Preliminary Effects of a Guided Self-Change Intervention on Perceived Risk and Self-Efficacy in University Students Engaging in Cannabis or Alcohol Misuse

Robbert J. Langwerden[1,2,3], Staci L. Morris[1,2,4], Sofia B. Fernandez[2,4], María Eugenia Contreras-Pérez[1,2,4], Michelle M. Hospital[1,2,5], Eric F. Wagner[1,2,4]

[1]Community Based Research Institute, Florida International University, Miami, FL, USA
[2]Research Center in a Minority Institution, Florida International University, Miami, FL, USA
[3]Center for Anxiety and Related Disorders, Boston University, Boston, MA, USA
[4]School of Social Work, Florida International University, Miami, FL, USA
[5]Department of Biostatistics, Florida International University, Miami, FL, USA

ABSTRACT

Guided Self-Change (GSC) is a Motivational Interviewing (MI)-based early intervention program, infused with Cognitive Behavioral Therapy (CBT), for individuals with substance use problems. In this study, we implemented a 4-session GSC program with the innovative addition of mindfulness-based techniques at a minority-serving institution to reduce substance use and negative consequences among self-referred university students. We investigated processes that may be associated with behavior change, including perceived risk of use and self-efficacy ratings among university students who reported their primary substance of choice was cannabis (n = 18) or alcohol (n = 18). The sample of 36 participants (M_{age} = 24.4, SD_{age} = 5, range 18-37) mostly identified as female (58.3%), then male (41.7%); 52.8% identified as Hispanic/Latine, 22.2% as Black or African American, and 19.5% as a sexual minority. Among cannabis primary using students, results indicated that the perceived risk of weekly cannabis use, confidence to change, and readiness to change showed statistically significant increases from pre- to post-assessment. Among alcohol primary using students, confidence to change and readiness to change showed statistically significant increases from pre- to post-assessments. All results yielded large effect sizes, which may be inflated due to the small sample size. Findings suggest that over the course of participation in a brief, 4-session targeted GSC program, there were significant increases in perceived risk and self-efficacy among minority university students who engage in primary cannabis or primary alcohol use.

Key words: = brief intervention; cannabis; GSC; substance misuse; university students

Currently, substance use is a widespread health problem among university students. The last National Survey on Drug Use and Health (SAMHSA, 2021) reported that more than half of the full-time college students surveyed drank alcohol in the past month, and roughly one in three engaged in binge drinking. College students face specific stressors and environmental pressures that are often associated with alcohol or marijuana misuse (Arnett, 2005; Horigian et al., 2021; Single et al., 2022); this could be related to the fact that most college students are within the emerging, young, and middle adulthood ranges, which are stages typically associated with social

Corresponding Author: Eric Wagner, Ph.D., Florida International University, 11200 SW 8 Street, AHC5, Miami, FL, 33199. Phone: (305) 348-5612. Email: wagnere@fiu.edu

role changes, identity development, exploration, and transitioning (Arnett, 2000). Starting to attend a U.S. college has been reported to be a risk factor for cannabis (Miech et al., 2017) and alcohol use initiation (Borsari et al., 2007). While risky drinking behavior, on average, decreases after college, drinking for stress reduction tends to increase in post-collegiate periods (Perkins, 1999). College students also face unique barriers to receiving treatment, such as low confidentiality, financial constraints, and potential university involvement, which might deter students from seeking these services (Welsh et al., 2019). That said, among all university students, racial, ethnic, and sexual minority students may be burdened with additional risk factors, such as microaggressions and minority stress (Pittman et al., 2019; Pro et al., 2018; Winberg et al., 2019), increased (historical) trauma (Reyes et al., 2022; Skewes & Blume, 2019), and potentially stressors associated with acculturation (Pham & Lui, 2021). These barriers may instigate disparities in substance misuse rates and access to intervention, including at minority-serving institutions. In the current study, we focus on a sample of university students (both undergraduate and graduate students), most of whom identify as a racial, ethnic, or sexual minority.

The portion of university students who engage in alcohol or cannabis misuse may exhibit a broad, yet milder range of use compared to those with substance use disorders as described in the DSM-5 (American Psychiatric Association, 2013). Substance misuse describes a pattern of alcohol and/or illicit drug use that does not meet the full criteria for substance use disorder yet can have negative short- and long-term consequences. Risks associated with students' alcohol and cannabis use include, but are not limited to, being the victim or perpetrator of violent behavior (Hingson et al., 2017), worsened academic performance, and risk of drop-out (Buckner et al., 2010; Suerken et al., 2016), unsafe sexual behavior (Mair et al., 2016; Rehm et al., 2017), the later development of a substance use disorder (Prince et al., 2019) and adverse mental health impacts, including suicidality (Coryell et al., 2022). For cannabis misuse specifically, consequences can include cognitive or motivational difficulties (Buckner et al., 2010) and psychotic symptoms (Wright et al., 2021). In short,

misuse of alcohol and cannabis are each associated with significant psychosocial burdens and consequences. Therefore, well-timed and effective intervention with student misuse has public health relevance.

The risks of alcohol and cannabis misuse do suggest that intervening early in substance use problem trajectories, before use worsens into more severe SUDs, has significant benefits. College-attending adults who engage in alcohol and cannabis misuse are responsive to early and brief interventions (BIs), particularly when focusing on concrete impact, harm reduction, education, and coping skills training (Carey et al., 2007; DiClemente et al., 2017; Halladay et al., 2018, 2019; Hennessy et al., 2019; Palfai et al., 2016). Research has shown that brief interventions effectively reduce use and negative consequences in university students and young adults who engage in cannabis (Halladay et al., 2019) or alcohol misuse (Larimer & Cronce, 2002). Nonetheless, and as was pointed out by Cronce and colleagues (2022), many studies have been conducted at majority non-Hispanic White U.S. institutions. Further research is needed on brief interventions for racial, ethnic, and sexual minority students at minority-serving institutions (Cronce et al., 2022), including investigating the application of BIs with minority university students who engage in cannabis or alcohol misuse. The benefits of such research include having real-world effectiveness evaluations among understudied populations who are at risk of misusing alcohol and cannabis and are at risk for other health inequities.

Of particular interest are BIs that are rooted in motivational interviewing (MI; Miller & Rollnick, 2012) because of their 1) person-centered and concrete approach, 2) known effectiveness across different health outcomes (Magill et al., 2018), and 3) demonstrated effectiveness in reducing substance misuse (DiClemente et al., 2017). An example of an MI-based BI applied across a CBT framework is Guided Self-Change (GSC; Sobell & Sobell, 2005). GSC incorporates various elemental components of MI, including the elicitation of change-talk (Barnett et al., 2014), the stages of change model (Prochaska & DiClemente, 1994), and Rogerian approaches and personalized feedback, all of which are effective in substance use reduction, including among college students (Walters & Neighbors, 2005). Miller and

Rollnick define change talk as "any self-expressed language that is an argument for change" (Miller & Rollnick, 2012, p.152). GSC fits well with university-based implementation due to its brevity, low burden on students, and low-threshold position in the continuum of care (Halladay et al., 2019). Moreover, GSC has been effective in reducing substance use in minority adolescents (Gil et al., 2014; Wagner et al., 2014).

GSC's underlying CBT framework is based on several emotional and cognitive processes that lead to changes in substance use. At least three theories could predict these processes and their role in the behavioral change of misuse of substances. First, in line with the Social Learning Theory (Bandura & Walters, 1977), observing and modeling of peers' substance use behavior are influential, as was confirmed by empirical research on young adults (O'Donnell et al., 2019). Therefore, the perception of what peers perceive as "normal" versus "risky" plays a role in misuse and, more importantly, change in misuse of substances. Second, the Health Belief Model (Sulat et al., 2018) predicts that *perceived severity*, *self-efficacy*, and *perceived benefits of change* are pivotal to behavior change. Perceived risk was shown to be a strong predictor of health behavior change outcomes (Ferrer & Klein, 2015), including misuse of alcohol and cannabis in emerging adults (Grevenstein et al., 2015). Third, Grevenstein and colleagues (2015) found support for perceived risk predicting future alcohol and cannabis use reduction (in line with the *motivational hypothesis*). However, these same scholars found that cannabis use reduction, in turn, also predicted perceived risk (in line with the *risk appraisal hypothesis*) in emerging adults (Grevenstein et al., 2015). This indicates that these factors might be important outcomes in alcohol and cannabis misuse, which may be generalizable to college students. Real-world intervention data on GSC, an MI-based BI, could provide insight into these secondary outcomes among U.S. university students, including racial, ethnic, and sexual minority students.

Taking into consideration Social Learning Theory, the Health Belief Model, and the Motivation & Risk Appraisal Hypotheses, our study investigated the perceived risk of use (*perceived severity*), importance to change (*perceived benefits*), confidence to change (*self-efficacy*), and readiness to change (*self-efficacy*) at pre- and post-intervention time points. Based on previous findings that alcohol and cannabis use rates decreased throughout this 4-session GSC program (Morris et al., 2022), we hypothesize pre- to post-intervention increases in perceived severity, self-efficacy, and perceived benefits. We think GSC may positively influence these secondary outcomes due to its focus on harm reduction, pros and cons of use, antecedents, and consequences of use, training in coping skills (i.e., mindfulness training, self-care skills, communication skills), and MI-consistent reinforcement of change talk. Finally, we do not investigate nor make claims about causality in this study but merely investigate potential changes that occur throughout an intervention program.

METHODS

Participants

Participants were university students who self-referred to the Guided Self-Change program following an intake at the institution's counseling center. Of the total participants who enrolled in the baseline research portion of the study ($N = 76$), less than half were included in the present study ($n = 36$) based on the following inclusion criteria: 1) providing informed consent and completion of both the baseline and exit survey, 2) sole use of cannabis or sole use of alcohol, 3) completing GSC (as opposed to an abbreviated program), and 4) self-referral. We excluded participants who participated in the program due to student conduct mandates or were otherwise not self-referred to minimize social desirability bias. Enrolled participants completed the program and associated surveys between August 2017 and November 2019. Only participants who provided informed consent filled out the surveys. Participants were compensated with a $20 gift card for each survey completion.

Procedures

The study was part of a larger study funded by SAMHSA (grant number: #1H79SP021160; see Morris et al., 2022). Our GSC program consisted of 4 single-hour sessions across 4-5 weeks. The session content involved therapeutic exercises focused on harm reduction, personalized feedback

on substance use, exploring the antecedents, consequences, pros and cons of use, and training in reflective-, communication-, and coping skills to promote non-substance-using adaptive coping. The exercises were aided using client manuals, which participants took home as educational materials and worksheets. All sessions concluded with a weekly goal, and each session started with a check-in and discussion of these goals. Through non-judgmental, MI-based approaches, the program aimed to increase intrinsic motivation and behavioral change in the misuse of alcohol and cannabis. For a detailed account of our GSC program and study, please see Morris et al. (2022).

Instruments

Minority AIDS Initiative (MAI) questionnaire surveys were administered before session 1 (pre) and immediately after session 4 (post). The survey is a standardized questionnaire developed by SAMHSA as part of the Minority AIDS Initiative (MAI), which focused on HIV/STI prevention and substance use amelioration (SAMHSA, 2006). Survey questions asked about demographics, primary substances of use (cannabis, alcohol, and/or other), past 30-day use for distinct substances, perceived risk regarding substance use, and perceived risk regarding sexual risk behaviors.

In the present study, we assessed specific outcomes: the perceived risk of 1) using cannabis once or twice a week, 2) binge drinking alcohol once or twice a week, 3) using tobacco once or twice a week, 4) engaging in unprotected sexual intercourse (generally), and 5) engaging in sexual intercourse while under the influence of drugs or alcohol (generally). All perceived risk questions were rated on a 4-point rating scale (1: No risk, 2: Slight risk, 3: Moderate risk, 4: Great risk) with "Don't know/Can't say" as an additional answer option.

Goals for Change Outcomes

GSC participants provided three Goals for Change ratings during session 1 (pre) and session 4 (post) of the program. (1) the Motivation to Change rating assessed how important changing substance use was to participants on a 5-point scale (0: Not important at all, 1: Less important than most of the other things in my life, 2: About

as important as most of the other things in my life, 3: More important than most of the other things in my life, 4: The most important thing in my life). (2) The Confidence to Change rating assessed perceived confidence in oneself to reduce substance use on a 5-point scale (0: Not confident at all, 1: A little confident, 2: Somewhat confident, 3: Very confident, 4: Extremely confident). (3) The Readiness to Change rating aimed to assess the acute readiness to change use of alcohol and cannabis on a 5-point scale (0: Not ready at all, 1: A little ready, 2: Somewhat ready, 3: Very ready, 4: Extremely ready). In this study, we used the Importance to Change question as a proxy for perceived benefits, while we used Confidence and Readiness to Change as proxies for self-efficacy.

Analysis Procedures

Data were analyzed using SPSS version 27 (IBM Corp., 2020). Kolmogorov-Smirnov tests (Kendall & George, 2008) indicated that all included variable distributions lacked normality. Thus, nonparametric tests were applied to assess mean-level change in perceived risk variables and motivation to change variables. For effect size estimation, we calculated Pearson's r values based on $z/\sqrt{n}$ (cutoffs: <.30: small; .30-.50: medium; >.50: large). Using G*Power 3 (Faul et al., 2007), we calculated that power sufficed for non-parametric tests at the final sample size if effect sizes were large.

RESULTS

Sample

The final sample consisted of 36 participants; sample demographics are displayed in Table 1. Among the 40 participants who were excluded from further analyses were those who: did not complete the program or survey ($n = 22$), did not complete the program or survey and used other substances ($n = 4$), did not complete the program or survey and were not self-referred ($n = 1$), were not self-referred ($n = 4$), used both cannabis and alcohol ($n = 3$), completed a shortened program ($n = 1$), were not self-referred and completed a shortened program ($n = 1$), were not self-referred and used other substances ($n = 1$), and used other substances ($n = 3$).

Table 1. *Demographics of the overall sample and by subsample*

	Overall sample $N = 36$	Subsample cannabis $n = 18$	Subsample alcohol $n = 18$	p^a
Age				
$M(SD)$	24.4 (5)	22.8 (4.3)	25.9 (5.2)	**.04**
Range	18 – 37	18 – 36	19 – 37	
Gender				.09
Female	21 (58.3%)	8 (44.4%)	13 (72.2%)	
Male	15 (41.7%)	10 (55.6%)	5 (27.8%)	
Ethnicity				**.02**
Hispanic/Latine	19 (52.8%)	13 (72.2%)	6 (33.3%)	
Not Hispanic/Latine	17 (47.2%)	5 (27.8%)	12 (66.7%)	
Race				
White	25 (69.4%)	15 (83.3%)	10 (55.6%)	.052
Black or African American	8 (22.2%)	3 (16.7%)	5 (27.8%)	.42
Asian	2 (5.6%)	0	2 (11.1%)	.15
Ethnicity & Race				
Hispanic/Latine & White	17 (47.2%)	12 (66.7%)	5 (27.8%)	**.02**
Hispanic/Latine & Black or African American	1 (2.8%)	1 (5.6%)	0	.31
Sexual Orientation				.6
Heterosexual	27 (75%)	13 (72.2%)	14 (77.8%)	
Bisexual	6 (16.7%)	3 (16.7%)	3 (16.7%)	
Homosexual	1 (2.8%)	1 (5.6%)	0	
Unknown	2 (5.6%)	1 (5.6%)	1 (5.6%)	
Housing status				
In own home or apartment	16 (44.4%)	9 (50%)	7 (38.9%)	.85
In campus/dormitory housing	9 (25%)	4 (22.2%)	5 (27.8%)	
In a relative's home	8 (22.2%)	4 (22.2%)	4 (22.2%)	
In a group home	2 (5.6%)	1 (5.6%)	1 (5.6%)	
Other	1 (2.8%)	0	1 (5.6%)	

Note: bolded *p* values indicate statistical significance at the .05 significance level. Percentages reflect absolute percentages, not valid percentages. Overall sample statistics reflect both subsamples combined. ^{a} = *p*-value based on Mann Whitney U tests (age) or Pearson Chi-Square tests (all other variables) to assess group differences (cannabis primary using or alcohol primary using).

We compared the participants who were included in the final sample ($n = 36$) with those who were excluded ($n = 40$) on gender (Pearson Chi-Square tests), age, baseline perceived risk outcomes, and baseline degree of use (Mann-Whitney U tests). There were no statistically significant differences between the two groups.

Half of the sample ($n = 18$) indicated cannabis as the only and primary substance used, and half ($n = 18$) indicated alcohol as the only and primary substance used. We compared the two subsamples on all demographics using Mann-Whitney U tests for age and Pearson Chi-Square tests for categorical demographic variables. On average,

the cannabis-using subsample was younger ($p = .04$), and included more Hispanic/Latine and White participants ($p = .02$) than the alcohol-using subsample. The results are listed in Table 1. We did not control in any way for these differences since we only looked at outcomes within each subsample and not between.

Perceived Risk

Among the cannabis-using participants, the perceived risk of using cannabis or hashish once or twice a week increased from 1.89 (no to slight risk) to 2.5 (slight to moderate risk). This increase

was statistically significant with a large effect size ($p = .03$, $r = 0.51$). No other risk variables among cannabis using participants showed a statistically significant result. However, all average scores increased from pre- to post-assessments. This and all remaining results are provided in Table 2.

Among the alcohol-using participants, the results indicated no statistically significant increase in perceived risk outcomes. However, all perceived risk variables, except the perceived risk of having sexual intercourse while under the influence of drugs or alcohol, showed pre- to post-assessment increases in average scores.

Motivation to Change

Among cannabis-using participants, we identified an increase in Confidence to Change from 2.42 (somewhat confident) to 3.14 (very confident). This increase was statistically significant with a large effect size ($p = .02$, $r = 0.57$). The results also indicated an increase in Readiness to Change from 2.56 (somewhat ready) to 3.25 (very ready). This increase was statistically significant with a large effect size ($p = .03$, $r = 0.52$).

Among alcohol-using participants, the results showed an increase in Confidence to Change from 2.24 (somewhat confident) to 3.08 (very confident). This increase was statistically significant with a large effect size ($p = <.001$, $r = 0.79$). The results also indicated an increase in Readiness to Change from 2.83 (somewhat ready) to 3.47 (very ready). This increase was statistically significant with a large effect size ($p = .02$, $r = 0.57$). Importance to Change increased slightly in both subsamples but did not evidence statistical significance in either.

DISCUSSION

We investigated pre-to-post changes in five perceived risk outcomes and three motivation to change outcomes in U.S. university students who attended a 4-session GSC program to reduce misuse of alcohol and cannabis. A substantial portion of our sample identified as racial minority (27.8%, $n = 10$), ethnic minority (52.8%, $n = 19$), or sexual minority (19.5%, $n = 7$). The results showed that, throughout the program, the perceived risk of using cannabis statistically significantly increased in the cannabis-using subsample but not the perceived risk of using alcohol in the

alcohol-using sample. In both the cannabis-using and alcohol-using subsamples, confidence to change and readiness to change statistically significantly increased from pre- to post-program assessments. These results align with our hypotheses, although the lack of a statistically significant increase in perceived risk among the alcohol sample was unexpected.

The findings suggest that during participation in the program, the perceived risk of cannabis use increased among those who engaged in cannabis misuse, which may supplement the previous finding that substance use, overall, decreased in this program (Morris et al., 2022). While we did not directly investigate mechanisms, causality, or *how* participation in the program affected the perceived risk, there are several possible explanations. First, engagement in the program may result in a heightened focus on the harm cannabis use is causing to the students and their environment. The perceived risks associated with the misuse of alcohol may be more blatant than the risks with cannabis use, so while students previously did not see their cannabis use as being as harmful initially, the program may have helped them identify how the use of cannabis impaired their daily life. This notion could be supported by the average rating anchors, which went from "no to slight" to "slight to moderate" perceived risk. Second, decreased use rates found previously (Morris et al., 2022) may have created cognitive dissonance, such that students aligned their perception of risk with their behavior. The ambivalence created by MI-techniques could have played a role in this change, which supports the underlying hypothesis of Motivational Interviewing (Barnett et al., 2014). We could not investigate whether the risk predicted misuse of alcohol and cannabis reduction or vice versa, but the *motivational* and *risk appraisal hypotheses* (Grevenstein et al., 2015) may apply. Third, part of the program is focused on training in coping skills, such as reflective skills, communication skills, mindfulness skills, and self-care. These skills may have given students the skills to be able to more clearly identify the risks associated with cannabis use that were previously unrecognized but may have offered skills as a prosocial alternative to use itself. The emphasis is on the perception of risks rather than the actual risks, with the former arguably being equally important as the latter in the context of health behaviors..

Table 2. *Perceived risk pre-post descriptives by subsample, including tests and effect sizes*

	Subsample Cannabis					Subsample Alcohol				
	Valid Pair N	pre *M* (*SD*)	post *M* (*SD*)	*p*[a]	*r*[b]	Valid pair N	pre *M* (*SD*)	post *M* (*SD*)	*p*[a]	*r*[b]
Perceived risk of using cannabis or hashish once or twice a week	18	1.89 (0.76)	2.5 (0.92)	**.03**	.51	14	2.07 (0.62)	2.36 (0.5)	.1	.44
Perceived risk of binge drinking alcohol once or twice a week	18	3 (0.77)	3.39 (0.7)	.08	.41	16	3.44 (0.63)	3.69 (0.48)	.16	.35
Perceived risk of using tobacco once or twice a week	16	1.13 (0.5)	1.38 (0.89)	.1	.41	16	1 (0)	1.06 (0.25)	.32	.25
Perceived risk of having unprotected sexual intercourse	17	2.94 (0.97)	3.35 (0.79)	.08	.42	18	3.33 (0.69)	3.44 (0.62)	.53	.15
Perceived risk of having sexual intercourse while under the influence of drugs or alcohol	17	2.94 (0.9)	3.29 (0.85)	.08	.42	18	3.56 (0.71)	3.56 (0.78)	1	0
Importance to Change	18	2.83 (0.9)	2.94 (0.78)	.61	.12	18	2.81 (0.75)	3.19 (0.75)	.053	.46
Confidence to Change	18	2.42 (0.97)	3.14 (0.64)	**.02**	.57	18	2.24 (0.96)	3.08 (0.6)	**<.001**	.79
Readiness to Change	18	2.56 (0.92)	3.25 (0.77)	**.03**	.52	18	2.83 (1.15)	3.47 (0.72)	**.02**	.57

Note: bolded *p* values indicate statistical significance at the two-tailed .05 significance level. Statistics (*M*/*SD*) reflect the valid pair statistics based on analysis-by-analysis deletion of missing observations. [a] = *p*-value based on Wilcoxon Signed-Rank Tests; [b] = Pearson *r* effect sizes.

The confidence to change and readiness to change ratings increased in cannabis and alcohol use groups. This could be expected, as the program focuses on goal setting, skills-training, and reflective goal-setting exercises, which may have caused students' confidence and readiness to change to increase. As previously reported (Litt & Kadden, 2015), the acquisition of new coping skills could have mediated the relationship between substance use reduction and self-efficacy (i.e., confidence and readiness to change behavior). Confidence and readiness to change could be seen as indicators of self-efficacy. The finding that GSC participation could be associated with substantial increases in self-efficacy might support the validity and effectiveness of the program's application in university settings. The finding that motivation to change did not statistically significantly increase may be the result of the effect of use reduction: the reduction caused cannabis use or alcohol use to become less important over time because other factors became more important.

Although these findings must be interpreted with caution due to the lack of experimentality and sufficient sample size, the findings may carefully indicate that a brief yet concrete, goal-oriented program such as GSC might induce perceived risk reduction. For cannabis use, increased perceived risk may have lasting effects beyond the program due to the lessons learned during the program. While alcohol has a biologically addictive component, cannabis use is mainly influenced by a psychological and social addiction pattern. A heightened risk perception and more confidence/readiness to enforce change in one's behavior could, therefore, positively influence the use reduction and harm reduction trajectory beyond the program, particularly when considering Social Learning Theory (Bandura & Walters, 1977). Importantly, participants may have gained valuable insight into their use patterns and associated contexts beyond mere use reduction and may deter students from continuing to progressively increase misuse, which is in line with harm reduction approaches.

Overall, these findings do not directly address the notion that GSC, as implemented in this study, is culturally and developmentally appropriate in terms of direct impact on outcomes, as was found previously (Gil et al., 2004; Morris et al., 2022; Wagner et al., 2014). However, the increase in perceived risk, motivation, and confidence to change among (minority) U.S. university students across the GSC program, as found in the current study's sample, is promising. We hope this indicates a substantial clinical impact of the program, which is portable and can be flexibly tailored to meet the needs of specific populations. Focusing on the perception of risks (rather than actual risks) may inform dissemination and implementation campaigns to reduce cannabis or alcohol misuse on college campuses.

Several aspects of this study design could restrict the generalizability of these findings. The sizes for the two student subsamples were small, and the study was too underpowered to detect small effect sizes. It is not easy to collect large clinical samples in collegian contexts, and the conclusions should be interpreted carefully as we had to rely upon nonparametric tests and small samples to investigate pre-post differences. Further, while we found pre-post increases in five outcomes, we did not conduct an experimental study with control groups and controlled manipulation. Therefore, claims about causality (or mediation/moderation) could not be made. We minimized social desirability bias by only including self-referred participants. Yet, social desirability bias, among other biases, might have still been a factor in the program because participants wanted to succeed and complete the program. For example, only including participants who completed the program may have biased the results such that participants included in this study might have been inherently more motivated to change their use. It is also worth noting that these results are area- and population-specific. The data were collected at a large institution in South Florida, and findings may not be generalizable to all U.S. colleges or universities. This further underlines the need for implementation at different institutions. Finally, to streamline the interpretation of study results, only participants who used either cannabis or alcohol were included. The results may differ for students who use both substances, which has been tied to worsened outcomes (Jackson et al., 2020).

Future research could address these limitations by collecting larger sample data, implementing, and evaluating the GSC program on geographically diverse U.S. campuses. This would allow for replications of studies that

simultaneously investigate substance misuse, perceived risk, and self-efficacy among university students. While experimental laboratory studies are useful in identifying the exact relationship between the factors investigated in this study, community-based intervention studies are recommended because they emphasize effectiveness (i.e., real-world conditions). To further the dissemination and implementation of GSC programs, community-based studies generally assess the here-and-now needs of individuals and communities. There are added societal and community benefits to simultaneously studying early intervention implementation and providing U.S. students with services. Future investigations also should study the effect of perceived risk-focused campaigns, such as online campaigns (Fernandez et al., 2019).

The students in this study were of diverse racial, ethnic, and sexual minority backgrounds and were self-enrolled in a brief university student cannabis or alcohol misuse reduction program. We carefully conclude from the study's results that perceived risk of cannabis use and confidence and readiness to change cannabis and alcohol use increased during a brief Guided Self-Change intervention.

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