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Brief intervention and the Theory of Planned Behavior: A randomized controlled trial among adolescents

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Abstract

Brief Intervention (BI) is a successful tool for reducing adolescent drinking, although little is known about how it works to change behavior. Components of the Theory of Planned Behavior (TPB) predict alcohol consumption in this population; thus, modifying them through BI could be beneficial. This study aimed to determine if BI for alcohol drinking among adolescents affects the TPB components', considering readiness to change. Participants were 102 Argentinean high school students (age $M = 15.08$, $SD = 1.38$, 85% male). We compared two groups: 1) evaluation about alcohol consumption, TPB's components and readiness to change 2) same evaluation plus a BI. After three months, the BI group showed a significant reduction in intention ($\beta = -1.21$; $p < .05$) and perceived social norms ($\beta = -2.79$; $p < .01$). However, readiness to change did not predict any changes in TPB's components. This study contributes to understanding BI's mechanisms of change and closing the evidence gap from Latin America.
Keywords: Brief intervention; theory of planned behavior; alcohol; adolescents; Latin American.

Resumen

Intervención breve y teoría de la conducta planeada: Un ensayo clínico aleatorizado en adolescentes. La Intervencion Breve (IB) ha mostrado reducir el consumo de alcohol en adolescentes, aunque poco se sabe sobre como actúa cambiendo el comportamiento. Los componentes de la Teoría de la Conducta Planificada (TCP) predicen el consumo de alcohol en esta población, por lo tanto modificarlos mediante la IB podría ser beneficioso. El objetivo de este estudio fue determinar si la IB afecta a los componentes de la TCP considerando la disposición al cambio. Los participantes fueron 102 estudiantes argentinos (edad $M = 15.08$, $EE = 1.38$, 85% varones) de escuelas secundarias. Se compararon dos grupos que recibieron: 1) evaluación del consumo de alcohol, los componentes de la TCP y la disposición al cambio 2) la misma evaluación más una IB. Después de tres meses, la IB mostró reducciones significativas en la intención ($\beta = -1.21$; $p < .05$) y la norma social percibida ($\beta = -2.79$; $p < .01$). Sin embargo, la disposición al cambio no predijo modificaciones en los componente de la TCP. Este estudio contribuye a comprender los mecanismos del cambio de la IB y cerrar la brecha de evidencia para Latinoamérica.
Palabras clave: Intervención Breve; Teoría de la Conducta Planeada; Alcohol; Adolescentes; Latinoamérica.

Drinking is a widely accepted practice in the Argentinean population, and it starts very early, around 13 years of age (Argentine Drug Observatory, 2017). Alcohol is, thus, the most frequently consumed substance by Argentine adolescents. Furthermore, typical consumption among adolescents involves drinking a large amount of alcohol on a single occasion, which is considered high risk drinking (Argentine Drug Observatory, 2016). Numerous negative consequences from adolescents' drinking affect both themselves and others. Among them are neglecting activities, suffering blackouts, accidents or violence, and unsafe sex (Conde et al., 2016; Golpe et al., 2017). Also, because the adolescent brain continues to develop until adulthood, alcohol makes adolescents vulnerable to cognitive impairments (Spear, 2018).

The Theory of Planned Behavior (TPB) has successfully explained alcohol consumption among adolescents (Marcoux & Shope, 1997; Peltzer et al., 2013). According to the TPB, behavior is determined by intention, which refers to the willingness of the person to perform a specific action. The intention depends on three factors: attitudes, perceived social norms, and perceived behavioral control (PBC). Attitudes are defined as the positive/negative evaluation of behavior. Perceived social norms have two dimensions, descriptive norms (the perceptions about significant others' behaviors) and injunctive norms (the perceptions about significant others' approval/disapproval of the

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behavior). Last, PBC includes both beliefs about internal and external barriers (controllability) and the trust in their own ability to carry on the behavior (self-efficacy). PBC also directly influences behavior (Ajzen, 2002).

Due to the explanatory power of TPB in risky consumption, its components have been considered in the design of interventions (French & Cooke, 2012). Brief Interventions (BI) are motivational tools designed to achieve abstinence or reduce high risk drinking. Despite small effect sizes, BIs have shown to successfully reduce or eliminate risky alcohol consumption among adolescents (Steele et al., 2020; Steinka-Fry et al., 2015; Tanner-Smith & Lipsey, 2015; Tanner-Smith & Risser, 2016).

Over the last decades, most BIs have been based on Motivational Interview principles (Miller & Rollnick, 2012), which enclose a fundamental concept denominated readiness to change; this is, the initial level of motivation a person has to modify his/her behavior (alcohol consumption). Despite some evidence indicating a greater readiness to change predicts better results after BI (Davis et al., 2018), other suggest that it is unrelated to BI results (Mastroleo et al., 2011; Reid & Carey, 2015). However, readiness to change is a complex concept that may be linked to other factors. For instance, an association was found between readiness to change and some TPB's components, such as perceived social norms and self-efficacy (Cho, 2006).

Many studies have shown that BIs among adolescents generate changes in alcohol consumption behaviors (Steele et al., 2020; Steinka-Fry et al., 2015; Tanner-Smith & Lipsey, 2015; Tanner-Smith, & Risser, 2016). Although TPB's components are generally present in BIs, research monitoring whether BI changes these components is scarce. Furthermore, most evidence on both BIs performance and TPB in alcohol consumption among adolescents comes from the USA or other non-Latin American countries (Cooke et al., 2016; Tanner-Smith & Lipsey, 2015).

Argentina has a wet drinking culture characterized by widespread and highly accepted consumption and, like other Latin countries, places great emphasis on social relations. Thus, TPB components' performance in this country could be different from those in most of the literature (Savic et al., 2016). Therefore, we aimed to determine if BI for alcohol drinking among adolescents affects the TPB components' (i.e., intention, attitudes, perceived social norms, and PBC) while taking into account readiness to change.

Method

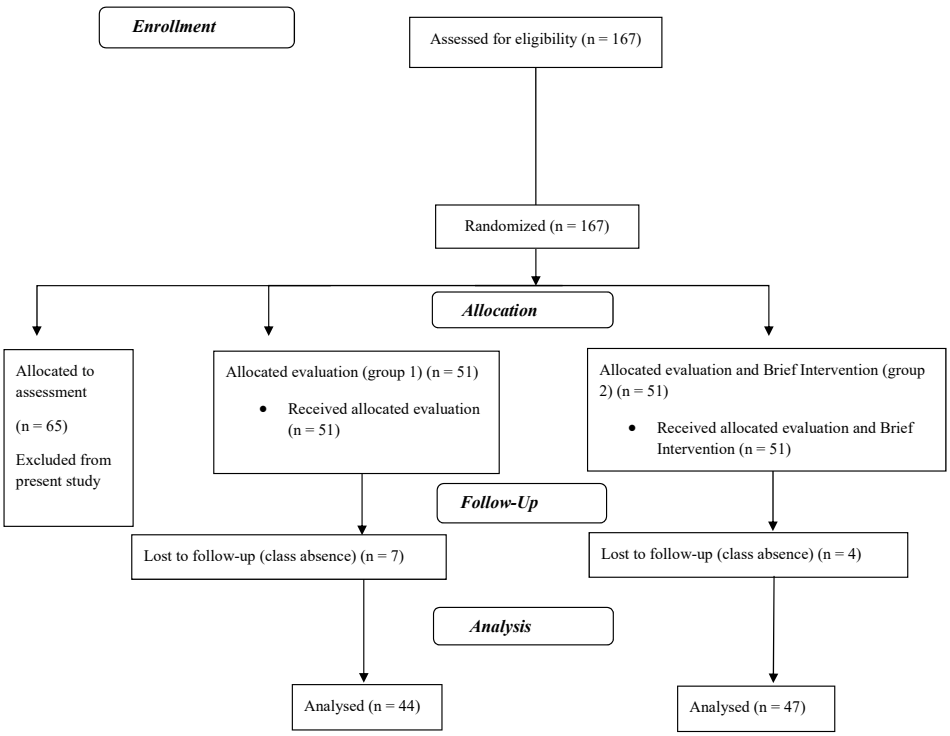
Design

We present here a secondary analysis from a factorial Randomized Controlled Trial whose principal aim was to determine BI efficacy (Conde et al., 2018). Participants were randomly assigned either one of two groups: 1) evaluation about the quantity and frequency of drinking and alcohol-related problems, TPB's components, and readiness to change (n = 51), or 2) same evaluation plus BI (n = 51).

Participants

Participants were adolescents attending a public high school in Mar del Plata, Argentina. At the beginning of the study (Time 1), we collected a probabilistic systematic sample, and 167 adolescents were assessed for eligibility. For the purpose of this study, 65 participants who received an assessment only were excluded because did not received an evaluation about the TPB components. The final sample was composed of 102 students (age *M* = 15.08, DS=1.38, between 12 and 19, 85% male, 10% abstainers), 51 from group 1 (i.e. evaluation), and 51 from group 2 (i.e., evaluation plus BI). After three months (Time 2), they were reassessed. The sample retention was 89% (n = 91, age *M* = 14.98, 84% male, 9% abstainers); sample attrition was mainly due to class absence. Figure 1 shows the participants' flow chart.

Figure 1. Flow Diagram



Measurements

High risk drinking. At Time 1 were considered as positive: 1- students between 12 and 15 years who consumed 3 or more standard units (any drink with 11 gr of pure alcohol) on the same occasion in the last 12 months; 2- students between 16 and 20 years, who consumed 5 or more standard units per occasion in the last 12 months. At Time 2, the same criteria were considered, but the last 3 months were assessed (dichotomous variable yes/no).

Theory of planned behavior (TPB). A questionnaire used in previous studies and with adequate psychometric performance was employed (Peltzer et al., 2013). It included 23 items with a five-point Likert scale response. The questionnaire dimensions are:

Intention. It comprised three items about the disposition/tendency to high risk drinking (α = .94). For example, how likely is the adolescent to have 5 or more drinks on the same occasion in the next month. Higher scores indicate a higher probability that the behavior will be performed.

Perceived social norms. Seven items about prescriptive and descriptive perceived social norms were included. The items evaluate the degree of agreement with sentences about the perception of significant others' (e.g. parents, friends) opinions, and of their behaviors related to alcohol (α = .88). For example, if their significant others approve the consumption of 5 or more drinks in the same occasion (prescriptive perceived social norm) or if they consume 5 or more drinks in the same occasion (descriptive perceived social norm). High scores indicate a high perception of high risk drinking behaviors among significant others and their approval of these behaviors.

Perceived behavioral control (PBC). Five items were used to assess two dimensions: controllability (i.e., whether high risk drinking depends on either themselves or external factors) and self-efficacy (i.e., perceptions about barriers and facilitators to perform the behavior) (α = .58). For example, if the adolescent perceives that they could easily drink or not 5 or more drinks in the same occasion. Higher scores indicate greater confidence that performing the behavior depends on one's abilities.

Attitudes. A semantic differential was developed with eight adjectives' pairs (α =. 94) about high risk drinking and their instrumental quality (e.g., useful/useless), feelings, and experiences when performing the behavior (e.g., pleasant/unpleasant) and general evaluation (e.g., good/wrong). For example, if the adolescent considers right/wrong to consume 5 or more drinks on the same occasion. Higher scores indicate a more positive assessment of high risk drinking.

Readiness to change. It was measured with the Readiness Ruler (Miller, 1999) (quantitative variable). Participants had to report how prepared they felt to change their alcohol consumption (1 = not prepared- 10= already changing).

Procedure

First, we obtained the consent of the institution's directors to carry on the study. Then, we contacted the parents or tutors and explained the study's details. Finally, we contacted the students and obtained their informed consent. The students, the institutions, and the parents or tutors were informed about the study's general characteristics and participation's confidential, anonymous, and voluntary nature. They did not receive economic compensation. 167 students were recruited during class, and all accepted to participate. The screening and BI were performed individually by a trained researcher in the school's library room. This study was approved by the Ethics Committee of the National Epidemiology Institute.

Randomization

One of the researchers (RB) performed the randomization. Each student was identified by a single code to allow follow up while keeping data anonymous. We performed a two step randomization. Firstly, all adolescents who consented to participate completed the drinking assessment and were randomly divided into two groups. One of them composed the assessment-only group and ended their participation at this point. The other group continued to complete an evaluation about quantity and frequency of drinking and alcohol-related problems, TPB's components, and readiness to change. Then, we performed a second randomization that assigned these participants to either group 1 (i.e. evaluation) or group 2 (i.e. evaluation plus BI).

Group 1 Evaluation

This group received an evaluation of about quantity and frequency of drinking and alcohol-related problems, the TPB's components, and the readiness to change.

Group 2 Evaluation plus Brief Intervention.

This group received the same evaluation than group 1 plus the BI. The BI steps were: 1) Personalized feedback about their level of consumption and potential adverse consequences; 2) When high risk drinking was detected, problems experienced were discussed. Otherwise (e.g., abstinence), the behavior was reinforced with positive comments and advice not to drink alcohol; 3) Reasons to decrease consumption, reach or maintain abstinence were discussed with participants; 4) If the student drank alcohol, he/she was persuaded to setting abstinence as a goal. If the participant refused, a reduction in quantity and frequency was discussed as a damage reduction approach; 5) Finally, the intervention ended with advice to reduce or stop drinking and positive feedback for their compromise. BI's were performed by research assistants previously trained.

Data Analysis

Descriptive analyses of high risk drinking behavior, readiness to change, and TPB's components at Times 1 and 2, were performed. To detect variations in TPB's components (i.e., intention, perceived social norms, PBC, and attitude) in group 1 (evaluation) and group 2 (evaluation plus BI), we performed linear regression analyses for each component. TPB's components at the beginning and readiness to change were included as control variables and TPB's components at Time 2 as the outcome. We established lineal adequacy and normality through residual graphs. Logistic regressions were used to evaluate a model to predict high risk drinking at Time 2 (No = 1, Yes = 0), according to group (group 1 = 1, group 2 = 2). For this analysis, PBC, the intention to perform the behavior (high risk drinking), and readiness to change, all at Time 1 were set as predictors while high risk drinking at Time 1 (No = 1, Yes = 0) was included as a control variable. Analyses were performed with R 3.3.1 software.

Results

Descriptive results showed reductions in all variables, except PBC, among group 2 participants (i.e. evaluation plus BI). On the contrary, no reductions were observed among group 1 (i.e. evaluation) participants. (Table 1).

The reduction of TPB components in group 2 was significant for the intention of high risk drinking and perceived social norms, marginally significant for PBC, and non-significant for attitude. Readiness

Table 1. Descriptive analysis of High Risk Drinking, Readiness to Change, and the Theory of Planned Behavior (TPB) components before and after Brief Intervention in the control (group 1= evaluation) and experimental groups (group 2= evaluation and Brief Intervention) among adolescents.

Variables	Time 1						Time 2					
	Control			Experimental			Control			Experimental		
	%	*M(DS)*	*CI 95%*	%	*M(DS)*	*CI 95%*	%	*M(DS)*	*CI 95%*	%	*M(DS)*	*CI 95%*
HRD	37.5	---	22.9-52.1	43.2	---	29.5-56.8	39.6	---	25-54.2	22.7	---	11.4-36.4
I	---	5.74(2.73)	4.78-6.7	---	6.68(2.99)	5.56-7.84	---	6.44(3.29)	5.22-7.55	---	6.2(3.58)	4.96-7.68
SN	---	18.04(5.23)	16-19.92	---	18.68(4.88)	16.8-20.4	---	18.19(5.02)	16.26-19.93	---	16.28(5.14)	14.4-18.08
PBC	---	38.19(5.17)	36.33-40.04	---	36.32(5.61)	34.08-38.48	---	39.33(4.26)	37.89-40.96	---	36.68(5.98)	34.48-38.96
A	---	18.7(6.99)	16.07-21.15	---	20.76(6.58)	18.36-23.56	---	20.04(7.53)	17.26-22.74	---	19.36(7.96)	16.68-22.56
RC	---	3.96(3.28)	2.82-5.33	---	3.76(2.93)	2.68-4.96	---	---	---	---	---	---

Note. HRD= High Risk Drinking, I= Intention, SN= Perceived Social Norms, PBC= Perceived Behavioral Control, A= Attitud, RC= Readiness to Change, CI= Confidence Interval.

Table 2. Prediction of the Theory of Planned Behavior (TPB) components in Time 2 by TPB components in Time 1, Experimental Condition (group 2= evaluation and Brief Intervention) and Readiness to Change, adolescents.

Variables	Intention		Perceived Social Norm		PBC		Attitude	
	β	*CI 95%*	*β*	*CI 95%*	*β*	*CI 95%*	*β*	*CI 95%*
Group	-1.21*	-2.25/-.17	-2.79**	-4.24/-1.35	-1.88.	-4.03/.27	-1.55	-4.21/1.1
Readiness to change	-0.08	-.24/.08	.004	-.22/.23	.23	-.11/.57	-.24	-.64/.17
Intention	.83**	.66-.99	---	---	---	---	---	---
Perceived Social Norms	---	---	.78**	.62/.94	---	---	---	---
PBC	---	---	---	---	.63**	.44-.82	---	---
Attitude	---	---	---	---	---	---	.66**	.47/.86
F	34.2		40.89		17.94		15.53	
R^2	.57		.62		.42		.36	

Note. CI = Confidence Interval. PBC= perceived behavioral control.
***p < .01 *p < .05 p < .1*

to change did not predict any changes in TPB's components at Time 2 (Table 2).

Regarding the model, receiving the BI incresead 7 times the probability of not reporting high risk drinking. Also, a greater intention to perform high risk drinking at Time 1 reduced 44% the probability of high risk drinking behavior. Additionally, high risk drinking at Time 1 increased 7 times the probability of high risk drinking at Time 2. Nor PBC, nor readiness to change predicted high risk drinking at Time 2 (Table 3). The model fit was high (*Hosmer-Lemeshow X2* = 2.76, *df* = 7, *p* = .91) and predictors explained 60% of high risk drinking behavior's variance at Time 2 (*R2Nagelkerke* = .62).

Table 3. Prediction of High Risk Drinking in Time 2 by Experimental Condition (group 2= evaluation and Brief Intervention), the Intention of High Risk Drinking, Perceived Behavioral Control, Readiness to Change, and High Risk Drinking at Time 1, adolescents.

Predictor	*OR*	*CI 95%*
Experimental condition	7.34*	1.26-42.7
Readiness to change (Time 1)	1.076	.84-1.38
Intention (Time 1)	.56**	.39-.80
PBC (Time 1)	.94	.79-1.12
High risk drinking (Time 1)	7.01*	1.35-36.44

Nota. CI = Confidence Interval. PBC= Perceived Behavioral Control.
***p < .01 *p < .05 p < .1*

Discussion

We aimed to explore if BI changes TPB's components, also considering the readiness to change among adolescents from a Latin American country. We found that BI reduced the intention of high risk drinking and perceived social norms, but it it did not affect PBC or attitudes. These results are in agreement with Armitage and Talibudeen (2010) who found reductions in the same TPB components in a study to promote safe sex among adolescents.

It is not surprinsing that our BI have change intentions of high drinking since it provided feedback about adolescents' own levels of consumption and negative consequences. Thus, this new information might have driven this change. These findings agree with others that show that motivational interventions tend to change intentions (Steinmetz et al., 2016).

Despite the predictive power of the TPB model, our BI did not change the components that affect intention, except for perceived social norms. One possible explanation is that our BI was not designed according to TPB theory, and we did not include a specific ingredient to change each component of this model. Another alternative explanation is that some components are more malleable than others. There is vast evidence of perceived social norms as a mediator of BI efficacy but not in favor of attitudes (Reid & Carey, 2015). Positive evaluations about alcohol could be challenging to modify among adolescents, especially in Argentina, where alcohol is an important part of social lives. For example, they could still think that drinking alcohol is fun after the BI, but they could change their intentions to drink for other reasons, such as avoiding important other's disapproval.

Interestingly, our results suggest adolescents' perceptions about how normative risky alcohol behaviors are and significant others' approval were modified by the intervention, although our BI did not include normative information (e.g., rates of actual consumption). It is possible that to becaming aware about their own level of consumption, also changed their perceptions about important others drinking behavior and approval.

The lack of change in attitudes could highlight the need to review traditional BIs designs, especially since attitude has been considered the strongest predictor of high risk drinking intention in other cultures (Cooke et al., 2016), as well as in ours (Peltzer et al., 2013). Future research lines should study which ingredients change personal beliefs. For example, increasing skills seems to change attitudes (Steinmetz et al., 2016); Also, injunctive normative feedback, this is correcting misperceptions about significant others' approval of alcohol consumption, has been associated to changes in attitudes (Reid & Carey, 2015).

There is often a marked difference in the literature on how descriptive (perception of significant other's drinking behavior) and injunctive (perception of significant other's approval concerning drinking behaviors) norms affect alcohol consumption. According to Lac and Donaldson (2018), descriptive norms are associated with alcohol behavior and injunctive norms with attitude. Thus, descriptive and injunctive norms might be considered separately. Also, future studies should include an analysis of the interaction between TPB's components, such as each type of perceived social norms and attitudes.

Interestingly, BI did not change PBC. However, the literature indicates that this is a complex construct, and several studies with adolescents did not find an association between PBC and high risk drinking (French & Cooke, 2012; Peltzer et al., 2013). Possibly, BI has no effect on PBC because young people falsely believe that they can voluntarily control their consumption (Cooke et al., 2016; French & Cooke, 2012).

On the other hand, readiness to change was not associated with TPB's components nor predicted high risk drinking at Time 2. Borsari et al. (2009) summarized three studies where motivational interventions were applied, and that did not find clear evidence of readiness to change as a behavioral change mechanism. In line with these findings, recent studies found no support for readiness to change (Büchele et al., 2020; Read & Carey, 2015). Furthermore, readiness to change has shown to be a controversial construct with diverse measurements (Maisto et al., 2011).

While relevant to the field, these findings must be considered with caution due to some limitations. Firstly, the sample size could be small to detect some significant differences between groups. Secondly, because this study was performed among public school students, the results could not be generalized to all adolescents. Further, the sample was primarily composed of men. Also, there may be differences between early (e.g., between 12 and 15 years) and late adolescents (e.g., more than 15 years) that were not considered here. Further research should explore the separate role of each component's dimensions. For example, perceived social norms should be measured as descriptive and prescriptive, attitudes as experiential and instrumental, and PBC as capacity and autonomy (McEachan et al., 2016). Recent studies (Norman et al., 2018; Norman et al., 2019) have examined the impact of these differences on the development of interventions, and future research should focus on these operationalization issues.

Despite limitations, our results have implications for future BI designs among adolescents. Our intervention was not designed to modify each TPB's component but was based on the traditional motivational BI model. Despite this, changes in intention and perceived social norms were found. As we previously stated, a motivational intervention is expected to affect intention. However, despite not including a normative ingredient, perceived social norms had also changed. This interesting finding raises the question if a normative ingredient (i.g. feedback of rates of alcohol consumption on peers) could increase the effect of BI among adolescents. Also, normative feedback as the only intervention could be cost-effective, and it would be interesting to test in future studies. On the other hand, BI did not affect attitudes. Since attitudes have a substantial weight on adolescents' high risk alcohol consumption, this could be a weakness. Traditional BI approaches maybe benefit from the inclusion of a component to change attitudes. Future research lines should focus on the active ingredients of BI. Especially, dismantling studies could inform about which ingredients affect each construct (Reid & Carey, 2015).

To our knowledge, this is the first study that evaluates the effects of BI on TPB's components among adolescents in a Latin American context. Our results contribute to the understanding of BI's mechanisms of change and closing the evidence gap between the northern and the Latin American regions. In sum, according to our study BI change intentions to high-risk drinking and perceived social norms but it did not affect attitudes and PBC among adolescents.

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Conflics of interest

All authors declare that they have no conflicts of interest.

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