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The Effects of Minimum Legal Drinking Age on the Amount of Alcohol Consumed and the Attitudes Toward Alcohol in Adolescents

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Underage drinking, especially binge drinking in teenagers is a major epidemic across the globe that can result in a multitude of negative consequences. In the U.S., binge drinking is defined as drinking that brings the blood alcohol level to .08; drinking four or more drinks for women and five or more drinks for men in two hours usually brings the blood alcohol content (BAC) to this level (National Institute on Alcohol Abuse and Alcoholism, 2004). In 2012, there were nearly 3.3 million deaths due to alcohol worldwide (World Health Organization, 2015). In addition, 320,000 of those deaths were individuals from the ages of 15-29 years old (National Council on Alcoholism Drug Dependence, n.d). A 13-year longitudinal study is proposed to study 10,000 participants all beginning at the of age 13 in 20 different countries varying in minimum legal drinking ages. In this study, the effect of the minimum legal drinking age (MLDA) will be evaluated for any association with: age of initiation of drinking, amount of underage binge drinking, legal age binge drinking, underage attitudes, and legal age attitudes.

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In recent years, drinking among adolescents has become a growing concern. Many young people are drinking to excess, and even more disturbing, binge drinking. In the United States, binge drinking is defined as drinking four or more drinks for women and five or more drinks for men in two hours and bringing the blood alcohol level to .08 (NIAAA, 2004). A shocking 90% of all alcohol consumed by underage drinkers in America is in the form of binge drinking (Underage Drinking Enforcement Training Center, 2005). In the United States alone, underage drinking is responsible for about 4,300 deaths due to car accidents per year alcohol poisoning, suicides, or other fatal injuries. Drinking in teens is not only an issue in America, but in many other

countries around the world. (Hibell & Guttormsson, 2011; Rehm et al., 2004; Youth Central. n.d).

Drinking norms vary globally (Heath, 1982). People from countries such as those that produce mainly wine, such as France and Italy, have been found to drink more frequently, while those from Nordic countries that produce hard liquor, such as Finland, Norway, Iceland, and Sweden, drink less frequently, but drink in larger quantities (Hibell et al., 2004). People living in beer countries, like Ireland and Denmark, are likely to drink more frequently and in large consumptions (Hibell et al., 2004). There is also a correlation between the amount of drinking and risk perception associated with drinking between countries (Morgan et al., 1999). Those from countries such as Romania, Portugal, and Italy perceive drinking to have negative consequences, such as getting a hangover or getting sick, and

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report drinking less (Jarvinen & Room, 2007). On the other hand, people in countries that drink in order to feel relaxed or happy, like Denmark, Ireland, and the UK, are found to drink more in a sitting (Jarvinen & Room, 2007). Perceptions such as these often influence how much, and how often an adolescent drinks (Jarvinen & Room, 2007), and many drinking habits are developed through cultural norms.

Different countries consume more or less amounts of alcohol based on what that country/society deems as “normal” (Jarvinen & Room, 2007). There are several countries where teens seem to have a relaxed attitude towards drinking. For example, Lalander’s (2007) study found that teens from Sweden see alcohol as a way of relaxing and breaking away from the everyday stresses of life. Swedish young adults has been seen to have a lifestyle directed towards getting drunk (Lalander, 1997). As a result, these teens drink frequently and consume a large amount of alcohol in order to escape reality. They also drink as a way of showing they are entering adulthood, but simultaneously protesting adulthood by breaking the rules (Lalander, 1997). Similarly, Coleman and Cater (2005) surveyed teenagers from the United Kingdom and found that they view binge drinking as something that is normal. These teens like to emphasize the positive effects from drinking, such as socializing, making friends, and blocking out the negatives in their lives. Unfortunately, the UK and Sweden are not the only regions in which adolescents view alcohol in this matter. Adolescents in Norway, Denmark, and Finland all had similar attitudes that viewed binge drinking as normal and freeing (Beccaria & Sande, 2003; Jarvinen, 2007). On the other hand, Italy’s youth reported the opposite, saying that their goal for intoxication was to experiment without losing control (Beccaria & Sande, 2003). They also said that drinking to such degrees of drunkenness was a display of bad behavior (Beccaria & Sande, 2003). But in recent years, as parents from some countries like Italy allow their child to drink in their home, binge drinking has risen (Laghi, Lonigro, Baiocco, & Baumgartner, 2013). While the idea raises controversy, drinking wine underage in Italy is customary and quite common. While no causation interference can be made between allowing a child to drink underage and binge drinking, binge drinking among adolescents has increased rapidly in recent years (Gallimberti et al., 2011).

Teenage consumption of alcohol can cause a considerable amount of adverse effects on not only the consumer, but also on society around them. Drinking to excess can cause issues in school that may result in numerous absences or poor grades (CDC, 2014). Social problems with friends

and lack of participation in activities are also correlated with drinking (CDC, 2014). Aside from social problems, drinking also has an effect on the physical well being of an adolescent. One can become ill from drinking too much, causing hangovers, alcohol poisoning, or even death. Drinking underage has also been shown to increase the risk for drinking problems later in life (CDC, 2014). Unwanted sexual activity, memory loss, poor decision making, interference of healthy brain development, and introduction of other, more harmful drugs have all been associated with drinking in excess (CDC, 2014).

Adolescents in European countries have the highest alcohol consumption worldwide (Rehm et al., 2004). In 2011, more than 40% of young adults in Europe reported binge drinking at least once a week (Committee on National Alcohol Policy and Action, 2014). In the United Kingdom, nearly 85% of underage drinkers have reported drinking in the past 12 months; a rate higher than average when compared to the rest of the European Union (79%) (Hibell & Guttormsson, 2011). Israely (2009) reports that 34% of surveyed 11-year olds in Milan, Italy has a problem with alcohol, specific problem were not given. Reports from Australia state that at least one teenager dies each week, while at least 60 teens are hospitalized weekly as a result of binge drinking (Youth Central, n.d). Not only is alcohol the most recreationally used drug in Australia, but is also Australia’s leading cause of death in teens. To make matters worse, among 16 and 17 year olds in Australia, one in five teens admitted to binge drinking (Youth Central, n.d).

In effort to reduce these dangerous drinking habits, along with the possibly detrimental consequences, almost every country around the world, has passed drinking laws, putting into effect, minimum legal drinking age (MLDA). The United States has the highest MLDA of any other country, at 21 years old. The reason for their high MLDA is because of the studies that have been conducted on the effects of alcohol on the teenage brain (National Health and Medical Research Council, 2009). Research has found that alcohol affects the hippocampus, the area of the brain responsible for memory and learning (National Health and Medical Research Council, 2009). Teens who drink heavily can destroy the hippocampus, which can lead to reductions of the structure by 10%. The prefrontal cortex is also negatively affected by alcohol. In a teenage brain, the prefrontal cortex is not fully developed; the prefrontal cortex is associated with judgment and decision-making (National Health and Medical Research Council, 2009). When alcohol is introduced into the system, physical changes can be made to this area, such as shrinking of the lobe.

Cognitive thought is also affected when the prefrontal cortex is distorted due to alcohol (National Health and Medical Research Council, 2009). Many countries in Europe have a MLDA of 18 years old, but can be as low as 16 years old (ICAP, 2010). These differences between countries have given rise to many questions as to which MLDA is most effective. Studies in the United States have shown that MLDA has been the most successful underage drinking control effort to date (Saylor, 2011). The same study also found that once New Zealand lowered their drinking age from 20 to 18 years old in 1969, the number of alcohol-related crashes and injuries increased (Saylor, 2011). Similarly, Wagenaar and Toomey (2002) found an inverse relationship between minimum legal drinking age and alcohol consumption and alcohol related crashes in the U.S. Higher drinking ages, along with stronger alcohol control policies, were associated with lower weekly drinking (Wagenaar & Toomey, 2002). However, higher drinking ages have led to more occasions of binge drinking (Gilligan, Kuntsche, & Gmel, 2012). Countries with lower MLDA feel that perhaps they are protecting their youth by introducing them to alcohol at a lower age (Laghi et al., 2013). By exposing them to alcohol at a young age, teens will be able to experience the effects of drinking. This information raises some questions, such as: “Does a minimum legal drinking age have an effect on how responsibly a teen drinks?” and “Are there more factors to how a teen handles their alcohol consumption besides MLDA, such as peers, parents, and their society?” Regardless of these answers, teen drinking, both underage and legally, is an issue.

In order to decrease the amount of alcohol teens drink, one must understand what influences them drink in the first place. Peers are a major factor into how much a teenager drinks, or does not drink. In fact, Sale, Soledad, Springer, and Turner (2003) found that peer attitudes and behaviors are the strongest influences on substance abuse. Adolescents who have peers that drink heavily are more likely to drink heavily as well, in order to “keep up” with their friends (Gallimberti et al., 2011). However, due to adolescents’ misconstrued perceptions, their friends may appear to be drinking a lot more than they actually are. Teenagers also believe that their classmates are drinking on weekends, therefore drinking themselves is considered “normal” (Gallimberti et al., 2011). Teenagers are likely to adopt the same habits and attitudes as their friends in order to fit in (Gallimberti et al., 2011). Research supports that a teens’ alcohol consumption is associated with the amount of alcohol their friends drink (Bot, Engels, Knibbe, & Meeus, 2005). This association is so strong that

not only does it affect the teen at that time, but also affects him/her up to six months later (Bot et al., 2005). Bot et al. (2005) also states that peer influence may be stronger as one gets older because drinking becomes more frequent. Not only are teens drinking in order to keep up with their friends, but they are also drinking to possibly make new friends (Bot et al., 2005).

Parents also influence a teen’s drinking. Parents may not realize, but their children notice how much they drink and will likely emulate the same drinking habits (Duncan & Strycker, 2006). Parenting styles can also play a role in how much one drinks (Laghi et al., 2013). A lack of parental involvement and monitoring, coupled with harsh and inconsistent consequences are strong indicators that teens will be more likely to rebel, and therefore drink more (Stormshak, Bierman, McMahon, Lengua, & Conduct Problems Prevention Research Group, 2000). In contrast, parents who were seen as warm and involved are more likely to have kids that have attitudes that are more positive towards drinking, meaning they do not drink to get drunk (Laghi et al., 2013).

Even though there are several studies on teenagers and binge drinking, no research has focused specifically on the effect of MLDA on drinking initiation, attitudes on drinking, and the long-term effects of teenage binge drinking. The current study will concentrate on:

- Drinking initiation out of parental supervision (with peers)
- Drinking initiation with parental supervision
- Underage binge drinking
- Legal age binge drinking
- Underage attitudes
- Legal age attitudes
- Drinking patterns at age 26
- Drinking attitudes at age 26

Underage drinking, more specifically binge drinking, has recently been on the rise and leading to many fatal accidents (CDC, 2014). Thousands of deaths each year could be prevented if teens knew how much is too much. By having 10,000 participants answer questions regarding their drinking habits during their adolescent years, the results will allow many people to see the alarming rates of underage drinking. The findings of this research will be significant to many groups of people such as parents, teens, and even policymakers. These groups around the world will be more aware of this epidemic, which will raise questions as to which MLDA is most effective. Comparative data from countries with different minimum legal drinking ages will allow these

groups to see a correlation between the legal drinking age and underage drinking rates through graphs and charts that will be made.

PROPOSED METHOD

Study Design

A 13-year longitudinal study is proposed to study 10,000 participants all beginning at the age 13 in 20 different countries varying in minimum legal drinking ages. In this study, the effect of the minimum legal drinking age (MLDA) will be evaluated for any association with: age of initiation of drinking, amount of underage binge drinking, legal age binge drinking, underage attitudes, and legal age attitudes. It is hypothesized that the younger the minimum legal drinking age is in a country, those underage teens will consume more alcohol. Participants will complete the same survey each month, starting in September, answering questions about their drinking habits until they are 21 years old. Results from this survey will be analyzed and compared in several ways to show similarities, differences, and correlations among different groups. After these results are evaluated, another survey will be given five years later, at 26-years old. During these five years, participants will live their lives as they please. The purpose of this additional survey is to monitor the participants' drinking habits as they become adults. This extra survey will also see if a country's minimum legal drinking age has an effect on their drinking later on in life.

Participants

A total of 10,000 participants, 13 years old, will be recruited for this study; 500 participants from each country listed will participate in the study. These participants will be selected using convenience sampling, from middle schools in 20 different urban cities within the listed countries (one city per country) all with various minimum legal drinking ages (MLDA). Participants will need the consent of their parents to participate in the study. An incentive of \$15, or equivalent, will be given to participants each year they are involved in the study. The participants in this study will be recruited from: Armenia (no MLDA), Greece (no MLDA), Morocco (no MLDA), Denmark (16 MLDA), Germany (16 MLDA), Italy (16 MLDA), Portugal (16 MLDA), Australia (18 MLDA), England (18 MLDA), Finland (18 MLDA), France (18 MLDA), Ireland (18 MLDA), New Zealand (18 MLDA), Sweden (18 MLDA), Spain (18 MLDA), Canada (19 MLDA in majority of the country), Iceland (20 MLDA), Norway (20

MLDA), Indonesia (21 MLDA), and United States of America (21 MLDA) (ICAP, 2010).

Procedure

A total 500 participants from each country will be involved in this 13-year longitudinal study. Every month, participants will fill out an online survey and email the survey to the researcher. The survey will include questions about how often the participant drinks, how much he/she drinks in a sitting, what type of alcohol he/she consumes, after how many drinks he/she stops after, and what drives him/her to drink (Appendix). If a participant has not had any experience of drinking, they will still be included in the study. This will allow the researcher to see at what age the participant starts to drink. A descriptive analysis will be conducted for each year, as well for the first eight years of the study, for each country. The analysis will also be conducted for countries that are culturally similar and for countries that vary in MLDA. For example, beer countries such as Germany (16 MLDA) and Ireland (16 MLDA) will be compared to see if MLDA and/or cultural norms play a role in drinking rates.

CONCLUDING REMARKS

Significance

The benefits that may derive from this study are numerous. Parents, teens, and policymakers will all receive awareness from the results. Teenagers will be more conscious of the influences around them and the consequences that result in making poor decisions. They may give more thought to which friends they chose and where they spend their time. Parents may think twice before allowing their teens to drink at home (ex. glass of wine at dinner) or drinking themselves, due to the power it has upon their own adolescents. They may also want to consider setting stricter rules with the intention of keeping their children safe. In addition, parents could have a meeting and set boundaries, such as where their children are allowed to go or to make sure there is a parent home at all times. Parents can make sure that their teens have other fun options that do not involve drinking. The results from the study will allow parents to become more informed about the realities and dangers of teen drinking, as well as the pressures that teens are dealing with in today's society. Finally, policymakers may reanalyze the MLDA laws that are set in their countries and decide if they are effective. If the laws are not effective, ideally policymakers can use these

results to find ways to modify them. Another way policymakers could benefit from this research is by setting stricter laws in establishments that serve alcohol to minors. Understanding the attitudes that adolescents have on drinking will allow others to better come up with ways to keep teenagers safe; this study will expectantly provide various insights to do so.

Limitations

There are several limitations in this research. The first, and possibly the most validity-threatening limitation, is dishonesty of the participants. Some participants may not be honest in their answers due to fear of consequences. Parents would have to give consent that they are not allowed to see their child's survey answers. Parental consent may not always be given, which would make it more difficult for participants to be recruited. Participants may unintentionally misreport the truth because they may not remember or remember incorrectly. Since alcohol is going to be involved, it is possible the participants will have their memory affected. Participants may also skew their answers based off what they think the research would want to hear. Another limitation that this proposal presents is participant dropout rate; since this will be a longitudinal study, participants may no longer want to partake in the study as they grow older. Additionally, a loss of contact, such as a move or change in contact information, with the participant may occur. Lastly, a participant's normal drinking habits may change after starting the study, which would skew the results. These limitations would make the sample size smaller, thus preventing the results from accurately representing the population.

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Appendix A

Alcohol Consumption Questionnaire

1. **What is your age (in years) ?**
 2. **What country do you live in?**
 3. **What is your gender?**
 - a. Female
 - b. Male
 4. **Have you ever consumed alcohol?**
 5. **At what age did you start consuming alcohol?**
 6. **Why did you start consuming alcohol? (Circle all that apply)**
 - a. I have not consumed alcohol before
 - b. Peer pressure Curiosity
 - c. You felt like it (Bored)
 - d. Influence of an adult
 7. **Do you feel you are a normal drinker?**
 - a. Yes
 - b. No
 8. **How often do you drink?**
 - a. Every day
 - b. Once a week
 - c. Only on weekends
 - d. 3-5 times a week
 - e. Special occasions
 9. **Do you engage in binge drinking? (4+ drinks for girls/5+ drinks for boys)**
 - a. Yes
 - b. No
 10. **Estimate the number of hours you drank the last time you socialized**
 - a. None
 - b. 1 hour
 - c. 2-3 hours
 - d. 4-5 hours
 - e. More than 5 hours
 11. **How many drinks did you have during that time?**
 - a. 0
 - b. 1-2
 - c. 3-4
 - d. 5-6
 - e. 7-9
 - f. More than 9
 12. **In the last two weeks, how many times have you had 5 or more drinks at a sitting?**
 - a. 0
 - b. 1-3
 - c. 3-5
 - d. 5-7
 - e. More than 7 times
 13. **Do any of your friends drink?**
 - a. Yes
 - b. No
 14. **How many days a week do you think your friends drink?**
 - a. 0
 - b. 1-2 days
 - c. 3-4 days
 - d. 5-6 days
 - e. Everyday
 15. **How many days a week do you think the typical student at your school drinks?**
 - a. 0
 - b. 1-2 days
 - c. 3-4 days
 - d. 5-6 days
 - e. Everyday
- Answer the following questions based on your behaviors in the last month:**
16. **Were you always able to stop drinking when you want to?**
 - a. Yes
 - b. No
 17. **Did you drink to get drunk?**
 - a. Yes
 - b. No
 18. **Have you passed out or experienced memory loss due to drinking? (blackout)**
 - a. Yes
 - b. No
 19. **Have you had unprotected sex while under the influence of alcohol?**
 - a. Yes
 - b. No



- 20. Were you sexually taken advantage of while under the influence of alcohol?**
- Yes
 - No
- 21. Have you been sexually taken advantage of someone while under the influence of alcohol?**
- Yes
 - No
- 22. Did you drive after drinking?**
- Yes
 - No
- 23. If yes to the previous question, how many drinks did you have before you drove under the influence?**
- Yes
 - No
- 24. Do you drink to feel good/ to function better?**
- Yes
 - No
- 25. Do you have a history of alcohol or drug problems in your family?**
- Yes
 - No
- 26. How often do your parents/guardians drink?**
- Once a week
 - 1-2 times a week
 - 3-4 times a week
 - 5 or more times a week
- 27. Have you become violent or aggravated while drinking?**
- Yes
 - No
- 28. Do you drink to escape pain, either physical or emotional?**
- Yes
 - No
- 29. Did you drink before noon?**
- Yes
 - No
- 30. Did you get into any fights while drinking?**
- Yes
 - No
- 31. Was your drinking a reason to lose a relationship whether it be a friend or girlfriend/boyfriend?**
- Yes
 - No
- 32. Have you skipped or missed class because of drinking?**
- Yes
 - No
- 33. Have you ever gotten in trouble at work because of drinking?**
- Yes
 - No
- 34. Has your drinking caused problems at home?**
- Yes
 - No
- 35. Did you feel guilty about your drinking?**
- Yes
 - No
- 36. Have you sought help for your drinking?**
- Yes
 - No
- 37. Have you ended up at the hospital as a result of your drinking?**
- Yes
 - No
- 38. Have you been arrested, even for a few hours because of drunken behavior?**
- Yes
 - No
- 39. Have you been arrested for drunk driving?**
- Yes
 - No
- 40. What is the driving age in your country?**
- 41. Has a relative, friend, or doctor ever been concerned about your drinking or suggested you cut down?**
- Yes
 - No



42. Have you ever consumed illegal drugs (including marijuana)? If so, which drugs?