A RANDOMIZED CONTROLLED TRIAL OF A NOVEL INSTAGRAM INTERVENTION TARGETING ALCOHOL USE AND BINGE-DRINKING

By

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TABLE OF CONTENTS

Chapter 1: Introduction

Overview

Over 40% of young adults in the United States report past-month binge drinking and nearly 15% meet criteria for an alcohol use disorder (Schulenberg et al, 2021; SAMHSA, 2021). However, despite these high prevalence rates and the significant consequences associated with problem drinking, the vast majority of young adults never seek treatment; many citing barriers such as cost, time constraints, stigma, and the belief that treatment is unnecessary (SAMHSA, 2021). In an attempt to overcome these barriers, researchers have developed brief, computerized interventions which require limited time, training and face to face interaction with clinicians. However, brief interventions are typically administered in settings that are not often utilized by young adults, such as primary care offices and emergency rooms.

In contrast, social media is widely and frequently used by young adults and may therefore provide an ideal platform for alcohol interventions. To date, however, very few empirical studies have tested the effects of social media-based alcohol interventions, and those that have, have used Facebook, a platform with diminishing popularity among young adults. The current study addresses this gap in the literature by testing an Instagram-based binge drinking intervention among young adults. Instagram is an engaging and highly accessible social media platform whose use exceeds that of Facebook and Twitter, particularly among young adults. Recent pilot work suggests that the Instagram intervention is engaging and highly acceptable, and that it shows some evidence of efficacy. The current study builds on this pilot work by using a community-based sample, a randomized controlled design, and a 10-week follow-up assessment.

Alcohol Use Among Young Adults

According to the National Survey on Drug use and Health (NSDUH, 2021), over the past month, 52% of American adults used alcohol, 23% engaged in binge drinking, and 11% met criteria for an alcohol use disorder. These high rates of problem drinking are concerning, given the substantial health consequences associated with alcohol use, including diseases (e.g., liver disease, stroke, cancer), chronic health conditions (high blood pressure, stomach ulcers), mental health problems (e.g., depression, anxiety), pregnancy complications, and birth defects (Bagnardi et al, 2015; Chen & Yoon, 2022; Iranpour & Nakhaee, 2019; Kesmodel et al, 2019). Alcohol use is also strongly associated with injuries, motor vehicle accidents, sexual violence, and suicide (Alpert et al, 2022; Berglund & Ojehagen, 1998; National Highway Traffic Safety Administration, 2023). In total, more than 140,000 people die from alcohol-related causes each year, making alcohol use the fourth-leading preventable cause of death in the United States behind tobacco use, obesity, and the use of illegal drugs.

Although heavy alcohol use occurs in all major demographic groups, it is most prevalent among young adults. Specifically, 43.4% of 18- to 24-year-olds report past-month binge drinking, and 49.6% of US young adults report exceeding recommended alcohol use limits at least once during the past month (Esser et al., 2014). Young adults also report high rates of other risky drinking practices, including daily drinking and high intensity drinking (i.e., 8/10 or more drinks in a sitting for women/men; Schulenberg et al, 2021; Windle, 2003), and nearly 15% of young adults (ages 18-25) meet criteria for an alcohol use disorder.

Many social and developmental factors contribute to problem drinking among young adults. In the United States, young adulthood or "emerging adulthood" is often thought of as a distinct developmental period characterized by identity exploration, a lessening of parental control, and the delay of typical adult milestones, such as marriage, parenthood, and stable employment

(Arnett, 2000). In addition, adolescence and emerging adulthood are associated with increased impulsivity and sensation-seeking, coupled with a sense of subjective invulnerability which can impair the ability to assess risk (Potard et a1., 2018; Sher et al, 2004; Goudriaan et al., 2007). Finally, emerging adulthood is characterized by increased peer influence (Schwartz, 2016). These changes often occur in the context of heavy drinking environments, such as college campuses, where subgroups of heavy drinking peers can lead to inflated perceived drinking norms and subsequent increases in alcohol use (DiGuiseppi et al., 2018). All of these factors (i.e., lack of adult responsibilities, impulsivity, low levels of risk perception, heightened peer influence, and diminished parental influence) contribute to high rates of risky drinking among emerging adults, rates which tend to increase rapidly between ages 18-22 and then decrease steadily during the third decade of life (White & Jackson, 2004).

Alcohol Use Disorder Treatment

Despite the high prevalence of risky drinking among young adults, rates of treatment within this demographic are very low. In fact, the National Survey on Drug Use and Health estimates that 95.6% of 18–25-year-olds, who meet criteria for an alcohol use disorder, do not receive treatment for their problem drinking (SAMHSA, 2021). While untreated alcohol use disorders are problematic for all age groups, they may be especially so for young adults, as heavy substance use during this period can interfere with healthy identity development and the acquisition of developmentally appropriate skills (Arnett, 2005; Barry & Nelson, 2005; Schulenberg et al., 2004). In particular, young adult alcohol misuse has been associated with social isolation and academic difficulties (Brown et al., 2008), as well as neurocognitive deficits, such as problems with memory retrieval and visuospatial functioning (Brown et al., 2000).

Notably, there are many barriers to substance use treatment among young adults. These include: cost, lack of time, treatment-related stigma, inability to access medical care, and – especially – the belief that treatment is unnecessary (May, Nielsen, & Bilberg, 2019; Schuler et al., 2015). In fact, 97.5% of emerging adults, who met criteria for a substance use disorder in 2020, did not want – or feel that they needed – treatment (SAMHSA, 2021). Thus, there is a need to develop alcohol use interventions that are non-burdensome, cost-effective, and engaging for young adults, who may feel ambivalent about receiving treatment.

Brief Interventions

The difficulties associated with disseminating alcohol use treatments have led many practitioners to utilize brief interventions. Brief interventions are short (often single session) treatments that use empirically-based strategies, such as assessing the pros and cons of drinking, providing normed feedback, and giving participants the opportunity to set drinking reduction goals (Miller & Rollnick, 2012). These interventions are convenient and time limited and can be administered in a variety of settings, such primary care facilities, college health centers, and emergency departments. Brief interventions are also uniquely applicable, given the large number of young adult drinkers who find longer-term, more intensive treatments to be unwanted and unneeded (SAMHSA, 2021). Brief interventions are grounded in a variety of theoretical perspectives, most notably motivational interviewing (MI) and cognitive behavioral therapy (CBT).

Motivational Interviewing

Motivational interviewing (MI; Rollnick & Miller, 2012) is a set of semi-structured techniques that can be used by clinicians to address ambivalence toward behavior change. Unlike

more confrontational and directive therapies that previously dominated the field of addiction, MI acknowledges the counterproductive nature of arguing against "sustain talk" (i.e., reasons for maintaining current behavior) and instead positions the client to produce their own "change talk" (i.e., reasons, ability, need and ways to change; White & Miller, 2007). MI therapists use a variety of techniques to promote change talk and increase motivation. These include the use of affirmations, reflections (both simple and complex), and open-ended questions (Rollnick et al., 2010). More generally, at MI's foundation is the "MI spirit," which emphasizes several therapeutic components: collaboration, support of autonomy, evoking rather than installing, accurate empathy, acceptance, and compassion (Miller & Rollnick, 2012).

Although MI was developed as a therapeutic "style" that emphasized clinician/client collaboration, some interventions (particularly brief, computerized interventions) use specific MI techniques in isolation (Grekin et al., 2019). Commonly used standalone MI techniques include norm referencing, use of a readiness ruler, and statements of affirmation.

Norm referencing refers to providing information about the prevalence of alcohol use and alcohol-related consequences within specific demographic groups. Norm referencing is based on the idea that heavy drinkers underestimate how much they drink in comparison to others their age (i.e., they believe that their drinking is more 'normal' than it really is; Moreira et al., 2009). Data suggest that norm referencing is an effective component of alcohol interventions (Saxton et al., 2021) and that it may be especially effective among young adults (Krieger et al., 2018).

A readiness ruler is a common motivational interviewing technique in which respondents are asked how confident they are about changing their alcohol use and how important it is to them Both confidence and importance are rated on a scale of 1 (not confident/important) to 10 (very confident/important). After selecting a number on the scale, respondents are given a chance to

explain why their response was not lower (e.g., "Why are you a 3, instead of a 1?"). This technique prompts the respondent to focus on their reasons for wanting change, rather than their reasons for sustaining behavior.

Affirmations are positive and strength-based statements. They aim to increase participants' self-efficacy and confidence, factors which are in turn negatively associated with heavy drinking (Kaden & Litt, 2011). Affirmations can take many forms, including general praise, acknowledgment of effort, comments about personal strengths and observations about progress made. Affirmations have been found to be one of the components of MI that most consistently promotes change talk and decreases sustain talk within MI sessions (Apodaca et al, 2016).

Cognitive Behavioral Therapy

Cognitive behavioral therapy (CBT) for alcohol use focuses on identifying and modifying thoughts (e.g., "I can't relax without a drink") and behaviors (e.g., keeping large quantities of alcohol in the house) that may be contributing to excessive drinking. CBT also helps clients to identify drinking triggers (i.e., environmental factors that make drinking more likely), as well as coping mechanisms for dealing with situations in which alcohol use is likely to occur (Larimer, Palmer, & Marlatt, 1999; Parks & Marlatt, 2000).

As with motivational interviewing, many brief interventions have incorporated specific CBT techniques into their protocols. One commonly used technique (drawn from CBT-based relapse prevention) is mindfulness. Mindfulness is a state of awareness in which individuals are focused on, and accepting of, the present moment (Creswell, 2017). Specific mindfulness exercises (e.g., body scans, focusing on breathing, paying attention to sensory experiences) can be used to foster awareness and acceptance of one's thoughts, feelings, and sensations. Notably, mindfulness

has been used as an effective coping strategy for craving (Schmidt, Lumley, & Grekin, 2023; Witkiewitz, Marlatt, & Walker, 2005), particularly among individuals who drink to cope with negative affect (Wisener & Khoury, 2021).

Another commonly used CBT technique is education about protective behavioral strategies (PBS). Protective behavioral strategies are self-regulated behaviors that can minimize the consequences and harm associated with alcohol consumption (e.g., consuming water between drinks of alcohol, picking a designated driver, avoiding drinking games, etc.; Martin et al., 2020). Evidence suggests that the use of PBS is associated with reduced drinking and fewer alcohol-related consequences within both young adult and adult samples (Benton et al, 2004; Ray et al., 2009). Additionally, studies show that the relationship between binge-drinking and alcohol-related problems is weaker among young adults, who report more frequent use of PBS (Borden et al., 2011).

Brief Alcohol Interventions: Efficacy and Dissemination Issues

Although brief interventions are widely used and grounded in empirically-supported therapies, their effects have nonetheless been modest, with meta-analyses yielding effect sizes in the small to moderate range, and many individual efficacy trials producing null results (Butler et al., 2013; Kaner et al., 2013; Maio et al., 2005). Studies focusing specifically on brief interventions for young adults and college students have produced similar findings. In fact, three recent meta-analyses suggest that the effects of brief interventions for young adult drinkers are non-significant (Huh et al, 2015) or very small (Carey et al, 2007; Foxcroft et al, 2014).

Brief alcohol interventions have also been negatively affected by implementation challenges. Specifically, health care providers with limited time and training are often unable or

unwilling to adhere to established guidelines for alcohol screening and brief interventions (Kaner et al., 2013; Larimer et al., 2004; Van Beurden et al., 2012). Additionally, many health care providers are uncomfortable administering alcohol use interventions to clients, who seek care for non-substance related issues (Larimer et al., 2004).

In order to address the dissemination issues posed by brief interventions, some clinicians have turned to computer-delivered brief interventions (CDBIs). CDBIs use interactive technology to deliver interventions via computers or mobile devices. CDBIs are inexpensive and readily available. Moreover, they can be delivered with perfect fidelity (i.e., near perfect standardization with no human or clinician error between administrations), and they eliminate the need for provider time and training. However, despite their convenience, it is a challenge to connect heavy drinkers with CDBIs. Many heavy drinkers, particularly those under the age of 30 (Petterson et al., 2018), do not present in primary care settings where CDBIs are typically delivered. In fact, 45% of young adults (aged 18 to 29) in the United States report that they do not have a primary care provider (Kaiser Family Foundation, 2018). Additionally, many heavy drinkers are unwilling to spend even a limited amount of time working through a computerized intervention.

Social Media Interventions

To circumvent the dissemination problems associated with CDBIs, some researchers have begun to use social media sites as platforms for heavy drinking interventions. Social media is a ubiquitous feature in most young Americans' lives. Nearly 84% percent of individuals, aged 18 to 29, report using some form of social media (i.e., Facebook, Instagram, Twitter, etc.; Auxier & Anderson, 2021). This number rises to 98% among college students, most of whom spend multiple hours per day on social media (Perrin & Anderson, 2019). The near universal use of social media

among young adults, coupled with its ability to host engaging and flexible content, makes these sites ideal platforms for young adult alcohol interventions.

Social media-based alcohol interventions may also be useful in combatting the large amount of alcohol-positive content that can be viewed online. In particular, studies have found that the majority of alcohol-related content on Twitter is positive (Cavazo-Rehg et al., 2015) and that adolescents, who are presented with experimental Facebook pages showing older peers drinking, are more likely to report willingness to drink (Litt & Stock, 2011). This type of positive alcohol content may contribute to skewed, perceived drinking norms and may promote alcohol use among young adults (Stoddard et al., 2012). In contrast, social media alcohol interventions may serve to correct skewed drinking norms on a platform where they are often promoted.

Notably, existing social media-based alcohol interventions, while sparse, have shown some evidence of efficacy. For example, Ridout and Campbell (2014) assigned 98 university students who met criteria for hazardous drinking to either a control group or a Facebook intervention group. Participants in the intervention group received private Facebook messages that contained information about actual drinking norms on campus and how they compared to participants' perceived norms (e.g., "You said that you have six or more standard drinks weekly and that you think a typical student in this unit of study has six or more standard drinks weekly. In fact, of the students in this unit who drink alcohol, most (84%) have six or more standard drinks once a month or less"). Results showed that participants in the Facebook intervention group reduced their drinking significantly more than those in the control group at both 1- and 3-month follow up. Additionally, intervention group participants showed improvements in the accuracy of their perceived drinking norms.

Bonar and colleagues (2022) assigned 955 youth, who reported recent risky drinking, to one of three conditions: a Facebook-based alcohol intervention, a Facebook-based alcohol intervention with incentives for participation, or a placebo-control condition. Participants in the intervention conditions viewed 8-weeks of daily content that covered a range of topics, including current events, dealing with stress, staying healthy, getting support, and handling tricky situations. Additionally, peer e-coaches were trained to respond to participants in the two intervention conditions using motivational interviewing strategies. Results revealed that the intervention plus incentives condition yielded higher acceptability ratings, and greater reductions in drug, but not alcohol, use when compared to the control condition at both 3- and 6-month follow-up. There were no significant differences between the three conditions at 12-month follow-up.

Finally, Ramo and colleagues (2019) tested the feasibility and acceptability of a Facebook-based intervention for tobacco use and heavy episodic drinking. Fifty participants were assigned to 1 of 2 private Facebook groups based on their readiness to reduce their substance use. Both groups of participants were then exposed to 90 days of Facebook posts which used MI and CBT-based strategies to target tobacco and alcohol use. Participants were also exposed to live group sessions with a doctoral level counselor. Results showed that the intervention was perceived as helpful and easy to understand. However, at the end of the intervention, participants were more receptive to reducing their tobacco, as opposed to their alcohol use.

Instagram Interventions

Notably, no studies have used Instagram to deliver an alcohol-based intervention (though Instagram messaging has sometimes been a component of non-targeted public health campaigns, e.g., McLaughlin et al, 2022). This is surprising, given that Instagram use exceeds that of both

Facebook and Twitter among US young adults. Specifically, 73% of 18- to 29-year-olds report logging onto Instagram at least once per day, and 53% report logging on several times per day (Schaeffer, 2021; Auxier & Anderson, 2021). Thus, Instagram has tremendous potential for widespread, effective dissemination of intervention content.

In light of these data, the aim of the current study is to test the efficacy of a fully online, Instagram-based intervention designed to reduce heavy alcohol use among young adults. Participants will be randomly assigned to either an intervention or an assessment-only control condition. Analyses will compare mean changes in past-month alcohol use, alcohol-related consequences, mindfulness, and use protective behavioral strategies in intervention versus control group participants at 10-week follow-up. Secondary analyses will assess the perceived acceptability of the intervention and its posts, as well as the degree to which the posts were seen and remembered by participants. It is hypothesized that (1) participants in the intervention group will show greater decreases in alcohol use and consequences and greater increases in mindfulness and protective behavioral strategy use than participants in the control group and (2) intervention posts will be remembered and given high acceptability ratings.

Pilot Work

The proposed project will build on a pilot study conducted by the PI between April 2021 and December 2021. During this pilot study, 50 Wayne State University students between the ages of 18-28, who reported regular binge drinking, were given an Instagram-based alcohol intervention (developed specifically for the study by the PI). After an initial orientation session, participants were asked to follow the study Instagram page and were then shown intervention posts each day for 6 weeks. A subset of participants was also exposed to a series of Instagram 'stories'

(i.e., images that are available for viewing for twenty-four hours after posting), which were posted once every two days. Instagram content consisted of mindfulness exercises, presentation of drinking norms, information about protective behavioral strategies, and specific affirmations (described in more detail below).

The intervention was rated as highly acceptable. Additionally, analyses revealed significant within-subjects decreases in past-month alcohol consumption, drinking days, and binge-drinking days post-intervention; however, there were no significant changes in past-month protective behavioral strategies and mindfulness practices. Although this pilot study provided critical feedback about intervention development and administration, it was intentionally small and did not include a control group, thereby limiting the interpretation of findings. The proposed study builds on this pilot work by replicating the study with a larger sample size, a community-based sample, and an assessment-only control group. Specific procedures are described below.

Chapter 2: Methods

Participants

Eighty participants will be recruited from Prolific, an online platform designed to screen and recruit potential research participants for online studies. Power analyses indicate that, with an N of 80 (two groups of 40), this study will be sufficiently powered to detect effect sizes of .20, an effect size consistent with other standalone, technology-delivered, cognitive behavioral interventions for alcohol use (Kiluk et al., 2019).

In order to be eligible for the study, participants must: (1) be a US resident, (2) be between the ages of 18 and 30; (3) report at least two binge-drinking episodes (i.e., four or more drinks in one sitting for cis women, five or more drinks in one sitting for cis men or transgender and

nonbinary individuals) per month over the past three months; (4) have an active Instagram page; and (5) report regular Instagram use (i.e., at least 2-3 times a week).

Participants will be randomized to either an intervention condition in which they will follow an Instagram page and engage with content during the six-week study period or to an assessment-only control condition in which they will be emailed assessment measures, but will not be exposed to intervention content.

Measures

Demographics will be assessed at baseline. Participants will be asked to answer questions about their sex, gender, age, race, ethnicity, sexual orientation, education level, and household income. State of residence will also be assessed.

Past Month Alcohol Use will be assessed with The Timeline Follow-Back (TLFB; Sobell & Sobell, 1996), a highly reliable interview that uses a calendar and multiple procedures to aid in the retrospective reporting of substance use. During the TLFB, participants are asked to report how many standard drinks they consumed each day, during the past 30 days. Before beginning the task, participants will be provided with a graphic that illustrates the size of a standard drink (Figure 1), as well as a calendar marked with major holidays (Figure 2). The online version of the TLFB has been found to be a reliable measure of alcohol use in young adult samples (Rueger et al., 2012).

Past-Month Alcohol Consequences will be assessed using the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ; Kahler et al., 2005), a well-validated 24-item questionnaire designed to assess high- and low-level drinking consequences commonly experienced by young adults. The BYAACQ has shown good validity among young adults and is

designed to be sensitive enough to detect drinking consequences within non-clinical samples (Stamates, Yang, & Lau-Barraco, 2022).

Protective Drinking Practices will be assessed with the Protective Drinking Practices Scale (PBS; Martin et al., 2020), a 20-item questionnaire which measures the frequency of protective behavioral strategy use in the past month (e.g., "Limited cash before going out" rated on a Likert scale ranging from 'Never' to 'Always'). This measure has shown good validity for use among young adults in the United States (Jordan et al., 2021).

Mindfulness Practices will be assessed using the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS is a 15-item questionnaire that assesses the frequency of engaging in mindfulness and mindfulness-related practices (e.g., "I find it difficult to stay focused on what's happening in the present" rated on a Likert scale ranging from 'Almost Always' to 'Almost Never'). The MAAS has been well-validated in young adult populations (MacKillop & Anderson, 2007).

Intervention Acceptability will be assessed using six domains of acceptability (i.e., relevant, respectful, helpful, empathic, personalized, and interesting). A selection of individual posts will be rated, in addition to the overall intervention. Ratings will be made using single-item, 5-point Likert scales.

Intervention Content

Each intervention post will contain at least one of five elements: mindfulness exercises, norm referencing, readiness assessment, affirmations, or protective behavioral strategies.

Mindfulness Exercises. Mindfulness posts in the current Instagram intervention consist of breathing and imaginal exercises that encourage participants to be attuned to the present moment.

Examples include statements such as, “Ever zone out while doing something boring? Next time, try focusing on your breathing” or “Give yourself a moment this morning to really taste whatever your morning drink is, whether it be coffee, tea, or water. Let yourself savor it. Notice the smell (if there is one), the temperature, the texture.” Given that there is a particularly strong relationship between acting with awareness (one specific facet of mindfulness) and reductions in alcohol consumption (Karyadi & Cyders, 2015), the mindfulness posts in the current study will aim to promote “acting with awareness” with regards to both alcohol use and everyday living.

Norm Referencing. Norm referencing posts in the current study will provide participants with information about binge drinking and its risks (e.g., “Binge-drinking is defined as: 4+ drinks in one sitting for women, 5+ drinks in one sitting for men”). Other norm referencing posts will use population statistics to prompt participants to consider how their drinking habits align with those of others their age (e.g., “In 2018, 63% of 18- to 24-year-olds reported no binge-drinking during the past month. Do you drink more than the average of people your age?”).

Readiness Assessments. Readiness assessment posts will use a readiness ruler to ask participants (1) how ready or able they are to reduce their alcohol use and (2) why they think they might be ready/able (e.g., “On a scale of 1 to 10, how confident are you that you could cut back on your drinking? Was your answer a zero? If it was another number, why is that? What makes you feel like you’re - even a little bit -ready to change your drinking habits? Think about strengths and past successes that you could draw on.”).

Affirmations. Affirmation posts will present participants with positive, encouraging statements that are generic enough to apply to many, but meaningful enough to tap into specific values. An example of an affirmation post is the sentence, “No one knows you better than you do!” Other affirmation posts will reference common values and skills (e.g., “You have the power to

prioritize the things that matter to you and to achieve your goals! Put your values first, and the rest will follow") or prompt participants to reflect on their own individual values and skills (e.g., "You did that! Give yourself credit where credit is due. Think about your goals and go for them!").

Protective Behavioral Strategies. Protective behavioral strategy posts will reference specific behaviors that can increase or decrease the consequences of alcohol use (e.g., "Drinking games can be dangerous. Drinking too much, especially in short spans, can lead to alcohol poisoning. What was once fun can become frightening."). Other posts will ask participants to reflect on protective behavioral strategies that they have used in the past or have seen others use effectively.

Procedure

Recruitment and Baseline. Eighty participants will be recruited using a screening survey administered through Prolific, a research recruitment website. Eligible participants will be given access to the main study on Prolific, and those randomized to the intervention condition will be invited to follow the study Instagram page. Before being given the Instagram page username, participants will be asked to agree to the following study guidelines/expectations:

1) They will follow the Instagram intervention page for the duration of the 6-week study

2) They will treat their fellow group members with respect and avoid "trolling" (i.e., contacting other participants, posting disrespectful comments, using obscene language, etc.)

3) They will participate, comment, and share when they feel comfortable doing so

4) They will 'like' intervention content posts as they appear on their feed (as a way of indicating that they have seen them)

5) While their comments and interactions on the page will not be seen by the general public, other participants will be able to view them and interact with them

After agreeing to these expectations, participants will be asked to provide their Instagram username, sent a baseline survey containing a link to the Instagram page and the baseline questionnaires, and instructed to begin following the Instagram page immediately.

In order to prevent delays between baseline survey completion and the start of the Instagram intervention, subgroups of participants may be randomized to condition and exposed to the intervention in different data collection waves. Each wave will last for six weeks and will contain a total of forty-two Instagram posts and twenty-one Instagram 'stories' (i.e., images that are available for viewing for twenty-four hours after posting and can utilize mechanics like polls and quizzes). Intervention content will be posted once per day throughout the 6-week intervention period, alternating between posting times of approximately 8 AM EST/EDT and 8 PM EST/EDT, and intervention 'stories' will be posted once every two days.

10-Week Follow-Up Survey. Ten weeks after the intervention start date (and four weeks after the end of the intervention), participants will be emailed a follow-up survey, which will contain the same questionnaires as the baseline survey. Participants in the intervention condition will also be asked to rate how relevant, respectful, helpful, empathic, personalized, and interesting they felt the intervention content had been, using 5-point Likert scales. Additionally, participants in the intervention group will be shown specific examples of previously posted content and asked to rate each specific post on the dimensions listed above, as well as to indicate whether they remembered seeing those particular posts.

The follow-up survey will remain open for two weeks, and reminder messages will be sent during this time to encourage participant completion. Each participant will receive $10 for completing the baseline session and $15 for completing the 10-week online follow-up survey.

Analytic Strategy and Hypotheses

The data will be assessed for normality, missing data, and outliers. Data transformation, multiple imputation, and list-wise deletion will be utilized as needed. Mixed repeated-measure ANOVAs will be used to analyze within- and between-group differences in participants' alcohol consumption, alcohol-related consequences, mindfulness practices, and use of protective behavioral strategies at baseline and 10-week follow-up. Average acceptability ratings will be calculated using group means.

We predict that (1) intervention participants will show greater decreases than control group participants in past-month quantity and frequency of alcohol use, binge-drinking episodes, and alcohol-related consequences, and (2) intervention participants will show greater increases than control group participants in the use of protective behavioral strategies and mindfulness practices. We also predict that the intervention as a whole. and specific intervention posts will be remembered and rated as highly acceptable across several dimensions (i.e., relevant, respectful, helpful, empathic, personalized, and interesting).

Figures

12 fl oz of regular beer	=	8–9 fl oz of malt liquor (shown in a 12 oz glass)	=	5 fl oz of table wine	=	1.5 fl oz shot of 80-proof spirits (whiskey, gin, rum, vodka, tequila, etc.)
						
about 5% alcohol		about 7% alcohol		about 12% alcohol		about 40% alcohol

The percent of "pure" alcohol, expressed here as alcohol by volume (alc/vol), varies by beverage.

December 2022

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18 Hanukkah Begins	19	20	21 Winter Solstice	22	23	24 Christmas Eve
25 Christmas Day	26 Hanukkah Ends / Boxing Day	27	28	29	30	31

APPENDIX

Instagram Intervention Posts

Image 1.

Caption 1. It can be easy not to be present when you're going through the motions. Next time, try to focus your attention on your breath, and do things with intent.

Image 2.

Caption 2. A lot of people think alcohol helps them fall asleep, but it can actually cause you to wake up throughout the night and get less sleep overall. Have you ever had a drink right before bed? What do you do to make sure you can get a good night's rest?

Image 3.

Caption 3. This definition is brought to you by the National Institute of Alcohol Abuse and Alcoholism. Do you binge-drink?

Image 4.

Caption 4. Share how you know it's time to call it a night.

Image 5.

Caption 5. What can you do for yourself today? Sometimes happiness isn't something we find, but it's something we can create!

Image 6.

Caption 6. Homework? Making time for family? Saving extra money? It's important to prioritize the things that matter to you!

Image 7.

Caption 7. Happy Friday! What are you proud of accomplishing this week? What are your goals for next week?

Image 8.

Caption 8. In 2016, over 10,000 people died as a result of an accident involving alcohol-impaired driving. What will you do to prevent drunk driving tragedies?

Image 9.

Caption 9. Give yourself a moment this morning to really taste whatever your morning drink is, whether it be coffee, tea, or water. Let yourself savor it. Notice the smell (if there is one), the temperature, the texture.

Image 10.

Caption 10. Drinking can put a dent in your bank account. If you cut back on drinking, you might see your savings flourish!

Image 11.

Caption 11. You're the expert on you! You know your limits and what's important to you.

Image 12.

Caption 12. Know the signs of alcohol poisoning so that you can keep yourself and your friends safe!

Symptoms include:

- Confusion

- Passing out
- Vomiting
- Seizures
- Slow or irregular breathing
- Slow heart rate
- Clammy skin
- Dulled responses
- Extremely low body temperature

Image 13.

Caption 13. Do you drink more than the average of people your age?

Image 14.

Caption 14. You did it! You made it another week *party emoji* Remember to take some time to reward yourself for powering through! Whether it be a walk or watching your favorite show, no act of self-appreciation is too small.

Image 15.

Caption 15. Some drinks have much higher alcohol content than others. One small shot has the same amount of alcohol on average as a glass of beer or wine. How could you change your drinking so that there is a less chance of you getting sick?

Image 16.

Caption 16. Was your answer a zero? If it was another number, why is that? What makes you feel like you're - even a little bit -ready to change your drinking habits? Think about your strengths and past successes that you could draw on.

Image 17.

Caption 17. Taking a moment to notice what's around you is a useful practice whenever you find yourself getting caught up in your thoughts and feelings.

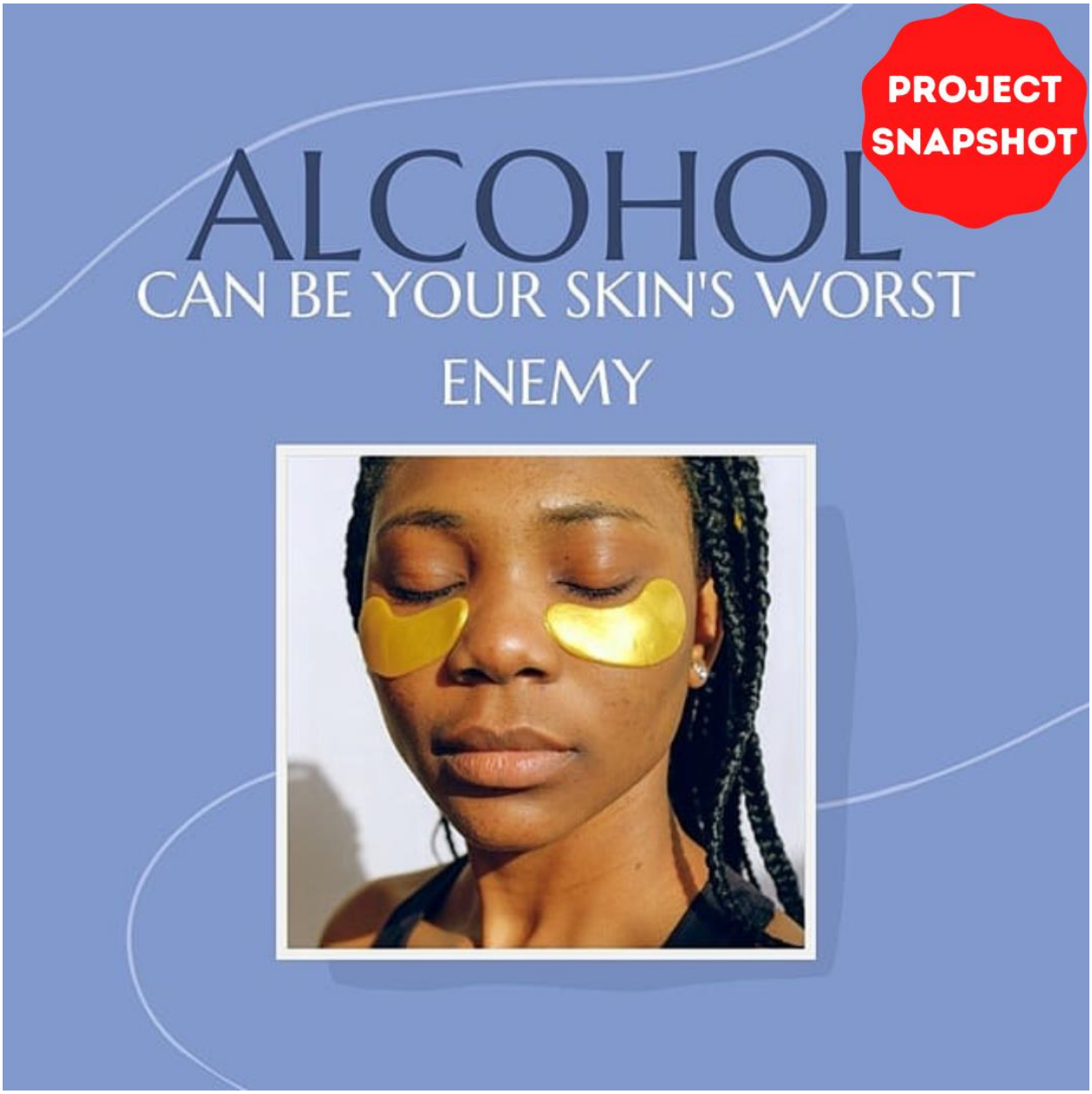
Image 18.

Caption 18. Eating before drinking can help keep you from getting sick. What's your favorite thing to eat when you plan on drinking throughout the night?

Image 19.

Caption 19. When was the last time you had a really awful hangover? What do you do to avoid them?

Image 20.



Caption 20. Drinking can dehydrate you and kill your complexion. Cutting back can help you get that healthy glow!

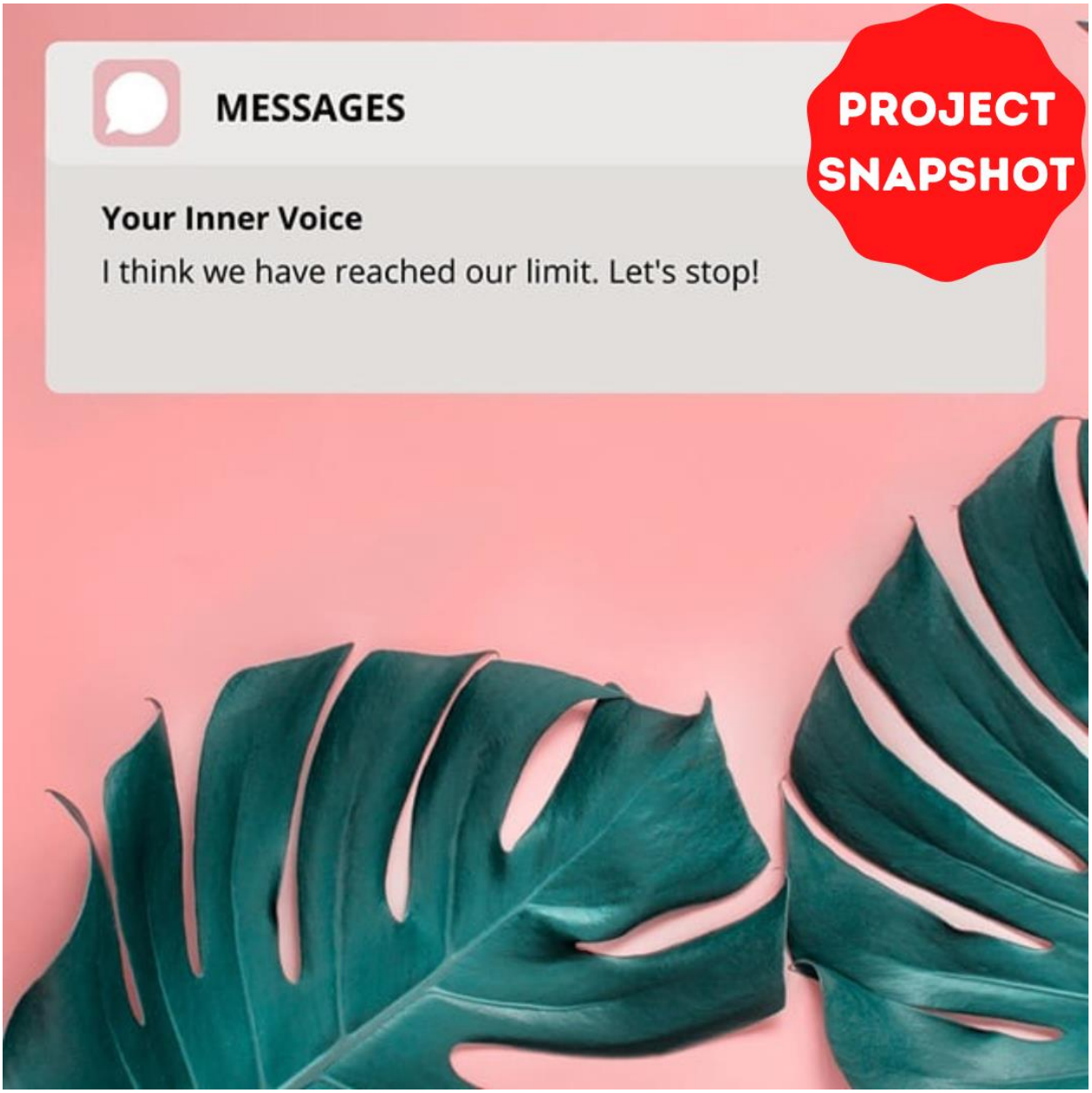
Image 21.

Caption 21. Another week down! What are you looking forward to this weekend? What are your goals for next week?

Image 22.

Caption 22. Take a moment to reflect on the things that make you happy. Think of three things, and name them below in the comments [finger pointing down emoji]

Image 23.



Caption 23. Feeling too warm, woozy, or a little nauseous? All of these can be a sign that it is time to pause your drinking. How does your body tell you that you've reached your limit?

Image 24.

Caption 24. Craving = feeling the need to drink

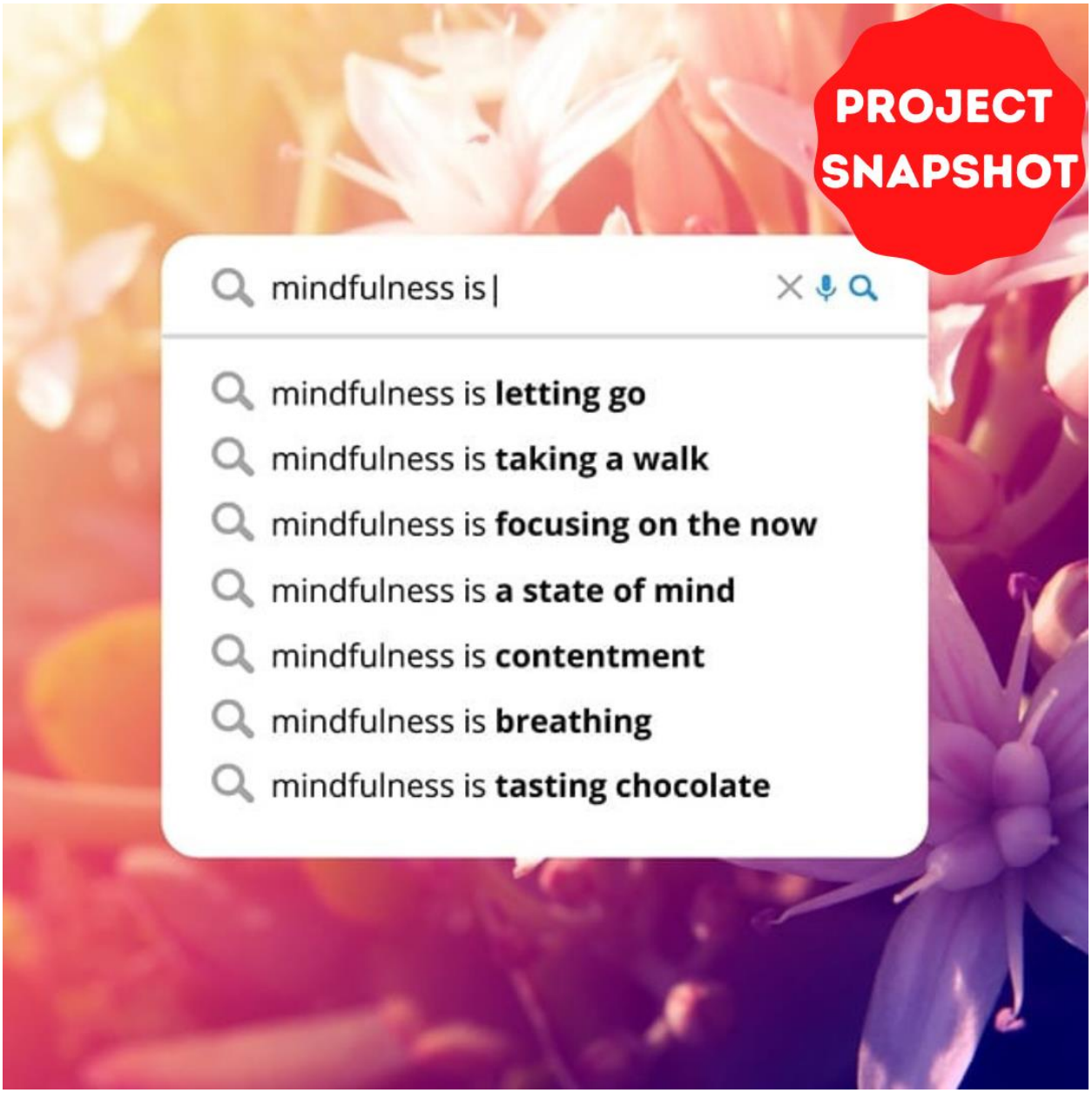
Loss of Control = drinking more than you planned

Physical dependence = needing a drink to feel okay

Tolerance = having to drink more to feel the effects

Have you ever experienced any of these?

Image 25.

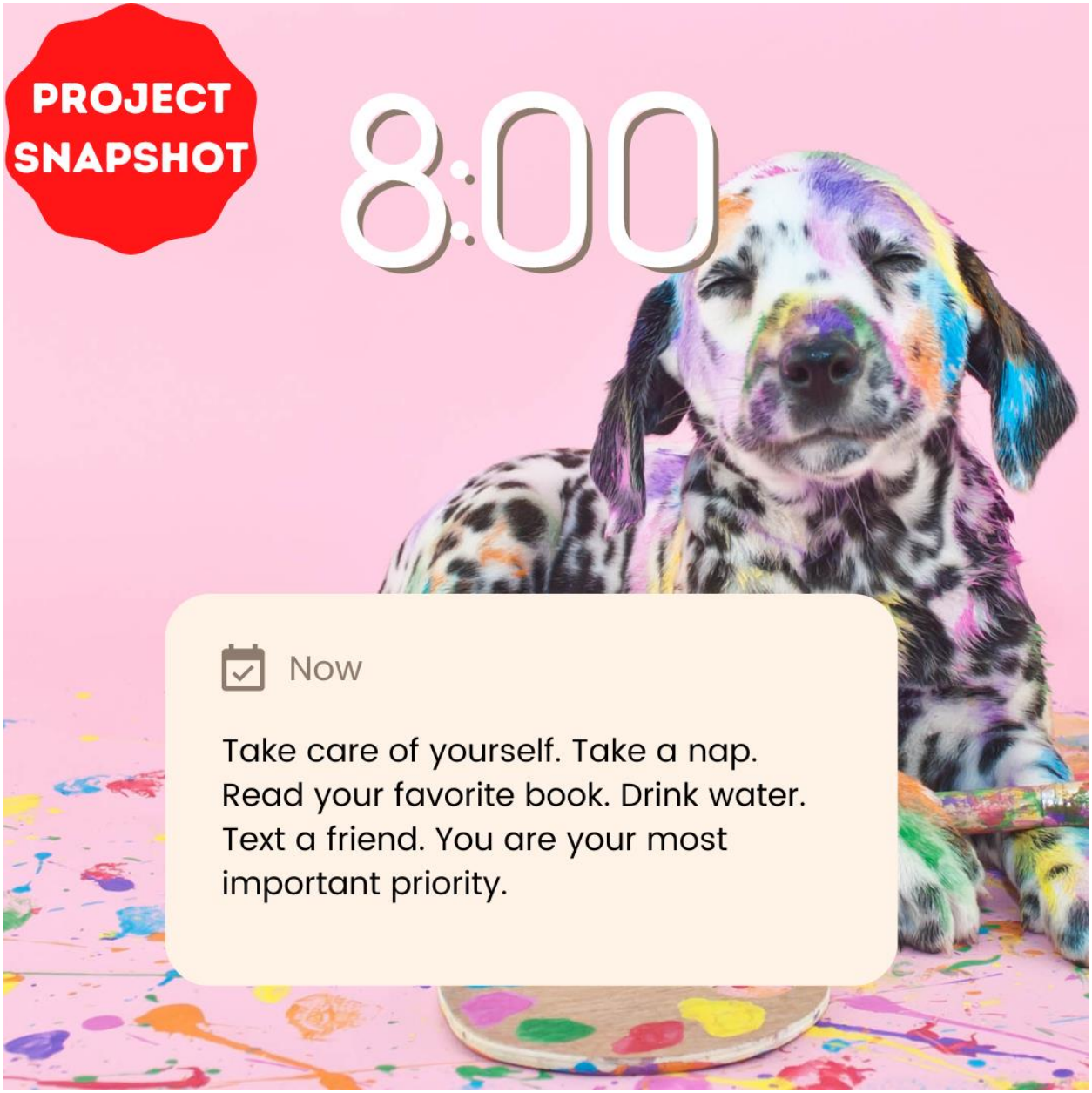


Caption 25. Mindfulness is a set of practices that help you to ground yourself by staying the moment. What is your favorite way to stay mindful?

Image 26.

Caption 26. Treat yourself like you would treat your best friend.

Image 27.



Caption 27.

What can you do today (minus drinking) to bring yourself joy?

Image 28.

Caption 28. You did that! Give yourself credit where credit is due. Think about your goals, and go for them!

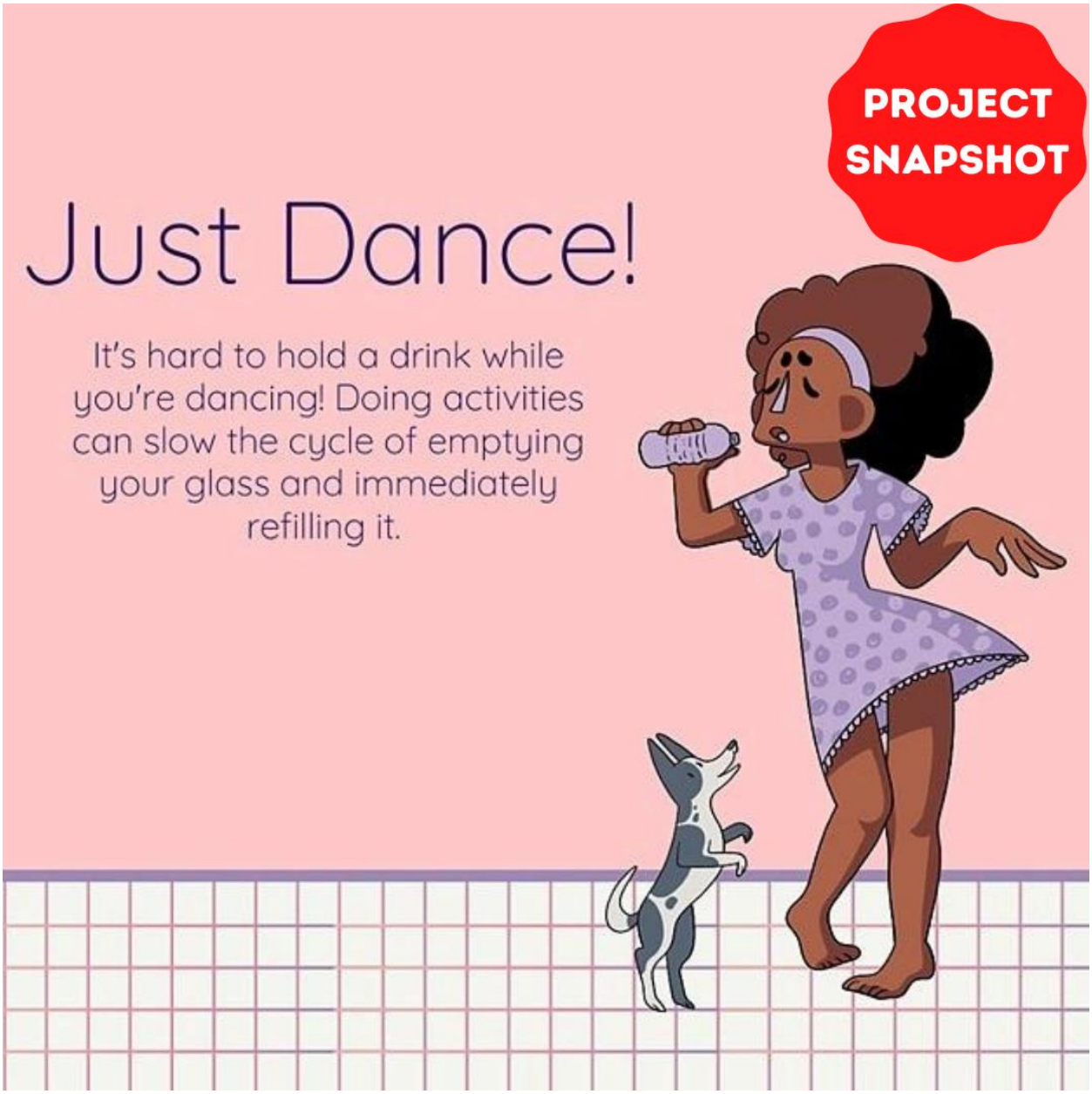
Image 29.

Caption 29. One of the best ways to make sure that everyone stays safe during a night of drinking is sticking with those you know and trust. Write down the name of one person you trust.

Image 30.

Caption 30. Tell us in the comments what you're noticing right now.

Image 31.



Caption 31. It's all about the fun you can have! Keeping your body moving can help you to drink at a safe pace. What's your favorite song to dance to?

Image 32.

Caption 32. Take your time, examine your food, and really taste it. Use intent with each bite so that you can stay in the present and notice how the flavor changes.

Image 33.

Caption 33. Once you have a number in mind, ask yourself: why that number and not zero?

Imagine what you would gain from cutting back on alcohol.

Image 34.

Caption 34. Instead of rushing through your drink, take your time to enjoy it!

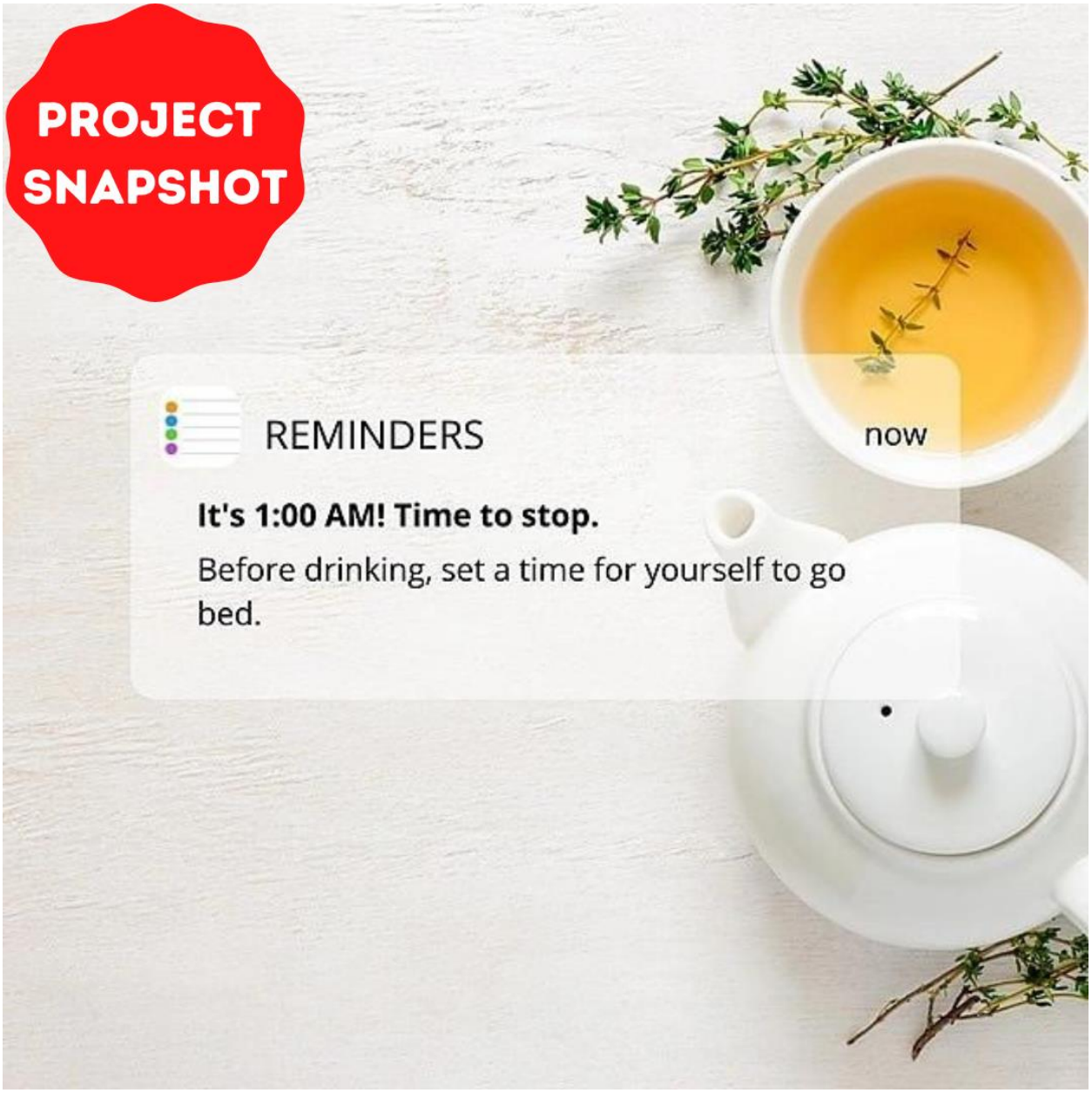
Image 35.

Caption 35. How do you reward yourself after a tough week? Some quiet time with a good book, a nice long walk, or an impromptu dance break can go a long way!

Image 36.

Caption 36. Having trouble concentrating? Your drinking might be making it worse.

Image 37.



Caption 37. One way to make sure you don't end up drinking more than you would like is to set a time ahead of time for when you'd like to stop. How else can you make sure not to drink too much?

Image 38.

Caption 38. Mindful breathing can be a great practice for when you're feeling overwhelmed or disconnected. Take a few moments, and remember this pattern: 4 - 7 -8.

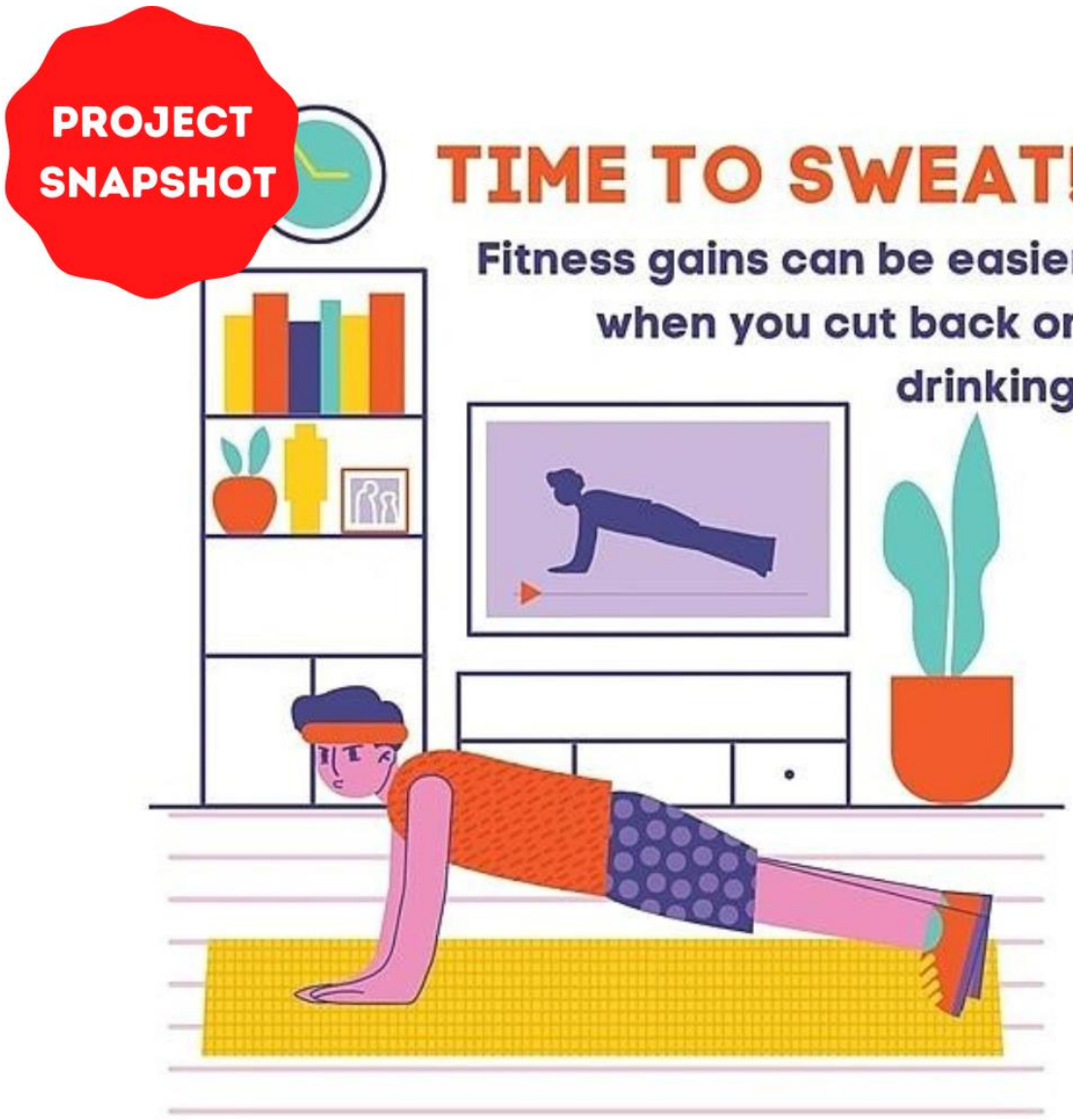
Image 39.

Caption 39. You have the power to prioritize the things that matter to you and to achieve your goals! Put your values first, and the rest will follow.

Image 40.

Caption 40. The people who love you can worry about your safety when you're out. Make sure to get a safe ride home!

Image 41.



Caption 41. Alcohol can impair your body's ability to build muscle, which means that drinking might get in the way of your fitness goals. What's your favorite way to get your body moving?

Image 42.

Caption 42. Reflect on all that you have accomplished this week, even the things that seem small, and celebrate each victory with a little self-care.

***

This is our last post! Thanks for participating in the project. Please stay followed to us for at least this next week, and keep a lookout for the final survey, which will be emailed to you four weeks from today [insert date]. Take care, and be well!

Instagram Intervention Stories

Story 1.

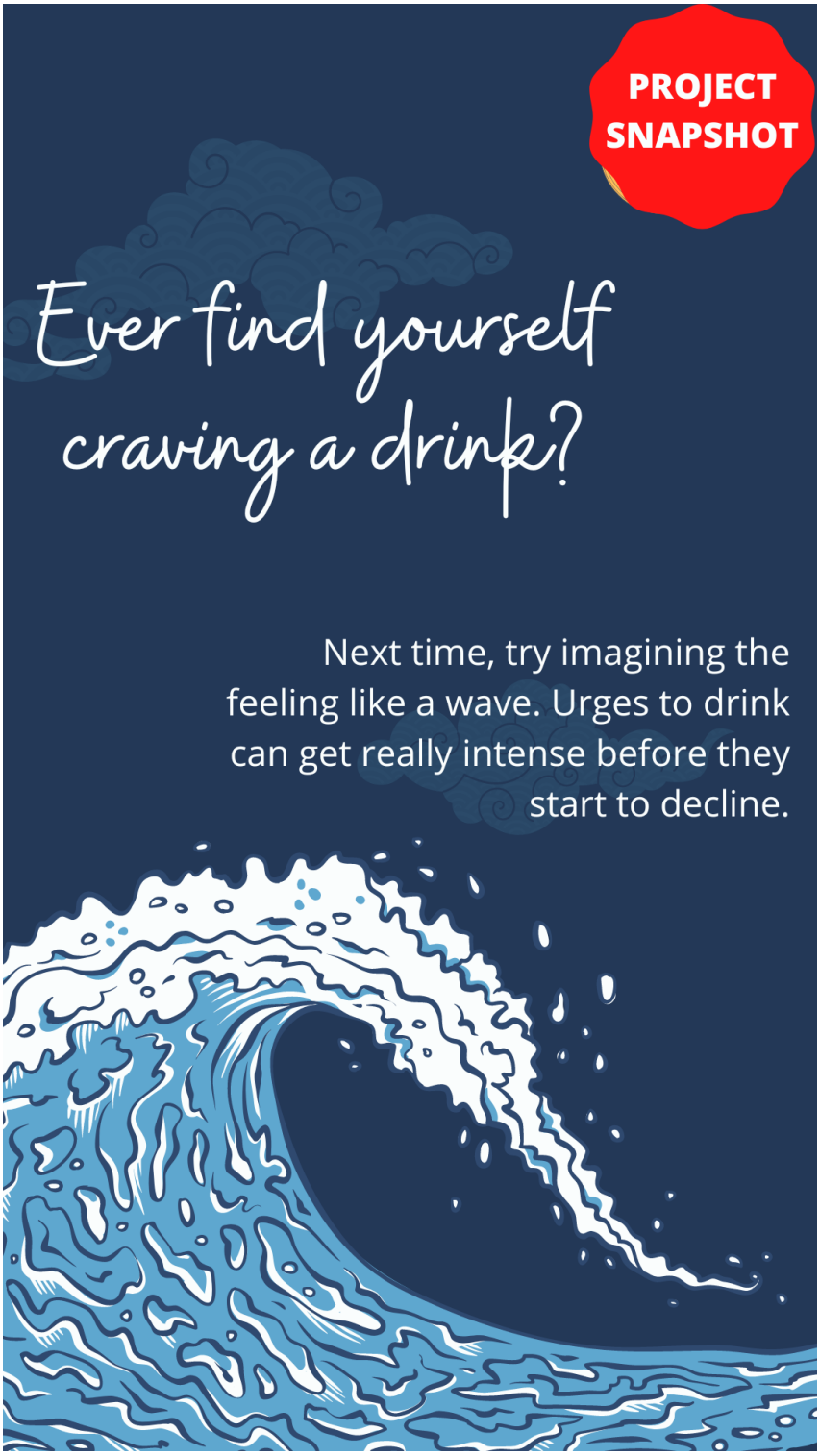
Story 2.


PROJECT SNAPSHOT
STOP
Take a mindful minute.
5
Note five things you can *see*.
4
Note four things you can *touch*.
3
Note three things you can *hear*.
2
Note two things you can *smell*.
1
Note one thing you can *taste*.

Story 3.

Quiz included: With options “True” or “False”

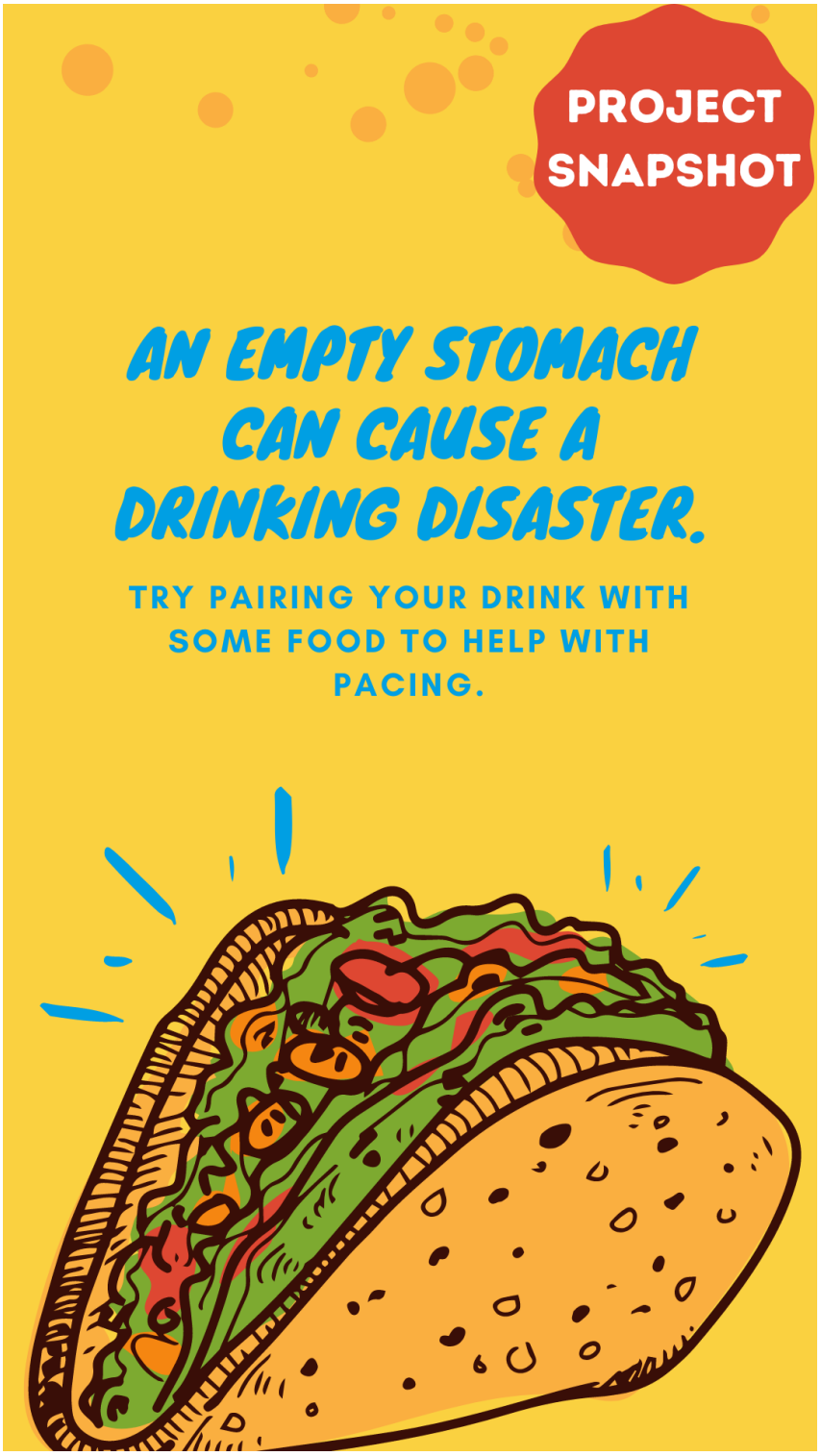
Story 4.


PROJECT SNAPSHOT
Ever find yourself craving a drink?
Next time, try imagining the feeling like a wave. Urges to drink can get really intense before they start to decline.

Story 5.


PROJECT SNAPSHOT
Beer
Beer
355 ML
1 for 1: Water for Alcohol
For every sip of alcohol, take a sip of water. This can help you pace yourself and keep you from drinking more than you would like.

Story 6.


PROJECT SNAPSHOT
AN EMPTY STOMACH CAN CAUSE A DRINKING DISASTER.
TRY PAIRING YOUR DRINK WITH SOME FOOD TO HELP WITH PACING.

Story 7.


PROJECT SNAPSHOT
Mindful Minute
Take a moment to imagine leaves flowing down a stream. Acknowledge each thought you have, and then, place them on a leaf, one by one. Visualize the leaves flowing down the stream.

Story 8.


PROJECT SNAPSHOT
DOES YOUR DRINKING CHANGE BASED ON CONTEXT?
SOMETIMES THE PEOPLE AROUND US AND WHERE WE ARE CAN INFLUENCE THE WAY WE DRINK. PAYING ATTENTION TO THESE PATTERNS HELPS US NOT TO DRINK MORE THAN WE WOULD LIKE.

Story 9.

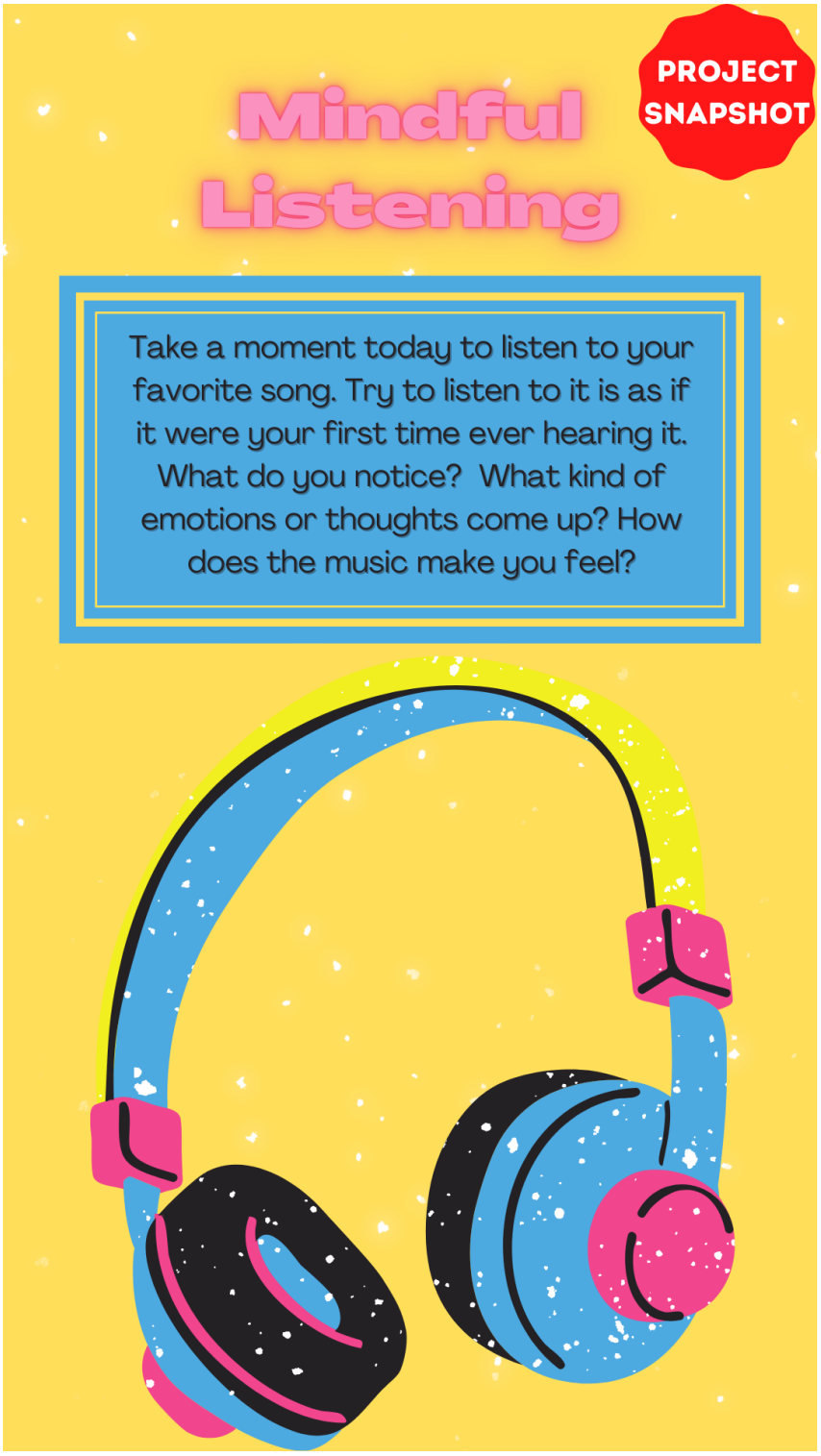

PROJECT SNAPSHOT
When you have someone who is with you the entire night and can help you keep track of how much your drinking, it can help you from over-drinking.
Keep trusted friends close by during a night of drinking!

Story 10.

Poll included: "Have you ever set a limit on how much you want to drink ahead of time?"

Answers: “Yes” or “No”

Story 11.


PROJECT SNAPSHOT
Mindful Listening
Take a moment today to listen to your favorite song. Try to listen to it is as if it were your first time ever hearing it. What do you notice? What kind of emotions or thoughts come up? How does the music make you feel?

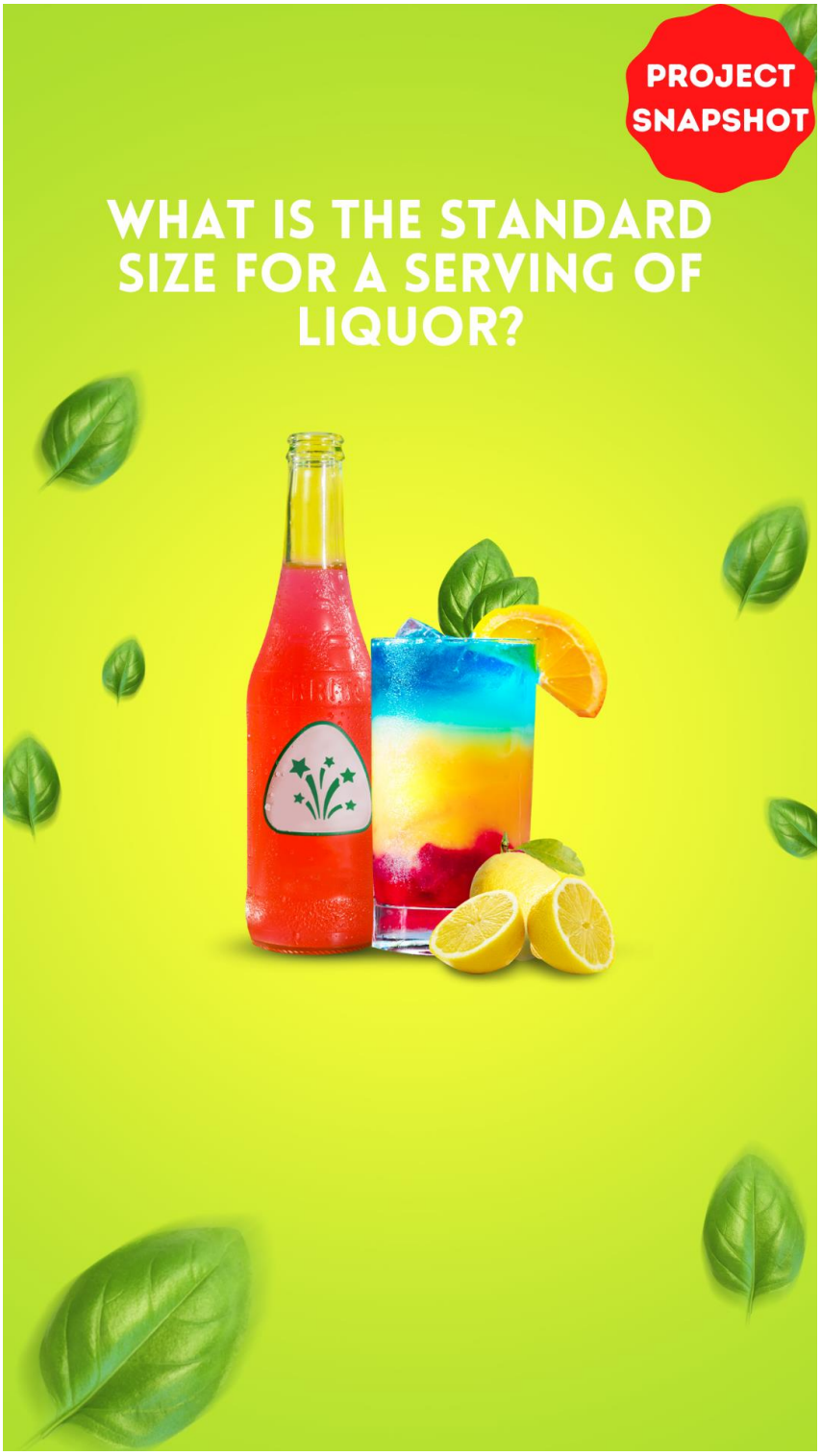
Story 12.

Quiz included: With options “3 oz,” “4 oz,” “5 oz,” or “6 oz”

Story 13.

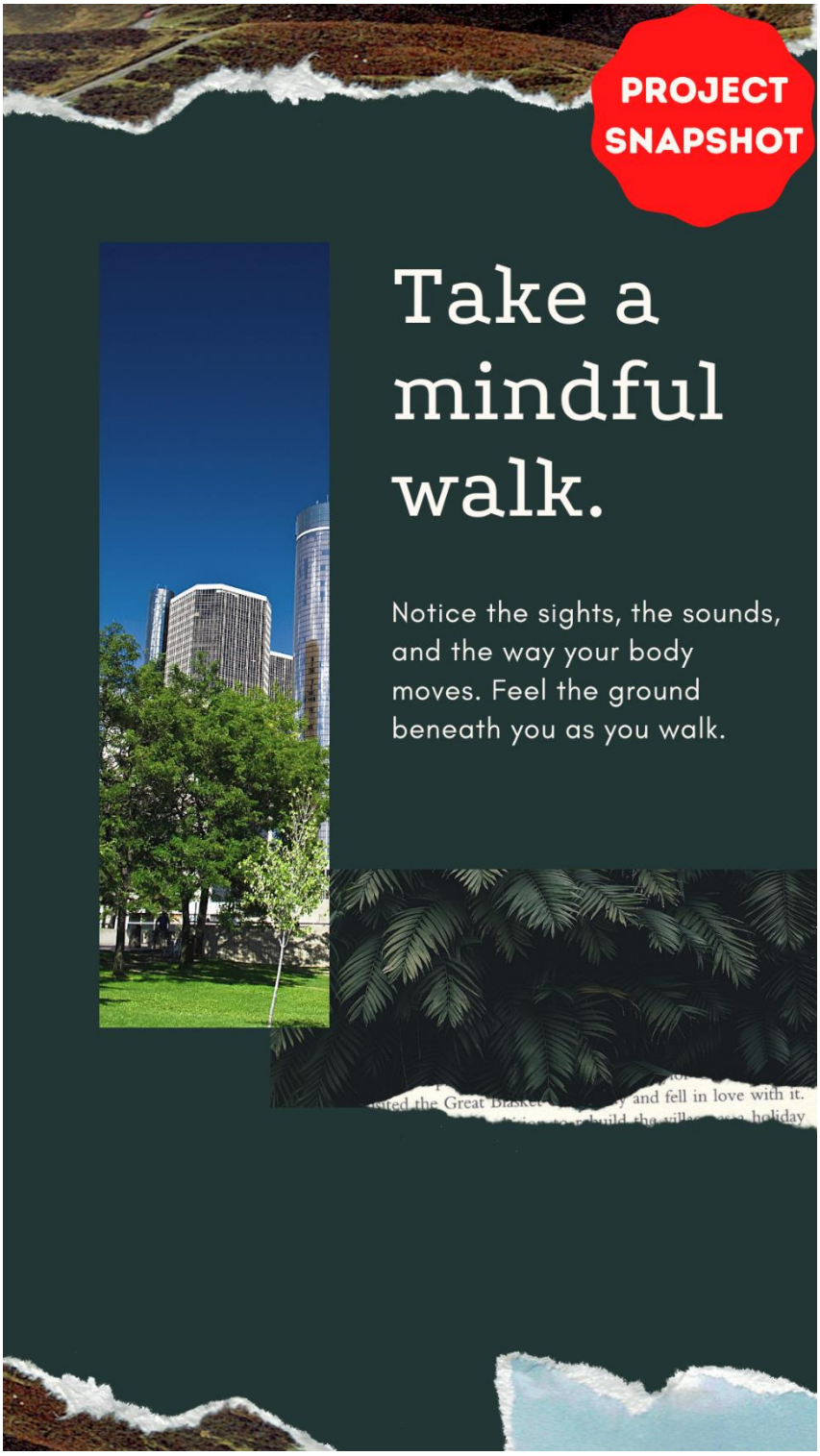
Quiz included: With options “10 oz,” “12 oz,” “14 oz,” or “16 oz”

Story 14.



Quiz included: With options “1.5 oz,” “2 oz,” “2.5 oz,” or “3 oz”

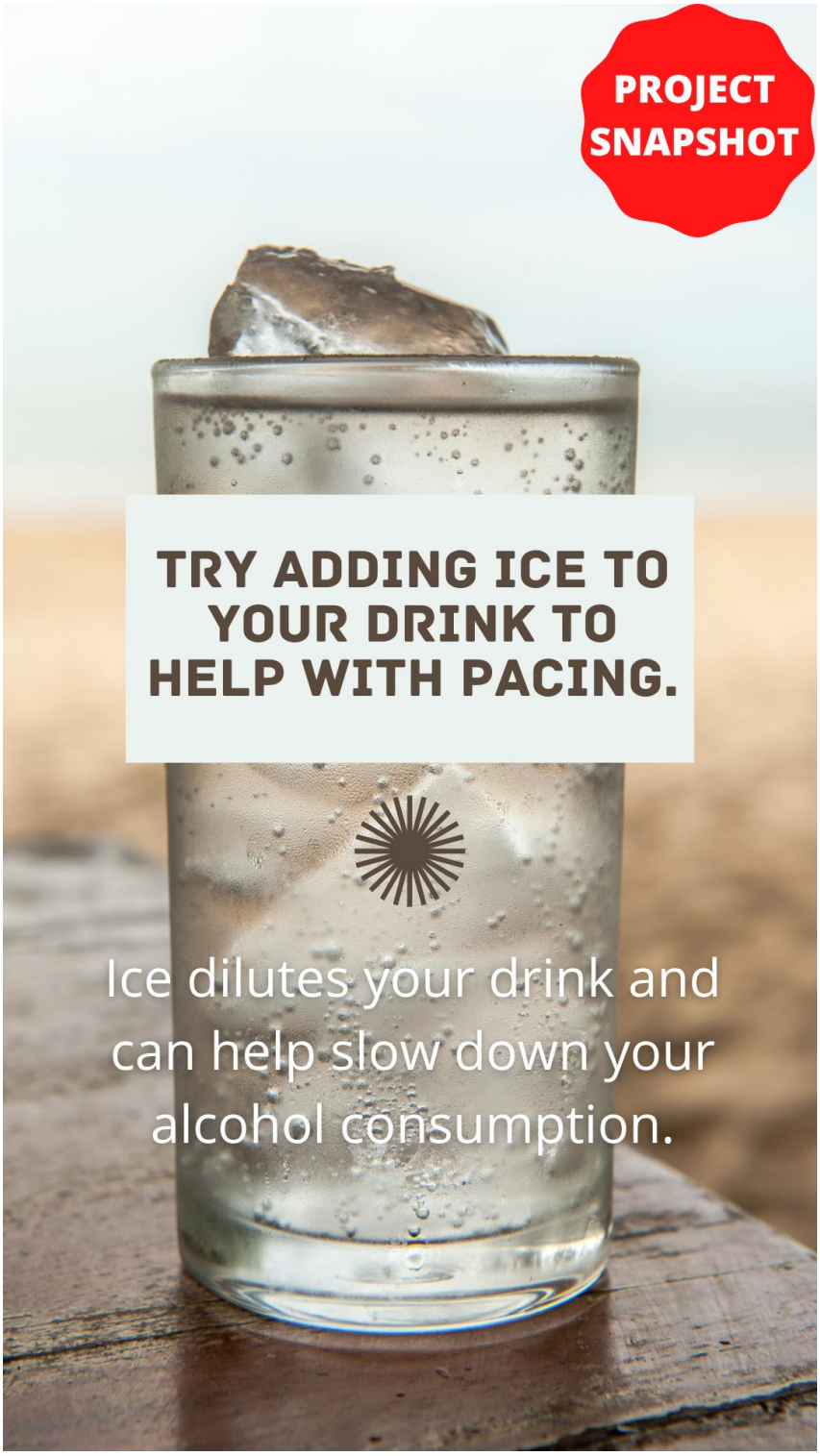
Story 15.


PROJECT SNAPSHOT
Take a mindful walk.
Notice the sights, the sounds, and the way your body moves. Feel the ground beneath you as you walk.

Story 16.


PROJECT
SNAPSHOT
1
2
3
4
IF YOU'RE WORRIED A FRIEND MAY BE SUFFERING FROM ALCOHOL POISONING, PLACE THEM IN THE RECOVERY POSITION WHILE YOU WAIT FOR PARAMEDICS TO COME HELP.

Story 17.


PROJECT SNAPSHOT
TRY ADDING ICE TO YOUR DRINK TO HELP WITH PACING.
Ice dilutes your drink and can help slow down your alcohol consumption.

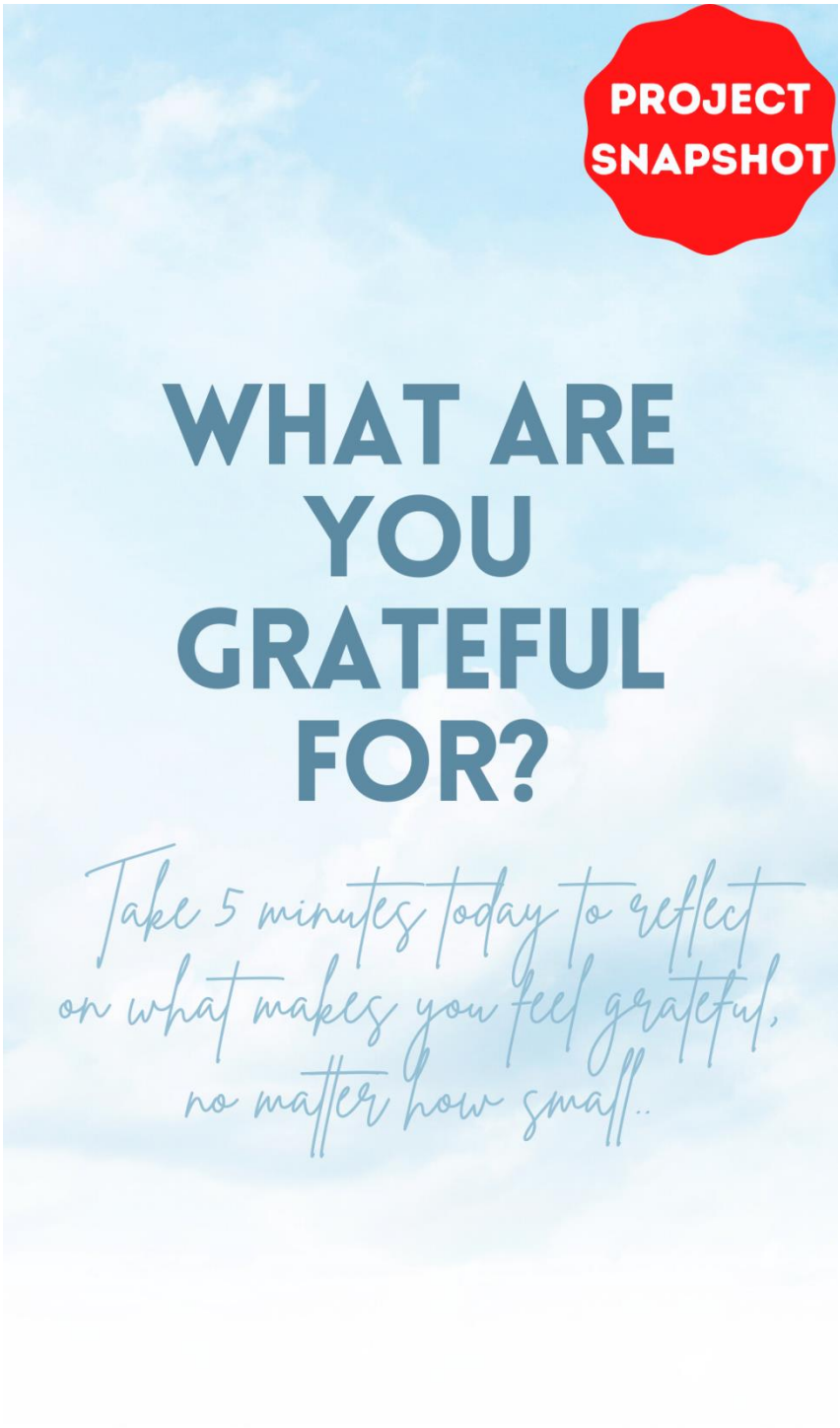
Story 18.

PROJECT SNAPSHOT

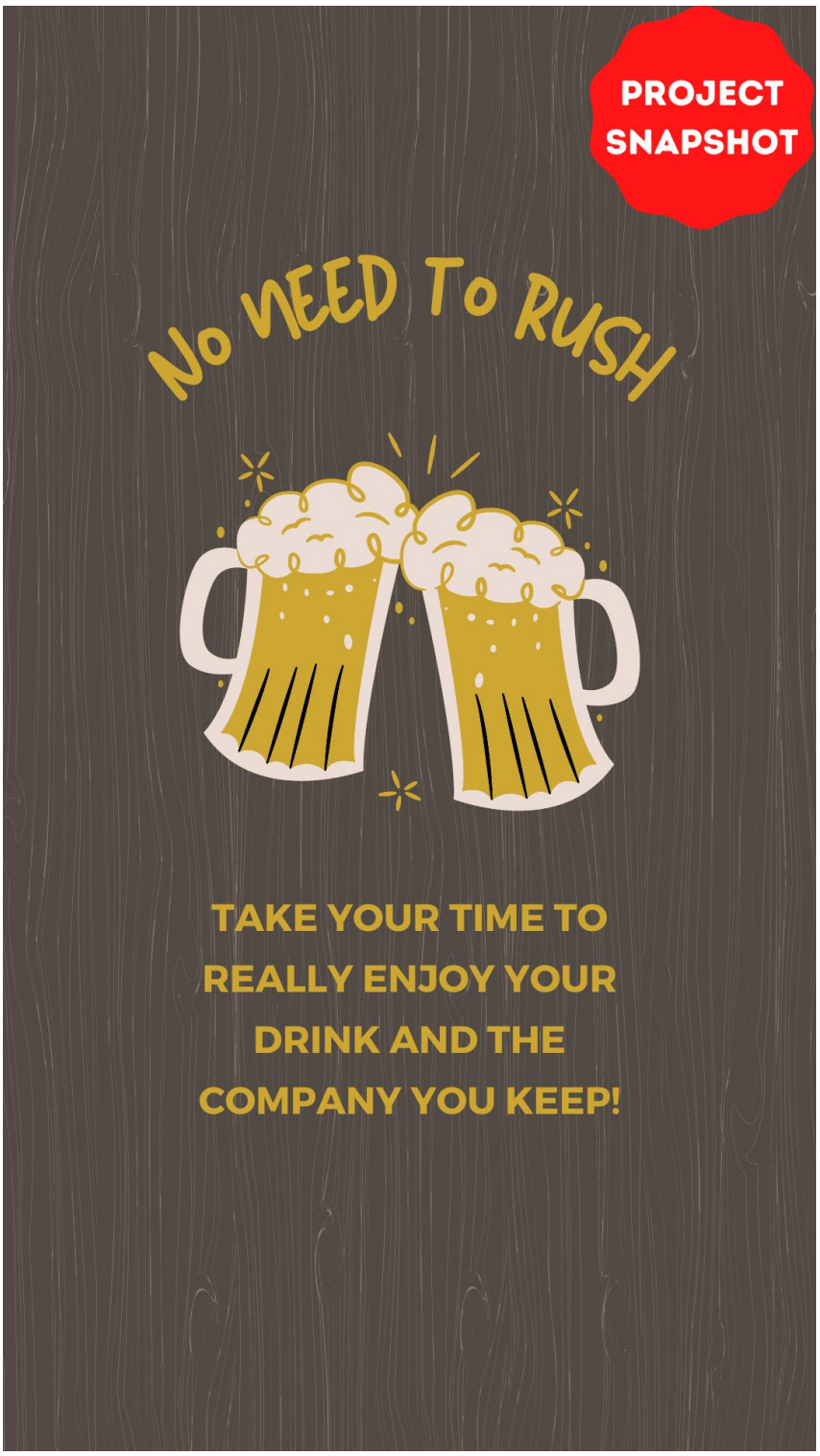
HEAVY DRINKING IS ASSOCIATED WITH HEALTH CONSEQUENCES.

The CDC defines heavy drinking as:
8+ drinks per week for women
15+ drinks per week for men

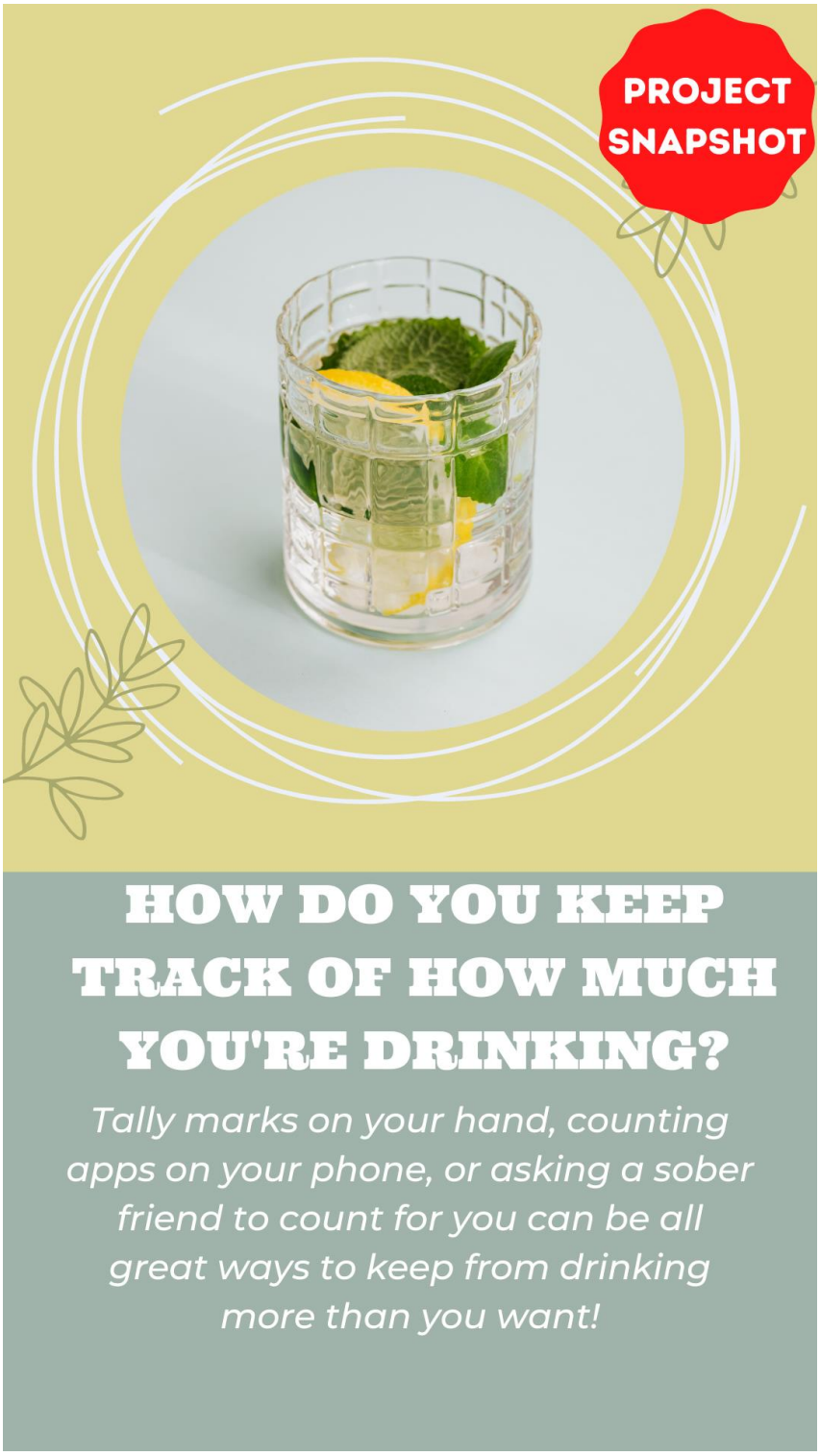
Story 19.


PROJECT
SNAPSHOT
WHAT ARE
YOU
GRATEFUL
FOR?
Take 5 minutes today to reflect
on what makes you feel grateful,
no matter how small..

Story 20.


PROJECT
SNAPSHOT
No NEED To RUSH
TAKE YOUR TIME TO
REALLY ENJOY YOUR
DRINK AND THE
COMPANY YOU KEEP!

Story 21.


PROJECT SNAPSHOT
HOW DO YOU KEEP TRACK OF HOW MUCH YOU'RE DRINKING?
Tally marks on your hand, counting apps on your phone, or asking a sober friend to count for you can be all great ways to keep from drinking more than you want!

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