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Drinking refusal self-efficacy: Impacts on outcomes from a multi-site early intervention trial

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Abstract

This study examines relationships between drink refusal self-efficacy (DRSE) and outcomes in Project Options (PO), an adolescent alcohol use early intervention. 1171 US high school students (39.3% Hispanic, 59.3% girls) participated in PO, reporting their demographics, alcohol use, and drinking reduction efforts at baseline, 30 days and three months later. Items from the Drug Taking Confidence Questionnaire for Adolescents (DTCQ-A) assessed DRSE. DRSE corresponded negatively with drinking at 30 days and, among drinkers, predicted fewer use reduction attempts at 30 days and three months. Results indicate that, unlike in treatment settings, DRSE may not correspond to improved early intervention outcomes.

Keywords

self-efficacy; alcohol; early intervention; adolescence

Introduction

Alcohol experimentation is a common feature of adolescence in the United States. Though normative, adolescent alcohol use carries a broad range of consequences. These include lasting impairments in learning and attention, neurodevelopmental changes, increased risk of physical or sexual assault, and accidental injury or death (Brown et al., 2008; Miller, Naimi, Brewer, & Jones, 2007; Spear, 2018). Even light, experimental drinkers risk consequences such as increased risk of future problematic drinking (Gil, Wagner, & Tubman, 2004).

To help mitigate these consequences, researchers have developed evidence-based early intervention strategies designed to reduce current and future alcohol use in general

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adolescent populations (Brown, Anderson, Schulte, Sintov, & Frissell, 2005; Onrust, Otten, Lammers, & Smit, 2016). Many such programs have been developed, but these vary widely in effectiveness (Foxcroft & Tsertsvadze, 2011). Some programs bring about significant improvements in binge drinking and alcohol related problems while others fail to change the drinking behavior of their participants (Foxcroft & Tsertsvadze, 2011, Malmberg et al., 2014, Schinke, Cole, & Fang, 2009). Recent research has significantly increased our knowledge of what may underlie these differences by analysing which elements most improve the outcomes of early intervention programs. In a recent meta-analysis of nearly 300 programs including 436,000 participants, Onrust et al. (2016) assessed 18 common early intervention components and identified numerous program components consistently associated with treatment success (Onrust et al., 2016). While this study substantially improved our knowledge of what comprises an effective early intervention strategy, the effects of many common intervention targets remain unexplored. Investigating how these relate to outcomes in effective early interventions can identify additional means of improving these programs (Foxcroft & Tsertsvadze, 2011; Onrust et al., 2016).

One successful program worthy of such an investigation is Project Options (PO). PO invites high school students to participate in voluntary half-hour sessions during their lunch breaks. Structured, manualized sessions focus on evidence-based intervention targets including perceived alcohol use norms, alcohol expectancies, alternatives to use, and behavioral and communication skills (Brown et al., 2005). PO effectively recruits high risk participants and increases their efforts to reduce use (Brown et al., 2005). As PO has recently completed a large multi-site trial, the program offers an excellent opportunity to further investigate the components that contribute to a successful early intervention.

Drink refusal self-efficacy (DRSE), an individual's belief in their ability to say "no" when offered an alcoholic beverage, is a common target within these interventions about which little is known in the early intervention context (Brown et al., 2005; Onrust et al., 2016). Self-efficacy is a person's perception of their own domain-specific competence, and it facilitates behavioural change efforts across numerous domains (Bandura, 1997). People with higher self-efficacy in a particular area put forth more effort and persist longer through challenges and so are often more likely to succeed (Bandura, 1997).

DRSE ratings consistently predict alcohol moderation and reduced relapse rates in heavy drinking college student populations as well as in adult and adolescent treatment programs for alcohol use disorders (AUD) (Adamson, Sellman, & Frampton, 2009; Bureson & Kaminer, 2005; Foster, Neighbors, & Young, 2014; Foster, Yeung, & Neighbors, 2014; Oh & Kim, 2014; Voogt, Kuntsche, Kleinjan, & Rutger, 2014). Higher DRSE scores predicted lower alcohol use intentions and lower rates of current and future substance use in community samples of younger adolescents and high school students (Aas, Klepp, Laberg, & Aarø, 1995; Connor, George, Gullo, Kelly & Young, 2011; Jang, Rimal, & Cho, 2013; Jongenelis, Pettigrew, & Bagioni, 2018; Wills, 1994). Given these findings, studies have frequently recommended including DRSE as an intervention target in adolescent alcohol interventions (Connor, George, Gullo, Kelly & Young, 2011; Jang, Rimal, & Cho, 2013; Jongenelis, Pettigrew, & Bagioni, 2018). However, programs targeting DRSE have had mixed results and even effective programs have not directly assessed the effects of DRSE on

intervention outcomes (Malmberg et al., 2014; Schinke, Cole, & Fang, 2009). To the authors' knowledge, no published study has evaluated DRSE's relationships to drinking and intervention outcomes in an early intervention program.

Such a study is necessary to validate DRSE's frequent inclusion in early intervention programs, as findings from existing literature may not extend to this setting. Participants in early intervention settings generally drink less and experience fewer problems than those in AUD treatment (Mcgee, Valentine, Schulte, & Brown, 2011). Therefore, they may be less motivated to change regardless of their self-efficacy. Associational studies have found negative relationships between DRSE and alcohol use in community high school samples (Jang, Rimal, & Cho, 2013; Jongenelis, Pettigrew, & Bagioni, 2018). However, other relationships of great importance to early interventions, such as how DRSE relates to efforts to reduce use over time, have not been evaluated.

In light of these differences in population characteristics and outcomes of interest, findings from treatment and community settings may not generalize to the early intervention context. We thus explored the relationship of DRSE to alcohol use outcomes, past 30-day use, and intentions to change, in PO. Based on previous findings, we hypothesized that higher DRSE scores would predict lower rates of past 30-day drinking among lifetime drinkers and increased efforts to change among current drinkers.

Methods

Participants

Ninth - 12th graders voluntarily participated in up to six lunch time PO sessions (N = 1171; Table 1) at 11 high schools across Portland OR, Minneapolis, MN, and Miami, FL. Participants were ethnically diverse and exhibited a wide range of drinking patterns (Table 1).

Procedures

Investigators gathered data from a mixed efficacy effectiveness trial on the use of motivational enhancement (ME) techniques in PO. Participating school districts, individual school administrators, and the IRBs of participating institutions all approved PO's procedures. Participation required both parent consent and participant verbal assent (Ladd et al., 2016). Treatment fidelity of the manualized intervention and control conditions was maintained via weekly meetings with site PIs and bi-weekly all staff meetings conducted via teleconference. Independent coders rated treatment session adherence, assessing "How closely did the leader(s) follow the script?" on a 7 point likert scale. Results indicated that study interventionists generally adhered closely to session content ($M=6.13$, $SD = 0.72$; Ladd et al., 2016). Participants provided data at their first session in person and online 30 days and three months later. Each received a five-dollar gift card at baseline and a \$10 and \$15 gift card after the 30-day and three-month follow ups (Garcia et al., 2015). The voluntary session format resulted in attrition with 802 participants (68.5%) completing 30-day follow ups and 720 (61.5%) completing 3-month follow ups (Table 1).

Measures

Alcohol use—Participants reported their past month and lifetime alcohol consumption by providing the number of separate drinking occasions in their lifetime on an ordinal scale from “zero” to “over 100” and recording how many days in the past month they had drunk. Both variables were recoded dichotomously for modelling purposes with lifetime alcohol use defined as having used alcohol at any time in the past (0/1) and recent alcohol use as having had one or more drinks in the past 30 days (0/1).

Change efforts—Change efforts, attempts to reduce or abstain from alcohol, were operationalized using the item, “Past 30 days: how many times have you tried to cut down or stop drinking alcohol?” and coded dichotomously as “never” (0) or “one or more times (1).”

Demographic information—Participants provided their race, Hispanic origin (0/1), sex (male/female), and grade in school (9–12th) at baseline. Race was recoded as non-White (0)/White (1) for analysis in the present study due to issues with model stability.

Intervention condition—The data in the present study was gathered as part of a larger study assessing the mechanisms of action in PO. These were tested by contrasting two versions of the program: 1) a full PO content with motivational enhancement components (ME), and 2) a didactic control providing the CB skills components of PO without ME (Control). The ME condition was delivered at a 3:1 ratio to the didactic control. Schools served as their own control with a three month wash out period before the switch between conditions, most commonly over summer vacation. Condition and the total number of prevention sessions attended were included as covariates in analysis.

Drink refusal self-efficacy—Participants indicated their confidence to refuse alcohol offers (0% - 100%) across three high-risk use situations: “when out with friends and they kept suggesting we go somewhere and drink,” “if I was excited about something,” and “if I started to feel guilty about something,” from the revised Drug Taking Confidence Questionnaire for Adolescents (DTCQ-A; Ramo, Myers, & Brown, 2009; $\alpha = .91 - .94$ across assessments). DRSE was operationalized as a continuous variable ranging from 0 to 100 calculated by averaging the confidence scores for the three use situations. Mean DRSE scores were only moderately stable over time, with correlations ranging from $r = .43 - .57$ across assessment waves. The sample mean for DRSE varied by time point (baseline: $M = 64.53$, $SD = 36.95$, 30-day follow-up: $M = 70.62$, $SD = 36.19$, three-month follow-up: $M = 71.78$, $SD = 35.21$).

Analytic strategy

We estimated the impact of DRSE on current use status (0/1) among any participants reporting consuming alcohol in their lifetime and alcohol change efforts (0/1) among youth who reported drinking in the past 30 days using hierarchical linear models with students nested in schools (Woltman, Feldstain, MacKay, & Rocchi, 2012). Dichotomizing both current use and drinking status was deemed necessary as response distributions were highly non-normal (skew and kurtosis > 3 for both measures at all timepoints), and the chosen modelling strategy assumed a normal distribution for continuous outcome variables. More

liberal methods to normalize these distributions, such as square root and log transformations, were explored but ultimately rejected as they did not sufficiently improve normality and due to concerns about the interpretability of results when using these strategies (Feng et al., 2014).

Four DRSE models were evaluated: 1) current drinking status at 30-days on DRSE, assessed across baseline and 30-days; 2) current drinking status at three months on DRSE, assessed across baseline, 30-days, and three months; 3) change efforts at 30-days on DRSE, assessed across baseline and 30-days; 4) change efforts at three months on DRSE, assessed across baseline, 30-days, and three months. Models included covariates if they exhibited significant bivariate relationships with the model's outcome at one or more timepoints. Under these criteria, change effort models included race and current use models included grade, race, and ethnicity. Additionally, all models included treatment condition and dosage to account for the effects of the intervention. Due to the presence of missing data, investigators considered strategies to address missingness such as FIML and multiple imputation. These were ultimately not used due to sample violations to multivariate normality and the modelling strategy's robustness to missing data (Dong and Peng, 2013; Rabe-Hesketh and Skrondal, 2012).

Results

Model results are presented in Table 2. All four models assessed were significant at the omnibus level. DRSE was significantly related to current alcohol use at 30 days but not at 3-months. At 30 days, a one-point increase in a participant's mean DRSE score corresponded to a one percent decrease in the likelihood of the participant being a current drinker ($OR = 0.99$, $SE < 0.01$, $p = 0.001$).

DRSE was also significantly related to change efforts at both follow up timepoints. A one point increase in mean DRSE was associated with a two percent decrease in change effort likelihood odds at 30 days ($OR = 0.98$, $SE < 0.01$, $p = 0.045$) and a one percent decrease in the odds at the three month follow up ($OR = 0.99$, $SE < 0.01$, $p = 0.049$).

Both models contained significant covariates. With every additional year in school, participants had roughly 2.6 times the odds to use alcohol at 30 days ($OR = 2.55$, $SE = 0.33$, $p < 0.001$) and 2.9 times as likely at 3 months ($OR = 2.92$, $SE = 0.45$, $p < 0.001$). Additionally, White participants had 2.8 times the odds to be current users than their non-White peers at 30 days ($OR = 2.82$, $SE = 0.75$, $p < 0.001$) and 3.5 times the odds at three months ($OR = 3.50$, $SE = 1.12$, $p < 0.001$). Non-Hispanic, White participants also had one fourth the odds of their Hispanic or non-white peers to attempt to reduce their drinking at both 30 days ($OR = 0.25$, $SE = 0.13$, $p = 0.008$) and three months ($OR = 0.26$, $SE = 0.13$, $p = 0.006$). Condition and dosage were unrelated to alcohol use or efforts to change at both follow ups.

Discussion

Higher DRSE scores corresponded to reduced alcohol use at 30-days but not at three-month follow up, partially conforming with previous findings in non-clinical settings (Aas et al.,

1995; Connor, George, Gullo, Kelly & Young, 2011; Jongenelis, Pettigrew, & Bagioni, 2018; Wills, 1994). The lack of significant relations between DRSE and drinking status at three months indicates a weak or inconsistent relationship between them. Covariance between DRSE and model covariates may also explain their insignificant relationship. However, this would indicate DRSE does not consistently offer additional explanatory power for drinking status beyond that given by race, ethnicity, and grade level which again suggests a weak relationship. Alternatively, treatment effects may have reduced alcohol use among lower DRSE participants such that they resembled their higher DRSE peers; however, this hypothesis cannot be adequately tested in this sample due to the lack of a non-intervention control group.

Contrary to drinking status, the negative relationship of DRSE with change efforts, observed at both 30 days and three months, differs from findings in treatment settings (Adamson et al., 2009). In the early intervention context, high DRSE appears to correspond to reduced, rather than increased, likelihood of intervention success among current drinkers. This finding may result from adolescents in this setting drinking at lower levels and experiencing fewer consequences than those in treatment settings. Therefore, early intervention participants may feel confident that they can quit while not feeling any reason to do so and without previous failed efforts.

Nonetheless, early intervention participants, such as those seen in PO, continue to represent an at-risk group. PO participants generally engage in riskier use and experience more alcohol problems than their peers (McGee et al., 2011). Furthermore, even PO's lighter drinking participants may face risks due to the relationship between experimental alcohol use and future alcohol problems (Gil, Wagner, & Tubner, 2004). This combination of risk factors and lack of motivation to change represents a significant challenge within the early intervention setting and may in part explain the varying effectiveness of these programs.

Additionally, several significant covariate relationships were observed. Adolescents tend to drink more as they get older and so, unsurprisingly, grade level predicted current alcohol use at both timepoints (Johnston et al., 2018). Race also corresponded significantly with both higher current use and lower intentions to quit. As race was included dichotomously (White/non-White) due to model constraints, the interpretability of this result by subcategories is limited.

Nonetheless, non-Hispanic White high school students tend to drink at slightly higher rates than Black and Hispanic students though the difference is smaller than observed in the model (Johnston et al., 2018). This suggests a difference, likely due to participant self-selection, in use by race between the PO sample and the nation. Furthermore, the differences in change efforts by race and ethnicity are consistent with Bacio et al. (2017) which found that majority Hispanic or African American groups in PO had greater session satisfaction and elicited greater empathy from session facilitators than majority non-Hispanic White groups. Analytic constraints prevented Bacio et al. (2017) from drawing definitive conclusions about the impact of racial and ethnic group composition on intervention outcomes. However, its findings indicate that Black and Hispanic majority groups performed

better on some specific measures of session quality, and this may have contributed to their superior change effort rates.

This study is the first study known to the authors to directly investigate the effects of DRSE in an early intervention context. Additionally, the study's use of hierarchical linear modelling allowed for longitudinal analyses that controlled for school-based and individual differences and were robust to attrition and missing data. Furthermore, the investigation used data from a large, diverse, multisite program which greatly increases the generalizability and ecological validity of its results.

Nonetheless, a variety of study limitations warrant consideration. Firstly, the limitations introduced by dichotomizing the outcome variables must be acknowledged. These include reducing model power and, especially in the case of current use status, potentially introducing error by grouping together low, moderate, and heavy drinkers. Furthermore, this study used a three-item measure of DRSE, rather than the full DTCQ-A, which may have reduced the breadth of the construct. Though race and ethnicity impacted both alcohol use rates and change efforts in PO, dichotomizing participants as White/non-White likely obscured finer between-group differences and whether specific groups were primarily responsible for the effect. Furthermore, while PO's voluntary session format accommodates the enhanced desire for personal autonomy common in adolescence, it nonetheless presents obstacles to research. Participant selection bias and higher rates of attrition may bias outcomes in ways that cannot be statistically observed or corrected for, particularly if selection is influenced by variables unobserved in the study. The voluntary session format may also lead to qualitative differences in session dynamics between PO and other early intervention programs, which may be mandated or classroom-based, and so results may not generalize to these settings.

Given that higher DRSE scores related to reduced change efforts, increasing DRSE appears insufficient to prompt change in adolescent early intervention settings. Clinicians should thus be aware that youth attitudes endorsing confidence in their refusal skills are likely independent of attempts to reduce use. Further research should aim to understand why the effects of DRSE in the early intervention context differ from those in treatment or community settings, with a particular focus on the role of motivation to change. To this purpose, qualitative or mixed methods research on adolescent drinking attitudes can provide a new avenue of understanding into how DRSE impacts alcohol use in adolescent samples.

This research aims to aid efforts identifying the driving components of successful early alcohol interventions. Due to the existence of both effective and ineffective programs and the substantial gaps in our knowledge of what distinguishes the two, future research identifying the most potent active ingredients in early alcohol interventions can aid the development of progressively better interventions and improve the health and safety of adolescents.

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Table 1.

Sample Demographics by time point

	Baseline		30-day follow-up		3-month follow-up	
	<i>N</i>	%	<i>N</i>	%	<i>n</i>	%
Gender						
Male	460	39.3%	283	35.3%	244	33.8%
Female	694	59.3%	509	63.5%	467	64.9%
Race & Ethnicity						
Non-Hispanic White	274	23.4%	176	21.9%	164	22.8%
African American	282	24.1%	202	25.2%	163	22.6%
Hispanic	460	39.3%	313	39.0%	298	41.4%
Mixed/Other	151	12.9%	108	13.5%	95	13.2%
Location						
Portland	325	27.8%	186	23.2%	182	25.3%
Miami	504	29.2%	371	46.3%	336	46.7%
Minnesota	342	43.0%	245	30.6%	202	28.1%
Grade						
9 th	294	25.1%	189	23.6%	173	24.0%
10 th	224	19.1%	155	19.3%	128	17.8%
11 th	249	21.3%	177	22.1%	165	22.9%
12 th	389	33.2%	271	33.8%	246	34.2%
Drinking Status						
Lifetime Drinkers	694	59.3%	492	61.3%	442	61.4%
Current Drinkers	291	24.9%	178	22.2%	212	29.4%
Total	1171		802		720	

Note: Percentages may not add up to 100% due to missing data (participants declining to respond on certain items).

Table 2.

Hierarchical linear models predicting 30-day and 3-month prevention outcomes

	30 Day Outcomes		3 Month Outcomes	
	<u>Current Use (0/1)</u> <u>OR (SE)</u>	<u>Change Efforts (0/1)</u> <u>OR (SE)</u>	<u>Current Use (0/1)</u> <u>OR (SE)</u>	<u>Change Efforts (0/1)</u> <u>OR (SE)</u>
Grade	2.55 (0.33) ***	---	2.92 (0.45) ***	---
White (0/1)	2.82 (0.75) ***	0.25 (0.13) **	3.50 (1.12) ***	0.26 (0.13) **
Hispanic (0/1)	1.61 (0.49)	---	1.86 (0.65)	---
Condition (0/1)	1.39 (0.42)	2.01 (1.14)	1.70 (0.62)	1.75 (0.97)
Total Dose	0.88 (0.58)	0.96 (0.13)	0.96 (0.07)	0.94 (0.09)
DRSE	0.99 (0.00) ***	0.98 (0.01) *	0.99 (0.03)	0.99 (0.01) *
ICC: students in schools	0.66 (0.05)	0.72 (0.08)	0.73 (0.04)	0.66 (0.10)
<u>Overall Model</u>				
Wald chi square [♦]	71.65 ***	13.27 **	62.53 ***	12.80 *
N	1064	352	942	331

Note. *Condition*= didactic (0) vs. motivationally-enhanced (1);

[♦] $df=4$ for Change Effort models; $df=6$ for Current use models;

* p .05

** p .01

*** p .001