Bolger, Kelly , Carter, Kimberly , Curtin, Lisa , Martz, Denise M. , Gagnon, Sandy G. and Michael, Kurt
D.(2010) 'Motivational Interviewing for Smoking Cessation Among College Students', Journal of College Student Psychotherapy, 24: 2, 116 — 129
DOI: 10.1080/87568220903558661

Motivational Interviewing for Smoking Cessation Among College Students

KELLY BOLGER, KIMBERLY CARTER, LISA CURTIN, DENISE M. MARTZ, SANDY G. GAGNON, and KURT D. MICHAEL

Motivational interviewing has shown some success as an intervention for college student cigarette smokers. We tested the efficacy and process of a two session motivational-interviewing-based smoking intervention compared to an assessment/information session. College student participants assigned to the motivational interviewing condition did not differ significantly from participants in the assessment/information condition on smoking outcome variables one month later. However, both groups reported significant decreases in self-reported smoking over time, suggesting that brief interventions for college student smoking can be efficacious. Consistent with theory, the motivational interviewing group reported a significant increase in self-efficacy over time and reported stronger perceptions of the therapeutic alliance after the first session compared to assessment/information participants.

Cigarette smoking is the leading preventable cause of morbidity and mortality in the United States (Centers for Disease Control and Prevention, 2006). Although the overall prevalence of smoking has declined since 1991, the rate among American youths has risen since 1992 (Johnston, O'Malley, & Bachman, 1996). In fact, young Americans, particularly college students, have the highest rate of "new smoker" status (Centers for Disease Control and Prevention, 2006), and recent reports indicate that approximately 28% of college students smoke cigarettes (Weitzman, Chen, & Subramanian, 2005). Nearly one-third of college smokers began to smoke regularly at or after age 19 (American Cancer Society, 2006), suggesting the early college years might be an opportune time to impact smoking behaviors (Herman & Fahnlander, 2003).

Brief interventions may aid college student smokers in successful smoking cessation (Herman & Fahnlander, 2003; Prokhorov et al., 2008), and they frequently employ a motivational interviewing style. Motivational interviewing (MI) is a client-centered therapeutic style designed to increase readiness to change by helping clients resolve ambivalence and increase motivation for change (Miller & Rollnick, 2002). The four basic principles of MI are creating empathy, increasing client efficacy, developing discrepancy, and rolling with resistance.

An empathetic counseling style that creates a nonthreatening, accepting environment is fundamental to MI (Rogers, 1951; Rollnick & Miller, 1995). Self-efficacy refers to the client's confidence that he or she is able to engage in specific behaviors that are promoted in MI by focusing on the choice of the individual to implement change. An MI therapist also seeks to develop discrepancy between the problem behavior (e.g., smoking) and the client's change goals by providing feedback and reducing ambivalence toward change. In addition, a therapist using an MI style rolls with resistant verbalizations or behaviors by using reflective listening and avoids arguing with clients when they are ambivalent about or resistant to change (Miller & Rollnick, 2002).

A significant body of research supports the efficacy of brief interventions and the MI style for decreasing substance use (Bien, Miller, & Tonnigan, 1993; Bosari & Carey, 2000), and some evidence supports the potential efficacy of MI for smoking cessation (Butler et al., 1999; Colby et al., 1998; Dunn, Deroo, & Rivara, 2001; Herman & Fahnlander, 2003; Prokhorov et al., 2008; Schneider, Casey, & Kohn, 2000). Herman and Fahnlander found that college students who participated in a single 50-minute brief MI session for cigarette smoking were more likely to report abstinence at a 6-month follow-up compared to a no treatment control group. In addition, Prokhorov and colleagues (2008) compared a face-to-face, computer-assisted individualized feedback motivational smoking cessation intervention for community college students to a standard advice to quit and information session. They found a slight advantage for the more intensive

intervention relative to abstinence rates, but the differences were not statistically significant. Although promising, the research conducted on smoking cessation and MI has taken place primarily in medical settings and has typically provided only one brief session (Colby et al., 1998; Herman & Fahnlander, 2003; Stotts, DiClemente, & Dolan-Mullen, 2002).

Although MI relates to decreased future substance use, the process of how MI works has not been systematically tested. Each principle of MI has been investigated outside of the context of MI treatment. For example, a strong therapeutic alliance predicts positive therapeutic outcome (Barrett-Lennard, 1962; Horvarth & Symonds, 1991; Patterson, 1983), and client self-efficacy correlates positively with therapeutic outcome and negatively with smoking behavior (Baer, Holt, & Lichtenstein, 1986; DiClemente, 1981; DiClemente, Prochaska, & Gilbertini, 1985). Finally, MI utilizes the stages of change as a framework for behavior change, and increased readiness to change has been linked to a decrease in smoking (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992).

The purpose of the present study was to test the efficacy of a MI-based intervention and to assess variables related to the principles of MI in the context of a controlled smoking cessation study targeting college student smokers. It was hypothesized that the MI intervention group would evidence greater reductions in quantity and frequency of self-reported smoking behavior, carbon monoxide levels, and nicotine dependence between baseline and the one-month follow-up compared to the assessment/information (AI) control group. It also was hypothesized that participants randomly assigned to an MI condition would report more positive perceptions of the therapeutic alliance and greater self-efficacy and readiness to change smoking behavior at a one-month follow-up than participants assigned to the AI condition.

METHOD

Participants

Volunteer participants were recruited through the psychology participant pool and through advertisements (e.g., flyers, university publications). Recruitment material targeted college students between the ages of 18 and 24 who smoked at least one cigarette per day over the past month and were interested in learning about their smoking to participate in a study on smoking habits. Participants who responded to recruitment materials and who met inclusion criteria signed up for individual appointments.

Forty undergraduate college students (n = 28 males, n = 12 females) served as participants. On average, participants were 19.2 (SD = 1.59) years

of age, reported first smoking a cigarette at 13.9 years of age (*SD* = 2.48), and reported smoking regularly at 16.6 years of age (*SD* = 1.60). Participants reported smoking an average of 8.35 cigarettes per day (*SD* = 5.86) and smoking an average of 28.13 days (*SD* = 5.46) per month. The mean CO level reading at baseline was 12.35 parts per million [ppm] (*SD* = 8.01, range 9.79 ppm to 14.91 ppm). All participants were treated in accordance with the American Psychological Association's ethical guidelines (American Psychological Association, 2002), and this research was approved by the university's institutional review board.

Measures

An adapted version of the Mayo Nicotine Dependence Center Patient Questionnaire (Hays et al., 2001) was used to assess demographic characteristics and self-reported smoking (e.g., "How many cigarettes do you smoke per day on average?" "How many days have you smoked in the past 30 days?"). The Fagerstrom Test for Nicotine Dependence (FTND; Dijkstra & Tromp, 2002), a 6-item self-report questionnaire that yields scores between 0 and 10 was used to assess nicotine dependence. High scores on the FTND are associated with longer smoking histories, greater subjective enjoyment of smoking, and psychological dependence (Dijkstra & Tromp, 2002). Internal consistency was adequate in the present study (alpha = 0.88).

The 12-item short version of the Working Alliance Inventory (WAI; Horvath & Greenberg, 1989; Busseri & Tyler, 2003) was used to measure participants' perceptions of the quality of the alliance between themselves and the therapist. It assesses three components that relate to the strength and quality of the therapeutic relationship: tasks, bonds, and goals. Tasks refer to the client's perception of counseling as relevant and efficacious, goals refer to the perception of a shared mutual purpose between client and therapist, and bonds refer to the client's perception of the therapist as empathetic. Participants rate agreement with statements reflecting perceptions of the therapeutic alliance on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Total scores range from 12 to 60, and 2 items are reverse scored. The WAI reliably predicts early success in counseling outcome and correlates with a variety of other counselor and self-report measures of the therapeutic alliance (Horvath & Greenberg, 1989). Internal consistency was adequate in the present study (alpha = 0.88).

The Readiness to Change Questionnaire (RCQ; Forsberg, Halldin, & Wennberg, 2003) is a self-report measure designed to assess a patient's readiness to change alcohol consumption. It was adapted for this study to assess client readiness to change smoking behavior by replacing "alcohol" or "drinking" for "cigarettes" and "smoking." Participants responded to 12 questions (e.g., It is a waste of time thinking about my smoking;

Sometimes I think I should quit or cut down on my smoking) using a 5-point Likert scale where 1 = strongly agree (scored +2), 2 = agree (scored +1), 3 = neutral (scored 0), 4 = disagree (scored –1), and 5 = strongly disagree (scored –2). The total score reflects the extent to which the participant reports readiness to change. The one-factor method, or global score for readiness to change, was used in the present study, and it has been shown to have internal consistency of .88 and a test-retest correlation of .94 (Forsberg et al., 2003). Internal consistency was adequate in the present study (alpha = 0.82).

The Smoking Self-efficacy Measure (SSEM; Velicer, DiClemente, Rossi, & Prochaska, 1990) is a self-report questionnaire used to assess confidence in one's ability to quit smoking in a variety of situations. The SSEM consists of 9 questions that participants responded to using a 5-point Likert scale to rate confidence in his or her ability to abstain from smoking (e.g., when I am very angry about something or someone). Total scores range from 9 to 45. The SSEM correlates negatively with smoking behavior, and alpha coefficients range from .83 to .95 (Velicer et al., 1990). Internal consistency in the present study was alpha = 0.85.

A hand held carbon monoxide (CO) monitor (piCO Smokerlyzer model #: EC50-piCO-CHART) was used to assess the amount of carbon monoxide in the participants' lungs when they blew into the mouthpiece. The monitor provides a score for the degree of smoking compared to normative data. Nonsmokers have CO levels of 10–20 ppm and heavy smokers have CO levels of 20–80 ppm (Herman & Fahnlander, 2003). The sensitivity of exhaled CO for classifying active smoking is generally in the 80% to 85% range, but it can be affected by the time of day, time elapsed since the last cigarette, and environmental exposure (Velicer et al., 1990).

Procedure

Each participant signed up for an individual appointment. During the individual meetings, all participants (N = 40) were screened for the inclusion criteria (ages 18–24; smoke ≥ 1 cigarette per day) and were then asked to consent to participation. Next, consenting participants who met inclusion criteria completed the revised Mayo Nicotine Dependence Questionnaire, the FTND, the RCQ, and the SSEM. The 40 volunteer participants were then randomly assigned to either an AI control condition (n = 20) or an MI condition (n = 20), each led by two master's level candidates in clinical psychology under the supervision of a licensed doctoral level clinical psychologist.

Participants assigned to both the MI and AI conditions were asked about their knowledge of CO and provided information about the effects of CO, how it relates to cigarette smoking, and its effects on the body. Interviewers then obtained CO levels from the participants, provided

participants with their CO levels (scores), and illustrated how they compared to normative data.

Assessment/information condition

The participants in the AI condition were provided with CO feedback and information and with pamphlets about cigarette smoking and related health risks. Participants were given time to review the pamphlets and ask questions, and they were then scheduled for a one-month follow-up. Immediately following each AI session, a research assistant administered the WAI to assess participant perceptions of the therapeutic alliance.

Motivational interviewing condition

Participants assigned to the MI condition participated in a 50 minute MI session consistent with the methods of Herman and Fahnlander (2003) and were given pamphlets with information about cigarette smoking and related health risks. The MI session was intended to build a therapeutic alliance, increase participant self-efficacy, develop discrepancy between current and ideal smoking behavior, and reflect rather than argue with any participant resistance. The session included verbal assessment for desired change in smoking behavior from the participant (e.g., "How do you feel about your current smoking habits?" "What are the advantages and disadvantages of your smoking behavior?"). The interviewer used reflective listening to highlight positive change talk, reviewed client responses to assessment instruments, and discussed client feelings concerning smoking behavior. The interviewer remained nonconfrontational but continued to direct the conversation toward developing discrepancy and resolving ambivalence. The interviewer then summarized the session and asked questions regarding the participant's plans to change his or her smoking behavior. The MI participants were asked to schedule a second 50-minute session one week later. During the second MI session (n = 19), the interviewer assessed for change and continued to use MI principles to intrinsically motivate the client toward behavior change. The interviewer used the techniques described in the first session. Immediately following each MI session, a research assistant administered the WAI to assess participant perceptions of the therapeutic alliance.

Follow-up

All 40 participants were asked to return for a one-month follow-up assessment. During the follow-up assessment, participants (MI condition n = 19, AI condition n = 19) completed the revised Mayo questionnaire,

the FTND, the WAI, the RCQ, and the SSEM, and they provided a CO sample. Participants received $10.00 for their participation.

RESULTS

To test the effectiveness of random assignment, participants were first compared on baseline smoking variables. A multivariate analysis of variance (MANOVA) found a borderline significant multivariate difference on smoking quantity, smoking frequency, FTND scores, and CO levels as a function of treatment group, approximate $F(4,35) = 2.49$, $p = .06$, $\eta^2 = .22$ (Pillai's statistic = .22). Examination of univariate tests indicated significant differences between participants assigned to the MI condition and participants assigned to the AI condition on baseline FTND scores, $F(1, 38) = 5.934$, $p = .02$, $\eta^2 = .135$, and on baseline CO levels, $F(1, 38) = 6.08$, $p = .02$, $\eta^2 = .138$. On average, participants assigned to the MI condition had higher FTND scores and greater CO levels than participants assigned to the AI control condition.

Outcome Analyses

Smoking outcome as a function of treatment condition was tested using four analyses. The baseline and follow-up scores for the four smoking related dependent variables (quantity, frequency, FTND, CO) had restricted ranges, resulting in deviation from normality. Thus, the original values were submitted to a square root transformation based upon Kirk's (1982) recommendations. Participants' transformed self-reported quantity of smoking, self-reported frequency of smoking, FTND scores, and CO levels were utilized as dependent variables. Two mixed-model analyses of variance (ANOVAs) utilizing treatment condition as the between subjects factor (MI versus AI) and time as the within subjects factor (baseline, one-month follow-up) were utilized on the dependent variables of smoking quantity and smoking frequency. Due to differences between conditions on baseline FTND and CO levels, two covariate ANOVAs were used to test for the impact of treatments on these variables. In the covariate ANOVAs, treatment condition served as the independent variable, one-month follow-up FTND and CO levels served as dependent variables, and baseline FTND and CO levels served as respective covariates.

Counter to the hypothesis, a mixed-model ANOVA with smoking quantity as the dependent variable did not reveal a treatment by time interaction, $F(1, 36) = 0.72$, $p = .40$, $\eta^2 = 0.02$, or a treatment effect, $F(1, 36) = 0.43$, $p = .52$, $\eta^2 = .012$. A significant time effect was found, $F(1, 36) = 29.03$, $p = .001$, $\eta^2 = .45$, indicating decreased average quantity of smoking across time for participants in both conditions (see Table 1). Similarly, a

TABLE 1 Baseline and Follow-up Values for Motivational Interviewing and Assessment/ Information Conditions on Smoking-Related Variables

	MI				AI			
	Pre		Post		Pre		Post	
Dependent variable	M	SD	M	SD	M	SD	M	SD
Quantity	8.95	5.80	6.79	5.37	7.58	6.27	5.84	4.84
Frequency	27.37	7.10	18.63	11.34	28.68	5.58	19.63	10.78
FTND	2.53	2.04	1.58	1.71	1.11	1.29	.84	1.12
CO Levels	15.16	9.00	10.32	7.52	9.16	6.10	8.95	5.64

mixed-model ANOVA with smoking frequency as the dependent variable did not reveal a treatment by time interaction, $F(1, 36) = 0.14$, $p = .71$, $\eta^2 = 0.01$, or a treatment effect, $F(1, 36) = 0.45$, $p = .51$, $\eta^2 = .012$. A significant time effect was found, $F(1, 36) = 11.68$, $p = .002$, $\eta^2 = .25$, indicating decreased average frequency of smoking across time for participants in both treatment conditions.

A covariate ANOVA was conducted using the follow-up FTND as the dependent variable, baseline FTND as the covariate, and treatment condition as the independent variable. Contrary to the hypothesis, there was no difference between the MI and the AI conditions on follow-up FTND scores when controlling for baseline FTND scores, $F(1, 35) = .353$, $p = .56$, $\eta^2 = .010$. Another covariate ANOVA was conducted using the follow-up CO levels as the dependent variable, baseline CO levels as the covariate, and treatment condition as the independent variable. Again, there was no difference between the MI and AI groups on follow-up CO levels when controlling for baseline CO levels, $F(1,35) = 1.32$, $p = .258$, $\eta^2 = .036$.

Process Analyses

To test if participants in the MI condition reported increased perceptions of the therapeutic alliance (WAI), self-efficacy (SSEM), and readiness to change (RCQ) across time compared to participants in the AI condition, three 2 (condition: MI vs. AI control) × 2 (time: baseline versus one-month follow-up) mixed-model ANOVAs were used.

The interaction between condition and time on the WAI was not significant, $F(1, 36) = 0.03$, $p = .87$, $\eta^2 = .001$, and there was no effect of time for scores on the WAI, $F(1, 36) = 0.80$, $p = .38$, $\eta^2 = .02$. However, there was a significant overall condition effect on the WAI, $F(1, 36) = 4.15$, $p = .05$, $\eta^2 = .10$. On average, the participants in the MI condition ($M = 46.30$, $SD = 6.25$) reported significantly higher baseline scores on the WAI compared to the participants in the AI control ($M = 42.61$, $SD = 4.94$).

TABLE 2 Means and Standard Deviations for the WAI, the SSEM, and the RCQ for the Motivational Interviewing Condition and the Assessment/Information Condition

	MI condition		AI condition	
	Baseline	Follow-up	Baseline	Follow-up
WAI	46.30 (6.25)	46.59 (6.61)	42.61 (4.94)	43.17 (5.81)
SSEM	2.61 (0.64)	3.13 (0.79)	2.88 (0.75)	3.02 (0.82)
RCQ	6.17 (8.73)	8.00 (7.27)	4.21 (6.92)	7.32 (6.57)

Note: Standard deviations in parentheses.

Although there was not a significant main effect of condition on SSEM scores, $F(1, 35) = .13$, $p = .72$, $\eta^2 = .004$, a significant treatment by time interaction was found for the SSEM, $F(1, 35) = 4.64$, $p = .04$, $\eta^2 = .117$ (see Table 2). Smokers in the MI group reported a significant increase on SSEM scores between baseline and follow-up, $t(17) = -3.87$, $p = .001$, whereas participants assigned to the AI control did not differ on the SSEM scores between baseline and follow-up, $t(18) = -1.29$, $p = .212$. In addition, there was a significant main effect across time on the SSEM between baseline and follow-up, $F(1, 35) = 14.57$, $p = .001$, $\eta^2 = .294$.

The analyses on the RCQ did not result in a significant condition by time interaction, $F(1, 35) = .38$, $p = .54$, $\eta^2 = .011$), and there was not a main effect of condition on RCQ scores, $F(1, 35) = .36$, $p = .55$, $\eta^2 = .010$ (see Table 2) . However, there was a significant main effect for time, $F(1, 35) = 5.76$, $p = .02$, $\eta^2 = .141$, with both the MI condition and the AI control condition relating to significant increases on participant RCQ scores between baseline and follow-up.

DISCUSSION

Contrary to hypotheses, participants randomly assigned to the brief MI intervention did not differ from participants assigned to the AI control condition on smoking-related variables at follow-up. Both groups reported significant decreases in smoking quantity and frequency across time and increased readiness to change smoking behavior. Consistent with MI theory, the MI group participants reported a significant increase in smoking self-efficacy between baseline and follow-up compared to the AI group. In addition, participants in the MI group reported a stronger perception of the therapeutic alliance than the AI participants after the first session.

Similar to the current findings, previous studies comparing brief smoking cessation interventions to informational and assessment groups have demonstrated associations with overall reductions in smoking over time, but no significant differences between groups (Burke, Arkowitz, & Menchola,

2003; Colby et al., 1998; Prokhorov et al., 2008; Stotts et al., 2002). Studies supporting MI over controls for smoking reduction and cessation typically have not used active assessment and information control groups (Butler et al., 1999; Herman & Fahnlander, 2003; Woodruff, Conway, Edwards, Elliot, & Crittenden, 2007). The AI used in this study employed active treatment components of assessment, information, and individualized CO feedback, arguably a more stringent comparison. Assessment (Burke et al., 2003; Stotts et al., 2002) and self-monitoring of smoking behaviors (Abrams & Wilson, 1979; Foxx & Brown, 1979), as well as providing individuals with smoking information, supplying self-help materials concerning smoking behaviors, and asking questions about smoking behavior (Colby et al., 1998; Curry, Ludman, & McClure, 2003) may lead to reductions in smoking behavior. Thus, a two session MI intervention targeting smoking behavior among college students may not exceed the effects of nonspecific therapeutic factors, assessment, information, and feedback.

On average, participant perceptions of the therapeutic alliance did not change between the end of the first session and the one-month follow-up. However, participants assigned to the MI condition reported a greater therapeutic alliance after the first session compared to AI participants. Given that the MI intervention was brief, it is not surprising that participants' perceptions of the alliance did not change between the end of the first and second sessions. Our findings suggest that participants were sensitive to the increased emphasis of MI on development of a working alliance compared to the AI condition. This finding, however, is potentially compromised by the relatively greater length of the first MI session compared to the AI session, leaving time as a viable alternative hypothesis to therapeutic style.

Consistent with the emphasis of MI, participants in the MI group, versus AI group, reported a significant increase in confidence to change smoking behavior between the first session and the one-month follow-up, although the effect size was small. The MI intervention explicitly promotes client efficacy by focusing on and by supporting autonomy regarding treatment plans (Miller & Rollnick, 2002). Contrary to hypotheses, participants in the MI group did not report a significant increase in readiness to change their smoking behavior across time compared to the AI participants. However, participants in both groups reported a significant increase in readiness to change between the first session and the one-month follow-up. The current participants endorsed a desire to learn about their smoking behavior but not necessarily a desire to actively quit smoking. Regardless of their condition assignment and length of intervention, simply by engaging in the study, discussing their smoking behavior, and learning more about cigarette smoking, participants may have accurately viewed themselves as taking action toward changing smoking behavior. As participants continued to take additional action by attending a follow-up session and completing questionnaires, readiness to change reports likely would increase across

time. However, we did not include a group that controlled for the potential impact of time alone (e.g., Solomon four-group design).

College students typically have a short history of cigarette smoking, making them less physically dependent and thus less likely to experience negative smoking-related consequences (Arnette, 2000). Future studies could select for heavier and more dependent college smokers, employ a more diverse sample, and explicitly assess smoking-related consequences. It also is possible that the primarily light smoking sample affected measurement of CO levels, potentially making differences in CO levels so slight that they were undetectable at follow-up.

Given that MI theoretically opens the door to change, a longer follow-up period of 6 to 12 months may have also revealed effects that were undetectable after only one-month (Herman & Fahnlander, 2003). The present study did not assess the fidelity of treatment delivery, and MI fidelity has been found to relate positively with smoking cessation (Thyrian et al., 2007) and with therapeutic alliance (Boardman, Catley, Grobe, Little, & Ahluwalia, 2006). Thus, similarities and differences between the actual delivery of MI and delivery of the AI control conditions are unknown.

The present study supports the use of brief interventions as useful for smoking reduction for college students, resulting in approximately 9 fewer days of smoking across the past 30 days and a reduction of approximately 2 cigarettes per day, regardless of the length of the intervention. Future investigations should employ a heavier smoking sample, assess the biological marker of cotinine, utilize intervention fidelity scales (e.g., the Motivational Interviewing Treatment Integrity Scale; Moyers, Martin, Manuel, Hendrickson, & Miller, 2005), follow participants across a longer time period, and investigate the process of change in the context of brief interventions (Boardman et al., 2006; Curtin, Stephens, & Boneberger, 2001).

REFERENCES

Abrams, D. B., & Wilson, G. T. (1979). Self-monitoring and reactivity in the modification of cigarette smoking. *Journal of Consulting and Clinical Psychology*, *47*, 243–251.

American Cancer Society. (2006, February 13). Questions about smoking, tobacco and health. Retrieved July 25, 2008, from http://www.cancer.org/docroot/PED/content/PED_10_2x_Questions_About_Smoking_Tobacco_and_Health.asp.

American Psychological Association. (2002). Ethical principles of psychologists and code of conduct. *American Psychologist*, *57*, 1060–1073.

Arnette, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*, 469–480.

Baer, J. S., Holt, C. S., & Lichtenstein, E. (1986). Self-efficacy and smoking re-examined: Construct validity and clinical utility. *Journal of Consulting and Clinical Psychology, 54*, 846–852.

Barrett-Lennard, G. (1962). Dimensions of therapist response as causal factors in the therapeutic relationship. *Psychological Monographs; General and Applied*, *76*, 2–36.

Bien, T. H., Miller, W. R., & Tonnigan, J. S. (1993). Brief interventions for alcohol problems. *Addiction*, *88*, 305–325.

Boardman, T., Catley, D., Grobe, J. E., Little, T. D., & Ahluwalia, J. S. (2006). Using motivational interviewing with smokers: Do therapist behaviors relate to engagement and therapeutic alliance? *Journal of Substance Abuse Treatment*, *31*, 329–339.

Bosari, B., & Carey, K. B. (2000). Effects of a brief motivational interview with college student drinkers. *Journal of Counseling and Clinical Psychology*, *68*, 728–733.

Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology*, *71*, 843–861.

Busseri, M. A., & Tyler, J. D. (2003). Interchangeability of the Working Alliance Inventory, short form. *Psychological Assessment*, *15*, 193–197.

Butler, C. C., Rollnick, S., Cohen, D., Bachmann. M., Russell, I., & Stott, N. (1999). Motivational consulting versus brief advice for smokers in general practice: A randomized trial. *British Journal of General Practice*, *49*, 611–616.

Centers for Disease Control and Prevention. (2006). *Fact sheet: Tobacco-related mortality*. Retrieved July 25, 2008, from http://www.cdc.gov/tobacco/data_statistics/Factsheets/tobacco_related_mortality.

Colby, S. M., Monti, P. M., Barnett, N. P., Rohsenow, D. J., Weissman, K., Spirito, A., Woolard, R., & Lewander, W. (1998). Brief motivational interviewing in a hospital setting for adolescent smoking: A preliminary study. *Journal of Consulting and Clinical Psychology*, *66*, 574–578.

Curry, S. J., Ludman, E. J., & McClure, J. (2003). Self-administered treatment for smoking cessation. *Journal of Clinical Psychology*, *59*, 305–319.

Curtin, L., Stephens, R. S., & Bonenberger, J. (2001). Goal setting and feedback in the reduction of heavy drinking in female college students. *Journal of College Student Psychotherapy*, *15*, 17–37.

DiClemente, C. C. (1981). Self-efficacy and smoking cessation maintenance: A preliminary report. *Cognitive Therapy and Research*, *5*, 175–187.

DiClemente, C. C., Prochaska, J. O., & Gilbertini, M. (1985). Self-efficacy and the stages of self-change of smoking. *Cognitive Therapy and Research*, *9*, 181–200.

Dijkstra, A., & Tromp, D. (2002). Is the FTND a measure of physical as well as psychological tobacco dependence? *Journal of Substance Abuse Treatment*, *23*, 367–374.

Dunn, C., Deroo, L., & Rivara, F. P. (2001). The use of brief interventions adapted from motivational interviewing across behavioral domains: A systematic review. *Addictions*, *96*, 1725–1742.

Forsberg, L., Halldin, J., & Wennberg, P. (2003). Psychometric properties and factor structure of the readiness to change questionnaire. *Alcohol and Alcoholism*, *38*, 276–208.

Foxx, R. M., & Brown, R. A. (1979). Nicotine fading and self-monitoring for cigarette abstinence or controlled smoking. *Journal of Applied Behavior Analysis*, *12*, 111–125.

Hays, T., Wolter, T., Eberman, K., Croghan, I., Offord, K., & Hurt, R. (2001). Residential treatment compared with outpatient treatment for nicotine dependence. *Mayo Clinical Proceedings*, *76*, 124–133.

Herman, K. C., & Fahnlander, B. (2003). A motivational intervention to reduce cigarette smoking among college students: Overview and exploratory investigation. *Journal of College Counseling*, *6*, 46–55.

Horvath, A. O., & Greenberg, L. S. (1989). Development and validation of the Working Alliance Inventory. *Journal of Counseling Psychology*, *36*, 223–233.

Horvath, A. O., & Symonds, D. B. (1991). Relation between working alliance and outcome in psychotherapy: A meta-analysis. *Journal of Counseling Psychology*, *38*, 139–149.

Johnston, L. D., O'Malley, P. M., & Bachman, J. C. (1996). National survey results on drug use from the Monitoring the Future Study, 1975–1995 (NIH Publication No. 96-4139, vol.1). Rockville, MD: National Institute on Drug Abuse.

Kirk, R. E. (1982). *Experimental design: Procedures for the behavioral sciences* (2nd ed.) California: Wadsworth.

Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change*. New York: Guilford Press.

Moyers, T. B., Martin, T., Manuel, J. K., Hendrickson, S. M., & Miller, W. R. (2005). Assessing competence in the use of motivational interviewing. *Journal of Substance Abuse Treatment*, *28*, 19–26.

Patterson, M. (1983). *Nonverbal behavior: A functional perspective*. New York: Springer-Verlag.

Prochaska, J., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, *51*, 390–395.

Prochaska, J., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, *47*, 1102–1114.

Prokhorov, A. V., Yost, T., Mullin-Jones, M., de Moor, C., Ford, K. H., & Marani, S., et al. (2008). "Look at Your Health": Outcomes associated with a computer-assisted smoking cessation counseling intervention for community college students. *Addictive Behaviors*, *33*, 757–771.

Rogers, C. (1951). *Client centered therapy: Its current practice implications and theory*. Boston: Houghton Mifflin & Company.

Rollnick, S., & Miller, W. R. (1995). What is motivational interviewing? *Behavioural and Cognitive Psychotherapy*, *23*, 325–334.

Schneider, R., Casey, J., & Kohn, R. (2000). Motivational versus confrontational interviewing: A comparison of substance abuse assessment practices at employee assistance programs. *The Journal of Behavioral Health Services and Research*, *27*, 60–74.

Stotts, A. L., DiClemente, C. C., & Dolan-Mullen, P. (2002). One-to-one: A motivational intervention for resistant pregnant smokers. *Addictive Behaviors*, *27*, 275–292.

Thyrian, J. R., Freyer-Adam, J., Hannover, W., Roske, K., Mentzel, F., Kufeld, C., et al. (2007). Adherence to the principles of Motivational Interviewing, clients' characteristics and behavior outcome in a smoking cessation and relapse prevention trial in women postpartum. *Addictive Behaviors*, *32*, 2297–2303.

Velicer, W. F., DiClemente, C. C., Rossi, J. S., & Prochaska, J. O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors*, *15*, 271–283.

Weitzman, E. R., Chen, Y. Y., Subramanian, S. V. (2005). Youth smoking risk and community patterns of alcohol availability and control: A national multilevel study. *Journal of Epidemiology and Community Health*, *59*, 1065–1071.

Woodruff, S. I., Conway, T. L., Edwards, C. C., Elliot, S. P., Crittenden, J. (2007). Evaluation of an Internet virtual world chat room for adolescent smoking cessation. *Addictive Behaviors*, *32*, 1769–1786.