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Pilot of a Behavioral Activation-Enhanced Smoking Cessation Program for Substance Users With Elevated Depressive Symptoms in Residential Treatment

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Smoking is the number one preventable cause of death in the United States and half of the people who currently smoke will die from smoking-related causes (World Health Organization, 2007). Although smoking cessation treatments are effective, individuals with depressive disorders/symptoms (Weinberger et al., 2012a, 2012b, 2013) and substance use disorders (SUDs; Baca & Yahne, 2009; Okoli & Khara, 2011; Prochaska et al., 2004) have particular difficulties quitting smoking. Unfortunately, treatment providers in mental health and addiction treatment settings rarely advise their clients to quit smoking, or provide cessation treatments (Guydish et al., 2011; Knudsen et al., 2010; Prochaska, 2010), often because they believe cessation could cause relapse to other substances or increases in psychiatric symptoms (Fuller et al., 2007; Prochaska et al., 2006). However, multiple studies demonstrate that smoking cessation does not interfere with substance use (e.g., Prochaska et al., 2004; Tsoh et al., 2011), or mental health outcomes (e.g., Lawn & Pols, 2005; Prochaska et al., 2008). Despite negative consequences associated with smoking, few *successful* cessation treatments have been developed specifically targeting individuals with co-occurring depressive and SUDs.

Cessation programs tested with smokers with depressive disorders/symptoms include treatments focusing on motivation (Hall et al., 2006), mood management via cognitive behavioral therapy (CBT; Batra et al., 2010; Hall et al., 1998), and reducing depression via CBT (Brown et al., 2001; 2007). A recent meta-analysis indicates components targeting mood management improve outcomes (Gierisch et al., 2012), suggesting it is essential to target mood improvements in individuals with depressive disorders attempting to quit smoking. However, despite significant advances in smoking cessation therapies for individuals with depressive disorders/symptoms, low cessation rates continue to be observed (e.g. Weinberger et al., 2013).

Treatments targeting individuals with SUDs have utilized CBT, contingency management, and nicotine replacement therapy (NRT) (see Okoli et al., 2010 review); group counseling (Reid et al., 2008); behavioral therapy (Joseph et al., 2004); and content focused on depressive symptoms (see Baca & Yahne, 2009 review). Barriers to cessation have been noted in these studies, where long-term abstinence is relatively rare. For example, only 5%

of individuals with SUDs who received NRT + CBT were abstinent at a 13-week follow-up (Reid et al., 2008), while 7-day point prevalence abstinence rates were 15.5% at a 3-month follow-up among individuals with alcohol use disorders receiving NRT + behavioral therapy (Joseph et al., 2004). Thus, it is necessary to formulate new strategies to better target the needs of substance users.

Recently, researchers have targeted increases in positive affect via behavioral activation (BA) to increase abstinence from cigarettes and drugs. MacPherson and colleagues (2010) demonstrated that a BA-enhanced (see *Treatment* section and Table 1 for a description of BA) treatment for smokers (BATS), which included CBT for smoking cessation (CBT), NRT, and BA, significantly improved outcomes among individuals with elevated depressive symptoms. In their study, individuals receiving BATS were 2.26 times more likely to be abstinent post-treatment than individuals receiving CBT + NRT.

Further, individuals in BATS had significantly greater decreases in depressive symptoms over time. BA has also been used to decrease depressive symptoms and improve substance use outcomes among individuals with SUDs (Daughters et al., 2008; Magidson et al., 2011). Taken together, these findings suggest a BA-enhanced treatment could address the multiple factors associated with poor cessation outcomes among smokers with SUDs and elevated depressive symptoms.

Method

Participants

The current study tested Behavioral Activation for Drug Abusing Smokers (BA-DAS; Table 1) among 12 African Americans (see Table 2) with SUDs and elevated depressive symptoms in residential substance use treatment. Inclusion criteria: 18–65 years-old, Beck Depression Inventory score ≥ 7 , scored ≥ 5 on a 10 point scale for motivation to quit, and smoked ≥ 5 cigarettes/day for ≥ 1 year.

Treatment

BA-DAS included key elements of CBT for smoking cessation (see Fiore et al., 2008), NRT (Nicoderm CQ 24-hour transdermal nicotine patch), and BA to target depressive symptoms (MacPherson et al., 2010). Treatment consisted of five 60–90 minute individual counseling sessions over 2 ½ weeks. BA components included: daily activity and smoking monitoring, identification of *life areas* (e.g., Relationships, Education) and *values* (broad descriptions of how individuals want to live within particular life areas), selection of *activities* enabling clients to live according to their values, creation of an activities schedule, and enlistment of social support via behavioral contracts (Lejuez et al., 2011; see Table 1). Therapists were four clinical psychology doctoral students who were trained extensively and received weekly supervision.

Measures

Clients reported their smoking for the 90 days prior to baseline and through four weeks post-quit via the Timeline Follow-Back (TLFB; Sobell & Sobell, 1979; 1996), a reliable and

valid self-report measure. TLFB reports were compared to biochemical assessments of abstinence (10ppm carbon monoxide cutoff via Vitalograph Breathco monitor). The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) was used to determine clients' depressive symptoms. A paper-based survey was created to determine participants' treatment satisfaction. Presence of current SUDs was confirmed with the SCID-IV (First et al., 1995).

Results

Four of the twelve participants were unreachable at the four-week follow-up. At the four-week follow-up, four of the eight participants assessed had CO levels < 10ppm, indicating abstinence (on quit day, seven of the eight participants assessed had CO levels < 10ppm; four participants did not provide CO levels because of administrator error). Of the total sample, 66.67% had not relapsed to smoking (defined as 5+ cigarettes/day for 3 days in a row; Shiffman et al., 2006) at the four-week follow-up (unreachable participants were coded as having relapsed at the prior assessment point), with a mean survival time of 23 days (see Figure 1). The average number of cigarettes consumed weekly pre-treatment was significantly higher than the average number consumed at the four-week follow-up $t(8) = 2.37, p = .045$ (Table 2). BDI scores decreased significantly from baseline to post-treatment $t(8) = 2.49, p = .038$ (see Table 2 and Figure 2).

Discussion

These preliminary results demonstrate the benefits of adding BA to smoking cessation interventions for individuals with substance use disorders and co-occurring depressive symptoms. Within our sample, 66.7% of participants had CO levels indicative of abstinence four weeks post-quit, as compared to 7.8% at a comparable time point in Saxon and colleagues' (2003) study. Furthermore, participants had particularly low relapse rates during the four weeks post-quit and reduced their cigarette consumption significantly. This suggests BA-DAS may benefit participants during the time when they are most vulnerable to relapse (Brown, et al., 2001; Prochaska et al., 2004). In future work, it will be important to examine whether decreases in depressive symptoms, as a function of BA, explain decreases in cigarette consumption over treatment.

There are a number of limitations of this pilot, including the lack of a contact-time matched control condition, small sample size, missing follow-up and CO data for some participants, and the short follow-up period. In future work, it will be important to test this intervention within a randomized control trial with longer follow-up periods. Despite these limitations, there are a number of strengths of this study, including cessation benefits within this particularly difficult to treat population, high treatment satisfaction, and significant decreases in depressive symptoms over treatment. This provides an important basis for future work to examine BA-enhanced smoking cessation treatments in difficult-to-treat populations.

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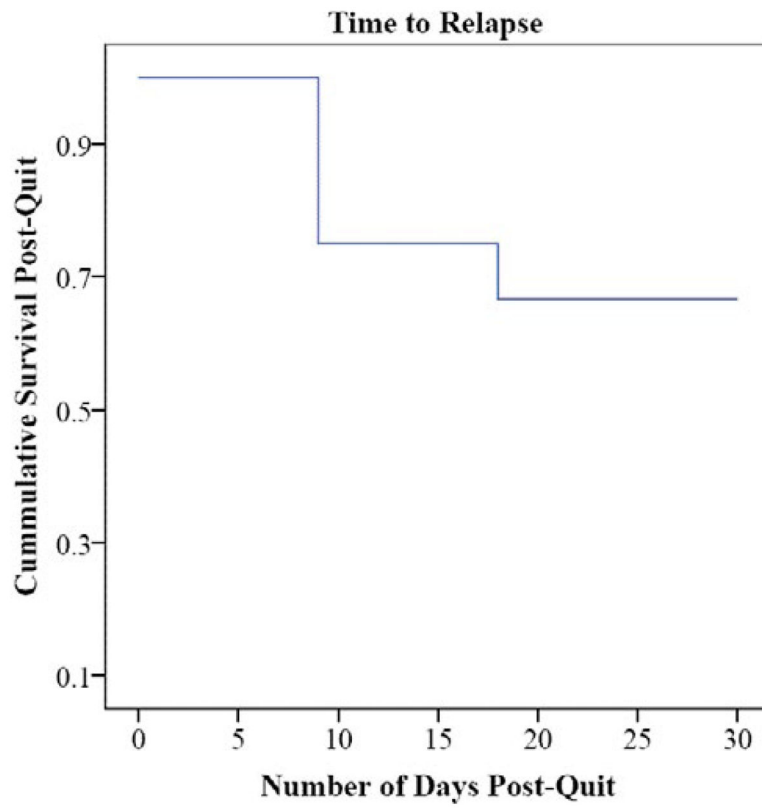


Figure 1.
Survival Curve

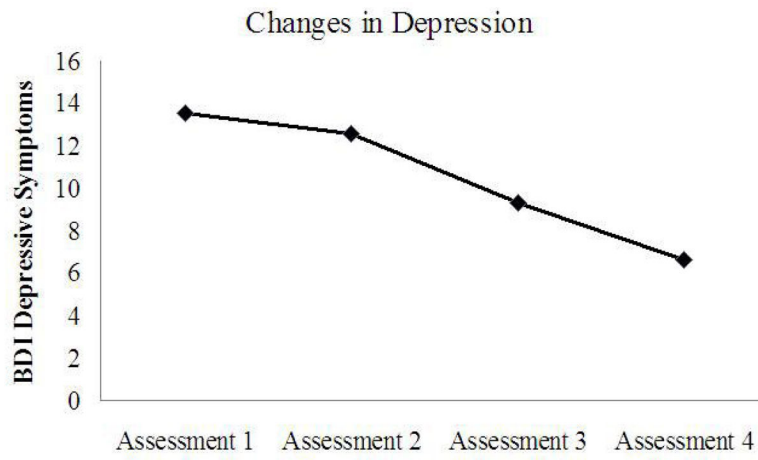


Figure 2.
Depression Graph

Table 1**BA-DAS Session Content**

Session 1: Introduction to BA and Smoking Cessation

- Treatment rationale
- Introduction to monitoring of daily activities, cigarette consumption, and mood
- Review previous quit attempts and prior strategies used
- Quit day set

Session 2: Life Areas, Values, and Activities

- Review of daily activity monitoring*
- Identification of values within life areas and relevant activities
- Scheduling of activities to complete prior to following session*
- Discussion of Avoid, Alter, Substitute Strategies*
- Introduction to the NRT Patch

Session 3: Quit Day: Monitoring Progress

- Discussion of quit attempt and problem solving related to slips*
- Review of activity completion*
- Discussion of abstinence violation effect
- Discussion of NRT patch*

Session 4: Reviewing Progress and Enlisting Social Support

- Creation of in-treatment contract to support activity completion

Session 5: Post-Treatment Plan

- Review of in-treatment contract
 - Identification of post-treatment activities
 - Creation of post-treatment contract
-

* Indicates treatment components that are repeated at all subsequent sessions

Table 2

Baseline Demographics, Smoking History, and Affective Variables.

	M	SD	N (%)
Demographics			
% Female			5 (41.70)
% Black/African American			12 (100.00)
% Court-mandated			4 (33.30)
Average age	39.18	10.25	
Average treatment length (in days)	34.50	17.53	
Education *			
Middle school graduate			1 (8.30)
Some high school			1 (8.30)
High school graduate/GED			2 (16.70)
Some college			5 (41.70)
Average household income			
\$0–9,909			3 (25.00)
\$10,000–19,999			2 (16.70)
\$20,000–29,999			-
\$30,000+			4 (33.30)
Smoking History Variables			
Number of year smoking	18.27	10.95	
FTND	5.18	2.36	
Average weekly cigarettes pre-treatment	96.95	92.97	
Average weekly cigarettes post-treatment	12.89	22.13	
Affective Variables			
Baseline BDI-II	13.55	9.02	
Post-treatment BDI-II	6.67	8.47	

* Not all percentages add to 100 because of missing data