Does the Drinking Age of 21 Really Benefit Society?

Evaluating the Effectiveness of the Uniform Drinking Age Act

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Abstract: This paper evaluates the federal Uniform Drinking Age Act of 1984, which required that all states raise their drinking age to 21 or subsequently lose 10% of their federal highway funds. The law was implemented in response to a rise in grassroots movements, like Mothers Against Drunk Driving (MADD), aimed at reducing alcohol-related traffic deaths. This paper will show that the law has been effective in reducing consumption of those 18-20 years old as well as reducing traffic deaths, particularly those in alcohol-related accidents. Despite many studies supporting this find, recent pressure has come from the Amethyst Initiative, which is a petition signed by college presidents that calls for a re-examination of the drinking age. Upon further analysis, it was clear why this initiative has gained so much support; raising the drinking age to 21 has had virtually no effect on college drinking patterns. However, there are alternative and additional policies that may be implemented that could ebb the tide of collegiate drinking.

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Introduction

On June 28th, 2009, just after 4 a.m., Ayesha Kathleen Wintersdorff was killed in a tragic

car accident on U.S. 460 in Blacksburg. A promising young student at Blacksburg High School,

Ayesha had a strong commitment to feed the hungry. Now, she is just another statistic in

drinking and driving accidents. Immediately following the accident, the police had no comment

as to what caused Ayesha to cross the center line of the highway and hit a guardrail. However,

they later arrested a 21-year-old Blacksburg resident, who was ultimately convicted of

contributing to a delinquency of a minor. The minor in question was Ayesha, who earlier on the

night of the accident had attended a gathering at his residence. Ayesha had partaken of alcohol

at the location, then attempted to drive home (Moxely 2009).

Unfortunately, this incident is just one of many across the United States that occur

every day. About 5,000 underage individuals die every year as a direct result of alcohol use, and

1,900 of those deaths involve car accidents. The problem does not stop with drinking and

driving alone; consumption rates are also through the roof. There are a total of 10.8 million

underage drinkers in the United States today, with 29 percent of high school seniors reporting

engaging in binge drinking (defined as consuming five or more drinks at a single time). Twenty-

two percent of high school sophomores and 11 percent of eighth-graders also report bingeing

(Moxley 2009, n.p.). There is no dispute that the use of alcohol by youth is considered an issue

in the United States. However, the reason for this excess of use is unclear, especially

considering that use of alcohol for anyone under 21 years of age is illegal in all 50 states, and

has been for almost three decades, due to the 1984 Uniform Drinking Age Act (Wagenaar and

Toomey 2002, 206).

There are many who have made the case that the age limit of 21 is the issue itself; that is, that raising the drinking age has made alcohol more attractive to teenagers simply because it is prohibited. To these individuals, the law also causes the young adults to engage in more risky behavior, bingeing when they get their hands on the alcohol and driving while intoxicated so they can try to hide their behavior. These dissenters make the case that an individual must only be 18 to join the military, serve on juries, vote, or become a legally-recognized "adult," yet for some reason they cannot drink (Moxley 2009, n.p.). Because of these ideas, recently, there have been several attacks on the national minimum drinking age, with the aim of reducing it or having the jurisdiction moved entirely under the states' control. Most notable of these movements has been the Amethyst Initiative, which in 2009 had been signed by 135 college presidents (Moxley 2009, n.p.).

It is important to note that, indeed, the national minimum drinking age does not seem to have the same effect on college populations as it does on the public as a whole. However, despite this discrepancy, reducing the drinking age would only serve to exacerbate the use of alcohol by youth. Overall, the empirical evidence supports that the national minimum drinking age has been effective in its goals of reducing consumption and traffic fatalities, notwithstanding its effect on collegiate populations.

The first step to understanding the problem of underage drinking must involve a discussion of the history of alcohol use in the United States and how Uniform Drinking Age Act came into being. Several issues will be addressed by this discussion. We will discover why the United States values drinking as a social activity and where this culture ultimately came from. We will also discuss how the Uniform Drinking Age Act was enacted, focusing on how the need

for a national minimum drinking age came to the attention of policy makers. We will investigate its major recent challenge, the Amethyst Initiative. We will then evaluate the national minimum drinking age, keeping this most recent movement in mind. Finally, the weaknesses of the policy will be addressed, and we will attempt to determine how these gaps can be filled.

History of the Policy

The American Alcohol Culture

After the United States was founded as an independent nation in the late 1700's, its ties with England and the other countries of Europe remained strong. Therefore, attitudes regarding alcohol were at first carried over from this region of the globe. In the early 1800's, there began to form a concern about widespread, severe alcohol use, which was initially addressed by the Temperance Movement. This phase was public health-minded and focused on responsible use, but it was quickly overtaken by the Total Abstinence Movement. This era was more concerned with avoiding sin and maintaining one's morals, which was clearly much more religiously-minded than most would consider constitutionally-sound. This movement advocated complete avoidance of alcohol because it was seen as the cause of most other ailments that affected the human race (Ashley and Rankin, 1988, 235). This cultural shift kept all individuals, but especially young adults, from drinking (Main 2009). The ideas spread quickly throughout Europe, North America, and Australia (Ashley and Rankin, 1988, 235).

Before long, laws were being created and implemented around this view of alcohol use, either prohibiting or severely restricting its use and sale. Prohibition in the United States is a perfect example of this kind of policy. However, a movement toward modernism and liberalism of cultural values caused a quick change of heart in regards to these types of policies. While

Prohibition is widely considered a failure, studies show that it actually decreased negative health and social outcomes while it was in place (Ashley and Rankin 1988, 235).

Prohibition was effectively instituted with the passage of the 18th amendment to the US Constitution, banning the manufacture, importation, and sale of "intoxicating liquors", the definition for which was quickly expanded to include even beer with the Volstead Act. Primarily because of the concurrent sharp decrease of alcohol availability, Prohibition reduced rates of alcohol-related deaths and health problems, as would be expected. At the same time, though, illegal distilleries were making awful and damaging forms of alcohol and underground organized crime tycoons were taking over American's greatest cities (Main 2009, 44). The law actually cost the national government funds through a loss of taxes and an increased need for enforcement. This latter force was especially potent because the states with more lenient laws toward alcohol felt stepped on, and therefore did not enforce the laws very stringently. Therefore, the federal agencies were left to take over the primary enforcement of Prohibition (Main 2009, 43). Add to this mix the Great Depression, and the money that could be made by the federal government by reopening the alcohol trade, and one can see why Prohibition was quickly repealed by the 21st amendment (Main 2009, 43-44). The 21st amendment left alcohol policy up to the states, and most of them set their minimum drinking age at 21 at that time (Main 2009, 35).

Immediately following the repeal of Prohibition came a new view on alcohol, known as the Alcoholism Movement. This concept took a completely different approach to alcohol use and the issues that arise from it. It focused not on consumption generally, but on those areas and individuals that drank to excess; this reflected the view of communities at the time that

alcohol was not a broad problem. The idea was to discover what caused a small segment of the population to drink heavily to the point of developing alcohol-related health issues. The proponents of this viewpoint advocated that alcoholism was a disease that led individuals to drink excessively and that could not be controlled by the individual alone. This idea seemed to be supported by community behavior, where many individuals were able to easily drink in moderation while a few could not. The focus therefore had moved from alcohol as a bad substance to a focus on troubled or "ill" persons as the primary issue (Ashley and Rankin 1988, 235). This viewpoint is the most-widely accepted one today, according to Ashley and Rankin (1988, 236); this popularity is shown by the continuing existence of programs such as Alcoholics Anonymous to address alcohol issues as a problem with the individual and their predisposition to drink.

The Alcoholism Movement was replaced after World War II by what is known as the integration hypothesis. The movement derived from an examination of other countries with much lower legal ages that did not seem to have the same issues with alcohol as did the United States. The major claim of this model is that alcohol is not well-integrated into the everyday tasks of an American's life, which causes the problems that are associated with alcohol use, including alcoholism. Advocates of this viewpoint proposed that promoting responsible drinking would resolve some of the issues the United States saw with alcohol use (Ashley and Rankin 1988, 236). At the same time, during the Vietnam War, many individuals questioned why men who fought for their county could not vote – and along with that, drink. Many laws were changed or introduced following this change in cognition, leading to the loosening or removal

of restrictions on alcohol use and sale. Twenty-nine states lowered their age of alcohol use during this time (Main 2009, 35).

The integration hypothesis, however, managed to ignore many of the health issues that countries that had integrated use of alcohol suffered outside of alcoholism (Ashley and Rankin 1988, 236). For example, after states lowered their drinking ages, highway deaths among teenagers rose dramatically (Main 2009, 35). Empirical studies released between 1970 and 1980 indicated anywhere from 10% to 30% increase in alcohol-related crashes involving young drivers when drinking ages were lowered (Saylor 2011, 332). Contributing to this problem, where some states had lowered drinking ages and others had kept it at 21, "blood borders" had formed where teens would drive across state lines to be able to drink, then drive back when intoxicated (King and Dudar 1987, 315).

Finally came the population consumption model, which grew in popularity in the late 1960's, but did not result in law change until the 1980s. This model shifted the attention back to the consumption of alcohol in certain heavily-drinking communities. It particularly addresses the factors that affect this consumption of alcohol, and how the level of drinking then affects the development of disease and injury among the population. This viewpoint rose primarily from different research studies and a concern that too much of the problem was being placed on "diseased" individuals who supposedly had no control over their drinking behavior. This model has led to the development of different types of alcoholism, of which only two are considered to be less controllable, actual disease. The impetus for change was placed both on the individual and society, considering excessive alcohol use to be primarily a choice mechanism. Through research, this theory has concluded that a) alcohol is a strong correlate

with illness, b) the number of alcohol-related health problems in a given populations is directly related to individual consumption, and c) prevention must therefore include a component designed to reduce consumption (Ashley and Rankin 1988, 236). Out of this movement developed the Uniform Drinking Age Act of 1984.

The Uniform Drinking Age Act

Through the development of these different viewpoints on alcohol, its use, and those who abuse it, one can see how the impetus for a national minimum drinking age developed. As Americans' viewpoint on drinking changed, with a refocus of fault on the individual, so did its consideration of drinking and driving. In 1980, Cari Lightner, a 13-year-old from California, was struck and killed by a hit-and-run drunk driver. Her mother, after being processed through the criminal justice system, was infuriated by what she considered a lenient treatment of drinking and driving. She, along with a friend, then founded Mothers Against Drunk Driving, now well-known as MADD, to draw attention to the issue and enact stricter laws against drunk driving (Main 2009, 35). The movement quickly gained support and voices and soon spread nationwide – within two years, it had 100 chapters (Main 2009, 36). In response, students formed a similar organization, called Students Against Drunk Driving (SADD), which helped draw further attention to the issue of drunk driving (King and Dudar 1988, 315).

By spring 1982, President Ronald Reagan had formed a commission to study drunk driving and try to have the states address the issue head-on and more uniformly. Based on an Insurance Institute of Highway Safety study, if every state raised its drinking age to 21, 750 fewer teenage drivers would be involved in nighttime crashes per year, with an accompanying 28% reduction in fatal nighttime crashes with the same population. That same year, Congress

approved a $125 million earmark to states that made their drinking laws more stringent;

however, only four states qualified within the next two years. To make it more appealing, it was

proposed that better incentives be implemented for any state that raised its drinking age to 21

(King and Dudar 1988, 315).

Another, more aggressive measure was introduced into a House committee by James

Florio; it stipulated that it would be a crime to sell alcohol made in another state or transported

across state lines to anyone under 21. However, this bill was attacked for its influence on

matters that should be regulated by the states, according to the Twenty-First Amendment. In

addition, many were concerned about an increased load on the federal courts. The bill

attempted to address these issues by imposing civil instead of criminal punishments, but it still

appeared that the federal government would be unable to have a strong role in dictating

drinking age policies directly (King and Dudar 1988, 316).

However, another proposal in the form of an amendment on a funding bill was placed

on the House floor, authored by James Howard, that mandated a hold on highway funding if

states did not raise their drinking age to 21. Five percent of a state's federal allowance for

highway funding would be withheld by 1987; starting in 1988 and every year following, the

percentage withheld would be 10%. The House quickly and, rather surprisingly, passed it. This

idea, compared to the Florio bill, was a little more within the federal government's powers, as

evidenced by prior exercise with funding stipulations. It also did not carry with it any chance of

increased traffic in the US court system in terms of enforcement.

It ran into a hitch in the Senate, as it was still challenged on constitutional grounds (King

and Dudar 1988, 316). In fact, many in Ronald Reagan's own party fought tooth-and-nail to

keep this law from going into effect, even while Reagan supported it. Conservatives proposed

that the issue of drunk driving should be addressed more directly, rather than create "arbitrary

age discrimination" in which 18 to 20-year-olds would be allowed to vote and serve in the

military, but not drink. They also disagreed with the law because they viewed it as an

underhanded attempt by the federal government to steal power from the states; therefore,

they wanted to keep focus on incentive-based plans, rather than the withholding of funds (King

and Dudar 1988, 317). However, an incentive measure meant as a substitute failed on the

Senate floor, presumably due to the earlier failures of incentive plans to address the issue and

encourage state compliance (King and Dudar 1988, 318).

In response to these criticisms, the Senate tied the amendment to another highway

safety earmark, and it passed to the President. As so often it happens in politics, it hit the

President's desk just in time for national elections, so Congress members could claim victory to

their constituents (King and Dudar 1988, 316). With Ronald Reagan's signature, the states then

had two years to implement a minimum drinking age of 21 before receiving a cut in their

highway funding. Within those two years, 20 states had raised their drinking age to 21, and by

1987, only eight states remained out of compliance with the law (King and Dudar 1988, 318).

By 1988, all states had raised their drinking age to 21 (Wagenaar and Toomey 2002, 206).

The states, however, enacted a higher drinking age rather reluctantly and amid many

constitutional challenges. Because of the 21st amendment, which stated the states would set

their own drinking laws, it was expected that the Uniform Drinking Age Act would be shot down

in the Supreme Court. Many states prepared for this by lining up "rollback" laws even as they

enacted a minimum drinking age of 21, allowing for the quick return of their previous drinking

ages if the act was declared unconstitutional. South Dakota was the state that ultimately took

the case to the Supreme Court, suing Reagan's secretary of transportation, Elizabeth Dole. To

the surprise of many, the Supreme Court ruled that the law was constitutional, citing that the

financial inducement was only encouragement to comply and was not severe enough to be

considered compulsion. They also wrote in their decision that the concern for safe interstate

travel was important enough that the federal government could intervene and suggest a

national minimum drinking age (Miron and Tetelbaum 2009, 317).

The Amethyst Initiative

The minimum legal drinking age (MLDA) of 21 has been in place for more than three

decades now; it is a generally accepted part of the U.S. code of laws. However, because of the

entrenched nature of drinking in American culture, underage drinking still occurs at a fairly high

rate. Many people believe that this phenomenon of underage drinking occurs because of the

way the US culture presents alcohol to its youth. A movement was initiated in 2007 called

Choose Responsibility, which advocates a shift in thought that would allow teens to drink in the

home and in controlled settings with their family (Main 2009, 33). Other stated goals include

lowering the drinking age to 18 and making alcohol use for those of age licensed like driving: for

example, having a mandatory class and standardized test to be able to legally drink (Saylor

2011, 331). From this movement has come a national reexamination of MLDA 21 (Main 2009,

33).

Nowhere is the U.S.'s underage drinking problem more apparent than on college

campuses. Alcohol use is inextricably intertwined with life at college, but it is associated with

many different negative outcomes, ranging from academic problems to rape and unwanted

pregnancy (Fitzpatrick et. al. 2012, 1608). School administrators struggle consistently to control underage drinking on- and off-campus by their students. In 2008, in response to the Choose Responsibility movement, John McCardell, president of Middlebury College, created a petition for his peer group of other college and university presidents. Known as the Amethyst Initiative, its intent was to collect signatures to ignite public discussions and cause legislators to reevaluate the national minimum drinking age (Main 2009, 33). There is no formal list of goals to accomplish, unlike the movement that spawned its creation (Main 2009, 34).

However, the petition is fairly clear that it would prefer the national minimum drinking age revoked. Its main premises are these: by making alcohol illegal, it makes it more desirable to those underage and drives drinking into the dark corners of society. Those who choose to drink underage feel as though they must hide it, and that when they can get it, they better take advantage of the situation (Main 2009, 34). As well, they are drinking in environments, such as college parties, that have less supervision than there could be otherwise, such as at a bar or a school function (Fitzpatrick et. al. 2012, 1609). The result, the petition claims, is more binge drinking for those 18-20 years old. It also postulates that the drinking age keeps college administrators from having honest discussions about alcohol use that could lead to more responsible behavior (Main 2009, 34). As of 2009, 135 college presidents, mostly from private schools in the Northeast, had signed the petition, bringing the conversation about alcohol use even more to the forefront of national attention (Main, 34).

As attention has grown on this subject, it has allowed for a more in-depth analysis of the minimum drinking age of 21. The Amethyst Initiative and other movements like it have been helpful in bringing more attention to the issue nationally, especially in more recent times.

However, the more it is studied, the more it is clear that the Uniform Drinking Age Act has succeeded in its goals of reducing alcohol consumption and deaths in young people that can result from its use.

Evaluation

General Population

<u>Consumption</u>

Fortunately, most of the hard work of evaluating the Uniform Drinking Age Act has already been done. Since the national minimum drinking age has been in place for more than thirty years, many studies have been conducted evaluating its effectiveness. Because of the widespread nature of the research, it is hard to truly determine the success of MLDA 21 without looking at the data in the aggregate. Wagenaar and Toomey (2002) did just that, gathering many different studies that had been completed regarding the national minimum drinking age. Their criteria for inclusion was any study that was completed between the years 1960 and 1999, in a peer-reviewed journal; the total they began their analysis with was 132 (206). They then broke their data down by outcomes: alcohol consumption, traffic crashes, and other health and social issues (209). The authors found 48 articles on consumption, 57 articles on traffic crashes and driving under the influence, and 24 studies on other health outcomes (209, 213, 215). For the purposes in this section, the focus will be placed on statistically significant data, because it is more reliable to use as evidence for an argument, and as consumption as the outcome. Consumption of alcohol is an important measure to focus on because it is related to many unseemly consequences, as aforementioned, as well as preventable deaths, such as suicide and accidents (Fitzpatrick et. al. 2012, 1608).

In the 48 articles discussing consumption, they together discussed 78 total outcomes of alcohol consumption. Of these 78 measures of alcohol consumption, 31 found statistically significant effects of the drinking age on consumption. Of these 31, 27 (87%) found the relationship between the drinking age and consumption to be inverse; that is, as drinking age increased, alcohol consumption decreased, and vice versa (Wagenaar and Toomey 2002, 209, 212). The higher-quality studies, as Wagenaar and Toomey (2002) claim, were those that recorded repeated measures over time; 19 of 57 of these longitudinal, pre-post, or time-series studies found a statistically significant inverse relationship, while only one found the opposite (212). Based on this evidence, it is tempting to conclude that consumption is clearly limited by a drinking age of 21. However, the relationship is much more complex than it may appear on the surface due to possible influence of other variables. To further analyze consumption rates, the studies themselves must be analyzed for any potential inadequacies or flaws.

One study used by Wagenaar and Toomey in their meta-analysis was a study by Timothy Williams and Robert Lillis (1988). This study was chosen for more in-depth analysis because it was of a longitudinal design, which, as has already been established, is considered one of the more reliable study designs (Wagenaar and Toomey 2002, 209). The study in question also reported statistically significant results. Williams and Lillis used random sampling to select 16-20 year old New York State residents to anonymously interview over the phone about their drinking consumption. The sample was broken into three groups – one, interviewed in November 1982, before the purchase age in New York was moved from 18 to 19; one in December 1983, one year after the change went into effect; and one in November 1985, three years after the change. Each of these groups had approximately 1,800 respondents, except for

the last group, which was age-extended to 16-24 year olds and had about 2,700 respondents.

Alcohol purchasing and consumption were both analyzed by survey questions asking, in the last

4 weeks, if an individual bought any alcohol, on how many days they drank, and how much they

normally consumed on the occasions they did drink. The purchase behaviors were broken down

into type and location: any alcohol purchase, purchase of beer, liquor, beer in bars, beer in

stores, liquor in bars, and liquor in stores. Response rates ranged from 76% in 1982 to 86% in

1983 (Williams and Lillis 1988, 210-212).

Williams' and Lillis' research (1988) indicated that 16- and 17-year-olds already had a

lower purchasing prevalence than 18-year-olds before the law change in 1982 (statistically

significant to the 1% level), which should be expected since it was illegal for the younger cohort

to do so. It also indicated that in 1982, 18-year-olds purchased at a statistically similar rate to

that of 19- and 20-year olds; the only difference, statistically (to a 1% level), was a tendency for

19-year-olds to purchase more beer and liquor in bars than 18-year-olds. All other types and

methods of purchase, though, were not statistically significant in difference (212).

After 1983, however, when the law was changed for purchase age, the prevalence of

purchase for 18-year-olds was significantly lower than for that of 19- and 20-year-olds (in 9 out

of 10 categories, to the 1% level; for the other category, to the 5% level) (Williams and Lillis

1988, 212). As well, the amount of alcohol purchased from 1982 to 1983 for 18-year-olds

decreased significantly (Williams and Lillis 1988, 213). Finally, when compared to 19- and 20-

year-olds, the 18-year-old cohort had significantly greater decreases in purchasing from 1982 to

1983 for all of the measures to at least the 5% level, verifying that the decrease seems to be

from the law itself and not from any other factors (Williams and Lillis, 213-214).

This data indicates the law is working; that is, it is now keeping those under the age of 19 from purchasing alcohol. Interestingly, though, the 1983 measures of purchasing for 18-year-olds were still significantly higher from the measures for 17-year-olds in 1982, indicating the law was not a total success (Williams and Lillis 1988, 212). While this data seems promising, what one must keep in mind is that this result is highly expected; that is, when the law changed, as long as establishments are following the law, the purchasing prevalence of 18-year-olds would necessarily go down. What is important here is consumption more than purchasing; did the law do its job of decreasing consumption among 18-year-olds as well?

The data shows that consumption also decreased with the aforementioned decrease in purchasing prevalence among 18-year-olds. **Table 1** shows the consumption of each age group in each of the different survey years, according to five different measures. By 1985, 18-year-old consumption was lower compared to 19- and 20-year-old drinkers, and the relationship was significant in seven out of 10 cases (all but one to the 1% level) (Williams and Lillis 1988, 214). The only statistically insignificant differences involved binge drinking measures and frequent use, indicating that the law did not affect those with high rates of use as much as others (Williams and Lillis 1988, 215). As well, between 1983 and 1985, none of the age groups significantly increased or decreased their consumption of alcohol in any of the categories. This result again points to the new law as the reason that consumption has changed, not to some other time-oriented variable.

It is important to note the weaknesses of the study. For example, the sampling groups for each survey time were different; that is, the same group of individuals was not asked the same questions in three different occasions. This type of study design would be very difficult to

carry out, but it would be more effective in terms of showing a decrease in consumption and purchasing after the law went into effect. Furthermore, there was reliance upon the lack of differences in consumption and possession from year-to-year by each age group to communicate that there were not intervening variables affecting the results. While it is true that alcohol use stayed much the same, statistically, for those unaffected by the law (16-,17-, 19-, and 20-year-olds), there may have been other factors affecting the drinking behavior of those 18 years of age (Williams and Lillis 1988, 215). An example of a possible external factor would be a massive campaign against alcohol aimed at 18-year-olds that may have affected their decision to drink. Despite these concerns, it is quite safe to trust that this study is correct in its conclusion that raising the purchase age in New York decreased both the purchase and consumption of alcohol for those affected by the law.

Traffic Fatalities

Consumption rates of alcohol are incredibly important by their own right for evaluating the national minimum drinking age and its effectiveness. As has been mentioned, many undesirable consequences can occur from the use of alcohol alone. However, the original spark for the idea of the Uniform Drinking Age Act, and what could be considered its primary concern, is when a motor vehicle becomes implicated in the situation, and the deaths that can occur as a result. The loss of human life is almost always at the forefront of any national discussion of this magnitude, and the national minimum drinking age is no different. Therefore, it must be used as a primary indicator of the success of this law.

Two studies were found that effectively addressed whether MLDA 21 has reduced alcohol fatalities. The first was carried out by Decker, Graitcer, and Schaffner, published in

1988. These authors examined the drinking age in Tennessee specifically, where the drinking age was 18 from 1971-1979, then 19 from 1979 to 1984, when it was raised to 21 (3604). Data was collected from varying systems, encompassing January 1st, 1980 to December 31st, 1986, then separated into three groups. The first cohort included drivers aged 15 to 18, who could drive but were never allowed to drink during the time period of the study; the second group, 19- and 20-year olds, whose right to drink was taken during the study period; and the third group, ages 21-24, who were allowed to drink at all times during the study period. The authors also had the foresight to note that certain age groups were more likely to drive a large amount of miles on average. Therefore, they created a measure that calibrated the fatality rate in terms of miles driven (as an age cohort on average), instead of by age group directly (3605). The primary measure in this study was the fatality rate of drivers in single-vehicle nighttime crashes, divided by age, which was used to determine success of a higher drinking age in preventing fatalities related to alcohol (3606).

The authors used the period from 1980 to early 1982 as their baseline for most comparison, primarily because of an increased penalty law that went into effect July of 1982. This law decreased single-vehicle nighttime (SVN) driver fatality rates for the 21-24 year old cohort until 1984, did the same for the 15-18 year old cohort until 1986, but did not affect the 19- and 20-year-old SVN fatality rate at all (See **Figure 1** for a visual representation). Because of these varied effects, the "baseline" was considered the SVN fatality rate before 1982, as to avoid any intervening effects from the penalty law (Decker, Graitcer, and Schaffner 1988, 3606).

After the implementation of the new age law in 1984, the SVN fatality rate of drivers aged 21-24 remained primarily stable when compared to the baseline established from 1980-

1981; the only decrease in SVN fatality rates came after the aforementioned penalty law. For

drivers aged 15 to 18, the decrease seen from the penalty law persisted until 1986, at which

time the SVN fatality rate returned to a statistically insignificant difference from baseline.

However, for the 19- and 20-year-old age cohort, after implementation of the age law, there

was a startlingly and statistically significant decline (to the 4% level) in the number of driver

deaths in single-vehicle nighttime accidents that appeared to continue on past the study scope

(Decker, Graitcer, and Schaffner 1988, 3607). Again referencing **Figure 1,** the marked decline of

SVN fatality rate of those drivers aged 19 and 20 is apparent compared to the other two age

cohorts. This same phenomenon is shown by numbers in **Table 2**; see the clear decline between

1984 and 1985 for 19- and 20-year-olds that does not exist for the other age cohorts.

It appears from this study that the new drinking age limit in Tennessee did indeed

decrease single-vehicle nighttime crashes with the deaths of drivers of the ages 19 and 20.

However, it has limited applicability to the success of raising the drinking age in terms of fatal

accidents overall. First, the study could have been improved by examining instead alcohol-

related traffic accidents, instead of simply single-vehicle nighttime accidents, to more directly

correlate the alcohol law and the results. As well, it could have included all fatalities in

accidents, rather than only driver fatalities. Though it is a limited study, just like any other, it

does seem to indicate that a higher drinking age reduces traffic fatalities. It cannot be ignored

that if this is the case, increasing the drinking age saved, and likely continues to save, lives in

Tennessee and elsewhere.

Another study that was effective in examining the MLDA 21 in terms of automobile

fatalities was executed by Young and Likens (2000). Using a large number of factors and control

variables, the authors exhaustively analyzed the drinking age and other methods of alcohol control to determine their effect on traffic fatalities. Data was gathered from 48 states over 9 years, and each year and state was taken as a separate data set (107). This study found that for alcohol-related driver fatalities, the legal drinking age had a significant and negative effect to the 5% level; that is, as the legal drinking age goes up, driver fatalities go down (116). For total fatalities, though, legal drinking age has a negative but non-significant effect (115). This distinction is important, because it tells the reader that the legal drinking age is in fact affecting accidents involving alcohol, rather than total accidents; MLDA 21 is achieving its goal of fewer traffic fatalities that are alcohol-related.

At this point, there are several issues that should be addressed. During the time at which the Uniform Drinking Age Act was enacted, other important safety considerations were also being implemented. For example, automatic occupant-protection systems, a type of seatbelt, were required in all new vehicles by 1989. In fact, it was in 1984, the same year the federal government mandated the national drinking age, that the U.S. Department of Transportation announced this requirement (CDC 1985, n.p.). Along with this change came mandatory seatbelt laws enacted by the states, which continue to vary greatly place-to-place. In studies based primarily on a measure over time, such as the Decker, Graitcer, and Schaffner (1988) study, the effects from seatbelts and seatbelt laws would intervene and would have the potential to conflate any results seen regarding the age-21 MLDA's effect on traffic fatalities. Any effects on automobile deaths found from raising the legal drinking age would be attributable also to the increase in safety features or seatbelt laws.

However, the Young and Likens study (2000) addresses this issue not only by including seatbelt laws as a control variable, but by how their analysis is performed. Because they take each state and each year as an independent set of data, not as a continuous flow in time, they do not suffer the conflagration that would occur with a time-dependent study. While the effect of seatbelt laws on auto fatalities is still built into the data, so to speak, the two variables can be analyzed entirely independent of one another. Mandatory seatbelt laws were analyzed by Young and Likens as a control variable; they showed that a mandatory seatbelt law would have a negative and significant effect on both total fatalities and alcohol-involved fatalities to a 1% level (2000, 115, 116). As has previously been mentioned, the legal drinking age in the same study had a negative and significant effect on *alcohol-related* traffic fatalities only. This result means that that MLDA 21 is affecting exactly what it was designed to attack, which are traffic deaths where alcohol is involved.

Because of the way that the data was set up and analyzed, a reasonable conclusion can be made that seatbelt laws and MLDA 21 both have negative and significant effects on traffic fatalities. These variables do interact with one another, but because legal drinking age can be analyzed independently, it can be shown that it has its own, separate effect on alcohol-related traffic fatalities. Further evidence of this effect can be seen by simply analyzing different age ranges over the time period MLDA 21 went into effect. After raising the drinking age to 21, rates of drinking and driving dropped 37% *more* for those underage than those 25-54 years old, and about 13% more than those aged 21-24 (Saylor 2011, 331). While this observational evidence alone is not sufficient, it does add an additional layer of support to the idea that the national minimum drinking age is decreasing auto fatalities.

Collegiate Population

It may seem evident at this point that the MLDA 21 has achieved its goals; the preponderance of evidence indicates both consumption of alcohol by those aged 18-20 years and traffic deaths related to alcohol declined when the drinking age was increased to 21. However, the recent debate has not centered around the general population of drinkers, but on college campuses, as shown by the Amethyst Initiative and its popularity. The four years a young person is in college is a totally new and different experience and environment, completely removed and distinct from the "real world." To any observer, the culture of drinking on a college campus in undeniable, and it does appear very different than the behavior of the general population. Therefore, an in-depth analysis of college students aged 18-20 as their own separate subset of the population will be necessary to determining the further effectiveness of MLDA 21, and ultimately, the validity of the Amethyst Initiative.

Consumption will still be used as a major indicator of success; however, because traffic fatalities are not typically reported as being "college-related," it will not be used to indicate success for this portion of the analysis. Instead, self-reported drinking and driving will be used to determine the effectiveness of MLDA 21 in keeping those under the influence off the road.

Consumption

One study that addressed the question of consumption among college students was conducted by Mooney and Gramling, published in 1993. They used data from anonymous questionnaires given to two groups of collegiate students in social science classes: one in North Carolina, and one in Louisiana. When the data was collected in 1987, the legal drinking age for North Carolina was 21; for Louisiana, it was 18 (331). The two schools were similar in size and

composition, except many more students lived at home who attended school in Louisiana. Because of this difference, the place of residence was taken into account as a possible covariate in the analysis conducted, along with race and sex.

The survey asked questions regarding frequency of drinking, quantity consumed per drinking occasion, quantity of alcohol consumed monthly, and the location where drinking occurred (332). To verify that the effects seen were indeed from policy differences, and not the culture of the location, significance testing was run for individuals over 21, and therefore not affected by the policy. These tests showed no statistical difference between the populations over 21 in their drinking behaviors (332-333). The main measure of the effect of the minimum age law was the state-age interaction; that is, whether age cohorts' drinking rates are affected significantly by the state which they are in, and therefore the law which they are under. A state-age interaction would therefore indicate an effect of the minimum drinking age law (335).

The study found the relationship between the minimum drinking age and consumption to be rather complicated. When looking at overall consumption of college students, the state and the age had significant effects on the three dependent variables of frequency of drinking, the number per occasion, and total monthly consumption. However, when held together, the interaction of the two variables held no significant effect. In layman's terms, North Carolina students drank more frequently, with more drinks per occasion, and higher total monthly consumption, but did so fairly consistently with all ages. This result means that the minimum drinking age of 21 in North Carolina is appearing to have no significant effect (Mooney and Gramling 1993, 335). Extrapolating from the previous analysis regarding consumption patterns in the general population, it would be expected that consumption would go down for college

students under a higher minimum drinking age. However, this effect does not seem to hold true for this collegiate population.

What becomes even more intriguing from this study is how drinking is affected in different social situations. It was previously mentioned that data was collected on where the drinking behavior occurred. Mooney and Gramling divided the different locations into two main groupings: controlled and uncontrolled settings. Controlled settings were places like bars – proof of age is required to enter or drink, and there is a higher likelihood that if caught, legal sanctions would be imposed. Uncontrolled settings were places like fraternity houses or apartments, where there was much less threat of formal sanctions or law enforcement (Mooney and Gramling 1993, 332).

When controlled locations were analyzed, the results were exactly what would be expected. The state-age interaction was significant for the frequency of alcohol use (to the 1% level) and the total alcohol use monthly (to the 5% level) in controlled locations (Mooney and Gramling 1993, 335). This result makes intuitive sense because it means that in bars or restaurants, where proof of age is required, those 18-20 years of age are not allowed to drink in North Carolina, where in Louisiana they are. Therefore, the frequency of use and total monthly use are necessarily affected by age in controlled locations, as long as establishments are following the laws. It is not surprising, either, that the number of drinks per occasion is not statistically affected by the state-age interaction, because North Carolina's laws do not impose more stringent penalties on underage drinkers for higher intoxication levels. Therefore, students have no incentive to purchase less alcohol if they are indeed getting away with it underage (Mooney and Gramling 1993, 336).

In contrast, for uncontrolled locations, the results are quite different than from the controlled settings and from what would be expected. If, again, results from the general population were to be assumed for college students as well, it would be expected that consumption would decrease under the more stringent legal age limit, regardless of location. Mooney and Gramling (1993) instead found that the state-age interaction did not significantly affect the frequency of drinking, number of drinks per occasion, nor the monthly total of alcohol consumed (335). This result means that in uncontrolled locations, for college students, MLDA 21 appears to have no effect on alcohol consumption. Another important point to note is that in both Louisiana and North Carolina, frequency, intake per occasion, and monthly consumption were all higher in uncontrolled than in controlled locations (Mooney and Gramling 1993, 336-337). Therefore, it appears that where the majority of drinking is taking place for college students, a minimum drinking age of 21 has no effect on consumption.

Returning to the Wagenaar and Toomey (2002) study mentioned at the beginning of the evaluation section of this paper, it seems they came to a similar conclusion when analyzing the data in the aggregate. As a reminder, of the 78 measures of consumption found by these authors, 27 (35%) found a statistically significant inverse relationship between the drinking age and consumption, with only four reporting the opposite significant effect (209). Forty-six percent presented no statistically significant effect of the drinking age on consumption (213).

However, when looking at the studies that only address the collegiate population, a quite different picture emerges. Twenty-four measures were specific to college populations, and of those, only three, or 13%, found a statistically significant inverse relationship. The exact same number of studies found the opposite effect of a statistically significant positive

relationship, and an overwhelming majority of studies (63%) found no significant relationship at all (Wagenaar and Toomey 2002, 213). It seems suddenly apparent that the MLDA 21, while decreasing the general population's consumption levels, has no effect on college populations. In light of this evidence, it suddenly seems clear why the Amethyst Initiative gained so much support and remains such a vivid discussion in the public sphere. College drinking patterns have responded much differently to the MLDA 21 than what was seen in the general public; in fact, it appears it does not affect collegiate populations much at all.

Drinking and Driving

In terms of collegiate populations and drinking and driving, the results are much the same as consumption. A study completed by Engs and Hanson (1986) compared collegiate populations in states with a drinking age of 21 with states with a lower drinking age, before the Uniform Drinking Age Act went into effect. They surveyed about 4,000 students with a 17-item questionnaire asking about the negative consequences from drinking they had experienced within the last year. For those states with a drinking age under 21, a higher percentage of their collegiate population reported driving after drinking (75.9 vs 72.1%), driving after knowing they had had too much to drink (62.6 vs. 58.6%), drinking while driving (63.0 vs. 55.6%), and being stopped for a DUI (3.6 vs. 3.1%). Out of these results, the only statistically significant difference (to a 1% level) between the two populations was the drinking while driving rate (981).

Based on this study alone, it does appear that the drinking age of 21 does reduce drinking while driving among collegiate populations. This effect should not be surprising, as this behavior is an especially irresponsible one. A person would expect its frequency to decrease greatly as age increases, and therefore if the drinking age is increased, the number of instances

of this behavior should also decrease. However, it does not appear to significantly affect other drinking and driving factors, such as drinking and then driving. Again looking at the previous analysis on the general population, one would assume drinking and driving incidents would decrease with a higher drinking age. However, it is again evident that MLDA 21 has had less of an effect among collegiate populations than on the general population.

Concluding Remarks

Through the critical analysis of this paper, it seems apparent that national minimum drinking age was effective in achieving its goals of reducing alcohol-related traffic deaths. Through the last three decades, MLDA 21 has been shown time and time again to have reduced consumption among the general population in the 18- to 20-year-old age cohort as well. These outcomes are unequivocally positive in nature and reap large benefits for society in terms of lives saved and health issues avoided. However, interestingly enough, these results do not seem to have crossed over into the college atmosphere.

Because of the very exclusive nature of the college environment, it seems extremely disconnected from the real world. College life means freedom for most students, and for many, it also means alcohol, and lots of it. Perhaps because of this atmosphere, it appears that MLDA 21 does not have the same effect as it does on the general population. Based on consumption and self-reported drunk driving levels, it appears as though raising the national minimum drinking age had little to no effect on collegiate students. This evidence is the main reason why the Amethyst Initiative exists and is still flourishing today; walking onto a college campus, it seems that students drink constantly, rather carelessly, and unsupervised. If the drinking age was 18, some argue that at least the drinking would be out in the open and in controlled

settings. It is not surprising that college administrators, faced with this issue, would consider

that the drinking age of 21 might be part of the problem.

However, further analysis shows that the drinking age is not the problem at all. First and

foremost, this paper has just shown that raising the legal age to 21 has reduced traffic fatalities,

especially for young people. One estimate places the number at over 15,000 lives saved

between 1975 and 1998 (DeJong and Hingson 1998, 368). Could the United States, as a society,

really remove MLDA 21, knowing that if states chose to lower their drinking ages, many youths

would die as a result? I do not know a single politician, or parent, or individual who would make

the argument that the problem of bingeing on college campuses is severe enough to outweigh

the lives saved by a higher drinking age.

Furthermore, the idea that the drinking age of 21 is causing the problems with drinking

on college campuses is simply flawed. One of the main claims of the Amethyst Initiative is that

making alcohol illegal to minors makes them want it more – the so-called forbidden fruit from

the tree (Main 2009, 34). We will ignore for now the problems of allowing everyone to do as

they please only to keep them from "wanting it more." As has been shown in this paper,

making it illegal for 18- to 20-year-olds to drink on the whole has not increased consumption,

but rather decreased it. Clearly, it is not the age-21 law that is "making" minors want to drink

more in college, because in the general population, it keeps them from drinking as much. As

well, drinking is hardly taboo in a social sense at universities – in fact, it is widely available

almost to the sense of being absurd (Main 2009, 36). In this situation, alcohol is not really

forbidden to these collegiate students, because they can get it really whenever they want from

friends who are upperclassmen and of-age.

Another claim is that having alcohol illegal pushes its use underground, which leads to a uncontrollable environment where bingeing is more frequent. According to John McCardell, who authored the Amethyst Initiative, this effect then causes individuals who are to that point inexperienced with alcohol to form a misconception about normal drinking behavior (Fitzpatrick et al. 2012, 1608-1609). They begin to imagine that all college students drink to this excess, so they begin to also. While it is true that drinking habits are predicted by the perception of behavior by their peers (Fitzpatrick et. al. 2012, 1609), this assumption that this phenomenon occurs in college does not hold up under further analysis. According to Main (2009), a majority of college students have at least tried alcohol before attending college; in fact, about 40% of students have "deeply engrained drinking habits" when they enter college (37). Therefore, the idea that the bingeing begins with watching others do it in college is simply unreliable on a large scale.

A mathematical discussion of this idea is provided by Fitzpatrick, et al. (2012). A model was set up to resemble a college campus, with parameters involving the wetness of the campus, the age of the students in terms if they can legally drink or not, and their misconceptions of use by their peers (1609). The model was estimated from data from 32 different college campuses that included measures of all these items. The authors then carried out a mathematical transformation of the model that involved increasing the wetness of the underage age group, while lowering their misconceptions, until that population reached the same levels of use as the legal age group. This increase in exposure to alcohol, while decreasing misconceptions, resembles what would probably occur on a campus if the drinking age was reduced. They found that even when lowering misconceptions about binge drinking, heavy

episodic binge drinking increased when the drinking age was lowered (1611). While this study is simply a predictive mathematical model, and therefore limited, it does help indicate what is likely to happen if the legal drinking age is again lowered to 18. The drinking problems on college campuses would not improve, but only get worse.

Policy Recommendations

It is apparent that some measure needs to be taken to ebb the tide of underage drinking on college campuses, and that measure is not to lower the national minimum drinking age. Any alternative or additional policies should be in addition to the national minimum drinking age of 21, not in place of it. The issue of college drinking patterns, while certainly a serious one, is not of itself enough to advocate for the removal of the policy. In the contrary, by all accounts, it appears that lowering the drinking age would only exacerbate the problem, in both the general and in collegiate populations.

Increase Taxes

One idea to control the continuing problem of underage drinking is to raise taxes, and therefore prices, on alcoholic beverages. If price increases, one expects that fewer people will buy alcohol, or at least will by less of it and "ration" their use. Studies confirm this assumption; according to Ashley and Rankin (1988), a study of Scottish drinkers indicated that total consumption decreased 18% when prices were raised on alcohol via a tax (245). In the United States, young drinkers age 16 to 21 were especially sensitive, decreasing their use by 14.8% with a 10% increase in price of beer, which is overwhelmingly the choice of alcohol among youth (Ashley and Rankin 1988, 246; Chaloupka and Wechsler 1996, n.p.). Kenkel (1993) found a similar effect regarding binge drinking, showing that price has a statistically significant

negative effect on the number of days that an individual consumed heavily (5 or more drinks

per occasion) (890). Finally, Chaloupka and Wechsler (1996) focused specifically on collegiate

populations, which, based on the earlier analysis, appear to need the most intervention. Based

on their findings, it appears that for female students, the price of beer has a statistically

significant negative effect on consumption, including on binge drinking and underage drinking.

However, for male students, while a negative effect was found, it was not a statistically

significant one. Therefore, it appears price of beer does not affect male students' drinking

patterns, though it does decrease bingeing behaviors in collegiate women. It is important to

note, however, that a relatively substantial increase in taxes would be needed to affect female

students' drinking behavior even slightly. This result is not particularly surprising, because in a

collegiate setting, many students drink at off-campus parties where alcohol may be provided

for free (Chaloupka and Wechsler 1996, n.p.).

Despite its limited effectiveness on college campuses, the idea of an increased tax lien

on alcohol may be a valid one. While it does not affect male students' drinking behavior, it does

decrease use of female students, and it also affects the general population's consumption.

Another benefit would be increased monies to the state and local governments. However, the

major roadblock for a policy of this type would be a push against any bill by powerful alcohol

lobbyists. They have an incentive to keep taxes from increasing on their products because of

this possibility of decreased consumption and therefore injury to their bottom line.

Conservatives would also likely have an issue with the increase of taxes, which would make any

laws regarding this policy hard to pass. These reasons may explain why this approach, though

supported by studies, has not been realized in the United States, and it is not likely to be in the future.

Educational Programs

Another popular idea, particularly in regards to college students, is increased education about alcohol and its use and harms. Many people believe that giving students, or even the greater population, more information about the dangers of drinking will allow them to make better decisions about their alcohol use. This concept is a big component of the Choose Responsibility movement, which sparked the Amethyst Initiative, with its "license to drink" ideal. However, these ideas are simply not supported by the data. According to Saylor (2011), many years of research have shown consistently that education programs do not work, especially in collegiate populations. In fact, even when alcohol education programs are combined with other interventions, they still are not usually effective (331).

One reason for this ineffectiveness is that alcohol use is not as much of a choice as it is a directorate from the social atmosphere of universities. College students, who are considered adults by society, are, for the most part, more like semi-adults, living in a transitional environment where there is little supervision, yet most of their basic needs are taken care of by the university. This situation creates an atmosphere of rather rash decision-making, without fear of many severe consequences. Students therefore do not tend to make rational decisions about their drinking behaviors, but do things they think other students are doing to try to fit in (Fitzpatrick et. al. 2012, 1609).

Many campuses attempt to provide education on the harms of drinking heavily, and they also try to present a picture of responsible drinking by peers instead of the typical "binge

drinking" most students think occurs. While this approach may seem like a smart move, in fact, these types of education programs can actually make drinking worse. A particular study showed that alcohol education can actually cause higher levels of consumption on campuses that provide it or require it (Main 2009, 45). Main (2009) argues that there are two distinct types of individuals on campus: initial binge drinkers, who arrived on campus having already been exposed to drinking, and initial abstainers, who have no or little experience with alcohol before college (45). Those who arrive with no drinking experience, which is approximately half of each freshman class, may see the picture of responsible drinking presented by the campus administration and see it as totally acceptable (46). And once the student has entered the world of drinking, there is no telling how far he or she may go.

Additional Laws

One final important idea for policy reformation is to increase either the laws surrounding and supporting the national minimum drinking age, or to intensify enforcement. While increasing enforcement is certainly an option, I do not think anyone would argue that the current police forces we have in place are not doing their job to control underage and problem drinking behaviors. To intensify enforcement, I would argue we would need an increase in police. Unfortunately, underage drinking is, by its very nature, hard to detect, so increasing enforcement may not be the most direct and effective way to decrease consumption, particularly among college students.

There are also arguments, though very few serious ones, to bring back Prohibition. While it is true, as mentioned previously, that Prohibition did decrease the negative consequences of consumption as well as consumption itself, it also lead to mob leadership of

cities across America. I think we would have to expect that if we outlawed alcohol again, we would see a similar effect to the Mexican and Columbian drug cartels that we have such a problem with today. In fact, the problem may even be exacerbated because of the widespread use of alcohol. Furthermore, I doubt very seriously many politicians would subscribe to the idea we should reinstitute Prohibition, both because of its negative reputation, and because of the ideas of liberty that exist in this country today.

That leaves the last option: increase the laws surrounding and supporting the national minimum drinking age. Unlike the other policy alternatives that have been examined here, it appears that bolstering the laws surrounding the Uniform Drinking Age Act, especially those dealing with drinking and driving, is effective in reducing consumption. In terms of the general population of the United States, Kenkel (1993) showed that laws implemented by states that are stricter on drinking and driving lead to less bingeing (5 or more drinks in an occasion). When laws exist regarding mandatory sentencing of first-time offenders, both males and females show a significant (to the 5% level) and negative effect on their heavy drinking habits. Breath test laws and sobriety checkpoint laws also have a negative effect on both sexes' bingeing behavior, but the statistical significance is not consistent with both groups (889).

Turning specifically to collegiate populations, as that is our main focus in regards to policy improvement, Chaloupka and Wechsler (1996) found that strong state policies regarding drunk driving also reduce consumption for college students. This effect holds true in terms of consumption both overall and in binges, and in male, female, and underage subgroups. This fact was particularly true of male and underage populations, because the decreases in consumption were found to be statistically significant in all measures. For females, binge

drinking was not statistically significantly impacted, but the overall model of drinking was. The

policies that were particularly examined in this study were ones that increased the probability

of arrest and raising the consequences of conviction of a DUI charge (n.p.).

It is apparent that MLDA 21 has been an effective policy, and one that is protecting our

society. However, collegiate populations continue to imbibe in alcohol without a significant

regard for the minimum drinking age of 21. From the research, it appears the best way to

resolve this problem is to increase the supporting laws regarding alcohol use, particularly those

focused on drunk driving. If consequences are increased, as well as the likelihood of being

caught, when driving under the influence, it appears that we, as a nation, could control the

continuing problems with alcohol in regards to collegiate populations.

Appendix

Table 1. Change in Consumption After a Change in Purchasing Age in New York from 18- to 19-years of age in December 1982

		N	In Last 28 days	On At Least 1 of the last 8 weekend evenings	On At Least 4 of the last 8 weekend evenings	At Least 5 Drinks per occasion on weekend evenings	At Least 4 of the last 8 weekend evenings and at least 5 drinks per occasion
	1982	481	48.6	44.1	18.7	21.2	12.7
16	1983	483	39.8	34.6	13.5	15.1	9.5
	1985	448	36.8	33.9	13.4	13.4	7.6
	1982	477	63.5	57.4	27.0	25.8	16.4
17	1983	448	54.9	48.7	19.0	17.9	10.3
	1985	348	48.9	46.0	17.5	19.5	10.6
	1982	310	81.0	75.2	48.1	35.2	26.5
18	1983	316	63.9	57.0	30.4	22.8	17.1
	1985	275	62.9	56.7	29.8	26.2	17.8
	1982	280	84.6	80.7	50.0	38.2	30.7
19	1983	275	76.7	66.2	40.4	33.8	24.0
	1985	275	75.6	68.7	40.4	34.2	22.5
	1982	263	82.5	74.1	47.9	34.2	25.9
20	1983	276	73.9	67.0	41.3	33.3	22.5
	1985	280	82.5	74.3	43.2	31.8	22.5
Comparison of 1985 Consumption 18- versus 19- and 20-year-olds							
19	vs. 18		+20.2**	+21.2**	+35.6**	+30.5*	+26.4
20	vs. 18		+31.1**	+31.0**	+45.0**	+21.4	+26.4

ªDoes not include New York City.
*$p<0.05$ **$p<0.01$.

(Williams and Lillis 1988, 214)

Table 2.

| Year | Fatality Rate for Drivers in Nighttime Single-Vehicle Crashes, per 100 Million Vehicle Miles Driven, by Age in Years | | | |
	15-18	19-20	21-24	≥25
1980	35.5	18.9	12.6	5.3
1981	27.2	22.8	12.4	4.9
1982	37.1	25.6	17.0	5.0
1983	20.9	27.1	9.8	4.3
1984	19.0	23.9	16.4	4.4
1985	19.1	12.4	15.2	4.4
1986	29.5	13.6	13.9	5.0

(Decker, Graitcer, and Schaffner 1988, 3607)

Figure 1. Twelve-month moving averages of monthly driver fatality rates for single vehicle nighttime crashes per hundred million vehicle miles (HMVM) traveled (15- to 18-year-old and 19- and 20-year-old cohorts represented by solid lines, 21- to 24-year-old cohort by dotted lines)
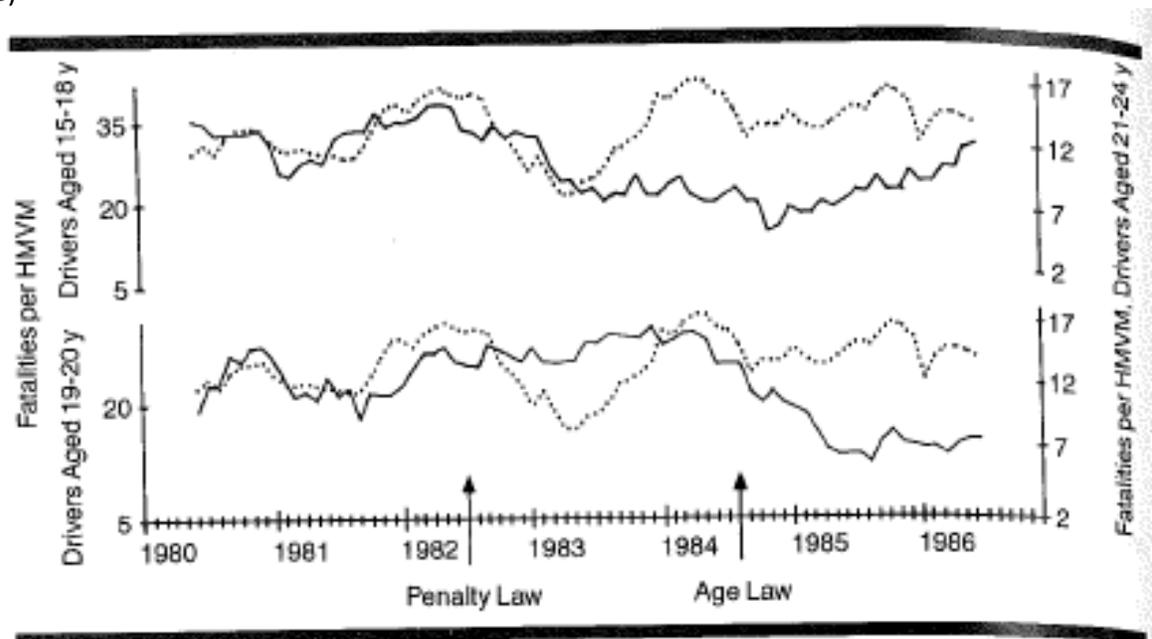
(Decker, Graitcer, and Schaffner 1988, 3606)

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