ORIGINAL INVESTIGATION

Expectancies for the Effectiveness of Different Tobacco Interventions Account for Racial and Gender Differences in Motivation to Quit and Abstinence Self-Efficacy

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ABSTRACT

Introduction: Racial and gender disparities for smoking cessation might be accounted for by differences in expectancies for tobacco interventions, but few studies have investigated such differences or their relationships with motivation to quit and abstinence self-efficacy.

Methods: In this cross-sectional study, 673 smokers (African American: $n = 443$, 65.8%; women: $n = 222$, 33.0%) under criminal justice supervision who enrolled in a clinical smoking cessation trial in which all received bupropion and half received counseling. All participants completed pretreatment measures of expectancies for different tobacco interventions, motivation to quit, and abstinence self-efficacy. The indirect effects of race and gender on motivation to quit and abstinence self-efficacy through expectancies for different tobacco interventions were evaluated.

Results: African Americans' stronger expectancies that behavioral interventions would be effective accounted for their greater motivation to quit and abstinence self-efficacy. Women's stronger expectancies for the effectiveness of pharmacotherapy accounted for their greater motivation to quit, whereas their stronger expectancies for the effectiveness of behavioral treatments accounted for their greater abstinence self-efficacy.

Conclusions: Findings point to the mediating role of expectancies for treatment effectiveness and suggest the importance of exploring expectancies among African Americans and women as a way to augment motivation and self-efficacy.

INTRODUCTION

The prevalence of cigarette use has declined to approximately 18% among individuals in the general population (Centers for Disease Control and Prevention, 2013); however, smoking rates remain at around 70%–80% among individuals in the criminal justice system (Cropsey et al., 2008; Cropsey, Jones-Whaley, & Hale, 2010). This indicates that standard tobacco interventions and public message campaigns are less effective or have not reached this unique population. In the only large-scale smoking cessation study of prisoners in the United States, racial disparities in cessation were noted, with African American smokers demonstrating approximately 5% lower cessation rates across timepoints compared with Whites (Cropsey et al., 2009). These findings are largely consistent with results from the general population. However, unlike studies in the general population, these racial disparities were found to persist despite equivalence between African Americans and Whites on a number

of environmental barriers (e.g., transportation, childcare, and work schedules) that are not present in a prison environment (Cropsey et al., 2009). Although studies conducted in prison potentially remove logistical barriers associated with accessing treatment, removal of these barriers may not reduce racial discrimination and stressors linked with higher levels of cigarette dependence (Kendzor et al., 2013) and reduced cessation (Hooper, Baker, Rodriguez de Ybarra, McNutt, & Ahluwalia, 2012), which may account for reduced abstinence rates of African Americans in prison.

Comparing racial differences in smoking characteristics, African Americans tend to exhibit characteristics that might favor smoking cessation, including smoking fewer cigarettes per day (e.g., Foulds et al., 2006), initiating smoking at older ages (e.g., Cropsey et al., 2009), and taking fewer puffs per cigarette (e.g., Clark, Gautam, & Gerson, 1996). However, the majority of African Americans smoke mentholated cigarettes, (Stahre, Okuyemi, Joseph, & Fu, 2010; Trinidad, Pérez-Stable,

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Messer, White, & Pierce, 2010) and may hold unrealistic expectancies about the cessation process (i.e., predicted difficulty, likelihood of success, and so forth), both of which may account for lower cessation rates (Hendricks et al., 2013).

In terms of racial differences in treatment preferences, African American smokers are less likely to use pharmacotherapy, or combination pharmacotherapy with behavioral therapy, during quit attempts compared with White smokers (Shiffman et al., 2007). Although African Americans express more interest and present for initial screening at higher proportions than Whites, they generally are excluded for ineligibility (e.g., too few cigarettes smoked per day [CPD]), have lower attendance to the initial session, and have lower participation rates even when eligible (King, Cao, Southard, & Mathews, 2011). Furthermore, a recent study found that African American smokers are less likely than White smokers to expect formal smoking cessation treatments, including pharmacotherapy and “professional” interventions, to be effective (Hendricks et al., 2013). Indeed, African American smokers in community corrections reported a preference for behavioral over pharmacotherapy methods of cessation (Cropsey et al., 2010). Overall, these findings suggest that African Americans may have a reduced preference for pharmacotherapy and a somewhat greater preference for behavioral therapy relative to other racial groups (Cropsey et al., 2010; Shiffman et al., 2007).

Women generally have lower cessation rates than men (Borrelli, Papandonatos, Spring, Hitsman, & Niaura, 2004; Burgess et al., 2009; Japuntich et al., 2011; Wetter et al., 1999a, 1999b). Although this gender disparity has been demonstrated in some disadvantaged populations (e.g., low-income smokers; Burgess et al., 2009), no studies in the criminal justice system have directly compared the smoking cessation rates of men and women during treatment. A study by Clarke and colleagues (2013) found no differences in relapse when prisoners were provided motivational interviewing prior to release from a smoke-free prison. However, women in the criminal justice system have more severe histories of physical and sexual abuse as well as mental health and substance use compared with their male peers (Clark et al., 2012a, 2012b, 2013; McCullumsmith, Clark, Perkins, Fife, & Cropsey, 2013), which may impact their ability to quit smoking. In addition, women in the criminal justice system report a preference for pharmacotherapy as well as greater prior use of both nicotine replacement and medications for smoking cessation relative to men (Cropsey et al., 2010). This work is notable and consistent with evidence that women experience more severe smoking withdrawal symptoms upon abstinence compared with men (e.g., al’Absi, Amunrud, & Wittmers, 2002; Leventhal et al., 2007; Pang and Leventhal, 2013; Wetter et al., 1999a). Perhaps women in the criminal justice system are more likely to expect pharmacotherapy to be helpful than men due to their experience of greater withdrawal symptoms. Also, women show slightly less self-efficacy in their ability to quit smoking cigarettes compared with men (Etter, Prokhorov, & Perneger, 2002; Stockton, McMahon, & Jason, 2000; Ward, Klesges, Zbikowski, Bliss, & Garvey, 1997), although differences tend to be very small. In contrast, African Americans typically have higher levels of both self-efficacy and motivation to quit than Whites (Boardman, Catley, Mayo, & Ahluwalia, 2005; Hendricks et al., 2013). These higher levels have been shown to be relatively unaffected by failed quit attempts (Boardman et al., 2005).

This study was conducted as part of a larger clinical trial among individuals in the criminal justice system to compare group differences on participants’ expectancies for a smoking cessation intervention involving both a behavioral intervention and pharmacotherapy. The original clinical trial was powered to examine racial differences to two intensities of behavioral therapy provided in conjunction with pharmacotherapy (bupropion). Expectancies for tobacco use are strong predictors of smoking cessation outcome (e.g., Vidrine et al., 2009; Wetter et al., 1994), whereas negative expectancies for quitting smoking, particularly for individuals with comorbid substance use, have been shown to be related to a lower desire for abstinence (Hendricks, Peters, Thorne, Delucchi, & Hall, 2014). Because self-efficacy and cessation motivation may be particularly pertinent to treatment success (Baker et al., 2011), the purpose of this paper was to test behavioral and pharmacotherapy treatment effectiveness expectancies as possible mediators of associations between groups (i.e., race and gender) and both motivation to quit and abstinence self-efficacy. We hypothesized that treatment effectiveness expectancies (i.e., beliefs about the effectiveness of behavioral therapy and pharmacotherapy) would account for the associations of race and gender to motivation to quit and abstinence self-efficacy.

METHODS

Participants

Six hundred and seventy-three participants recruited from community corrections offices signed informed consent and completed baseline measures at study entry. It should be noted that these participants, while in the criminal justice system through community supervision, were not incarcerated in a penal institution (e.g., jail or prison) during their participation in this study and lived in the community with their friends or family. As such, these participants did not have any restrictions to their smoking behavior other than what is experienced by the average smoker living in the community. Participants included in the study were at least 19 years or older (the age of legal adulthood in Alabama), smoking at least 5 cigarettes/day, had a cotinine level of 100 ng/ml, were under some form of community criminal justice supervision (e.g., probation, parole, drug court, community corrections, and so forth), were living in an environment that allowed smoking, reported wanting to quit smoking, and were willing to take pharmacotherapy and receive four sessions of behavioral counseling. Participants were excluded from the study if they had a demonstrated history of bipolar disorder, a history of a seizure disorder, a history of an eating disorder, current suicidal ideation or history of a suicide attempt in the past six months, were currently pregnant or lactating, were non-English speaking, had cognitive impairment such that they were unable to provide informed consent, or were medically unstable (e.g., had an elevation of liver function tests 3 times upper limit of normal). Participants with stable psychiatric or medical disorders were included in the study. All participants received 12 weeks of bupropion treatment at standard smoking cessation dosage and were told to take the medication consistently and attempt to quit in the second week. Participants were randomized to either four 20- to 30-min sessions of standard behavioral smoking cessation counseling or brief physician advice to quit. This report is an analysis of baseline variables for this large, ongoing randomized

clinical trial of counseling in a community corrections population. For the purposes of this study, all participants who completed informed consent and baseline measures were analyzed even though not all participants ($N = 173$; 25% excluded) went on to receive the study intervention.

Measures

At baseline, participants completed demographic questionnaires assessing race, age, gender, and education level. Participants completed measures that determined their smoking history including age of daily smoking, average CPD, difficulty of quitting smoking in the past, type of cigarette typically smoked (e.g., menthol, regular), use of other tobacco products, any personal medical problems due to smoking, and whether they live in a household with a current smoker. Participants were also queried on their past experiences with quitting smoking including whether or not a medical provider had ever discussed smoking cessation, type of cessation interventions tried in the past (i.e., nicotine replacement therapy, behavioral therapy, self-help materials, medication), and if they were considering quitting smoking (within 30 days, within 6 months, or no, not considering quitting). Finally, participants were administered several standard and well-validated smoking questionnaires including the Fagerström Test for Cigarette Dependence (Fagerström, 2012), the Questionnaire on Smoking Urges-Short Form (Tiffany, 1992), and the Minnesota Nicotine Withdrawal Scale (Hughes & Hatsukami, 1986).

Mediators were assessed via ratings of perceived treatment effectiveness expectancies (rated on a 1–7 Likert-type scale) of different cessation interventions including behavioral therapies (e.g., group therapy, individual therapy, and reading materials) or pharmacotherapy (e.g., nicotine replacement therapy, bupropion, or varenicline). The primary outcomes were assessed using the Readiness Rulers (adapted from Miller & Rollnick, 1991), which used one item each for abstinence self-efficacy and motivation to quit smoking (rated on a 1–7 Likert-type scale).

Procedures

All participants were recruited via flyers placed at a criminal justice supervision site. Participants were prescreened for study inclusion/exclusion criteria in person or over the phone and scheduled for a baseline study visit onsite at offices located at the community corrections site if initially eligible. At the baseline study visit, participants provided written informed consent, provided urine to test for cotinine and illicit substances, and expired air to measure for carbon monoxide. Participants completed self-report smoking measures and standard demographic questions, which served as the primary data included in this report. Participants were compensated \$20 for this baseline visit. This study was approved by the University of Alabama at Birmingham Institutional Review Board, and this trial was registered with ClinicalTrials.gov (NCT01257490).

Statistical Analysis

Analyses of variance and chi-square tests were used to examine whether there were significant group differences (i.e., racial and gender differences) on demographic variables and smoking characteristics. Demographic variables that significantly differed between the two racial or gender groups, and which were not expected to be different (i.e., did not reflect known population

differences), were entered in as covariates in subsequent multivariate analyses. For the mediation analyses, PROCESS (Hayes, 2012) was used to estimate the indirect effects of race and gender on both abstinence self-efficacy and motivation to quit, with the treatment effectiveness expectancies as multiple mediators operating in parallel. In order to examine the indirect effects of race and gender on motivation to quit and abstinence self-efficacy, four mediation models were examined, each with either race or gender as the independent variable and motivation to quit or abstinence self-efficacy as the dependent variable. For all mediation models, the alternative independent variable (i.e., either gender or race), age, current positive urine drug or alcohol screen, and cigarette dependence were used as a covariate in the analyses. A dichotomous code variable was used for both gender and race. Similarly, a dichotomous code variable was created for current substance use status; current substance use was operationalized as a positive baseline urine drug screen for any substances.

RESULTS

Participant Characteristics

African Americans and Whites

Demographic and smoking characteristics of White and African American smokers are presented in Table 1. African American smokers were less likely to have used previous cessation treatments such as nicotine replacement or other pharmacotherapy but were more likely to report past use of self-help materials to quit smoking. They were also more likely to rate behavioral interventions such as group therapy, individual therapy, and reading materials as potentially more effective during a quit attempt than White smokers, whereas no differences in the effectiveness expectancies of nicotine replacement or other pharmacotherapy were found between the racial groups. African American and White smokers did not differ in their reported interest in quitting smoking; however, African Americans were more likely to report higher levels of abstinence self-efficacy and motivation to quit smoking compared with White smokers.

Men and Women

Demographic and smoking characteristics of men and women are presented in Table 2. Women reported more difficulty with past quit attempts and were more likely to have used medication to aid in cessation in the past compared with men; however, there were no differences in past use of NRT, behavioral therapy, or past use of self-help materials. Women also perceived medication and nicotine replacement therapy as being more effective than did men, but there were no gender differences in the effectiveness expectancies of group therapy, individual therapy, or reading materials. They expressed greater interest in quitting; however, there were no differences in terms of abstinence self-efficacy and motivation to quit.

Mediational Analyses

African Americans and Whites

The first pair of mediational analyses examined racial differences in motivation to quit and abstinence self-efficacy (see Figure 1). Treatment effectiveness expectancies for behavioral therapy significantly mediated the relationship between race

Table 1. Demographic and Smoking Characteristics of Whites and African Americans (*N* = 673)

Variable	White (<i>n</i> = 230)	African American (<i>n</i> = 443)	<i>t</i> test or chi-square
	Mean (<i>SD</i>) %	Mean (<i>SD</i>) %	
Education			
<High school	22.2%	37.2%	29.4***
High school or general educational development	33.0%	37.6%	
>High school	44.8%	25.2%	
Age of daily smoking, years	16.6 (4.3)	17.9 (5.2)	−3.2**
Average cigarettes smoked per day	19.9 (7.9)	14.8 (10.7)	6.4***
Number of previous quit attempts	3.3 (10.8)	1.5 (3.3)	2.9**
Minnesota Nicotine Withdrawal Scale	14.0 (6.8)	10.4 (7.1)	6.1***
Questionnaire of smoking urges	42.6 (15.1)	38.1 (16.8)	3.4**
Other tobacco products tried or regularly used			
Cigars/cigarillos/little cigars	23.2%	24.1%	0.06
Pipe	6.1%	2.1%	7.3**
Smokeless tobacco	23.2%	4.0%	58.2***
Smoke menthol cigarettes	42.6%	86.2%	140.8***
Difficulty of quitting in the past ^a	5.6 (1.7)	5.3 (2.1)	1.6
Personal medical problem due to smoking (% yes)	15.7%	10.7%	4.1
Live with current smoker (% yes)	73.5%	56.9%	17.3***
Interest in quitting ^a	6.1 (1.3)	6.1 (1.4)	0.6
Thinking about quitting smoking			
Within 30 days	59.4%	59.7%	0.02
Within 6 months	36.2%	36.1%	
No, not considering quitting	4.4%	4.2%	
Type of cessation intervention tried in past			
Nicotine replacement	33.2%	18.2%	18.7***
Behavioral therapy	2.2%	1.9%	0.1
Self-help materials	7.9%	15.4%	7.5**
Medication	10.8%	2.6%	16.9***
Key variables			
Age (years)	35.6 (10.0)	37.8 (11.5)	−2.5*
Female	44.3%	27.1%	20.4***
Positive urine drug or alcohol screen	42.2%	50.6%	4.3*
Fagerström Test of Cigarette Dependence	6.4 (2.0)	5.4 (2.3)	5.6***
Abstinence self-efficacy ^a	4.9 (1.7)	5.9 (1.5)	−7.0***
Motivation to quit ^a	5.6 (1.8)	5.8 (1.8)	−2.6**
Perceived helpfulness of the following interventions ^a			
Group therapy	3.5 (2.0)	4.5 (2.1)	−5.9***
Individual therapy	4.3 (2.0)	5.3 (1.8)	−5.8***
Reading materials	3.2 (1.8)	4.2 (2.1)	−5.5***
Nicotine replacement therapy	4.2 (2.0)	4.3 (2.1)	−0.4
Medication (bupropion and varenicline)	5.3 (1.4)	5.2 (1.8)	0.4

^aThese variables utilized a 1 (*not at all*) to 7 (*very much*) Likert scale.

p* < .05. *p* < .01. ****p* < .001.

and both motivation to quit and abstinence self-efficacy, such that African Americans reported greater effectiveness expectancies for behavioral therapy, which in turn was associated with greater motivation to quit ($b = 0.31$, 95% CI = 0.09, 0.28) and greater abstinence self-efficacy ($b = 0.29$, 95% CI = 0.08, 0.27). The indirect effects of pharmacotherapy effectiveness expectancies were not significant for either outcome.

Men and Women

The second pair of mediational analyses examined gender differences in motivation to quit and abstinence self-efficacy (see Figure 2). Treatment effectiveness expectancies for pharmacotherapy mediated the relationship between gender and motivation

to quit, such that women's greater effectiveness expectancies for pharmacotherapy ($b = 0.08$, 95% CI = −0.00, 0.11) were associated with greater motivation to quit. Treatment effectiveness expectancies for behavioral therapy significantly mediated the relationship between gender and both abstinence self-efficacy and motivation to quit, such that women's greater expectancies for the effectiveness of behavioral therapy was related to greater abstinence self-efficacy ($b = 0.27$, 95% CI = 0.02, 0.20) and greater motivation to quit ($b = 0.32$, 95% CI = 0.02, 0.22).

Race/Gender Groups and Expectancies for Treatment

Finally, mediational analyses compared each race/gender group (e.g., White males) against the other race/gender groups (all other

Expectancies for different tobacco interventions

Table 2. Demographic and Smoking Characteristics of Males and Females (*N* = 673)

Variable	Male (<i>n</i> = 451)	Female (<i>n</i> = 222)	<i>t</i> test or chi-square
	Mean (<i>SD</i>) %	Mean (<i>SD</i>) %	
Education			
<High school	32.4%	31.2%	12.4**
High school or GED	39.8%	28.5%	
>High school	27.9%	40.3%	
Age of daily smoking, years	17.5 (5.0)	17.4 (4.8)	0.1
Average cigarettes per day	16.7 (11.0)	16.3 (8.1)	0.4
Number of previous quit attempts	2.1 (6.7)	2.3 (8.4)	−0.3
Minnesota Nicotine Withdrawal Scale	10.5 (6.9)	14.1 (7.2)	−6.1***
Questionnaire of smoking urges	38.4 (16.1)	42.2 (16.5)	−2.8**
Other tobacco products tried or regularly used			
Cigars/cigarillos/little cigars	28.3%	14.7%	14.7***
Pipe	4.7%	0.9%	6.3*
Smokeless tobacco	14.1%	3.7%	16.3***
Smoke menthol cigarettes	71.2%	71.6%	0.0
Difficulty of quitting in the past ^a	5.2 (2.0)	5.8 (1.7)	−3.5**
Personal medical problem due to smoking (% yes)	7.4%	22.5%	30.8***
Live with current smoker (% yes)	60.5%	67.0%	2.6
Interest in quitting ^a	6.0 (1.4)	6.3 (1.1)	−3.0**
Thinking about quitting smoking			
Within 30 days	60.7%	57.3%	2.1
Within 6 months	34.5%	39.4%	
No, not considering quitting	4.7%	3.2%	
Type of cessation intervention tried in past			
Nicotine replacement	22.0%	26.4%	1.6
Behavioral therapy	1.8%	2.4%	0.2
Self-help materials	12.3%	13.8%	0.3
Medication	3.0%	10.0%	14.1***
Key variables			
Age, years	36.5 (11.4)	38.3 (10.2)	−2.0*
White	28.4%	45.9%	20.4***
Positive urine drug or alcohol screen	52.8%	37.4%	14.1***
Fagerström Test of Cigarette Dependence	5.6 (2.2)	6.0 (2.2)	−2.5*
Abstinence self-efficacy ^a	5.6 (1.6)	5.5 (1.7)	0.4
Motivation to quit ^a	5.7 (1.5)	6.0 (1.4)	−1.9
Perceived helpfulness of the following interventions ^a			
Group therapy	4.1 (2.1)	4.3 (2.1)	−0.9
Individual therapy	4.8 (1.9)	5.1 (2.0)	−1.2
Reading materials	3.8 (2.1)	3.9 (2.1)	−0.4
Nicotine replacement therapy	4.1 (2.1)	4.6 (1.9)	−2.5*
Medication (bupropion and varenicline)	5.0 (1.7)	5.7 (1.4)	−3.8***

^aThese variables utilized a 1 (*not at all*) to 7 (*very much*) Likert scale.

p* < .05. *p* < .01. ****p* < .001.

groups combined) to determine the differences on motivation to quit and abstinence self-efficacy. Treatment effectiveness expectancies for behavioral and pharmacotherapy mediated the relationship between race/gender and abstinence self-efficacy, such that White male's lowered effectiveness expectancies for behavioral therapy ($b = -0.96$, 95% CI = $-1.32, -0.60$) was associated with greater abstinence self-efficacy ($b = 0.30$, 95% CI = $0.21, 0.39$). A similar pattern was shown for White males on motivation to quit, with lowered effectiveness expectancies for behavioral therapy ($b = -0.96$, 95% CI = $-1.33, -0.61$) associated with greater motivation to quit smoking ($b = 0.31$, 95% CI = $0.24, 0.39$). Similar to White males, White female's lower effectiveness expectancies for behavioral therapy ($b = -0.55$, 95% CI = $-0.95, -0.14$) was associated with greater abstinence self-efficacy ($b = 0.31$, 95% CI =

$0.23, 0.40$). This same pattern was shown for motivation to quit smoking, with White female's lower effectiveness expectancies for behavioral therapy ($b = -0.55$, 95% CI = $-0.96, -0.14$) associated with greater motivation to quit ($b = 0.32$, 95% CI = $0.24, 0.39$). Conversely, African American male's higher effectiveness expectancies for behavioral treatment ($b = 0.53$, 95% CI = $0.23, 0.84$) was associated with greater abstinence self-efficacy ($b = 0.31$, 95% CI = $0.22, 0.39$). Similarly, African American male's higher effectiveness expectancies for behavioral therapy ($b = 0.54$, 95% CI = $0.23, 0.84$) was associated with higher levels of motivation to quit ($b = 0.33$, 95% CI = $0.25, 0.40$), whereas lower effectiveness expectancies for pharmacotherapy ($b = -0.31$, 95% CI = $-0.61, -0.01$) was also associated with higher levels of motivation to quit smoking ($b = 0.08$, 95% CI = $0.01, 0.15$). Lastly, African American

Figure 1. Mediation path models of the association between race (African American and White race; White race was the reference group), treatment effectiveness expectancies (behavioral therapy and pharmacotherapy), and (a) motivation to quit and (b) abstinence self-efficacy. Gender, age, current substance use, and cigarette dependence (Fagerström Test of Cigarette Dependence) are included as covariates. Reported path coefficients are unstandardized. The values in parentheses are the direct effects of race, and the values outside of the parentheses are the total effects.

* $p < .07$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

female's higher effectiveness expectancies for behavioral therapy ($b = 0.70$, 95% CI = 0.31, 1.09) were associated with higher levels of abstinence self-efficacy ($b = 0.32$, 95% CI = 0.23, 0.40). African American female's higher effectiveness expectancies for both behavioral therapy ($b = 0.70$, 95% CI = 0.32, 1.08) and pharmacotherapy ($b = 0.61$, 95% CI = 0.23, 0.98) were associated with higher levels of motivation to quit ($b = 0.31$, 95% CI = 0.24, 0.39 and $b = 0.08$, 95% CI = 0.01, 0.16, respectively).

DISCUSSION

The associations between race and both motivation to quit and abstinence self-efficacy were mediated by behavioral therapy effectiveness expectancies in this sample of individuals under criminal justice supervision. Overall, African Americans in this study viewed behavioral methods as more effective relative to White smokers, whereas African American females had higher expectancies for both behavioral and pharmacotherapy treatment that was associated with increased motivation to quit. Previous work has found that African American smokers have a greater preference for behavioral therapy and a decreased preference for pharmacotherapy when compared with White smokers (Cropsey et al., 2010; Shiffman et al., 2007). Our findings build upon this literature by suggesting that these race-specific preferences or expectancies lead to important mechanisms

of change, namely abstinence self-efficacy and motivation to quit. Although expectancies about the effectiveness of behavioral therapy mediated the relationship between race and both abstinence self-efficacy and motivation to quit, expectancies about the effectiveness of pharmacotherapy only did for African American females. This is an interesting finding given accrued literature in this area suggesting that African Americans are less likely to have tried pharmacotherapy for smoking cessation, have a more limited knowledge of how it works, and report greater concerns about its safety than do Whites (Fu et al., 2007; Ryan, Garrett-Mayer, Alberg, Cartmell, & Carpenter, 2011).

Our findings also implicate effectiveness expectancies for behavioral therapy as important variables to consider when examining gender differences in abstinence self-efficacy. White women had lower expectancies for the efficacy of behavioral therapy relative to African American women, although women, in general, in this study tended to have greater effectiveness expectancies for both behavioral therapy and pharmacotherapy, which in turn, were associated with greater abstinence self-efficacy and motivation to quit. This is consistent with the finding that expectancies about treatment effectiveness predict treatment adherence across medical and psychosocial interventions and are related to treatment dropout (Baekeland & Lundwall, 1975; DiClemente, Fairhurst, & Piotrowski, 1995; Horne & Weinman, 1999).

Our findings are somewhat surprising given evidence that cessation rates are generally lower in women compared with men (Borrelli, Papandonatos, Spring, Hitsman, & Niaura,

Expectancies for different tobacco interventions

Figure 2. Mediation path models of the association between gender (women and men; males were the reference group), treatment effectiveness expectancies (behavioral therapy and pharmacotherapy), and (a) motivation to quit and (b) abstinence self-efficacy. Race, age, current substance use, and cigarette dependence (Fagerström Test of Cigarette Dependence) are included as covariates. Reported path coefficients are unstandardized. The values in parentheses are the direct effects of gender, and the values outside of the parentheses are the total effects.

* $p < .07$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

2004; Burgess et al., 2009; Japuntich et al., 2011; Wetter et al., 1999a, 1999b) and in African Americans compared with White smokers (Cropsey et al., 2009). Thus, although treatment effectiveness expectancies account for greater motivation and self-efficacy, greater motivation and self-efficacy may not be indicative of actual cessation success. Hendricks et al. (2013) offered one possible explanation for the inconsistencies between cessation rates and motivation to quit and abstinence self-efficacy among African Americans. Specifically, although African American smokers may be more likely to attempt to quit smoking due to higher pretreatment levels of motivation to quit and abstinence self-efficacy, their motivation and self-efficacy may decrease once they actually engage in a quit attempt (Hendricks et al., 2013). Although prior explanations for the inconsistencies specifically focus on African American smokers, the same may be true for women. Unfortunately, few studies have examined these constructs among individuals in the general population, let alone among individuals in the criminal justice system, making it difficult to determine if these findings are unique to this disadvantaged population or would hold true for the broader population of smokers.

This study is not without limitations. First, the data are cross-sectional, which limits inferences regarding the temporal order of the associations we examined. Prospective, longitudinal investigations are needed to inform causality. Second, although motivation to quit and abstinence self-efficacy are important outcomes that may be related to successful treatment, we do not yet have the more pertinent outcome data from the smoking

cessation treatment in which these individuals participated. Future studies should examine whether the current findings generalize to other groups and if treatment effectiveness expectancies—particularly those related to behavioral therapy—function as mediators in the relationship between race and gender and treatment outcomes. Finally, this study was conducted among smokers supervised under community corrections. Although these individuals were maintained in the community with few smoking restrictions on their behavior other than what is encountered by the average citizen, it is possible that these results may be influenced by their criminal justice experiences or behaviors leading to criminal justice involvement.

Despite these limitations, our results suggest that treatment effectiveness expectancies may be particularly important targets of smoking cessation treatment. Including a more formalized psychoeducational component that specifically addresses the effectiveness of behavioral therapy, and pharmacotherapy may serve to increase both motivation to quit and abstinence self-efficacy. As previously noted, both of these factors are important to treatment success, and thus, they may be beneficial to enhance treatment effectiveness expectancies for everyone. In particular, for African Americans and women discussing realistic expectancies for cessation may be particularly helpful to prevent a loss of motivation and self-efficacy during the quit process. However, our findings also suggest that the opposite approach may be particularly warranted for specific subgroups who tend to have lower treatment expectancies (i.e., Whites and men). By directly targeting treatment beliefs for these groups,

treatment providers can improve both motivation to quit and abstinence self-efficacy. Although White and male smokers tend to have higher cessation rates (compared with African American and female smokers), our results suggest that their motivation to quit and abstinence self-efficacy may be lower than their counterparts, and thus, may make them reluctant to attempt cessation. Such a component may, therefore, enhance treatment efficacy for Whites and men in particular. In the future, identifying relevant baseline variables that differentially affect treatment outcomes can be used to develop more efficient, cost-effective interventions targeted to the unique treatment needs of these groups (Kraemer, Wilson, Fairburn, & Agras, 2002; Schumacher, Mennemeyer, Milby, Wallace, & Nolan, 2002).

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DECLARATION OF INTERESTS

None declared.

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REFERENCES

- al'Absi, M., Amunrud, T., & Wittmers, L. E. (2002). Psychophysiological effects of nicotine abstinence and behavioral challenges in habitual smokers. *Pharmacology, Biochemistry and Behavior*, 72, 707–716. doi:10.1016/S0091-3057(02)00739-6
- Baekeland, F., & Lundwall, L. (1975). Dropping out of treatment: A critical review. *Psychological Bulletin*, 82, 738–83. Retrieved from www.apa.org/pubs/journals/bul/index.aspx
- Baker, T. B., Mermelstein, R., Collins, L. M., Piper, M. E., Jorenby, D. E., Smith, S. S., . . . Fiore, M. C. (2011). New methods for tobacco dependence treatment research. *Annals of Behavioral Medicine*, 41, 192–207. doi:10.1007/s12160-010-9252-y
- Boardman, T., Catley, D., Mayo, M. S., & Ahluwalia, J. S. (2005). Self-efficacy and motivation to quit during participation in a smoking cessation program. *International Journal of Behavioral Medicine*, 12, 266–272. doi:10.1207/s15327558ijbm1204_7
- Borrelli, B., Papandonatos, G., Spring, B., Hitsman, B., & Niaura, R. (2004). Experimenter-defined quit dates for smoking cessation: Adherence improves outcomes for women but not for men. *Addiction*, 99, 378–385.
- Burgess, D. J., Fu, S. S., Noobaloochi, S., Clothier, B. A., Ricards, J., Widome, R., van Ryn M. (2009). *Nicotine Tobacco Research*, 11, 1439–1447.
- Centers for Disease Control and Prevention. (2013). Current cigarette smoking among adults—United States, 2011. *Morbidity and Mortality Weekly Report*, 61, 889–894. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6144a2.htm?s_cid=mm6144a2.htm_w
- Clark, C. B., McCullumsmith, C. B., Waesche, M. C., Perkins, A., Islam, A. M., Francis, R., & Cropsey, K. L. (2013). HIV risk characteristics in community corrections. *Journal of Addiction Medicine*, 7, 210–215. doi:10.1097/ADM.0b013e3182781806
- Clark, C. B., Perkins, A., McCullumsmith, C. B., Islam, M. A., Hanover, E. E., & Cropsey, K. L. (2012a). Characteristics of victims of sexual abuse by gender and race in a community corrections population. *Journal of Interpersonal Violence*, 27, 1844–1861. doi:10.1177/0886260511430390
- Clark, C. B., Perkins, A., McCullumsmith, C. B., Islam, M. A., Sung, J., & Cropsey, K. L. (2012b). What does self-identified drug of choice tell us about individuals under community corrections supervision? *Journal of Addiction Medicine*. doi:10.1097/ADM.0b013e318233d603
- Clark, C.B., Reiland, S., Thorne, C., & Cropsey, K.L. (2013). Relationship of trauma exposure and substance abuse to self-reported violence among men and women in substance abuse treatment. *Journal of Interpersonal Violence*. Advance online publication. doi:10.1177/0886260513507138
- Clark, P. I., Gautam, S., & Gerson, L. W. (1996). Effects of menthol cigarettes on biochemical markers of smoke exposure among Black and White smokers. *CHEST*, 110, 1194–1198. doi:10.1378/chest.110.5.1194
- Clarke, J. G., Stein, L. A., Martin, R. A., Martin, S. A., Parker, D., Lopes, C. E., . . . Bock, B. (2013). Forced smoking abstinence: Not enough for smoking cessation. *JAMA Internal Medicine*, 173, 789–794. doi:10.1001/jamainternmed.2013.197
- Covey, L. S., Botello-Harbaum, M., Glassman, A. H., Masmela, J., LoDuca, C., Salzman, V., & Fried, J. (2008). Smokers' response to combination bupropion, nicotine patch and counseling treatment by race/ethnicity. *Ethnicity and Disease*, 18, 59–64. Retrieved from www.ishib.org/wordpress/?page_id=39
- Cropsey, K. L., Eldridge, G., Weaver, M., Villalobos, G., Stitzer, M., & Best, A. (2008). Smoking cessation intervention for female prisoners: Addressing an urgent public health need. *American Journal of Public Health*, 98, 1894–1901. doi:10.2105/AJPH.2007.128207
- Cropsey, K. L., Jones-Whaley, S., Jackson, D. O., & Hale, G. J. (2010). Smoking characteristics of community corrections clients. *Nicotine & Tobacco Research*, 12, 53–58. doi:10.1093/ntr/ntp172
- Cropsey, K. L., Weaver, M. F., Eldridge, G. D., Villalobos, G. C., Best, A. M., & Stitzer, M. L. (2009). Differential success rates in racial groups: Results of a clinical trial of smoking cessation among female prisoners. *Nicotine & Tobacco Research*, 11, 690–697. doi:10.1093/ntr/ntp051
- Cropsey, K. L., Martin, S., Clark, C. B., McCullumsmith, C. B., Lane, P. S., Hardy, S., . . . Redmond, N. (2013). Characterization of opioid overdose and response in a high risk community corrections population: A preliminary study. *Journal of Opioid Management*, 9, 393–400. doi:10.5055/jom.2013.0181
- DiClemente, C. C., Fairhurst, S. K., Piotrowski, N. A., & Maddux, J. E. (1995). Self-efficacy, adaptation and adjustment: Theory, research and application. *Self-efficacy, adaptation, and adjustment: Theory, research, and application*. New York, NY: Plenum Press
- Etter, J. F., Prokhorov, A. V., & Perneger, T. V. (2002). Gender differences in the psychological determinants of cigarette smoking. *Addiction*, 97, 733–743. doi:10.1046/j.1360-0443.2002.00135.x
- Fagerström, K.-O. (2012). Determinants of tobacco use and renaming the FTND to the Fagerström Test for Cigarette Dependence. *Nicotine & Tobacco Research*, 14, 75–78. doi:10.1093/ntr/ntp137
- Ferguson, J. A., Patten, C. A., Schroeder, D. R., Offord, K. P., Eberman, K. M., & Hurt, R. D. (2003). Predictors of 6-month tobacco abstinence among 1224 cigarette smokers

- treated for nicotine dependence. *Addictive Behaviors*, 28, 1203–1218. doi:10.1016/S0306-4603(02)00260-5
- Foulds, J., Gandhi, K., Steinberg, M. B., Richardson, D., Williams, J., Burke, M., & Rhoads, G. G. (2006). Factors associated with quitting smoking at a tobacco dependence treatment clinic. *American Journal of Health Behavior*, 30, 400–412. doi:10.5993/AJHB.30.4.6
- Fu, S. S., Burgess, D., van Ryn, M., Hatsukami, D. K., Solomon, J., & Joseph, A. M. (2007). Views on smoking cessation methods in ethnic minority communities: A qualitative investigation. *Preventive Medicine*, 44, 235–240. doi:10.1016/j.ypmed.2006.11.002
- Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from <http://www.afhayes.com/public/process2012.pdf>
- Hendricks, P. S., Westmaas, J. L., Thorne, C. B., Wood, S. B., Baker, M. R., Lawler, R. M., . . . Hall, S. M. (2013). Smoking abstinence-related expectancies among American Indians, African Americans, and Women: Potential mechanisms of tobacco-related disparities. *Psychology of Addictive Behaviors*. Advance online publication. doi:10.1037/a0031938
- Hendricks, P. S., Peters, E. N., Thorne, C. B., Delucchi, K.L., & Hall, S. M. (2014). Expectancies for smoking cessation among drug-involved smokers: Implications for clinical practice. *Journal of Substance Abuse Treatment*, 46, 320–324. doi:10.1016/j.jsat.2013.10.011
- Hooper, M. W., Baker, E. A., Rodriguez de Ybarra, D., McNutt, M., & Ahluwalia, J. S. (2012). Acculturation predicts 7-day smoking cessation among treatment-seeking African Americans in a group intervention. *Annals of Behavioral Medicine*, 43, 74–83. doi:10.1007/s12160-011-9304-y
- Horne, R., & Weinman, J. (1999). Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *Journal of Psychosomatic Research*, 47, 555–567. Retrieved from www.journals.elsevier.com/journal-of-psychosomatic-research/
- Hughes, J. R., & Hatsukami, D. (1986). Signs and symptoms of tobacco withdrawal. *Archives of General Psychiatry*, 43, 289–294. doi:10.1001/archpsyc.1986.01800030107013
- Japuntich, S. J., Leventhal, A. M., Piper, M. E., Bolt, D. M., Roberts, L. J., Fiore, M. C., & Baker, T. B. (2011). Smoker characteristics and smoking-cessation milestones. *American Journal of Public Health*, 101, 286–294. doi:10.1016/j.amepre.2010.11.016
- Kendzor, D. E., Businelle, M. S., Reitzel, L. R., Rios, D. M., Scheuermann, T. S., Pulvers, K., & Ahluwalia, J. S. (2013). Everyday discrimination is associated with nicotine dependence in African American, Latino, and White smokers. *Nicotine & Tobacco Research*. Advance online publication. doi:10.1093/ntr/ntp198
- King, A. C., Cao, D., Southard, C. C., & Matthews, A. (2011). Racial differences in eligibility and enrollment in a smoking cessation clinical trial. *Health Psychology*, 30, 40–48. doi:10.1037/a0021649
- Kraemer, H. C., Wilson, G. T., Fairburn, C. G., & Agras, W. S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry*, 59, 877–883. doi:10.1001/archpsyc.59.10.877
- Leventhal, A. M., Waters, A. J., Boyd, S., Moolchan, E. T., Lerman, C., & Pickworth, W. B. (2007). Gender differences in acute tobacco withdrawal: Effects on subjective, cognitive, and physiological measures. *Exp Clin Psychopharmacol*, 15, 21–36. doi:10.1007-01684-002 [pii]
- McCullumsmith, C. B., Clark, C. B., Perkins, A., Fife, J., & Cropsey, K. L. (2013). Gender and racial differences for suicide attempters and ideators in a high risk community corrections population. *Crisis*, 34, 50–62. doi:10.1177/0886260511430390
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behavior*. New York, NY: Guilford Press.
- Pang, R. D., & Leventhal, A. M. (2013). Sex differences in negative affect and lapse behavior during acute tobacco abstinence: A laboratory study. *Experimental and Clinical Psychopharmacology*, 21, 269–276. doi:10.1037/a0033429
- Ryan, K. K., Garrett-Mayer, E., Alberg, A. J., Cartmell, K. B., & Carpenter, M. J. (2011). Predictors of cessation pharmacotherapy use among Black and non-Hispanic White smokers. *Nicotine Tobacco Research*, 13, 646–652. doi:10.1093/ntr/ntp051
- Schumacher, J. E., Mennemeyer, S. T., Milby, J. B., Wallace, D., & Nolan, K. (2002). Costs and effectiveness of substance abuse treatments for homeless persons. *Journal of Mental Health Policy and Economics*, 5, 33–42. Retrieved from [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-176X](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-176X)
- Shiffman, S., Hughes, J. R., Ferguson, S. G., Pillitteri, J. L., Gitchell, J. G., & Burton, S. L. (2007). Smokers' interest in using nicotine replacement to aid smoking reduction. *Nicotine & Tobacco Research*, 9, 1177–1182. Retrieved from <http://ntr.oxfordjournals.org/>
- Stahre, M., Okuyemi, K. S., Joseph, A. M., & Fu, S. S. (2010). Racial/ethnic differences in menthol cigarette smoking, population quit ratios and utilization of evidence-based tobacco cessation treatments. *Addiction*, 105, 75–83. doi:10.1111/j.1360-0443.2010.03200.x
- Stockton, M. C., McMahon, S. D., & Jason, L. A. (2000). Gender and smoking behavior in a worksite smoking cessation program. *Addictive Behaviors*, 25, 347–360. doi:10.1016/S0306-4603(99)00074-X
- Tiffany, S. T. (1992). A critique of contemporary urge and craving research: Methodological, psychometric, and theoretical issues. *Advances in Behaviour Research & Therapy*, 14, 123–139. doi:10.1016/0146-6402(92)90005-9
- Trinidad, D. R., Pérez-Stable, E. J., Messer, K., White, M. M., & Pierce, J. P. (2010). Menthol cigarettes and smoking cessation among racial/ethnic groups in the United States. *Addiction*, 105, 84–94. doi:10.1111/j.1360-0443.2010.03187.x
- Vidrine, J. I., Vidrine, D. J., Costello, T. J., Mazas, C., Cofta-Woerpel, L., Mejia, L. M., & Wetter, D. W. (2009). The smoking consequences questionnaire: Factor structure and predictive validity among Spanish-speaking Latino smokers in the United States. *Nicotine & Tobacco Research*, 11, 1280–1288. doi:10.1093/ntr/ntp128
- Ward, K. D., Klesges, R. C., Zbikowski, S. M., Bliss, R. E., & Garvey, A. J. (1997). Gender differences in the outcome of an unaided smoking cessation attempt. *Addictive behaviors*, 22, 521–533. doi:10.1016/S0306-4603(96)00063-9
- Wetter, D. W., Fiore, M. C., Young, T. B., McClure, J. B., de Moor, C. A., & Baker, T. B. (1999a). Gender differences in response to nicotine replacement therapy: Objective and subjective indices of tobacco withdrawal. *Experimental and Clinical Psychopharmacology*, 7, 135–144. doi:10.1037/1064-1297.7.2.135
- Wetter, D. W., Kenford, S. L., Smith, S. S., Fiore, M. C., Jorenby, D. E., & Baker, T. B. (1999b). Gender differences in smoking cessation. *Journal of Consulting and Clinical Psychology*, 67, 555–562. doi:10.1037/0022-006X.67.4.555
- Wetter, D. W., Smith, S. S., Kenford, S. L., Jorenby, D. E., Fiore, M. C., Hurt, R. D., . . . Baker, T. B. (1994). Smoking outcome expectancies: Factor structure, predictive validity, and discriminant validity. *Journal of Abnormal Psychology*, 103, 801–811. doi:10.1037/0021-843X.103.4.801