

# Underage Alcohol Sales—It Only Takes a Minute: A New Approach to Underage Alcohol Availability

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**ABSTRACT. Objective:** Because minors generally report higher accessibility than one would expect on the basis of the “compliance rates” established by researchers (the percentage of stores that comply with age limits for sales of age-restricted products such as alcoholic beverages), we propose a new method to better depict the availability of age-restricted products for minors as an alternative to the compliance approach, which in our view is too narrow. **Method:** Underage mystery shoppers were assigned to buy alcohol in a store of their preference, using any (legally allowed) purchase method. The time required to buy alcohol was the main outcome variable. As a benchmark, the time required to buy

soft drinks was recorded. **Results:** All underage mystery shoppers succeeded in buying alcohol, which means 100% availability. On average, buying alcohol took less than 10 minutes (including travel and shopping time), which was 2 minutes more than when purchasing soft drinks. **Conclusions:** Compliance at an outlet level can misrepresent the actual availability to minors. Both the proposed approach to availability and a new approach to age validation indicate that the general assumption that the traditional methods of age validation can effectively prevent the commercial availability of age-restricted products to minors should be seriously questioned. (*J. Stud. Alcohol Drugs*, 74, 423–427, 2013)

ALCOHOL CONSUMPTION AMONG adolescents is considered a major public health issue because the early use of alcohol is a strong predictor of alcohol consumption in adult populations and consumption-related problems (e.g., Grant et al., 2006). For this reason, most societies have imposed legal age limits to restrict the sales of risk substances, like alcohol, to people under a certain age. Since 1992, researchers have studied the effectiveness of legal age limits by measuring compliance rates at the level of alcohol outlets. Because self-reported data by vendors tend to overestimate actual compliance, the mystery shopping method (also known as decoy operations) is used to determine compliance with age limits regarding the sale of alcohol, resulting in compliance rates representing a percentage of shops complying with this legislation (Britt et al., 2006; Freisthler et al., 2003; Gossett et al., 2007; Preusser and Williams, 1992; Preusser et al., 1994; Wagenaar et al., 2005; Willner et al., 2000; Wolfson et al., 1996).

These compliance rates on the outlet level, however, cannot simply be used to represent actual availability to minors. Consistent (i.e., predictable) noncompliance by cashiers, for example, can lead to compliance rates totally misrepresenting the actual commercial availability of alcohol to minors. Minors may very accurately know which stores, types of stores, or cashiers consistently do not comply with age limits, enabling them to buy alcohol by simply circumvent-

ing the compliance that they would encounter elsewhere. Availability in that case is 100%. Also, minors without this knowledge may challenge a compliance level by conducting more than one purchase attempt in order to succeed. For instance, in a town with a 50% compliance level, if minors randomly choose an outlet to conduct a purchase attempt (which is somewhat artificial) and when the binary chance of success is the same for all cashiers (which is most likely not the case), these minors have a 50% chance of buying alcohol at the first outlet or cashier they visit. When they do not succeed and decide to try again in a second outlet or through another cashier (with again a 50% chance of success), the overall success rate increases to  $1 - (0.5 \times 0.5) = 75\%$ , and so on.

In this article, we propose a new method to determine the availability of age-restricted products to underage customers that incorporates the predictability of noncompliance as well as the number of purchase attempts minors conduct. By developing a new research protocol that allows mystery shoppers to act as minors do in real life, we were able to measure the commercial availability of alcohol in the most realistic way. Instead of a percentage score as an outcome variable (compliance level), we introduce the time required to buy alcohol as the new outcome variable. To compare the new alcohol availability data with established compliance rates, we also collected data in the conventional way.

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## Method

### Research design

Data were collected in two regions in the Netherlands during a 3-week period. During Week 1, compliance on an

outlet level was measured following the traditional compliance protocol with four mystery shoppers (two boys and two girls, 14–15 years old) in a corpus of 203 alcohol outlets. During Weeks 2 and 3, availability was measured by 20 different mystery shoppers (10 boys and 10 girls) performing a total of 198 alcohol purchase attempts. Availability was measured in terms of effort (time required). As a comparison, soft drinks were also purchased in Weeks 2 and 3. Both the traditional and the new protocol were approved by the Ethical Commission of the Faculty of Behavioral Sciences of the University of Twente.

#### *Sampling of regions and adolescent mystery shoppers*

For the region selection, we have used three criteria: (a) no alcohol projects or campaigns aimed at compliance were active at the moment of data collection, (b) no alcohol projects aimed at compliance were scheduled for the near future, and (c) all five population density levels were present in the region (1 = *low density*, 5 = *high density*). This resulted in four possible regions, of which we selected two, also based on travel distances.

To recruit 24 underage mystery shoppers (12 boys and 12 girls), we contacted a school in each region. We asked teachers to select average-looking 14- to 15-year-old students who might be interested in participating. Students who were interested were sent an e-mail in which they were asked to submit their height and weight, two photographs, school schedules, and their knowledge of the neighborhoods in the research area. Potential mystery shoppers were sent a map containing 100 (Region 1) and 120 (Region 2; slightly larger) marked squared areas, and they were asked to indicate in which fields they were familiar with streets, shops, schools, sports clubs, and public buildings. All students who indicated at least 10 squares and were within the national 95% confidence interval on height and weight (and also looked like “average” teens) were included as potential mystery shoppers. Four mystery shoppers (1 boy and 1 girl in each region) were randomly selected for the first week (measuring compliance on outlet level), and 20 mystery shoppers were selected for the following weeks (measuring availability with the new method). All mystery shoppers obtained written parental consent and received some financial compensation for their participation.

#### *Procedures*

*Compliance on the outlet level.* In both regions, all off-premise alcohol outlets were indexed. This resulted in a list of 111 chain supermarkets, 38 liquor stores, and 159 cafeterias (small, privately owned fast-food restaurants). Within each of the three sectors, we randomly selected 69 supermarkets, 38 liquor stores, and 99 cafeterias in which to conduct alcohol purchase attempts ( $N = 203$ ). Within

each alcohol outlet, the mystery shoppers entered the store alone, picked up or asked for a beer, and subsequently tried to purchase the alcoholic beverage. The mystery shoppers were instructed to state that they were 16 years old (the legal age limit for beer in the Netherlands) when asked for their age. When cashiers asked for an identification (ID) document, the mystery shoppers showed their real ID (showing their date of birth). This protocol is in line with all our prior studies on age limit compliance (Gosselt et al., 2007).

*Alcohol availability to minors.* In both regions, for all 20 participating mystery shoppers, 10 squares were randomly selected, and within each square, the closest public address in the center of the square was determined and registered as a place of departure (POD). Subsequently, for all mystery shoppers, a map with 10 PODs was constructed. Because some squares were indicated more often and a random selection was made, there was some overlap in the PODs.

Before the visits, a trained adult researcher picked up the mystery shopper at his or her home and completed a research training session in the presence of at least one parent. The mystery shoppers were told that they were going to buy off-premise alcoholic beverages (and soft drinks) as quickly as possible, and they were explicitly instructed to operate within Dutch laws (respecting traffic rules, respecting no-bicycle areas, not to use false IDs, not to be aggressive and/or intimidating with sales personnel, not to steal, and not to ask others to buy the product). After the instructions, the researcher and the mystery shopper traveled by bicycle to the first POD, after which the mystery shopper was asked to buy an alcoholic off-premise beverage. The specific outlet, the type and quantity of beverages, and the cashier were chosen by the mystery shopper. For the purpose of comparing the time required to buy alcoholic beverages and soft drinks, a soft drink purchase was also carried out from the first and sixth POD (Table 1). The accompanying researchers were explicitly instructed that all decisions had to be made by the underage mystery shoppers. If an alcohol purchase attempt failed, they were allowed to travel to the next outlet to complete the purchase attempt (or to a third or fourth outlet). Also, the mystery shoppers were allowed to continue the purchase attempt from the next POD.

The following data were registered by the researchers: travel time (from POD to outlet), shopping time (from shop entrance until shop exit), and travel distance (from POD to outlet). Furthermore, after each purchase attempt, the mystery shopper registered and reported some outlet characteristics and their reason(s) for choosing the specific outlet.

After all data were collected, a debriefing session was organized covering two topics: (a) evaluation of the project, including a further exploration of reasons for the outlet selection, and (b) a professional education session on the negative consequences of alcohol use.

TABLE 1. Research schedule

Alcohol purchase attempt	POD	Type of beverage
	1	Soft drink <sup>a</sup>
1	1	Alcohol <sup>b</sup>
2	2	Alcohol
3	3	Alcohol
4	4	Alcohol
5	5	Alcohol
	6	Soft drink
6	6	Alcohol
7	7	Alcohol
8	8	Alcohol
9	9	Alcohol
10	10	Alcohol

<sup>a</sup>Off-premise soft drinks are available at supermarkets, liquor stores, fuel stations, vending machines (shopping malls, sports clubs, schools, retail stores), retail, take-away restaurants, day and week markets, food stands (e.g., snacks), paper stands; <sup>b</sup>alcoholic off-premise beverages are available at supermarkets, liquor stores, some take-away restaurants, a retail chain [HEMA], and some food stores (e.g., Chinese supermarkets).

**Results**

*Alcohol availability*

In total, the 20 underage mystery shoppers conducted 198 valid alcohol purchase attempts (two data forms could not be analyzed) and visited 236 different alcohol outlets. All mystery shoppers were able to buy alcohol. Of the 198 attempts, 173 were successful (150 times in the first outlet visited and 23 times in a subsequent outlet).

The time to buy the first unit of alcohol of the day, on average, turned out to be less than 12 minutes (11 minutes and 54 seconds), consisting of travel time ( $M = 1.2$  kilometer [or 0.75 miles]) and time spent in the outlet. The majority of the mystery shoppers (12 of 20) needed less than 10 minutes to buy their first unit of alcohol.

No mystery shopper needed to visit more than three alcohol outlets in order to buy the first unit of alcohol of the day, representing alcohol availability to minors of 100%. As also shown in Table 2, the average time required to buy alcohol in all 173 cases of noncompliance was 9 minutes and 51 seconds. When the mystery shoppers were successful in the first outlet, the average alcohol purchasing time turned out to be shorter (8 minutes and 11 seconds), whereas shopping at two or more outlets took just over 20 minutes.

*Mystery shoppers' reasons for outlet selection*

Both on the data form that was completed after each alcohol purchase attempt and during the debriefing sessions, the mystery shoppers were asked their reason(s) for choosing specific outlets. Of the 236 outlets visited during the 198 alcohol purchase attempts, about a quarter of all outlets (27%) were selected because of positive outcome expectancies.

TABLE 2. Times and distances for all successful alcohol purchases

Variable	Time or distance
Successful alcohol purchase attempt in first outlet ( $n = 150$ )	
Average travel time	4:38
Average shopping time	3:33
Average total time	8:11
Average distance, meters	924
Successful alcohol purchase attempt in subsequent outlet ( $n = 23$ )	
Average travel time	11:05
Average shopping time	9:21
Average total time	20:26
Average distance, meters	1.994
Total ( $N = 173$ )	
Average travel time	5:28
Average shopping time	4:20
<b>Average total time</b>	<b>9:51</b>
<b>Average distance, meters</b>	<b>1.068</b>

Note: Time is in minutes:seconds. (**Bolded** numbers indicate the main outcome referred to in the main text.)

Also, in the debriefing sessions, 5 of the 20 mystery shoppers indicated that they did not select specific supermarket and liquor store formats because they expected not to succeed there. Additionally, the chance of coming across family and friends, possibly present as customers, was a reason to avoid selecting a particular outlet. All but one mystery shopper avoided outlets that looked too crowded because they expected that bystanders would intervene, reducing the chance to succeed. One mystery shopper used the opposite strategy by visiting busy outlets only and acting as if she could not find her ID when asked for identification.

*Alcohol availability versus soft drink availability*

To compare the availability of alcoholic drinks and soft drinks, each mystery shopper was instructed to buy two soft drinks (starting from the first and sixth POD). A comparison, in Table 3, shows that the total average purchase time for soft drinks is about 2.5 minutes shorter than the time required to purchase alcohol,  $t(94.6) = -3.39, p = .001$ . This difference is related to travel time only,  $t(105.2) = -2.89, p = .005$ , as a result of longer travel distances to reach an alcohol outlet or because more than one outlet needed to be visited to buy alcohol,  $t(96.2) = -2.34, p = .02$ . The time spent in an outlet for soft drinks and alcoholic beverages did not differ significantly,  $t(205) = -1.90, p = .06$ . This is remarkable because, for purchases involving alcohol, in 23 cases more than one outlet was visited, and in these cases shopping times were combined.

*Compliance versus availability*

When comparing the compliance on an outlet level (Week 1: 203 purchase attempts) with the availability of alcoholic

TABLE 3. Alcohol availability versus soft drinks availability

Variable	Soft drinks ( <i>n</i> = 40) <i>M</i> ( <i>SD</i> )	Alcoholic drinks ( <i>n</i> = 173) <i>M</i> ( <i>SD</i> )
Average purchase time	07:06** (03:47)	09:51** (06:47)
Average travel time	03:43** (02:49)	05:28** (05:11)
Average shopping time	03:16 (02:08)	04:20 (03:15)
Average travel distance, meters	789* (565)	1.068* (999)

Notes: Time is in minutes:seconds. Independent sample *t* test: \**p* < .05; \*\**p* < .01.

beverages to minors (Weeks 2 and 3: 20 mystery shoppers), it becomes clear that the established compliance level on an outlet level did not accurately depict alcohol availability to minors. Despite compliance of 18.7% (representing a noncompliance of 81.3%), alcohol availability was 100% because all underage mystery shoppers were able to buy alcohol,  $\chi^2(1) = 4.51, p = .02, n = 223$  (Table 4).

### Discussion

By applying our new protocol, we were able to show that compliance rates can misrepresent actual alcohol availability. While following the traditional compliance approach, we found that, in only 38 of the 203 outlets visited, alcohol was not sold to the underage mystery shoppers, representing a compliance level of 18.7%. In the availability approach, all (*N* = 20) underage mystery shoppers succeeded in buying alcohol within three purchase attempts and in a relatively short time span, showing an actual availability of alcohol of 100%.

For practical (and financial) reasons, we engaged 20 mystery shoppers only, each conducting 10 alcohol purchase attempts. In future studies, a larger sample of shoppers is recommended, with each shopper fulfilling only one purchase. It may also be considered to let them start at their home instead of from a random POD, which we expect will lead to (availability) results with a better variance. A better variance will also allow thorough analyses of possible (non) compliance predictors, such as the number of outlets available, gender and age of cashiers, or preconceived knowledge of mystery shoppers. In the Netherlands, only the sales of alcohol to minors is illegal, not the purchase (attempt) by minors. When designing follow-up studies in other countries, one should take into account that purchase attempts by minors might be illegal. If so, the method applied in this study might not be applicable, and collaboration with the police or relevant authorities might be necessary. Alternatively, the use of older mystery shoppers who look younger (and whose estimated ages are validated) could be considered.

The misrepresentation of the actual availability of alcohol may lead to misjudgment of the effectiveness of measurements to prevent commercial alcohol availability to minors. We therefore have designed a model to better understand the

TABLE 4. Compliance versus availability

Variable	<i>n</i>	Non-compliance	Compliance
Compliance level	203 outlets	165 (81.3%)	38 (18.7%)
Alcohol availability	20 mystery shoppers	20 (100%)	0 (0%)

availability of age-restricted products to minors in countries making use of legal age limits (see formula below):

$$A = 100\% - (C^X \times K).$$

The availability to minors (*A*; percentage) depends on compliance (*C*; percentage variable), the number of purchase attempts required to obtain the product (*X*; number), and a factor that represents the predictability of noncompliance (*K*; dichotomy variable with 0 = *knowledge by minors where noncompliance consistently occurs turns out to be accurate* and 1 = *no, or no accurate knowledge by minors where noncompliance consistently occurs*, i.e., a random noncompliance).

Referring to  $C^X$ , if in a town with a compliance level (*C*) of 50% a minor randomly selects one ( $X = 1$ ) vendor to attempt to buy alcohol, the rate of success will also be 50% ( $A = 100\% - [0.5^1 \times 1] = 50\%$ ). If that minor attempts to purchase alcohol in two stores, however, the rate of success increases to 75% ( $A = 100\% - [0.5^2 \times 1] = 75\%$ ), and so on.

Referring to *K*, if a minor knows which outlet or which cashier does not comply (and that knowledge is accurate;  $K = 0$ ), compliance in all other stores does not matter, and a single purchase attempt will suffice to obtain alcohol ( $A = 100\%$ ).

This formula illustrates that both the level and predictability of noncompliance and the number of purchase attempts that minors conduct are crucial factors to consider, as they all affect the availability of alcohol to minors. The formula also explains cases in which youths report easy access to alcohol even when compliance is high. Minors' preconceived knowledge regarding where consistent noncompliance occurs can be accurate and may lead to minors buying alcohol, especially in the current age in which youths are connected through (social) media and knowledge about where age limits are consistently neglected can be easily spread.

Because noncompliance is caused by deficiencies in age validation, the availability of alcohol to minors can be directly related to methods of age validation that generate too much and/or a predictable noncompliance. In our view, therefore, only methods of age validation that reach both a high level of compliance and an unpredictable noncompliance can effectively prevent the commercial availability of alcohol and other age-restricted products to minors.

This combination of high compliance and unpredictable noncompliance is demonstrated in a specific method



of remote age validation in which age verifications are not performed by vendors but in a remote validation center where trained officers approve or disapprove age-related transactions based on images of customers (and/or their ID) captured by cameras at the checkout point. During the first compliance study, shortly after the introduction of this particular system, we observed a 96% compliance level. Equally important, this system randomly distributes incoming images from different stores among the remote officers (Van Hoof et al., 2010). Noncompliance is therefore not related to certain stores, as in the traditional methods of age validation, thus making it impossible for minors to know where or when noncompliance will occur.

This calls for a new rationale. Unmistakably, the traditional methods of age validation intrinsically lack a system that forces all the involved cashiers, in all stores, to consistently act both objectively and as the homogeneous group that the prevention of the commercial availability of age-restricted products to minors continuously requires. To compensate for these deficiencies, law enforcement is required; nonetheless, increased law enforcement never fully eliminates occurrence of noncompliance. However, a specific, central, and objective approach to age validation does not have all these drawbacks. Without the involvement of vendors, this type of approach leads to high compliance and systematically prevents any noncompliance that is predictable. This approach, therefore, allows law enforcement to efficiently allocate resources by using centralized monitoring along with checks of system presence in outlets rather than traditional law enforcement methods, which aim at the detection of illegal transactions.

Both this new approach to age validation and our new approach to availability indicate that the general assumption

that the traditional methods of age validation can effectively prevent the commercial availability of age-restricted product to minors should be seriously questioned.

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