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## An Experimental Test of Reward & Reminder as a Stand-Alone Program to Prevent Alcohol Sales to Underage Youths

Mark J. Van Ryzin , Jean Lee, and Anthony Biglan

Oregon Research Institute, Eugene, OR, USA

### ABSTRACT

Reward & Reminder has been a component of community-based preventive efforts against sales of substances (e.g., tobacco) to youths. To date, there has not been a randomized trial of Reward & Reminder as a stand-alone prevention program targeting youth access to alcohol. In this study, we address that gap. Data were collected as part of a randomized trial of a school- and community-based prevention program. Our analysis included 23 vendors in control communities and 33 vendors in intervention communities. We visited each vendor at least two times, and vendors in intervention communities received the Reward & Reminder protocol. Using McNemar's test, which evaluates the degree to which the outlets in each condition moved to a different cell in the contingency table from the first visit to the second (i.e., from *yes* to *no* or vice versa), we found that the control outlets did not change (all *p* values were non-significant). In contrast, the intervention outlets were significantly more likely to ask for identification ( $p < .05$ ) and significantly less willing to sell alcohol to young-looking project confederates ( $p < .05$ ); Asked for Age did not change. We conclude that Reward & Reminder could assist in preventing underage access to alcohol.

### KEYWORDS

adolescents; alcohol; prevention; Reward & Reminder

### Introduction

Although alcohol use starts among only a small percentage of youths during early adolescence, the percentage continues to increase as youths get older. Results from a recent national survey in the United States indicated that among eighth-grade students, only 12.2% had been intoxicated in the past year; by 12th grade, however, 47% of students had been intoxicated (Johnston et al., 2018). This escalation in alcohol use has both immediate and long-term implications for health and well-being (World Health Organization [WHO], 2014). Specifically, alcohol use before the age of 15 is a strong predictor of later abuse and dependence (Dawson et al., 2008; Hingson & Zha, 2009; Pitkänen, Lyyra, & Pulkkinen, 2005; Van Ryzin & Dishion, 2014), even when controlling for genetic and family influences and the actual number of years of use (Grant et al., 2005; Lynsky et al., 2003). In turn, problematic alcohol use is a key risk factor for injury and premature death, with nearly 10% of accidental deaths in the 15-to-29-year age group being attributed to alcohol (WHO, 2014). Alcohol abuse also confers greater risk of preventable diseases, such as cirrhosis of the liver, diabetes, and cancer (Rehm et al., 2009). In addition, alcohol use is often comorbid with other substances, such as tobacco, that can further harm individual health (Jackson, Sher, Cooper, & Wood, 2002). These negative health-related outcomes represent significant societal costs, making prevention of early adolescent alcohol use a vitally important goal.

One approach to underage use of alcohol and other substances is family-based prevention, which attempts to strengthen parental monitoring of youth behavior and improve family relations (for reviews and meta-analyses, see Kumpfer, Alvarado, & Whiteside, 2003; Lundahl, Risser, & Lovejoy, 2006; Smit, Verdurmen, Monshouwer, & Smit, 2008; Van Ryzin, Kumpfer, Fosco, & Greenberg, 2015; Van Ryzin, Roseth, Fosco, Lee, & Chen, 2016). Given the expense and complexity of these programs, and their difficulty in engaging parents (Leslie et al., 2016), more streamlined and/or direct approaches have been developed. For example, some community-based prevention programs attempt to directly limit youth access to alcohol and other substances. Sometimes called “compliance checks,” these programs employ undercover confederates (over the age of 21) who visit retail outlets that sell substances (e.g., convenience stores) and attempt to purchase without valid identification. In most programs, the “compliance check” is embedded in a range of other community prevention activities, such as training for store clerks, community organizing, and/or media attention to the issue of underage substance use (e.g., Grube 1997; Perry et al. 2002; Wagenaar, Toomey, & Erickson, 2005). Comparatively less research has been conducted on compliance check programs alone; limited research suggests that they have been effective at limiting youth access to alcohol and other substances (Lewis et al., 1996; Scribner & Cohen, 2001), although findings are mixed

and very few of these programs have been evaluated using a randomized trial.

One of the more well-known versions of the “compliance check” paradigm is the Reward & Reminder program (Embry, 2004). The name of the program is derived from the response to the purchase attempt, which is based upon the concept that positive reinforcement, delivered immediately, is more effective than sanctions or punishment. Specifically, depending on the outcome of the purchase attempt, the confederate either (a) *rewards* a clerk who does not sell or (b) *reminds* those who do sell that it is against the law to sell substances to underage youths and/or youths without valid identification. To further emphasize the reward aspect, the Reward & Reminder program calls for public recognition of the clerks and stores who refuse to sell.

Existing research finds that Reward & Reminder is effective in reducing the willingness of targeted retail outlets to sell tobacco products to youths (Biglan et al., 1996; Biglan et al., 1995). There is also some evidence that large-scale community-level interventions with multiple components that include Reward & Reminder can reduce youth alcohol use (Flewelling et al., 2013). Finally, there is limited evidence that Reward & Reminder may be able to reduce youth access to alcohol when implemented as a stand-alone prevention program (Moore et al., 2012), although this particular implementation did not involve an experimental design, so the results are not conclusive. To date, there has been no randomized trial of Reward & Reminder as a stand-alone program targeting youth access to alcohol, and thus there is not a strong basis for recommending Reward & Reminder to law enforcement organizations for large-scale implementation. In the current study, we attempt to address this shortcoming by conducting an experimental test of Reward & Reminder as a mechanism to reduce youth access to alcohol.

The findings from this study could not only inform law-enforcement efforts with regards to tobacco and alcohol, but also marijuana. As of mid-2018, the medical or recreational use of cannabis had been legalized in 30 U.S. states, plus the District of Columbia, and it is anticipated that more will follow. These laws allow for the establishment of retail locations or dispensaries, which must comply with the same laws regarding sales to minors as do retail outlets for alcohol and tobacco. Thus, if found to be efficacious, Reward & Reminder could also be used to limit sales of marijuana to minors.

Although Reward & Reminder was a component of a larger intervention, as in previous research (Flewelling et al., 2013), all of our community and law-enforcement efforts targeting youth access to alcohol occurred *after* the implementation of Reward & Reminder. Similarly, there were no community-initiated efforts occurring during our intervention that targeted youth access to alcohol. Thus, our data reflect only the impact of Reward & Reminder, and represent an unbiased test of its efficacy as a stand-alone mechanism targeting youth access to alcohol.

## Method

### Sample

Data for this manuscript were collected as part of a randomized trial of a school- and community-based prevention program called Youth Access (conducted in the state of Oregon) that is focused on counteracting peer influence in favor of substance use that is transmitted via social media. Research finds that adolescent Internet use is virtually universal in the United States. The Pew Research Internet Project reported that as of 2012, 95% of 12-to-17-year-olds were using the Internet (Pew Research Center, 2017). These developments have brought with them a concomitant increase in the extent to which young people are modeling and approving of problem behaviors via social media, including, in particular, the consumption of large and sometimes lethal amounts of alcohol. Since prevention researchers have thus far done very little to try to counteract these trends, the Youth Access project is evaluating ways of using social media to influence youths in ways that prevent alcohol use and promote more prosocial, developmentally healthy behavior. As part of this project, we implemented Reward & Reminder for retail alcohol outlets. The participating communities ( $N=8$ ) were matched by the size of the high school and randomized to condition (intervention versus control, four each; randomized by the first author using a random number generator). Overall, our sample included 26 vendors in control communities (i.e., communities that contained a control school) and 33 vendors in intervention communities (i.e., communities that contained an intervention school); however, of the 26 vendors in control communities, three were not targeted for follow-up since they were initially misidentified as retail outlets, so the final analytic sample included only 23 vendors in control communities. We visited each vendor at least two times, and vendors in intervention communities received the Reward & Reminder protocol. Implementation of Reward & Reminder began in August 2016 and was completed in December of the same year. The full protocol can be obtained from the second author.

### Procedures

*Phase 1: Community Participation and Endorsement.* During the first phase of implementation, project staff worked to secure community support for project activities. Presentations were made to local officials highlighting the community data on underage drinking and the increased risks of underage alcohol consumption. Community members were asked to support our project by signing on to a proclamation. The signed endorsements included acknowledgment from the law enforcement within each community, prosecutors for each city or county, and the state liquor commission. This was to ensure that the project was following the laws of the state and to ensure that law enforcement would be aware of our activities in their communities.

*Phase 2: Identification of Alcohol Outlets.* Alcohol vendors were selected from lists obtained from the Oregon Liquor

**Table 1.** Descriptive statistics (i.e., count of outlets).

Variable	Control		Intervention	
	Yes	No	Yes	No
1. Asked for Age				
Before	4	19	2	31
After	3	20	2	31
2. Asked for ID				
Before	20	3	21	12
After	17	6	30	3
3. Willing to Sell				
Before	3	20	11	22
After	5	18	1	31

Control Commission, Chamber of Commerce, State of Oregon, and Web-based searches. Our focus was on convenience stores, due to the easy accessibility of tobacco and alcohol (convenience stores are classified by the State of Oregon as stores that do not sell raw meat). All the convenience stores in each of the project cities or towns were included in the sample. If there were less than three convenience stores within the town limits, then small local supermarkets or grocery stores were included. The proximity and accessibility to youths of stores were also considered, which expanded the sample of businesses outside of the target community in situations where the target community was small and there were easily accessible vendors in adjacent communities.

*Phase 3: Education, Recruiting, and Training.* Notices were sent out by project staff to all the stores about project activities two to four weeks before store visits. These notices informed the stores of our activities and reviewed the state laws regarding the sale of alcohol. The stores in the intervention communities were sent additional information that included signs to post regarding the illegality of selling to minors, as well as a copy of the proclamation for their specific community. Stores were not informed about the presence of a randomized trial, and were not aware of being in an intervention or control community. Before all visits, law enforcement in each of the control and intervention communities received notices about when the visits would take place and received information about the store visit procedures.

The visits to the stores were designed to positively reinforce merchants for not selling alcohol to underage youths. The project staff recruited young-looking 21-to-25-year-olds to participate as assessors in the purchase attempt visits. We specifically recruited young-looking confederates so that they would, ideally, be more likely to prompt a request for identification. Photographs were taken of the young-looking recruits and staff would rate if they looked over or under the age of 21. The recruits rated as looking under the age of 21 joined the staff as employees and were assigned to be one of two purchase assessors as a part of a three-person team. The training of the purchasers included education about harms of alcohol and other substance use, ease in purchasing alcohol, and the elements of the Reward & Reminder protocol.

*Phase 4: Store Visits.* Teams of two purchase assessors and one team leader traveled to each store. The purchase assessors were instructed to leave their identification (ID) in

the car before entering the store, get a food item (such as chips or candy) and a six-pack of beer from the cooler, and bring purchases to the counter. One assessor was assigned as the primary, and this individual did all the talking and interacting with the store clerk; the second assessor was instructed to quietly observe the interaction and environment of the store. If the clerk agreed to sell the alcohol, the assessors were asked to say they had insufficient funds to purchase the alcohol and to only purchase the food item and leave the store. If the clerk asked for identification and/or refused to sell the alcohol, the assessors were again asked to only purchase the food item and to immediately leave the store. All assessors were instructed to answer all questions truthfully and, if asked for ID, to say that they didn't have their identification with them.

If the store visit was in an intervention community, a team leader would enter the store after the purchase assessors to observe the attempt-to-purchase interaction. After the purchase attempt was complete, the secondary assessor would signal to the team leader upon leaving the store whether the clerk checked ID and/or refused to sell. If the clerk was willing to sell alcohol, the team leader introduced himself or herself and provided a reminder about selling alcohol without proper ID, along with some tip cards of things to say if they didn't feel comfortable refusing to sell. If the clerk refused to sell alcohol, the team leader would introduce himself or herself and congratulate the clerk for checking identification for the purchase of alcohol. The clerk was then given a small reward and a packet of information celebrating their support of community efforts to keep alcohol out of the hands of underage youths. To help celebrate, the clerk was asked if he or she would be willing to have his or her picture taken and placed on websites and in press releases to the community news outlets promoting the good work of the clerks. Management at the stores received notices when their clerks received a reward.

## Measures

Project confederates used a paper form to document the outcome of each visit, which included an indication of the outlet's location, whether this was the first or second visit, and the clerk's behavior (i.e., whether he or she *asked for the purchaser's age*, whether he or she *asked for ID*, and whether he or she was *willing to sell*). Each outcome was recorded with a yes/no response.

## Results

Descriptive data are presented in Table 1. We initially conducted chi-square analyses to evaluate whether the intervention and control conditions were identical in terms of the measured variables at the first visit (i.e., before the Reward & Reminder had been delivered). We found that the two conditions were not different in terms of Asked for Age,  $\chi^2(1) = 1.38$ , *ns*, and Asked for ID  $\chi^2(1) = 2.08$ , *ns*. However, we found marginally significant results for Willing to Sell  $\chi^2(1) = 3.82$ ,  $p = .05$ . Inspection of the contingency

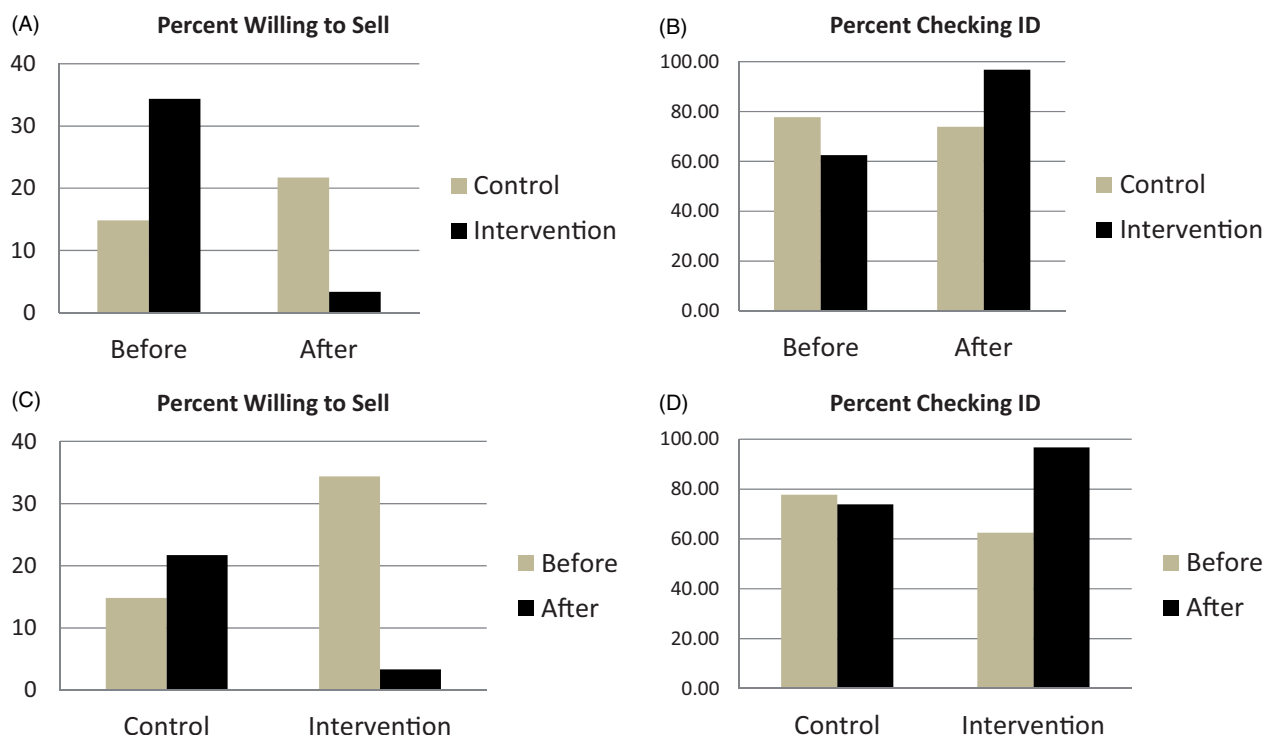


Figure 1. Group comparisons.

table suggested that the control outlets were *less* willing to sell as compared to the intervention outlets, which represents an even more strenuous test for the efficacy of Reward & Reminder.

To evaluate the effects of Reward & Reminder, we conducted a McNemar's test, which evaluates the degree to which the outlets in each condition moved to a different cell in the contingency table from the first visit to the second (i.e., from *yes* to *no* or vice versa). Results suggested that the control outlets did not change (all  $p$  values were non-significant). Indeed, out of 23 outlets, only one changed from *no* to *yes* for Asked for Age, only three changed from *no* to *yes* for Asked for ID, and none of them changed from *yes* to *no* for Willing to Sell. In contrast, the test results for the intervention outlets were significant for Asked for ID ( $p < .05$ ) and Willing to Sell ( $p < .05$ ); Asked for Age did not change. Out of 33 outlets, 11 changed from *no* to *yes* for Asked for ID, and nine changed from *yes* to *no* for Willing to Sell. These data are presented in graphical form in Figure 1.

## Discussion

In this study, we found that the Reward & Reminder program significantly reduced the likelihood that outlets would sell alcohol to minors. Communities exposed to the Reward & Reminder program showed significant increases in clerks' propensity to ask for ID and significant reductions in clerks' willingness to sell. When examining Figure 1, we find that, in Part A, the control condition is notably superior in terms of their willingness to sell before the Reward & Reminder program is implemented (reflecting the marginally significant chi-square value presented earlier); in Part B, the group difference for checking ID before Reward & Reminder was

not significant. When we examine the same graphs after Reward & Reminder, we see that the intervention outlets have improved, whereas the control outlets have not (reflecting the results from McNemar's test). In Parts C and D, the same data are presented, but from a different perspective. In these graphs, we can see how the control outlets did not improve from before to after Reward & Reminder, whereas the intervention outlets did improve (again reflecting the results from McNemar's test).

Interestingly, the Reward & Reminder program had no impact on the frequency that clerks asked for the buyer's age; this could be due to the rarity of this behavior on the first visit and the resulting low statistical power. Specifically, only six of the 59 outlets (10%) asked for the buyer's age at the first visit (see Table 1). Asking for the buyer's age may not be commonly implemented as an enforcement strategy, at least in Oregon. In contrast, 42 of the 59 outlets (71%) asked for ID.

Given these results, Reward & Reminder may also be effective in counteracting the issues that may arise in conjunction with the current trend toward legalization of marijuana. Thirty states and the District of Columbia currently have legalized marijuana in some form, and eight of these states and the District of Columbia have legalized marijuana for recreational use. Although the evidence on the impact of legalization on youth use is mixed (Choo et al., 2014; Friese & Grube, 2013), it is clear that state law enforcement will want to ensure that legalized marijuana remains out of the hands of underage youths. Reward & Reminder may aid in this effort.

We note that this study has limited generalizability due to its small sample size and concentration in rural and small-town areas in Oregon. Further research should explore

the effects of Reward & Reminder in urban areas in different parts of the country. We note that these results do not generalize to non-U.S. settings given the differences in liquor control laws in various countries, as well as differences in community norms regarding youth use of alcohol. In addition, some degree of bias may have been introduced by using project staff to rate the age of our confederates; however, we note that the same confederates worked in both intervention and control communities, thus ensuring that any bias in their appearance did not impact the comparison between the communities.

We conclude that Reward & Reminder may be a useful addition to community efforts to reduce youth access to alcohol. Pending additional research corroborating our findings in other locations, Reward & Reminder could be disseminated to law enforcement agencies as an evidence-based practice to prevent youth access to both tobacco and alcohol products. Also, given the growing numbers of states that have legalized the sale of either medical or recreational cannabis, or both, a logical next step would be to extend these findings to include attempts to purchase marijuana products at licensed retail outlets.

## Disclosure statement

The authors declare that they have no financial conflict of interest.

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## ORCID

Mark J. Van Ryzin  <http://orcid.org/0000-0003-2034-1585>

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