, youth race and clerk gender. As shown in Table 4.6, the step, block and model were significant at $p < .01$ with a Chi-square of 18.928 for the step and the block, and a Chi-square of 33.297 for the model. The block and step are the same and are significant, because most clerks did not sell when they asked for identification even if the youth showed identification, so predicting that the clerk denied the sale each time under this scenario would be correct 83.3% of the time. The model was significant because one of the predictor variables significantly increased the likelihood of selling when identification was requested and produced. The Nagelkerke R square was small in both blocks (Block 1: $R^2 = .027$; Block 2: $R^2 = .062$). There was a variable that predicted selling after presentation of identification, but it did not account for much of the variance.

The only variable significantly predictive of selling identification was provided was being a bar/restaurant. The coefficient for being a bar/restaurant (2.191) was positive and significant, indicating that being a bar/restaurant was predictive of selling tobacco after identification was provided. Clerks at these types of establishments may not be used to verifying age, so they may be unable to readily determine age from date of birth. The finding is complicated by the fact that bars are included. Bartenders would seem to be used to verifying age, but they may be used to verifying that people are of age to

drink alcohol, not buy tobacco products, so that may be confusing. This is explored further in Chapter 5. (See Table 4.6 for a summary of the statistics.)

Table 4.6: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING A SALE AFTER IDENTIFICATION WAS PROVIDED

Result of logistic regression for sale after identification was provided

Variable	B	S.E.	Sig.	Exp (b)
Town size	-.319	.219	.145	.727
Neighborhood income	.000	.000	.137	1.000
Gas station	1.692	1.037	.103	5.428
Convenience store	1.706	1.045	.103	5.505
Grocery store	1.935	1.044	.064	6.927
Liquor store	1.786	1.073	.096	5.963
Bar/restaurant*	2.095	1.048	.046	8.127
Youth gender	-.046	.190	.808	.955
Youth age	.290	.150	.053	1.336
African American	19.040	12292.091	.999	1.858E8
White	19.780	13392.091	.999	3892E8
Asian	18.202	13392.091	.999	80331479.446
Other	19.687	13392.091	.999	3.547E8
Clerk gender	.064	.194	.743	1.066

*statistically significant

Measure of Model Strength (Block 1)

Variable	Chi-square	df	Sig.
Step	14.369	7	.045
Block	14.369	7	.045
Model	14.369	7	.045

Model summary of model predicting sale after identification was provided (Block 1)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	790.504*	.016	.027

*Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Measure of Model Strength (Block 2)

Variable	Chi-square	df	Sig.
Step	18.928	7	.008
Block	18.928	7	.008
Model	33.297	14	.003

Table 4.6: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING A SALE AFTER IDENTIFICATION WAS PROVIDED (continued)

Model summary of model predicting sale after identification was provided (Block 2)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	771.576*	.037	.062

*Estimation terminated at iteration number 20 because maximum iteration has been reached. Final solution cannot be found.

RQ5: Which variables predicted whether there was a sale when the clerk did not ask for identification?

The only cases that were selected for the analysis were the cases in which the clerk did not ask for identification. Binary logistic regression was completed with two blocks of variables to predict the dependent variable selling (no sale=0; sale=1). The enter method of logistic regression was used. The analysis included 238 cases. The first block entered included the establishment variables: operation type, per capita income of the neighborhood and town size. As shown in Table 4.7, the step, block and model were significant at $p < .05$ with a Chi-square of 18.322. Because the variables were entered in blocks, the block and step are the same and are significant because most clerks who did not ask for identification sold to youth. Therefore, predicting that the clerk sold when identification was not requested would be correct 75.2% of the time. The next block included the event variables: youth age, youth gender, youth race and clerk gender. As shown in Table 4.7, the step, block and model were significant at $p < .01$ with a Chi-square of 22.095 for the step and the block, and a Chi-square of 40.417 for the model. The block and step are the same and are significant because most clerks sold if they did not verify age, so predicting that the clerk sold each time when they did not ask for identification would be correct 75.6% of the time. The model

was significant because one of the predictor variables significantly increased the likelihood of selling when age was not verified. The Nagelkerke R square was much larger in the second block (Block 1: $R^2=.111$; Block 2: $R^2=.234$). It would seem that there was a variable in the first block that helped to predict selling, but none of the variables was significant or approaching significance and none of the background variables was significant after the event variables were entered.

Youth age was the only variable significantly related to the likelihood of selling when identification was not requested. The coefficient for age (.896) was positive and significant, indicating that the likelihood of selling without requesting identification increased as age increased, for the same reasons that older youth are less likely to be carded: if they are older, they are more likely to look as though they are of age (18).

(See Table 4.7 for a summary of the statistics.)

Table 4.7: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING A SALE WHEN IDENTIFICATION WAS NOT REQUESTED

Result of logistic regression for sale when identification was not requested

Variable	B	S.E.	Sig.	Exp (b)
Town size	.013	.450	.976	1.013
Neighborhood income	.000	.000	.591	1.000
Gas station	.651	.916	.477	1.918
Convenience store	-.275	.919	.765	.759
Grocery store	-.139	.959	.885	.870
Liquor store	19.605	16281.620	.999	3269E8
Bar/restaurant	-1.385	.974	.155	.250
Youth gender	.111	.343	.747	1.1117
Youth age*	.896	.223	.000	2.449
African American [†]	-19.749	16114.594	.999	.000
White [†]	-19.975	16114.594	.999	.000
Clerk gender	.165	.355	.643	1.179

*statistically significant

[†]For this analysis, Asian, Hispanic, and other were grouped together to create the reference variable because the numbers were so small for race.

Table 4.7: RESULT OF LOGISTIC REGRESSION FOR ALL INCLUDED VARIABLES FOR PREDICTING A SALE WHEN IDENTIFICATION WAS NOT REQUESTED (continued)

Measure of Model Strength (Block 1)

Variable	Chi-square	df	Sig.
Step	18.322	7	.011
Block	18.322	7	.011
Model	18.322	7	.011

Model summary of model predicting sale when identification was not requested (Block 1)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	243.175*	.074	.111

*Estimation terminated at iteration number 20 because maximum iteration has been reached. Final solution cannot be found.

Measure of Model Strength (Block 2)

Variable	Chi-square	df	Sig.
Step	22.095	5	.001
Block	22.095	5	.001
Model	40.417	12	.001

Model summary of model predicting sale when identification was not requested (Block 2)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	221.620*	.156	.234

*Estimation terminated at iteration number 20 because maximum iteration has been reached. Final solution cannot be found.

Chapter Conclusion

Models were tested for each of the research questions. Two variables were found to be significant in predicting sale: youth age and asking for identification. Three variables were found to significantly predict asking: being a liquor store, youth age, and clerk gender. When a model used to predict selling when asking, it was found that

youth age, showing identification, and being a bar/restaurant predicted the sale. Only being a bar/restaurant, predicted whether clerks sold when they were presented with identification. When predicting sales when identification was not requested, age was the only significant predictor. The results are discussed in the following chapter. Limitations will be presented after the results are discussed.

CHAPTER 5: DISCUSSION

Chapter Overview

Chapter 5 is divided into three sections. The first section summarizes the key findings of the study in the context of the literature with speculation as to the psychological variables related to the clerk thought process that were not assessed in the current study, but may play an important role in the complicated exchange involved in tobacco sales to minors. The next section will address some of the limitations of the study. In the final section, recommendations for training and policy based on the findings are presented as well as directions for future research.

Because sections of this chapter reflect on the methodology of the compliance checks, it is important to review the methods. The current study used data from compliance checks conducted by the local health department. The local health department is charged with conducting compliance checks on each establishment in the county three times each year. The data are taken from the compliance checks conducted from 1997-2005. During that time period, the procedure was to send a warning letter out to vendors not less than a week before the compliance checks. Adults were recruited to drive the youth volunteers around, and witness and record each event. Youth were recruited to make tobacco purchase attempts. The youth were instructed to give their correct age and date of birth if asked. They were not allowed to use deceit. If a clerk asked for identification, the youth had the personal option of showing their identification or replying that they did not have identification. The details of each compliance check were recorded immediately after each establishment was

completed on a standard reporting form that was returned to the local health department after all the checks had been completed for that date.

Key Findings

This section reviews the key findings of the study. While explaining some of the findings, conclusions are offered that speculate as to the motives behind the clerks' behavior. For example, explanations are proposed as to why clerks asked for identification in certain situations, or why the clerks sold under certain circumstances. It is important to note that it is unknown why certain clerks ask for identification and others do not. It is unknown what motivates a clerk to ask for identification in a given situation. There are several explanations offered for the identified variables that predicted asking and selling in the current study. There will be a range of possible explanations presented in an attempt to explain this brief but complex encounter.

Sales

The first research question was what predicted whether there was a sale. The analysis showed that age and asking for identification predicted the sale. Neither of these findings was surprising. Both findings are consistent with the literature. Both age and asking for identification are event factors.

That age predicted selling makes sense because youth who are older are more likely to appear older. Most of the literature supports this finding (Klonoff et al., 1997; Levinston et al., 2002; Ma et al., 2003; O'Grady et al., 2000). While some youth appear older than others regardless of actual age, older youth are more likely to appear older, which may make the clerk more likely to sell to them. The clerk may believe that the purchaser is legally old enough to purchase tobacco products.

That asking for identification predicted whether there was a sale was also expected. Almost all of the research supports this finding (Arday et al., 1997; Curie et al., 2002; Hanson et al., 2000; Klonoff & Landrine, 2004; Levinston et al., 2002). Asking before refusing the sale makes sense because asking is the first step in the refusal process. Asking is the least confrontational method of denying the sale. Not doing anything (just selling the tobacco product outright) is the most passive behavior, but if someone was interested in not selling to minors, the most passive way to deny the sale is to ask for identification. Typically, a clerk asks for identification, and if identification cannot be produced or if it is produced and has a date of birth that proves the purchaser is not of age, the sale can then be denied. It would be unlikely for a clerk to only look at a youth and deny the sale, which would be the most confrontational manner to refuse a sale. Even if the clerk were confident the purchaser was a minor by sight, the less confrontational route would be to ask for identification and blame the denial of the sale on the policy, "I'm sorry, no ID, no cigarettes."

Asking

Because clerks were more likely to deny the sale if they asked for identification, the second research question was what predicted whether a clerk asked for identification. If asking makes clerks less likely to sell, then knowing which variables predict asking for identification are important to understand. If factors associated with asking for identification are understood, those factors could be influenced to encourage clerks to card. For example, if age predicts asking for identification, policies to encourage asking regardless of apparent age should be implemented. There were

three significant predictors for asking for identification: one background variable and two event variables.

The background variable associated with asking for identification was being a liquor store. That liquor stores were more likely to ask for identification is similar to a finding in Arday et al. (1997). The authors found that establishments that sold alcohol were less likely to sell, possibly because clerks at liquor stores are more likely to ask for identification. Arday et al. (1997) actually did find that establishments that sold liquor were not only more likely to comply, but also more likely to question the minor. However, when Arday et al. (1997) conducted an analysis making questioning the minor the dependent variable, being an establishment that sells liquor was not an independent predictor. Liquor stores may be more likely to ask for identification because they have to verify age for virtually every purchase. At grocery stores and convenience stores, people purchase a variety of items that do not require age verification, so clerks who work in those fields may be less likely to card for age.

The two event variables that predicted asking were age of the youth and clerk gender. The finding on age of the youth was expected. Again, older youth tend to look older. Since asking for identification is the first step in denying the sale, the clerks would be more likely to request identification from youth who appear younger. Youth who appear younger are generally youth who are younger.

The finding that clerk gender predicted asking for identification was slightly surprising. While no other research analyzed asking for identification against clerk gender, studies have analyzed selling and clerk gender. The findings in the literature are equivocal, but the studies that have found differences in sales by gender have found

that men tended to sell more often than women (Klonoff et al., 1997; Ma et al., 2003). That men are more likely to sell might be because women are more likely to card. That women are more likely to ask for identification is clearly a measure for something, but gender roles are so multidimensional and complex that it can only be speculated as to what might be at play with the finding that women are more likely to card. For example, men may be more likely to rebel against the rules. Men may have more confidence in their ability to accurately determine age by sight. Further, women tend to be more nurturing, so they may want to protect the youth from the dangers of tobacco, a sort of “it takes a village to raise a child” mentality. Men may believe it is not their business or have less interest in preventing youth tobacco use. Gender is only part of what makes people who they are. Not all women are nurturing; not all men are rebels. However, women are more likely to ask for identification, and it could be because of the expectations that our society has regarding gender roles.

Selling After Asking

Usually, when clerks ask for identification, they deny the sale, but there are times when they sell anyway. Therefore, the third research question was which variables predicted selling when the clerks asked for identification. There were two variables that predicted selling when identification was requested. One was a background variable, and two were event variables.

The background variable that predicted selling when identification was requested was being a bar/restaurant. Bars/restaurants were more likely to sell after requesting identification. The finding is not consistent with the literature; first, because never before has anyone asked if the clerk asked for identification, what predicted selling.

However, similar questions have been asked, such as which types of establishments are more likely to sell, and the research is ambivalent on the question of operation type. Curie et al. (2002) found that convenient stores were more likely to sell. Other studies found grocery stores were more likely to sell (Hoppock and Houston, 1990). Other studies found no trends (Arday et al., 1997; O'Grady et al., 2000). The previously mentioned studies only addressed selling though, not selling after requesting identification. While this finding is new to the literature, reasons for why it occurred can be considered, especially when taking into account the findings of the next research question. Therefore, the finding that bars/restaurants were more likely to sell when identification was requested will be examined more after the findings of selling when identification was produced are reviewed.

The event variable that predicted selling after requesting identification is showing identification. Clerks were 8.7 times more likely to sell when youth presented identification than when they did not. Selling after providing identification upon request was only tested once in the literature, and researchers found that presenting identification did predict sale in that youth who produced identification were 6 times more likely to be sold to than those who did not (Levinston et al., 2002).

It can be speculated why clerks sell after identification is provided, but without surveying the clerks who do this, it is only speculation. The following potential explanations illustrate the range of factors that may be at play in the interaction between a clerk and a young person around the event of a potential sale of tobacco. The clerks may be unable to accurately calculate age. The clerks may not bother calculating age because they assume the youth is old enough, or they are pretending to check because

someone is watching them. In the cases when the youth will be 18 that year, the clerk may have difficulty calculating age.

The clerks may be unable to accurately calculate age. When the youth presents identification, the clerk may make an attempt to calculate age and do so incorrectly. This may happen particularly if there is a line or other customers waiting. The clerk may be in a hurry and miscalculate age. This can also happen due to anxiety. If a clerk is attempting to calculate age and it is taking a while, the clerk may feel pressured by the customer or the other patrons waiting in line. This anxiety may cause them to “give up” and just sell the product even though they have not yet finished the process of age verification.

Another reason they may sell when identification is presented is that the clerk may not attempt to verify age after asking. If the youth presents identification, the clerk may assume that s/he is old enough and sell. The clerk may feel that a youth would not show identification if it proved that s/he was under 18, so the clerk assumes the identification card says the youth is old enough and sells the product.

Another reason clerks may sell after youth present identification is that they are “pretending” to verify age for whoever may be watching. There are cameras in some of the establishments, so they may request identification and glance at it, but it is only for “show.” It may be so their supervisors see them requesting it and glancing at it or that the cameras record them checking for identification before selling.

The final reason clerks may sell to youth despite the presentation of identification that verifies that they are underage is the case in which the youth will be 18 in the given year. If they are to turn 18 in that year, the clerk may only look at the year to verify age

and sell the product. The clerk may also think, “close enough,” and sell the product anyway. Again, it is unknown why clerks sell after identification is presented, but it can be speculated that it is one of these reasons or a combination of them.

It seems as though clerks who ask for identification have some concern about a fine, about youth smoking, or about keeping their job. If the clerks were not concerned about one or more of these issues, they probably would not have gone through the effort of asking for identification; they would have sold without asking.

Selling After Identification Is Provided

Asking for identification is the first step in the process of denying the sale. The next step is up to the youth. They can produce identification or not. While the clerks tend to refuse the sale even when identification is presented, they are much more likely to sell if the youth presents identification than if they do not. Because of this, the next research question was if the clerk asked for identification and the youth produced identification, what predicted whether the clerk sold.

The only significant predictor for selling after identification was provided as requested was being a bar/restaurant. While there is little consistency on which establishments sell within the broader literature, reasons why staff at bars/restaurants were more likely to sell after being presented with identification can potentially be explained by well-established practices of the businesses. Bars/restaurants may be used to asking for identification. Depending on the community, patrons must be 18, 19 or 21 to enter bars, so bars would be used to asking for identification. Restaurants that sell alcohol (all of them in the study) would need to verify age for each alcohol sale. While these places may be used to asking for identification, the staff may not be used to

calculating that someone is 18, old enough to buy tobacco. The staff may be flustered because these places rarely have someone come in just to purchase tobacco. People who purchase cigarettes from bars/restaurants are more likely to be people who are already there, eating and drinking.

It was speculated in the last section that perhaps clerks would be likely to sell after asking when the youth would be 18 that year, perhaps because the clerk only checked the year, or because the clerk thinks that the youth is close enough to legally buy cigarettes. However, age was not a predictor of selling when identification was provided as requested. Since age did not help predict whether there was a sale when identification was provided, the speculation proposed in the previous section that clerks only looked at the year on the identification card, or thought that if youth who are almost 18 they are “close enough,” does not apply. If the clerks only looked at the year, then a 17-year-old youth would be more likely to be sold to after presenting identification, and the analysis found that clerks were as likely to sell to any youth who provided identification, not just older youth.

Selling Without Asking

The only variable that predicted selling when the clerk did not ask for identification was the event variable age. If the youth was older, the clerk was more likely to sell. This is consistent with the literature (Klonoff et al., 1997; Levinston et al., 2002; Ma et al., 2001; O’Grady et al., 2000). There are four scenarios that can occur with this event. The current study was not designed to assess what the clerk was thinking when s/he sold or refused the sale without asking for identification. Reasons behind why a sale occurs can only be speculated upon with the current data.

One scenario would be that the youth entered the store, asked for the tobacco product and the clerk sold it to them. When this occurred it probably involved clerks who felt very confident in their ability to guess age just by appearance, so these clerks thought they could tell that the youth was old enough just by looking at their appearance. Another explanation is that the clerks were busy and did not think they had time to verify age. Another presumption is that they are not concerned about youth smoking.

Another scenario might be that the youth entered the store, asked for the tobacco product and the clerk may have done something to verify age, like ask for date of birth or age. Some clerks who ask these questions enter the answer into the cash register and the cash register informs the clerk whether they can sell. In the current study, the youth had to reply honestly, so at that point the clerk may have denied the sale based on the answer. This scenario is different than what might have played out if an actual youth smoker was attempting to purchase tobacco outside of the controlled procedures of a tobacco compliance check. The youth checking for compliance had to tell the truth; real-life youth smokers can lie. Clerks may have sold even though the youth was honest about their age or date of birth. Clerks who use verbal questioning without subsequent verification seem as though they are not concerned about youth tobacco use or youth tobacco policies.

With establishments that have technology to help with age verification, the clerks may have entered the given date of birth into the cash register and denied the sale. They may have also entered a date of birth of someone over 18, for example, their own, perhaps for expediency. They also may have entered the correct date of birth into the

cash register and when the cash register said the youth was not old enough, they may have assumed something was wrong with the process or the technology, *not* that the youth was underage. Selling when the technology will not allow the sale would involve finding another way to make the sale, perhaps entering a different date of birth.

One more scenario that may have occurred is that the youth could have entered the establishment and the clerk could tell that the youth was a minor and denied the sale without even verifying age. Under this scenario, the clerk would have to be very confident in their ability to discern age and/or have more of a confrontational personality. The least confrontational way to deny a sale is to ask for identification; at least the patron has a chance to prove s/he are old enough. To deny the sale outright involves refusing to even give the patron the opportunity to prove s/he may be of age. In some cases the clerk may have known that it was a compliance check. Again, the local health department sent letters notifying vendors that they would be checked in the near future, a practice the local health department has since abandoned. Also, as clerks passed their compliance checks, the youth volunteers could opt to give them a congratulatory pin. The clerks who passed may have notified other clerks at other stores that compliance checks were being conducted, thus making clerks more diligent about tobacco sales.

Limitations

While the current study contributes to the literature on tobacco sales to minors, there are limitations in the methodology and data to be considered. The current study was not a prospective study. Secondary data collected from the local health department were analyzed. However, the data were not collected to be analyzed for a

formal research study, but to document the compliance rate for the community.

Because of the protocol of the local health department, the procedures were not always standard, and the events may not reflect actual tobacco sales. The study is also missing a variable that might be relevant, enforcement. Another limitation is the lack of information on asking for identification for some of the checks. Another measurement concern involves categorizing bars/restaurants. Finally, the complexity of the transactions warrants input from clerks.

The youth volunteering for compliance checks were instructed to produce identification if asked only if they wanted to. Because the decision to provide identification or not was up to the individual youth volunteer, there was a lack of consistency on whether the youth showed identification. Under a different protocol, certain youth could have been instructed to show identification or not, or certain places could have been selected for providing identification upon request or not. Using protocol where identification is provided upon request at certain establishments or by identified youth might have helped to find patterns for certain variables like gender, age or operation type.

There is also a methodological issue that may be a limitation, which has to do with the role of the youth in structured and supervised compliance checks. Trying to simulate the illegal process of clerks selling tobacco to minors with contrived compliance checks is problematic. Because of the protocol set up by the local health department at the time, the businesses were warned that a check was impending, and the youth could not lie about age or date of birth. However in the real world, these are techniques that youth smokers can use to obtain tobacco. Youth smokers also may

have identified which clerks and which establishments will and will not sell to them, an advantage the youth volunteers did not have.

Further, although efforts were made to familiarize youth volunteers with tobacco purchases through training and suggesting products for purchase, youth smokers, who purchase tobacco product daily, may be more confident than youth volunteers when buying tobacco products. The emotional state of the youth volunteers at the time of the purchase attempt is unknown. Youth participating in their very first compliance check may have been very nervous, and relaxed more as the night went on. However, if the youth entered an establishment where the clerk knew it was a compliance check, the youth may have been scolded, possibly making him/her a little gun shy to do more compliance checks. If the youth appeared uncomfortable, the clerk may have suspected the youth was underage or a decoy because of the youth's apprehension. Therefore, a limitation of the study is that the compliance checks do not look exactly like what might go on when a real-life youth smoker attempts to purchase tobacco products.

The current study did not assess enforcement, which may have been a helpful variable to analyze. O'Grady et al. (2000) and others assessed enforcement because knowing how penalties impact behavior is important to understanding tobacco sales to minors. While O'Grady et al. (2000) found that enforcement predicted sale, once event variables were introduced, enforcement had no effect. However, it is unknown how enforcement would affect sales in the study community, so details on enforcement would have been helpful.

Another concern related to measurement is that the data collected are somewhat incomplete. There are 595 compliance checks in which it is unknown whether the clerk

asked for identification, due to a change in the recording forms in the middle of the years of the data collection. The older forms did not ask whether the clerk asked for identification, but the later forms did. There were times that the youth recorded this information even though it was not requested. There are also missing data because of incomplete recording forms used by adult volunteers to summarize each event.

Another issue with measurement is the categorization of operation type. What type of operation an establishment is would seem somewhat obvious. If the establishment sells gas, it is a gas station; if it does not sell gas and does not have several lanes of cashiers to ring up groceries, it is a convenience store. Operation type was established by the “if it looks like a duck” rule. The primary investigator and the program coordinator knew the establishments and categorized them in the way most people would describe them. Bars and restaurants were entered together because splitting them would have made both categories small, but also because deciding whether a place was a bar or a restaurant was a challenge for *some* places.

Categorizing certain places as bars was easy: criteria such as only adults are allowed and there is little to no food menu. Other establishments proved more difficult to categorize. If the place has a menu, but almost no one orders from it, is it a restaurant? Trying to use the guideline that restaurants hold food permits and bars do not was futile, because a food permit is necessary to serve ice, so every place had a food permit. An example of a challenging place to categorize is a place like Hooters which serves food. Children are allowed, but there are frequently plenty of patrons sitting at the bar, not eating, instead drinking, possibly to excess, and watching sports on television. Categorizing bars and restaurants together seemed to make sense. The category

includes bars, restaurants, and “barstaurants.” The limitation is that the category was a predictor for selling after asking, and selling after providing identification, so it would be helpful to have criteria to discern bars from restaurants to see if there is something particular to bars or restaurants that would help understand why these particular establishments sold after asking.

Finally, it is unknown why clerks sell tobacco products to minors, and while the current study has important findings, the study only measured observable behaviors, not thoughts or attitudes; therefore it did little to contribute to understanding the reasons behind clerk behavior. Clerks were not asked about the process they went through to decide to card or not to card, to sell or not to sell. The current study provides many findings that can help guide policy and training, but to specifically impact youth sales to minors, there must be a grasp on the processes the clerks go through for each event.

Recommendations for Training, Policy, and Future Research

Training

Because each purchase attempt is unique, and each clerk behaves differently for each attempt, clerks need training to insure they do not sell tobacco products to minors. Because clerks were 45 times more likely to sell if they did not ask for identification, the key to compliance seems to be asking for identification. Secondly, because sales were 8.7 times more likely to occur when the youth produced identification, the next step is actually looking at the identification card and accurately calculating age. If clerks would ask for identification every time, and effectively calculate age every time, it would greatly reduce commercial sources for youth. From the current study, identified concerns are that clerks who do not card tend to sell, so it is important to train clerks to ask for

identification. The second concern is that when identification is provided, clerks are more likely to sell than when it is not provided, so training should address issues surrounding age verification as well.

The training should involve information presentation (understanding of their responsibilities), but also a skills practice (math problems where they calculate age), and role play (practicing working with a “patron”), so the clerks can become comfortable and used to asking for identification. The concepts that should be emphasized in training include:

- 1) Always verifying age. The clerks who asked for identification were 45 times more likely to refuse the sale. Asking is the best way to prevent selling to minors, and clerks must understand that they cannot always “tell” how old someone is by how s/he looks.
- 2) Trusting the technology. The clerks should use the technology provided to them, such as cash registers that will not allow the sale until a date of birth is keyed in. Clerks can enter the same date of birth each time they sell without even asking for the patron’s actual date of birth or doing anything to verify it. Anecdotally, volunteers have witnessed clerks who seem to think the technology is failing them because they assume that if someone presents identification then s/he is old enough, and they end up getting flustered and selling the tobacco product anyway. It is unknown how clerks are currently trained to use the technology. The assumption is the training occurs on the job, but having seen clerks frustrated with the technology, it seems important to include this piece in the training of clerks.
- 3) Calculating age accurately. While clerks should trust the technology, it would not be an issue if they could accurately calculate age from date of birth. Further, not all

establishments are equipped with this technology. The training should give the clerk the skills to be able to accurately calculate age from date of birth. Accurate calculation is now enhanced with better identification cards. Since the data were collected for the current analysis of compliance checks, ID cards in Illinois have been altered quite a bit. The ID card displays the date at which the person will be 21 and the date at which the person will be 18 right next to the photograph. The ID cards for people under 21 have text and photographs that are displayed vertically, whereas ID cards for people over 21 have text and photographs that are displayed horizontally. The state has made it very easy for clerks who must verify age; they just have to ask for identification.

3) Understanding age verification. Clerks need to understand that a presented ID card or driver's license is not age verification. Clerks sold 8.7 times more when identification was provided than when it was not. Age was not a factor when identification was provided, so the clerk did not sell in the case of providing identification because the youth looked older, it was because they presented identification. The clerks must look at the ID card *and* calculate age after identification is produced to actually verify that the patron is old enough to purchase tobacco.

4) Understanding penalties. Clerks may not understand that they could be fined for selling tobacco to minors. Because it is unknown why certain clerks sell to minors, understanding penalties may or may not be important. However, clerks should be aware of what their responsibilities are (compliance with the law) and the penalties for denying that responsibility.

Licensing

The second recommendation is that the establishment be penalized as well as the clerk after a failed compliance check. Under the current structure, all the responsibility for complying with the law falls to the individual clerk. If the establishment were penalized, employee training may be taken more seriously. If the establishment would lose money based on employee behavior, perhaps there would be stronger policies for asking for identification. Along with this issue is tobacco licensing. If tobacco vendors were required to hold a license, the license could be suspended after selling to minors a certain number of times. If they could lose their ability to make money off tobacco products, they might work harder to make sure they complied. Similar to other permits granted by the health department, permits/licenses typically give policies the “teeth” they need for compliance. The argument against licensing is that it would be another business expense for owners. However, the cost of the license would not have to be expensive, but establishments would have to have it to sell tobacco, and it could be suspended for non-compliance. Owners who comply would have nothing to be concerned about; as a matter of fact, they could benefit. If they comply, and the business next door does not, the business next door would lose their license and not be able to sell cigarettes, and the compliant establishment might get additional business. Licensing might help urge establishments to comply.

Research

Recommendations for future research include suggestions for the local health department and also for independent researchers. The recommendations include

follow-up research on clerks, evaluation of new policies, and mixed method types of research on presenting identification and tobacco sales to minors.

Currently, training is provided through a mailing to all the vendors letting them know they are involved in the tobacco vendor compliance check program. The materials come from the Illinois Liquor Control Commission. It is unknown how they conceptualize the interaction between clerk and youth and, in turn, practically apply the information they have gathered on clerk behavior (if any) to training.

The mailing includes materials to encourage asking for identification, and information on what year a person must be born to be able to purchase tobacco products. The assumption is the clerks sell because they do not accurately calculate age (that is why the information on when a patron must be born is included in the training packet). The other assumption is that they sell because they do not ask for identification (which is why information encouraging asking for identification is included). While it is understood that asking for identification increases the likelihood of the sale, it is unknown why clerks ask for identification, sell without asking for identification, or sell when identification is provided. Information from clerks is necessary to understand the complex behaviors of asking for identification and selling tobacco and thus develop more targeted training or content. Independent researchers and the local health department can collaborate to develop research initiatives on the clerks in order to guide training.

Mixed methods research involving both quantitative methods that utilize deduction, prediction, and standard data collection, and qualitative methods that focus on exploring and theorizing must be conducted with clerks (Johnson & Onwuegbuzie,

2004). Focus groups could be assembled to probe the clerks in a qualitative manner. Another method would be to propose video vignettes or role plays and ask the clerks to speculate in their experience what happened. They could also be surveyed using hypothetical situations. Insight into the clerk thought process and decision-making is important to understanding the complex transactions that occur when clerks sell tobacco to minors. The interaction between clerks and youth is extremely complex, so understanding the psychological processes of clerks is an important piece of the puzzle. This type of research could help guide training and policy. There may be reasons completely unknown to researchers and policy makers behind the complicated interaction of selling tobacco to minors.

Because licensing and training were recommended in the previous section, if policies on licensing and training were to be enacted, it would be important to evaluate them. Since the local health department might be charged with the training, they should take the initiative to evaluate the training. Pre- and post-tests on clerk knowledge, attitude, past behavior, and intentions should be conducted before and after training. More qualitative methods could be used to evaluate the programs, like asking the participants to describe a situation when they did not ask for identification and why. Further, compliance rates should be compared before and after training, or compared for those who have been trained versus those who have not participated in the training.

If licensing were implemented, licensees could be interviewed or surveyed on the effectiveness, and feedback on the new policy could be obtained from licensees as well as representatives of the licensing agency. Compliance rates should be compared before and after the implementation of any sort of licensing policy as well. If training

and licensing prove to increase compliance, then the policies could be expanded to other communities, even state-wide and beyond. Independent researchers and the local health department could work together to evaluate the effectiveness of training and policy change.

Because the current study found that asking for identification predicted compliance in that clerks were 45 times more likely to sell if they did not ask for identification, the recommendation is that future research focuses on which variables predict asking for identification. Qualitative methods could be used to inform which variables might be able to predict asking for identification. Once those variables were discovered, they could be tested quantitatively.

Further, because the current study found that providing identification predicted selling when clerks requested identification, the practice of providing identification should be researched further. Youth smokers should be included to find out if showing identification is even a method they use to get tobacco products commercially. The protocols for compliance checks should continue to allow youth volunteers to present identification if asked, so this practice can continue to be monitored. Youth who provided identification were more successful at obtaining tobacco products than those who did not. Because the practice of showing identification was successful, other techniques should be allowed as well. If the youth could use more convincing methods of getting tobacco from stores, it may increase the likelihood of the sale. Two studies reported having youth use certain methods of manipulation, discussed later, to purchase tobacco products. It is unknown if youth who smoke use these methods to

obtain tobacco products from commercial sources in the study community, but they may.

The current study required that youth be honest and “give the clerk every opportunity to deny the sale.” The local health department had concerns that it would seem as though they were using entrapment to conduct compliance checks if youth were allowed to use manipulation. However, if it is discovered that youth smokers use manipulative methods to obtain tobacco products, future research might explore the impact of allowing youth to give false information during tobacco compliance checks, or perhaps the impact of using other discovered techniques of manipulation in the study community.

Manipulative techniques such as lying about age, the familiarity technique, and the foot-in-the-door technique, included in the literature have proven to increase the likelihood of selling. The familiarity technique involves the youth entering the store four times to purchase non-tobacco products. The fifth time the youth enters the store, a tobacco product is requested. In Landrine and Klonoff (2003) the familiarity technique increased the likelihood of selling. Another method is the foot-in-the-door technique, which involves youth grabbing several items for purchase and then asking for a tobacco product at the cash register (Klonoff & Landrine, 2004). The two above methods could be tested along with others, such as producing identification when asked and not producing identification when asked to see which methods are most likely to yield the sale. Once these factors are known, clerks can be trained to spot these techniques and avoid being manipulated by youth smokers.

Research using manipulation must be left to independent researchers. It is the long standing practice of the local health department to work *with* the community including commercial entities to educate community members and keep the community healthy and safe. All divisions of the local health department understand that the best way to keep the community healthy and safe is to help those in the community to understand the importance of following guidelines and the reasons behind the regulations, so they work hard to foster positive working relationships with all entities of the community. The local health department's role in tobacco vendor compliance checks is training, education, advocacy and evaluation. If the local health department began using practices involving manipulation for compliance checks, the community may lose their faith in them as helpers and educators in the community. If the perception of the local health department changed, it would make it much more difficult for people to trust them, and it would hinder much of the work done by the local health department.

The final recommendation for future research is to continue to monitor compliance in the community using mixed methods. By collecting formative data on understanding youth purchase attempts from youth smokers as well as the clerks who sell, new methods of purchase may be discovered, and compliance checks can include the new methods. Compliance checks are one piece to understanding tobacco sales to minors. Other methods are essential to gathering the entire picture of the problem. Youth smokers could be interviewed to discover what methods they use to obtain tobacco products commercially. Once actual sales to minors are understood, the methods youth smokers use can be employed in compliance checks. For example, if a

youth smoker reports the familiarity technique, then that should be a method tested in compliance checks.

Continuing to monitor tobacco compliance checks is essential. When the compliance checks for the current study were conducted, it was not uncommon for a youth to be scolded for their attempted purchase, or for an angry business owner to call the local health department shouting about how old the youth volunteer appeared. Now, most clerks are excited to receive their “Kids can’t buy ‘em here” pin. They are triumphant when they pass a compliance check. Excited owners call because they received a letter that one of their staff passed a compliance check and they want the name, so they can reward the person. The community is always changing. New stores open and close. Identification cards change. Policies change. Further, there are several units of analysis, which are ever changing. There are youth parameters, embedded in society. The culture of the store which is embedded in the community is important and changing. Therefore, continuing to monitor tobacco vendors and the complex interactions of tobacco sales to minors using a variety of methods is recommended.

Chapter Conclusion

Research, including the current study, shows that most clerks do not sell to minors, and that clerks who ask for identification are the most likely to comply with laws prohibiting tobacco sales to youth. While asking is an important predictor for tobacco sales to minors in that clerks who did not ask for identification were 45 times more likely to sell tobacco to minors, the current study probed further into the process to find which variables predicted asking for identification while most of the literature focuses on

predicting sales. The current study also tested which variables predicted selling after identification was requested. An important finding was that when youth produced identification, they were 8.7 times more likely to be sold to than if they did not produce identification. The current study also found that there were times when the clerk did not ask for identification and sold. Because of these two findings, training of clerks is recommended as well as licensing for tobacco vendors. If tobacco vendors can lose their ability to sell tobacco, then they may make compliance more of a priority, and training can be offered or mandated to help them comply.

Because of the limitations and findings of the current study, future research should focus on the processes clerks go through for the cascade of events that may be presented in an attempted purchase. Training and licensing should be evaluated as well. Finally, future research should focus on mirroring what might actually happen if youth used manipulative methods to obtain tobacco products like actual youth smokers may be doing. Knowing which manipulative methods work can help guide policy and training for tobacco vendors by enlightening the clerks on techniques youth use to obtain tobacco products so they can be attentive in identifying when youth may be using such manipulative methods.

Because of the fluidity of the community, the vendors, the youth, and the policies, tobacco sales monitoring is an ongoing public health endeavor requiring mixed methods of research including using focus groups, open-ended questionnaires, and hard data from compliance checks in order to understand the complexities behind each sale. This understanding is essential to eliminate commercial sources as a source for youth smokers in order to protect them from a lifetime of addiction and chronic disease.

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Appendix A



Dear Parent:

Your son/daughter has volunteered to participate in the Champaign County Tobacco Prevention Coalition's (CCTPC) "NOT HERE" Program. The CCTPC, in partnership with the Champaign and Urbana Chiefs of Police and the State's Attorney John Piland, unveiled its "NOT HERE" program on November 21, 1996. "NOT HERE" is a step-by-step process to inhibit the illegal sale of tobacco products to youth in Champaign County.

First, State's Attorney John Piland will issue a letter to all tobacco vendors in Champaign County outlining the goals of the program. In that letter he states, "In the very near future and from time to time after that, minors, as part of our program, will attempt to purchase tobacco products from tobacco retailers in Champaign County. If they are successful, we will vigorously prosecute those responsible for the illegal sale." His letter continues, "It is not our intention to surprise or harass those who are lawfully selling tobacco. To the contrary, this letter is intended to prevent potential prosecution by giving notice of this activity and by obtaining voluntary compliance." After the letters have been received, CCTPC members will closely supervise 15 to 17 year olds as they attempt to purchase tobacco products in Champaign County. The results of these buying attempts will be reported to the Chiefs of Police and State's Attorney John Piland.

Compliance checks are scheduled to be conducted, **DATES AND TIMES**. This program will be operated from Champaign-Urbana Public Health District facilities located at **815 N. Randolph in Champaign**. All youth will participate in about one hour of detailed training before they are asked to go, with at least one adult, to attempt to purchase tobacco products in a section of the county where they are not well known. Under adult supervision, your son/daughter will enter an establishment and attempt to purchase tobacco products. Your child will receive a \$20 stipend for his/her assistance with the NOT HERE Program. **Please have child bring verification of age. The following forms of identification are acceptable: Drivers License, State Issued ID, Student ID with birth date, or Birth Certificate.**

Please sign the enclosed parent permission slip and youth participant guidelines and have your son/daughter return the day of the event. **The parental permission slip must be signed in order to participate.** Your assistance with this prevention program is greatly appreciated. Please call us at 373-7901 or email at kfish@cuphd.org if you have any questions or concerns.

Sincerely,

Kerisa Fish

Nikki Hillier

Champaign County Tobacco Prevention Coalition

Appendix B

TOBACCO VENDOR COMPLIANCE

CHECK PROGRAM



YOUTH PARTICIPANT GUIDELINES

As a participant of the NOT HERE Tobacco Vendor Compliance Check Program, I agree to adhere to the following guidelines. I understand that my participation in the Tobacco Compliance Check Program is considered as temporary employment. I will conduct myself in a professional manner at all times. My failure to comply with these guidelines can and will result in my termination from the program.

1. I will wear casual attire that is acceptable at school that does not indicate any gang or school affiliation, or endorse the use of alcohol, tobacco or other drugs.
2. I understand that if at any time I feel uncomfortable at any location I can indicate this concern to the adult volunteer and the location will be bypassed.
3. I will not use profanity.
4. I will arrive promptly at my scheduled work time to ensure a timely departure. Failure to arrive on time will be considered "Tardy."
5. I will contact the C-U Public Health District no less than 24 hours before my scheduled work time in the event of an expected absence.
6. I will contact the C-U Public Health District no less than two (2) hours before my scheduled work time in the event of an unexpected absence.
7. My participation in this project will not have a negative affect on my academic or household responsibilities.
8. I understand that on my eighteenth birthday I am no longer eligible to participate in this project.
9. **I understand that in order to participate in this project, I must be smoke-free.**

By signing this document, I understand the terms of this project and agree to abide by the terms.

Participant/Signature: _____ Date: _____

Parent/Guardian Signature: _____ Date: _____

Program Coordinator: _____ Date: _____

Appendix C

TOBACCO VENDOR COMPLIANCE CHECK PROGRAM

Parent/Guardian Consent Form

Youth Participant Name: _____ Birth Date: _____

Parent/Guardian Name: _____

Address: _____

City: _____ Zip: _____

Home Phone Number: _____ Parent Work Number: _____

In case of emergency contact: _____ at _____

Cell Phone: _____

Parental Consent for child to participate:

I hereby release the Champaign County Tobacco Prevention Coalition, all of its agencies, members or representatives from any liability in case of injury sustained by my child in connection with his/her participation in this program and agree to indemnify, defend and hold harmless the Champaign County Tobacco Prevention Coalition, all of its agencies, members or representatives from any and all claims resulting from injuries arising out of, connected with or in any way associated with the activities of this program.

By signing below I agree to allow my child to be photographed, filmed, and/or video taped by the media. Participants further agree to allow the Champaign County Tobacco Prevention Coalition and its agents to use their picture, likeness and/or voice in documents and programs developed in conjunction with the NOT HERE tobacco compliance check program including but not limited to advertising, promotion, education, media, and other uses

I give permission for my child to participate in this project.

Youth Signature: _____ Date: _____

Parent/Guardian Signature: _____ Date: _____

Program Coordinator: _____ Date: _____

Appendix D

Tobacco Vendor Inspector Report Form

Name of Establishment: _____

Address: _____ City: _____

Date of Inspection: _____ Time: _____

Sex of Attendant: **M** **F**

Name of Attendant: _____ (if wearing nametag)

Description of Attendant: _____

		<i>Please circle one</i>
1. Sale?	YES	NO
2. Did the attendant ask your age?	YES	NO
3. Did the attendant ask for your ID?	YES	NO
4. Did you show your ID?	YES	NO

Youth Participant Name: _____ Age: _____

Race: **African-American**
 Asian
 Hispanic
 Caucasian
 Other

Adult Volunteer(s): _____

Comments: *(please give explanation if vendor was not checked)*

Appendix E

Dear Tobacco Retailer:

As part of the on going efforts to reduce the sale of tobacco products to minors, the Champaign County Tobacco Prevention Coalition in conjunction with the Champaign County State's Attorney Office is participating in a statewide tobacco enforcement program. This program is funded by the Illinois Liquor Control Commission and is designed to establish a comprehensive education and enforcement program regarding minimum age tobacco laws.

In the very near future, volunteers from the Champaign County Tobacco Prevention Coalition, with the assistance of underage teenagers will be conducting the third of three mandatory compliance checks at every identified tobacco retailer in Champaign County. The compliance check utilizes 15, 16, or 17-year-old minor(s) who will enter your business and attempt to purchase tobacco products.

These inspections will determine if your sales staff is correctly requesting and checking ID's, and refusing the sell of tobacco products to minors. At the completion of each check your sales clerk will be notified with the results, and we will follow-up with a letter to every business checked. In the event that your staff fails an inspection your information will be forwarded to the Champaign County State's Attorney Office and your local law enforcement authorities, at which time a follow-up inspection will occur.

For your convenience, I have enclosed the Illinois Tobacco Minimum-Age & Signage Laws Fact Sheet.

It is our hope that each business checked will successfully pass their inspection. If you should have any questions regarding this effort, please feel free to contact me at 217/531-2912 or email at kfish@cuphd.org.

Sincerely,

Kerisa Fish,
Chair
Champaign County Tobacco Prevention Coalition