

**PROVIDING NORMATIVE FEEDBACK ON THE
INTERNET TO STIMULATE SELF-EVALUATION
OF ALCOHOL, TOBACCO, AND CANNABIS USE***

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ABSTRACT

An internet application was created to provide users with personalized normative feedback regarding their use of alcohol, tobacco, and cannabis. Ninety-nine participants completed the alcohol assessment, 52 completed the cannabis assessment, and 60 completed the smoking assessment. Respondents expressed interest in the expansion of the site to include illicit use of prescription medications, hallucinogens, and methamphetamine. As far as the authors know, the present study, at time of preparation of this manuscript, is the first to examine e-mail broadcasting as a recruitment strategy, and to use normative feedback regarding cannabis usage over the internet. The use of personalized feedback over the internet offers an extremely cost-effective approach to helping substance users who may not access traditional treatment services.

INTRODUCTION

Self-help materials have been used to help clients address a wide variety of disorders, including substance use disorders (Agostinelli, Brown, & Miller, 1995;

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Heather, Kissoon-Singh, & Fenton, 1990; Koski-Jännes, 1995; Miller & Muñoz, 1982; Sanchez-Craig, Davila, & Cooper, 1996; Sitharthan, Kavanagh, & Sayer, 1996), anxiety and depression (Christensen, Griffiths, & Korten, 2002; Gega, Marks, & Mataix-Cols, 2004), and obesity (Tate, Wing, & Winett, 2001). Although most self-help materials were originally developed for delivery via books and videotapes, the explosive growth of the internet has prompted many researchers to explore the potential role of this new technology as a mechanism for delivering the various components of self-help programs.

Normative feedback to induce behavior changes are an important component of many self-help interventions. Based on Kanfer's (1986) self-regulation theory, Miller and Brown (1991) identified six processes which ultimately lead to behavior changes. The first two processes, informational input and self-evaluation, are particularly relevant to the use of normative feedback as a motivational tool. Normative feedback compares an individual's self-report of the frequency with which they engage in a particular behavior to that of others who share similar demographic characteristics. Such feedback can help correct distorted perceptions about typical behavioral patterns among peers. For example, research with college students has established that they tend to overestimate the prevalence of heavy alcohol consumption among other students (Perkins & Berkowitz, 1986). Correcting this misperception through the use of normative feedback reduces alcohol consumption and adverse alcohol-related consequences (Agostinelli et al., 1995). Assessment and provision of normative feedback are incorporated into a variety of effective brief interventions for problem drinkers, including Squires and Hester's Drinker's Check-Up (2004), as well as Sobell and Sobell's (1995) Guided Self-Change.

Although research on normative feedback in self-help interventions has focused primarily on alcohol consumption, such interventions may prove equally efficacious in reducing the use of other substances as well. For example, Curry & colleagues (Curry, Louie, Grothaus, & Wagner, 1992; Curry, Wagner, & Grothaus, 1991) provided computer-generated, personalized, normative feedback to a sample of 1,217 cigarette smokers and found that abstinence rates at 3- and 12-month follow-up were twice the rate of those that did not receive personalized feedback. Despite the promise of this approach, no published studies have evaluated the use of normative feedback to help individuals reduce their use of other substances such as opiates, stimulants, and cannabis.

A wide variety of self-help programs incorporating normative feedback have been implemented via computer, and the rapid proliferation of these applications demonstrates their increasing importance. One such application consists of a self-help program for individuals suffering from panic disorder (Carlbring, Westling, Ljungstrand, Ekselius, & Andersson, 2001). A rigorous evaluation of this software tool found that participants in the treatment condition improved significantly more (e.g., decreased panic attacks) than participants in the control condition. Oenema, Brug, and Lechner (2001) evaluated a computerized self-help

application designed to increase dietary awareness in obesity and found that their intervention had a positive impact on the determinants of dietary change.

Software applications designed to deliver self-help materials for individuals suffering from Post-Traumatic Stress Disorder (PTSD) and alcohol use disorder have also shown promise. For example, Lange, van de Ven, Schrieken, and Emmelkamp (2001) developed an application for patients with PTSD that focused on decreasing symptomatology. Evaluation of this computerized program found that 80% of participants who accessed it displayed clinically significant decreases in PTSD symptomatology after treatment. Researchers have also examined the efficacy of computer-delivered normative feedback for drinking and found that it lowered alcohol consumption at 3 and 6 month follow-up (Neighbors, Lasimer, & Lewis, 2004).

Even very brief interventions have been found to have a positive impact on behavior (Bien, Miller, & Tonigan, 1993). For instance, researchers have found that an online intervention that took only 20 minutes still positively affected participants' behavior (Westrup et al., 2003). Along similar lines, "Moodgym," a cognitive-behavioral intervention for anxiety and depression, found significant reductions in anxiety and depression scores among participants as they progressed through the course (Christensen et al., 2002). While a wide range of brief interventions are available, their highly structured, didactic format makes self-help programs based on cognitive-behavioral principles particularly well suited for delivery via computer (Copeland & Martin, 2004).

Delivering brief interventions via computer has many distinct advantages. For instance, participants tend to provide more honest answers than they would in a face-to-face interview (Barak, 1999; Burke, 1993; Martin & Nagao, 1989). In fact, one study found that the rate of detection of alcohol misuse using computer-based screening was twice that of face-to-face screening (Kobak et al., 1997). These studies indicate that the anonymity of computer-based surveys lead to an increase in self-disclosure by respondents. In addition to the increase in self-disclosure, respondents also report enjoying computerized measures more than traditional pencil-and-paper assessments (Hile & Adkins, 1997; Rozensky, Honor, Rasinski, Tovian, & Hertz, 1986). Finally, dynamically designed surveys (e.g., feedback that changes based on the users' responses) have been found to increase participant interest and motivation (Schmidt, 1997).

The present Web-based intervention consists of an internet application that provides users with normative feedback regarding their current alcohol, cigarette, and cannabis use. The alcohol use portion of this intervention was previously evaluated by Cunningham, Humphreys, and Koski-Jännes (2000; refer to Figure 1). The Cunningham et al. (2000) application was originally modeled after the "Drinker's Check-Up" (Miller, Sovereign, & Krege, 1988), which has been shown to reliably decrease participants frequency of alcohol consumption (Squires & Hester, 2004). The present application was modeled in a similar manner and extended to cigarettes and cannabis. With the addition of cigarettes

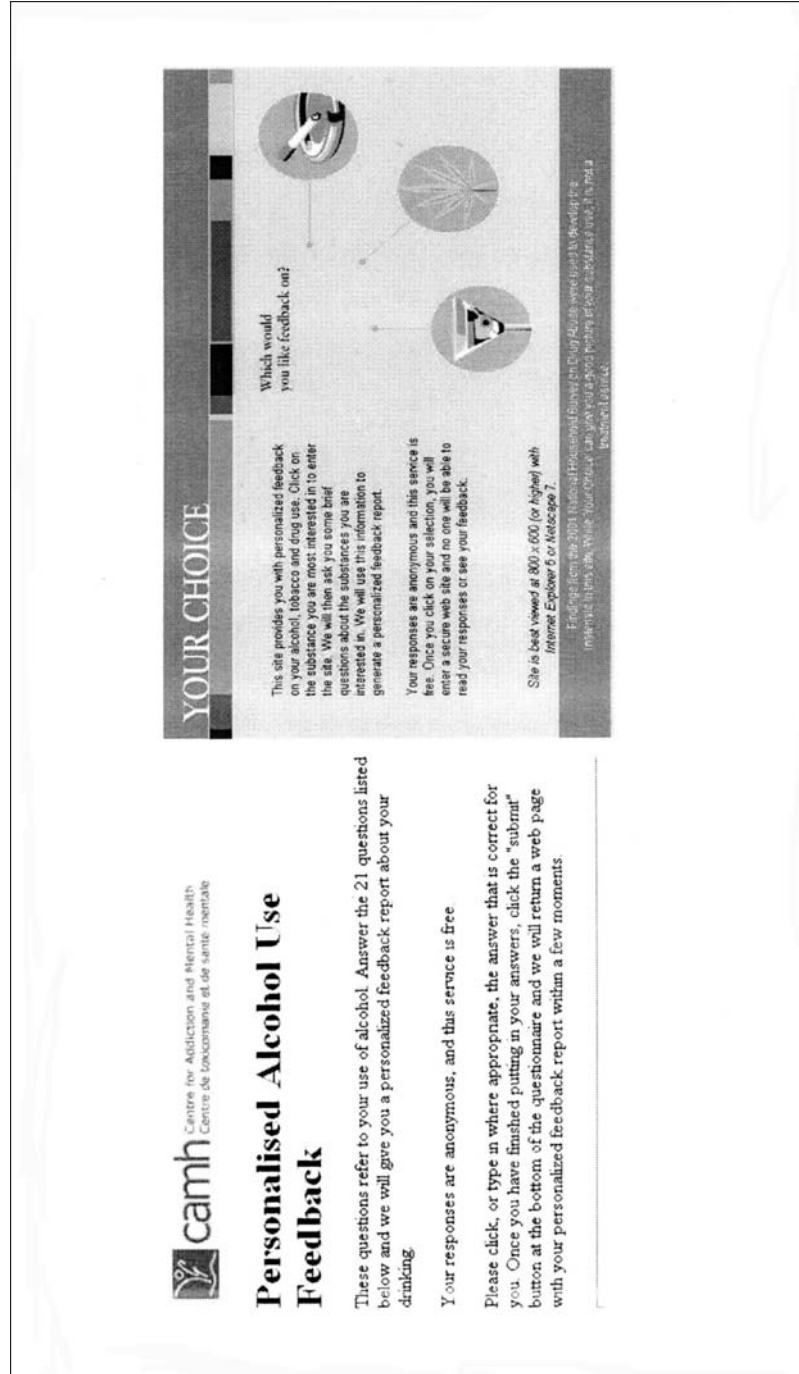


Figure 1. Screenshot of original CAMH Website (left) and Your Choice (right).

and cannabis, the database was designed in such a way as to enable the addition of other substances in future versions of the application. An attractive graphical interface was incorporated into the design of the Website in order to attract users. The purpose of the present study is twofold: 1) to test e-mail broadcasting as a novel subject recruitment strategy; and 2) to begin collecting preliminary data on the effectiveness of using the internet to provide normative feedback to cannabis users.

METHOD

Overview

After electronically signing an informed consent form approved by the Stanford University Institutional Review Board, participants logged on to a secure Website (www.yourchoice.cc) and were prompted to select one of three substances upon which to receive feedback: alcohol, cannabis, or cigarettes (see Figure 1). In order to personalize the feedback that the participants received, demographic information such as age, gender, and weight were collected prior to the presentation of the assessment selected. After completing the selected assessment, participants received personalized normative feedback regarding their use of that substance, and were asked whether they also wanted to receive feedback on either of the two remaining substances. Materials used for feedback were modeled after the Drinker's Check-Up (Agostinelli et al., 1995; Brown & Miler, 1993; Miller et al., 1988) and the Fostering Self-Change intervention (Sobell et al., 1996).

Measures

Alcohol

1. *Quantity/frequency* (1 item). Respondents were asked to report their alcohol consumption during a typical week in the past year using the period-specific normal week approach (Kühlhorn & Leifman, 1993; Romelsjö, Leifman, & Nyström, 1995).
2. *Alcohol Dependence* (7 items). Respondents were asked whether they wanted, or tried, to stop or cut down their use of alcohol during the past 12 months, but found that they could not (SAMHSA, 1999). Respondents were also asked if alcohol has had a harmful effect on their friendships/social life, physical health, home life or marriage, work, studies, or employment opportunities, financial position, or outlook on life (happiness) in the past 12 months (SAMHSA, 1999).

Cannabis

1. *Frequency* (1 item). Respondents were asked to report their frequency of cannabis use for a 12-month period, which ranges from "never" to "300 or more days."

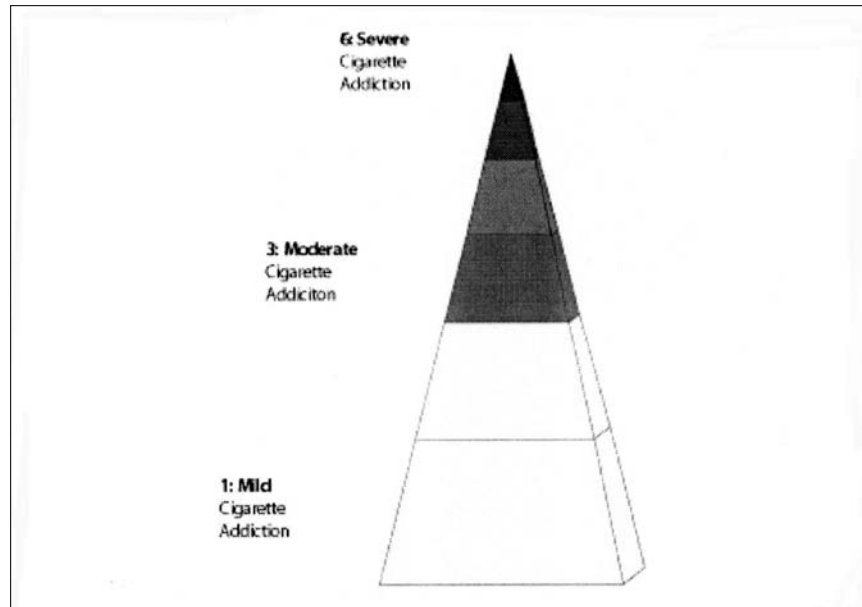


Figure 2. An example of the HSI in a graphical pyramid.

2. *Cannabis Dependence* (7 items). Respondents were asked whether they wanted, or tried, to stop or cut down their use of cannabis during the past 12 months, but found that they could not (SAMHSA, 1999). Respondents were also asked if cannabis has had a harmful effect on their friendships/social life, physical health, home life or marriage, work, studies, or employment opportunities, financial position, or outlook on life (happiness) in the past 12 months (SAMHSA, 1999).

Cigarettes/Nicotine

1. *Current Smoking Status* (1 item). Possible responses to the item "Do you smoke cigarettes?" include: a) "yes"; b) "I have smoked in the past 12 months, but not in the past 30 days"; and c) "I have not smoked at all in the last 12 months."
2. *Heaviness of Smoking Index* (HSI; 2 items). The HSI is a widely used measure in smoking cessation research (Heatherton, Kozlowski, Frecker, Rickert, & Robinson, 1989), which consists of the following two questions: a) "Think about the past 30 days. How many cigarettes did you smoke per day, on average?"; and b) "On the days that you smoke, how soon after you wake up do you have your first cigarette?"

Feedback

One of the advantages of using a software application to generate normative feedback is that it is relatively easy to provide such feedback in an attractive and easily understandable format. A summary of the participant's weekly substance use was generated by calculating the number of drinks the individual reported consuming in a typical week, the amount of cigarettes smoked in a day, and/or the amount of cannabis consumed in a year. The demographic information was then used to select the appropriate pie chart for the participant. Pie charts summarizing the average, weekly alcohol consumption, daily cigarette consumption, and yearly cannabis consumption of the general population were generated separately for each gender and for the age groups 12-17, 18-25, 26-34, 35-49, and 50 or more years. The segment of the pie chart reflecting each participant's substance use was highlighted to facilitate easy comparison of reported substance use to that of others in their same age group and gender. Pie charts were generated using data from the National Household Survey on Drug Abuse (NHSDA; SAMHSA, 2002).

Alcohol Feedback

Alcohol feedback included: a) a pie chart depicting the participant's quantity and frequency of alcohol use relative to population norms; and b) a bar chart indicating the likelihood that the participant is experiencing dependence symptomatology based on their reported level of alcohol consumption. In an effort to make the feedback more relevant to participants, the site employs normative feedback that has been tailored specifically for the individual's age group and gender.

The application also generates estimates of: 1) the length of time it takes for the respondent to metabolize alcohol (given their reported gender and weight); 2) the percent of days that the respondent consumed alcohol during the last year; 3) the total number of drinks consumed within the past year; 4) the amount of money the participant spent on alcohol during the past year; 5) the amount of extra calories the participant consumed during a typical drinking day; and 6) the time it takes the participant to metabolize 1 and 10 drinks is provided (based on calculations of the participants' weight for their age group). Finally, an estimate of the number of hours spent under the influence of alcohol is provided based on the respondents' drinking during a typical week.

Participants are also provided with a bar chart which highlights the probability of experiencing dependence symptomatology related to the frequency of substance use. The chart was generated using the NHSDA (SAMHSA, 2002), which employs data on the incidence of the seven dependence items utilized in the measures above. Participants who endorse any of the seven dependence symptoms on their initial assessment are provided with a summary of the probability of symptomatology they experienced in the last year. In line with a Harm Reduction approach employed in many brief interventions (Carey, Purnine, Maisto, & Carey,

2001; Donovan & Marlatt, 1993; Saunders, Kypri, Walters, Laforge, & Larimer, 2004), empirically supported suggestions are included to help respondents begin making changes in their substance use patterns (American Cancer Society, 2003; Cohen & Kay, 1994). Finally, participants are offered a booklet to download to assist them in decreasing their substance use patterns. The evaluative exercises in the booklet are derived from Guided Self-Change treatment (Sobell & Sobell, 1995; Sobell, Sobell, Brown, & Cleland, 1995).

Cigarette Feedback

Cigarette feedback included two pie charts which display participants' cigarette use relative to population norms. The format of these charts was identical to those used to provide alcohol feedback. The results of the HSI were displayed in a graphical pyramid of addiction severity ranging from mild (1) to severe (6; refer to Figure 2). In keeping with the harm reduction approach mentioned above, empirically supported suggestions are offered to decrease cigarette consumption (American Cancer Society, 2003), and participants are given the opportunity to download and print a summary of this information for later reference.

Cannabis Feedback

Normative feedback regarding participants' reported cannabis use was provided using two pie charts similar to those used for the alcohol and cigarette feedback. The application also generated a bar chart indicating the probability that the participant would experience dependence symptomatology given their reported frequency of cannabis use. Once again, empirically supported suggestions are offered to decrease cannabis consumption, and participants are given the opportunity to download and print the booklet for later use.

Website Evaluation

Upon completion of the three substance use assessments, participants were asked to fill out a brief questionnaire about their impressions of the intervention including: 1) how useful they found the feedback, 2) if they found the information surprising, 3) whether they provided information on their own or someone else's substance use, or a hypothetical situation, 4) whether their substance use was a problem in the last year, 5) the usefulness of the information, 6) the ease of understanding the information, 7) the use of graphics, and 8) the overall quality of the Website. Finally, respondents were asked what the best features of the Website were, and if there were any other substances about which they would be interested in receiving feedback.

Participant Recruitment

Participants were solicited from an e-mail broadcasting company, which deals in opt-in lists (an industry term for e-mail addresses that have been validated through previously signing up for services and solicitations). Thousands of e-mails are sent out from dedicated mail servers per day. Five million e-mails inviting potential respondents to evaluate “Your Choice” were sent over a two-week period. This study was reviewed and approved by the Institutional Review Board of Stanford University.

RESULTS

Alcohol

Of the five million e-mail invitations sent out, only 99 participants completed the alcohol assessment for an overall response rate of <.05%. Of these, 68% were male and 51% were in the 35-49 age range. Ninety-seven percent of respondents were from the United States. Analysis of drinking patterns revealed that average daily consumption increased as the weekend approached, ranging from 1 drink on Monday to 4 drinks on Saturday. Overall, respondents drank an average of 4 days per week. The average weekly alcohol consumption rate was 15 drinks, while the average yearly drink total was 795. Mean added calories associated with this level of consumption was 352.87, while the average yearly costs to drink at a bar was \$3,576.18.

Cannabis

Fifty-two participants completed the cannabis assessment. Of these, 65% were male and 52% were in the 35-49 age range. Again, the majority (92%) of participants were from the United States. A large portion (33%) of respondents indicated that they used cannabis 300 or more times within the past year, although a slightly lower portion (27%) indicated that they had never used, or hadn't used in the past year.

Smoking

Sixty participants completed the smoking assessment. Of these, 55% were male and 45% were in the 35-49 age range. Once again, the majority (93%) of participants were from the United States. Over half (55%) of respondents indicated that they currently smoke, and 37% indicated that they had not smoked in the past year. On average, 15% of the sample smoked a pack a day, and 93% indicated that they waited between 6 and 60 minutes to “light up” upon awaking, although 28% of participants scored a 3 or higher on the HSI.

Pilot Feasibility

Very few respondents chose to provide feedback about the intervention ($n = 16$). For those who did, 69% of respondents rated the usefulness of the feedback from “moderately useful” to “extremely useful.” Seventy-five percent ($n = 12$) of respondents who provided feedback stating that they had submitted substance use information for themselves, while the remaining 25% indicated that they had submitted the substance use description of someone else, or that they had entered hypothetical responses in order to test the functionality of the site. Finally, of the 12 individuals that indicated they had submitted their own information, 44% responded in the affirmative to the question, “did the feedback capture the amount you actually use?”

Out of the 16 participants who opted to complete the pilot feasibility questionnaire, 12 individuals also completed an evaluation of the Website itself. The usefulness of the information presented on the Website ranged from “fair” to “excellent” by 92% of respondents, while 100% of participants stated that the ease of understanding the information presented was “very good” or “excellent.” All of the participants rated the use of graphics on the site as “good” (16%), “very good” (42%), or “excellent” (42%). The Website as a whole ranged from “good” to “excellent” (92%).

DISCUSSION

This study was conducted to evaluate the feasibility and level of interest in an Internet version of a brief intervention that utilizes personalized normative feedback. Although this study did not assess behavior changes based on the normative feedback presented, it does demonstrate some of the potential strengths of administering brief interventions over the internet. One such benefit is the potential to reach an alternative audience who would otherwise not seek treatment in a more traditional setting. For instance, many substance users will not access “physical” treatment facilities, which underscores the importance of providing alternative and innovative services directly to the substance users. For individuals who cannot afford treatment, normative feedback has the benefit of correcting substance users’ cognitive distortions about the amount they use, while “Your Choice” simultaneously offers empirically supported suggestions for implementing positive behavior changes in reducing substance use.

The NHSDA is a reasonable and appropriate choice of data for calculating substance use norms because it provides current information on drug use in a representative sample of the U.S. population. Other strengths of the NHSDA are its large sample size, which includes both youth and adult respondents, as well as a detailed assessment of individual drug classes. These characteristics of the NHSDA allow for detailed normative feedback that is relevant to the user by providing population norms of those with similar demographic characteristics.

To the best of the authors' knowledge, the present study is the first to examine online normative feedback regarding cannabis use. It has been estimated that there were 2.4 million new users of cannabis in the year 2000 alone (SAMHSA, 2002). In regard to current cannabis users, 2.5 million people use cannabis on a daily or almost daily basis. Due to the alarmingly high incidence and prevalence rates of cannabis use, in addition to the fact that the majority of cannabis users will never seek treatment, "Your Choice" is an important first step in collecting data about this population of users (Cunningham, 2000). Due to the increasing demands for cannabis interventions, it has been suggested that the use of brief interventions for cannabis would be a logical next step (Copeland & Martin, 2004; Copeland, Swift, Roffman, & Stephens, 2001). While the behavioral effectiveness of normative feedback for cannabis was not evaluated in the present application, the need for more research to evaluate outcomes of brief interventions for cannabis use is apparent.

An important limitation of the present study stems from our choice of recruitment strategy. Recruiting participants through the use of e-mail broadcasting resulted in a very poor response rate (99 respondents out of 5 million e-mails sent). E-mail broadcasting was originally viewed as a viable recruitment method due to its low cost (pennies per e-mail) and potential to reach a broad audience. While it is difficult to estimate the number of individuals that actually read the e-mail; the present study indicates that e-mail broadcasting is an ineffective strategy for recruiting participants. Several respondents indicated that the e-mail was incorrectly marked as spam even though the receivers had asked to receive health information available on the Internet, which may explain the lack of response. An additional limitation is that it is rather difficult to judge the reliability of participants' responses. Although respondents were asked to indicate if they had provided their own substance use information, very few respondents provided this information.

Behavioral assessment and outcome evaluations are an important next step in the appraisal of personalized feedback, particularly in regard to other commonly abused substances such as inhalants and prescription drugs. Several respondents expressed interest in expanding the site to include other substances, such as the illicit use of prescription medications, hallucinogens, and methamphetamine. In addition to the use of the present application for personal use, one author (KRW) utilized the feedback with patients in a clinical treatment setting. Although brief interventions are far from a panacea, personalized feedback over the internet offers an extremely cost-effective approach to helping substance users who may not access traditional treatment services.

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