



## Gender-based Outcomes and Acceptability of a Computer-assisted Psychosocial Intervention for Substance Use Disorders



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### ABSTRACT

**Background:** Digital technologies show promise for increasing treatment accessibility and improving quality of care, but little is known about gender differences. This secondary analysis uses data from a multi-site effectiveness trial of a computer-assisted behavioral intervention, conducted within NIDA's National Drug Abuse Clinical Trials Network, to explore gender differences in intervention acceptability and treatment outcomes.

**Methods:** Men ( $n = 314$ ) and women ( $n = 192$ ) were randomly assigned to 12-weeks of treatment-as-usual (TAU) or modified TAU + Therapeutic Education System (TES), whereby TES substituted for 2 hours of TAU per week. TES is composed of 62 Web-delivered, multimedia modules, covering skills for achieving and maintaining abstinence plus prize-based incentives contingent on abstinence and treatment adherence. Outcomes were: (1) abstinence from drugs and heavy drinking in the last 4 weeks of treatment, (2) retention, (3) social functioning, and (4) drug and alcohol craving. Acceptability was the mean score across five indicators (i.e., interesting, useful, novel, easy to understand, and satisfaction).

**Results:** Gender did not moderate the effect of treatment on any outcome. Women reported higher acceptability scores at week 4 ( $p = .02$ ), but no gender differences were detected at weeks 8 or 12. Acceptability was positively associated with abstinence, but only among women ( $p = .01$ ).

**Conclusions:** Findings suggest that men and women derive similar benefits from participating in a computer-assisted intervention, a promising outcome as technology-based treatments expand. Acceptability was associated with abstinence outcomes among women. Future research should explore characteristics of women who report less satisfaction with this modality of treatment and ways to improve overall acceptability.

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### 1. Introduction

Women with substance use disorders (SUD) are especially at risk for negative consequences associated with abuse, including symptom severity and number of psychiatric, social, and medical problems upon treatment entry, despite fewer years of use and smaller quantities used compared to men (Gentilello et al., 2000; Greenfield et al., 2007; Henskens, Mulder, & Garretsen, 2005; Hernandez-Avila, Rounsaville, & Kranszler, 2004; Randall et al., 1999). Women have unique and

gender-specific barriers to seeking and engaging in SUD treatment (Greenfield et al., 2007). Programs that provide gender-specific and gender-responsive treatment and ancillary services may enhance women's treatment outcomes (Greenfield & Grella, 2009; Grella, 2008). Examining women's responses to substance abuse treatment program characteristics and clinical interventions can contribute to enhancing gender-responsive treatment and improving women's treatment outcomes.

#### 1.1. Computer-assisted treatment

Computer-assisted technology for the prevention and treatment of SUD has increased over the past decade. Research has established

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empirical support for computer-assisted interventions for the prevention of SUD (Fang, Schinke, & Cole, 2010; Hester, Delaney, & Campbell, 2012; Ondersma, Chase, Svikis, & Schuster, 2005; Ondersma et al., 2014; Schinke & Schwinn, 2005; Schwartz et al., 2014). Although treatment research is more limited, several randomized studies provide support for the effectiveness of computer-assisted technology in the treatment of SUD (Bickel, Marsch, Buchhalter, & Badger, 2008; Budney et al., 2011; Carroll et al., 2008, 2014; Chaple et al., 2014; Kay-Lambkin, Baker, Kelly, & Lewin, 2011; Marsch et al., 2014; Rooke, Copeland, Norberg, Hine, & McCambridge, 2013). Despite the increase in computer-assisted technologies research for substance use prevention and treatment, few studies have examined gender differences in these interventions. Moreover, previous literature on gender differences in computer-assisted technologies has been in *prevention* of SUD, rather than in the treatment of these disorders.

### 1.2. Gender and computer-assisted drug and alcohol interventions

Previous research demonstrates that women access traditional substance abuse treatment less often than men (Greenfield et al., 2007), but participate in technology-based services more frequently. A meta-analysis of online alcohol treatment services revealed women utilized various treatment tools at a greater rate than men and commonly cited 24-hour access and privacy as reasons for engagement (White et al., 2010). Similarly, female treatment-seekers were more likely than men to engage in electronic-based, supplemental treatments (VanDeMark et al., 2010). Technology-based interventions developed specifically for women also show promise, but with some mixed findings. Ondersma and colleagues studied screening and brief intervention platforms targeting substance abuse and smoking in pregnant and postpartum women using motivational enhancement and motivational interviewing. Results showed high acceptability and improved motivation to reduce substance use (Ondersma et al., 2005; Pollick et al., 2013), as well as actual substance use reduction (Ondersma, Svikis, & Schuster, 2007; Ondersma et al., 2012). However, in a randomized controlled trial of a Web-based alcohol treatment program among 44 rural women, no significant difference was detected between Web-based and standard care groups at 3 month follow-up (Finfgeld-Connett & Madsen, 2008).

There are few studies that have explored potential gender differences for technology-based interventions, and this is especially true for technology-based *treatment* of SUD. Several studies have found that brief, computer-assisted interventions did not produce differential outcomes for women (Chiauzzi, Green, Lord, Thum, & Goldstein, 2005; Steiner, Woodall, & Yeagley, 2005). However, a recent meta-analysis among college students with hazardous alcohol use found that gender moderated the effect on quantity of alcohol consumed for computer-assisted interventions compared to no intervention controls; that is, computer-assisted interventions were less successful at reducing alcohol use when there was a higher proportion of women in the sample (Carey, Scott-Sheldon, Elliott, Garey, & Carey, 2012). Overall, women and men had comparable outcomes with similar face-to-face interventions. This is of potential concern, given that the vast majority of computer-assisted interventions are brief, grounded in assessment and personalized feedback, and primarily target alcohol. The authors of the meta-analysis concluded that future research should consider gender-based acceptability of computer-assisted interventions.

### 1.3. Study purpose

Here we report one of the first analyses exploring the role of gender in a large scale effectiveness trial of a computer-assisted treatment for SUD. The study recruited from 10 diverse geographic community-based outpatient sites, representative of the primary mode of outpatient treatment for SUD in the U.S. The primary outcome analysis, previously published (Campbell et al., 2014), showed the computer-delivered intervention (comprised of Web-based psychosocial modules and

contingency management), when added to treatment-as-usual, was superior to the treatment-as-usual control condition on the primary outcomes of abstinence and treatment retention. The purpose of this paper is to explore gender differences in treatment outcome and acceptability of the computer-assisted intervention. Specifically, the paper addresses the following questions: (1) Does gender moderate the association between treatment and abstinence or retention? (2) Does gender moderate the association between treatment and other relevant outcomes such as social functioning and drug craving? (3) Do men and women differ in their acceptability of the computer-assisted treatment? and (4) Does gender moderate the association between acceptability and abstinence or retention among those in the computer-assisted intervention?

## 2. Methods

### 2.1. Recruitment sites

Participants ( $n = 507$ ) were from 10 community-based, outpatient substance abuse treatment programs affiliated with the National Drug Abuse Treatment Clinical Trials Network and enrolled between June 2010 and August 2011. Outpatient addiction treatment programs were selected for geographic and patient diversity, and also varied in programming, consistent with the goals of an effectiveness trial to promote external validity. Each program was asked to enroll approximately 50 participants (range = 38–60). Additional details of program selection, design, and methods have been previously published (Campbell et al., 2012).

### 2.2. Participants

Eligible participants were: (1) 18 or older, (2) using illicit substances in the 30 days prior to study entry (or 60 days if the patient was exiting a controlled environment), (3) within 30 days of entering the treatment episode, (4) planning to remain in the area and treatment program for  $\geq 3$  months, and (5) proficient in English. Participants were excluded if they were: (1) prescribed opioid replacement therapy (e.g., buprenorphine, methadone), or (2) unable to provide informed consent. The study was approved by the Institutional Review Boards of the New York State Psychiatric Institute and all participating clinical sites. After a complete description of the study to each patient, written informed consent was obtained. The study was registered on [clinicaltrials.gov](http://clinicaltrials.gov) under the identifier NCT01104805.

### 2.3. Design

Following a baseline assessment, participants were randomized to 12 weeks of either: (1) treatment-as-usual; or (2) treatment-as-usual + the Therapeutic Education System (TES), whereby TES was a substitute for approximately 2 hours of usual care (i.e., clinician-delivered groups). Randomization was stratified by: treatment site; patient's primary substance of abuse (dichotomized as stimulant vs. non-stimulant); and whether the patient was abstinent at point of baseline assessment and study entry based on urine drug and breath alcohol tests. All participants were asked to provide self-reported substance use and urine drug and breath alcohol screens twice per week during the treatment phase; additional assessments were collected at weeks 4, 8, and 12.

### 2.4. Computer-assisted intervention

The Therapeutic Education System (TES; Bickel et al., 2008) includes contingency management and 62 Web-delivered, interactive, multimedia modules, grounded in the Community Reinforcement Approach (Budney & Higgins, 1998). An initial training module teaches participants how to use the computer-based program, followed by modules

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