Original Investigation

Coping with temptations and adolescent smoking cessation: An initial investigation

Mark G. Myers & Laura MacPherson

Abstract

Introduction: Although a great deal of research focuses on adolescent cigarette smoking, little is known about the process by which adolescents attempt to stop smoking. Resisting temptations to smoke is one of the key challenges encountered by individuals who attempt smoking cessation. A large body of literature has examined coping with temptation among adult smokers, and research on this issue for adolescents is lacking. To further our understanding in this area, the present study reports on an initial examination of the Smoking Temptation Coping Questionnaire (STCQ). The STCQ, which assesses coping in a social pressure situation involving cigarettes, was adapted from the Temptation Coping Questionnaire, a brief self-report measure of adolescent coping with temptations to use alcohol and other drugs.

Methods: The present study included 109 adolescent participants (aged 14–19 years) in a naturalistic study of smoking self-change. Participants completed baseline and 6-month follow-up interviews.

Results: Exploratory factor analysis of the STCQ coping scale yielded a single factor including six strategies for coping with temptations. Analyses provided support for the concurrent, predictive, and construct validity of the STCQ. In particular, the coping scale score significantly predicted prospective duration of abstinence for adolescents who engaged in smoking cessation efforts.

Discussion: These results provide preliminary support for the utility of the STCQ. In addition, findings support the role of temptation coping in the adolescent smoking cessation process.

Introduction

Research indicates that most adolescent smokers report past-year cessation attempts (Bancej, O'Loughlin, Platt, Paradis, &

Gervais, 2007; Burt & Peterson, 1998; Myers & MacPherson, 2004; Sargent, Mott, & Stevens, 1998; Stanton, Lowe, & Gillespie, 1996; Sussman, Dent, Severson, Burton, & Flay, 1998). Given that teens rarely use formal treatment (Balch, 1998; Balch et al., 2004; Leatherdale & McDonald, 2005; Myers, MacPherson, Jones, & Aarons, 2007), unassisted attempts can be thought of as “self-change” efforts. Elucidation of adolescent smoking cessation self-change efforts may serve to inform intervention design, yet few studies have addressed this process. Recently, the social cognition model of adolescent addictive behavior self-change was proposed (Brown, 2001; Brown et al., 2008). In this model, self-change is conceptualized as a two-phase process in which factors associated with initial efforts to change substance use (i.e., a cessation attempt) differ from those necessary to maintain behavior change. Proposed influences on the maintenance of behavior change following a cessation attempt consist of environmental and intrapersonal factors that increase or decrease motivation for maintaining change (e.g., social support, nicotine dependence) as well as self-regulation variables that play a role in managing challenges to abstinence (e.g., coping with temptations, affect management skills). Further, the relationship between maintenance motivation factors and self-change outcomes are hypothesized to be mediated by self-regulation. Data from a recent study supported the first phase of this model for adolescent smoking cessation self-change (Myers & MacPherson, 2008).

Resisting temptations to smoke has been identified as one of the key self-regulation challenges encountered by individuals who attempt smoking cessation (O'Connell et al., 1998). Circumstances that increase the risk for a lapse to smoking for adults include being in the presence of cigarettes, consuming alcohol, and experiencing negative affect (Bliss, Garvey, Heinold, & Hitchcock, 1989; O'Connell & Martin, 1987; Shiffman, 1984; Shiffman et al., 1996). A well-developed body of research among adults has demonstrated that coping efforts in the face of temptations to smoke play an important role in the outcome of these situations. Evidence for the self-regulation function of temptation

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coping is supported by research, demonstrating that such coping may support abstinence by reducing the strength of urges to smoke (O'Connell, Hosein, Schwartz, & Leibowitz, 2007).

Little research has addressed temptation coping for adolescent smoking. A single published report was identified in which self-reported coping strategies were assessed for participants in a school-based smoking cessation program (Jannone & O'Connell, 2007). Consistent with adult studies, coping efforts were associated significantly with successful abstinence in the face of temptation to smoke. As with coping strategies, little is known regarding the characteristics of adolescent relapse-risk situations. The few relevant studies indicate that exposure to smoking is a frequent adolescent relapse-risk situation (Falkin, Fryer, & Mahadeo, 2007) and that availability of cigarettes is linked to lapse (Burris & O'Connell, 2003). The paucity of available information on adolescent temptation coping and the potential value of such knowledge for elucidating the smoking cessation process and informing intervention design highlight the need for further studies in this area.

The present study represents an initial evaluation of a temptation-coping measure for adolescent smokers. Concurrent validity of the coping scale was examined in relation to the situation appraisal variables included as part of the measure. Based on the transactional model of stress and coping (Lazarus & Folkman, 1984), we predicted that greater importance of not smoking, less perceived difficulty of coping, and higher self-efficacy for coping would be related with greater endorsement of temptation-coping strategies. Predictive validity was assessed prospectively in relation to abstinence duration following a smoking cessation attempt. It was anticipated that higher coping scale scores would predict longer duration of abstinence.

Construct validity was assessed in the context of the social cognition model. We hypothesized that temptation coping would mediate the relationship between greater baseline smoking rate and briefer abstinence duration. Finally, as suggested by the proposed model, temptation coping should not be associated significantly with attempts at cessation.

Methods

Participants

The present study of adolescent smoking cessation self-change included youth who (a) were high school students aged 14–19 years and (b) had smoked a cigarette in the past 30 days. Participants were 109 high school students; their demographic and baseline smoking characteristics are shown in Table 1.

Procedure

Participants were recruited from four public high schools in southern California. Adolescent participants provided informed consent (assent for minors under age 18), as did parents of minors. Participants completed in-person interviews and self-report measures at baseline and 6 months later.

Measures

Cigarette use quantity and frequency were assessed at each interview for the past 90 days using the timeline followback procedure (Sobell & Sobell, 1992). This procedure has been shown to

Table 1. Baseline demographics, cigarette use, and temptation-coping variables (N = 109)

Variable	Value
Demographics	
Age, years; mean (SD)	16.82 (1.07)
Gender (female, %)	55.96
Ethnicity (White, %)	70.64
Cigarette use	
Smoking frequency (% smoking daily)	46.79
Days smoking per month; mean (SD)	21.10 (10.35)
Cigarettes per day smoking; mean (SD)	5.96 (5.48)
Established smokers (percent ≥ 100 cigarettes)	90.80
Appraisal of temptation situation	
Confidence in abstinence; mean (SD) (1 = <i>not confident</i> , 5 = <i>very confident</i>)	3.08 (1.33)
Difficulty abstaining; mean (SD) (1 = <i>not at all difficult</i> , 5 = <i>very difficult</i>)	2.88 (1.28)
Importance of abstinence; mean (SD) (1 = <i>not at all important</i> , 5 = <i>very important</i>)	2.52 (1.38)
Temptation coping	
STCQ scale score; mean (SD) ^a	16.22 (4.85)

Note. STCQ = Smoking Temptation Coping Questionnaire.

^aSTCQ range = 6–27.

have good reliability and validity with adolescent smokers (Lewis-Esquerre et al., 2005). Self-reported smoking status was verified by measuring expired-air carbon monoxide levels. Past-month total number of cigarettes at baseline was used in validation and mediation analyses.

Cessation efforts were assessed at follow-up. A cessation attempt was defined as an intentional attempt to quit smoking lasting at least 24 hr. Of the original 109 participants, 99 (91%) completed 6-month follow-up assessments; 44 reported a cessation attempt. Participants who were abstinent at the follow-up interview and had quit within the prior 2 weeks were excluded from analyses using abstinence duration because the ultimate outcome of their cessation effort could not be determined. For the remaining 42 participants, length of abstinence ranged from 2 to 180 days, with a median of 29.5. These 42 participants did not differ from other participants on demographics, baseline smoking, or temptation-coping score.

Temptation coping was assessed with the Smoking Temptation Coping Questionnaire (STCQ). The STCQ was adapted from the Temptation Coping Questionnaire (TCQ; Myers, Stice, & Wagner, 1999; Myers & Wagner, 1995), a self-report measure of youth coping with temptations in a high-risk situation for alcohol or other drug use. As with the original TCQ, the STCQ consists of description of a hypothetical temptation situation ("It's after school. You see some friends across the street from school, hanging out, talking and smoking cigarettes. You walk over to join the group, and someone offers you a cigarette"), appraisal questions, and coping items. The appraisal questions assess perceived difficulty, importance, and self-efficacy of abstaining in the situation, each rated on a 5-point Likert-type scale. Participants are presented with 11 coping items and asked to endorse the likelihood of using each strategy in the hypothetical

situation. Response options range from “definitely would not use” to “definitely would use” on a 5-point scale. The content of the STCQ items are equivalent to those on the TCQ, with wording changed to refer to cigarette smoking.

Results

Exploratory factor analysis

Exploratory factor analysis (EFA) of the STCQ items identified three eigenvalues greater than 1 and generated a scree plot that indicated a stronger first factor (eigenvalue = 3.84; 34.9% of the common variance) and a natural break at the first factor. EFAs were run and items retained if they had a loading of greater than .40 on their primary factor and loadings of .30 or less on a second factor and if they were consistent with factor content (Floyd & Widaman, 1995). Three iterations of this process resulted in a single-factor solution comprising six items (Table 2).

Validation analyses

Past-month total cigarettes and abstinence duration were log transformed to correct skewness prior to analyses, resulting in acceptable distributions for each variable.

The STCQ scale score, computed as a sum of items, was related positively with efficacy for abstaining ($r = .32, p = .001$; small-medium effect size) and importance of not smoking ($r = .27, p = .004$; small-medium effect size) and negatively related to perceived difficulty of coping ($r = -.23, p = .02$; small effect size). In support of predictive validity, the STCQ scale score was significantly related to length of abstinence at follow-up ($r = .46, p = .002$; large effect size).

We used the product-of-coefficients procedures outlined by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) to test mediation. Significance of the individual mediated effect was assessed using MacKinnon's z' distribution. In the full model with past-month smoking and temptation coping as predictors, the effect of past-month smoking remained significant, with greater smoking predicting briefer abstinence ($sr^2 = .08, p$

$= .036$). However, partial mediation was supported in that the indirect effect of past-month smoking through temptation coping was significant ($z' = -1.69, p < .01$), accounting for 30% of the total effect of past-month smoking on abstinence duration.

Finally, as hypothesized, temptation coping did not predict engagement in a cessation attempt, $t(95) = -1.41, p = .16$.

Discussion

The present study examined the STCQ, a brief measure of adolescent coping with temptations to smoke in the face of social pressure. EFA yielded a single factor consisting of six temptation-coping strategies. Analyses provided support for the concurrent, predictive, and construct validity of the STCQ. In particular, the coping scale score significantly predicted duration of abstinence for adolescents who engaged in self-change smoking cessation efforts. Results provided support for the social cognition model of adolescent addictive behavior self-change.

Content for four of the STCQ coping items reflected thinking about the consequences of a return to smoking, cognitive strategies that may reinforce motivation for abstinence by focusing on negative consequences of smoking and the desire to not smoke. The remaining two items, doing something instead of smoking and concentrating on what to do next, may manage temptation by shifting attention away from urges to smoke. Scale content was similar to strategies reported in a previous study of adolescent coping with temptation to smoke (Jannone & O'Connell, 2007).

Coping scale scores significantly predicted abstinence duration among adolescents who engaged in smoking cessation efforts. Noteworthy was the magnitude of association between coping scores and abstinence duration, corresponding with a large effect size (Cohen, 1988). Notwithstanding the small sample, the strength of this correlation was surprising given the hypothetical nature of coping assessment and the relatively long (6 month) follow-up interval. These scores may represent a greater probability of engaging in any coping when confronted with temptation. These findings suggest that assessment of coping with temptations in response to a hypothetical situation has value for predicting subsequent cessation efforts. This result highlights the potential importance of social smoking temptation situations in adolescent cessation efforts. However, whether endorsement of items from a list of strategies in response to a hypothetical scenario reflects actual coping in a temptation situation remains to be demonstrated.

Construct validity analyses supported the social cognition model. Significant partial mediation was obtained, whereby responses to the coping scale reduced by 30% the magnitude of the relationship between extent of smoking at baseline and abstinence duration. Previous prospective studies have demonstrated that the relationship between smoking intensity and quitting outcomes is not explained solely by physical aspects of nicotine dependence (Zhu, Sun, Billings, Choi, & Malarcher, 1999). The present findings are consistent with this perspective and suggest that, perhaps, heavier smokers are less likely to engage in coping in the face of temptation. Finally, in support of the proposed two-phase process, coping scores were not significantly associated with likelihood of engaging in a cessation attempt.

Table 2. Exploratory factor analysis item loadings of the six-item STCQ measure

STCQ item	Item loading ($\alpha = .75$)
Think smoking is bad, you don't want to be part of it.	.63
Do something instead of smoking (socialize, chew gum).	.62
Think you would feel guilty if you smoked a cigarette.	.61
Just concentrate on what you have to do next to cope with the situation.	.61
Think to yourself you don't want to smoke a cigarette.	.48
Think others who matter to you (family, friends) will be upset.	.45

Note. STCQ = Smoking Temptation Coping Questionnaire.

The present findings must be viewed in the context of several limitations. The available sample size was modest for a factor analysis (Tabachnick & Fidell, 2001). Similarly, the small sample size used for prospective analyses cautions against over-interpretation of the present findings. Potential limitations of the coping measure include the hypothetical nature of the situation and responses, and inclusion of a limited range of coping strategies. Finally, the present study's design did not permit a true test of mediation.

The present study provided initial evidence for the validity and utility of the STCQ as a measure of adolescent coping with temptations to smoke in a social pressure situation. The STCQ affords a simple and easily administered means for examining temptation coping in relation to prospective cessation efforts in both naturalistic (i.e., self-change) and treatment outcome studies. In the future, this measure may inform adolescent smoking cessation intervention design by identifying coping strategies associated with salutary outcomes.

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Declaration of Interests

None declared.

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References

- Balch, G. I. (1998). Exploring perceptions of smoking cessation among high school smokers: Input and feedback from focus groups. *Preventive Medicine*, 27, A55–A63.
- Balch, G. I., Tworek, C., Barker, D. C., Sasso, B., Mermelstein, R., & Giovino, G. A. (2004). Opportunities for youth smoking cessation: Findings from a national focus group study. *Nicotine & Tobacco Research*, 6, 9–17.
- Bancej, C., O'Loughlin, J., Platt, R. W., Paradis, G., & Gervais, A. (2007). Smoking cessation attempts among adolescent smokers: A systematic review of prevalence studies. *Tobacco Control*, 16, e8.
- Bliss, R. E., Garvey, A. J., Heinold, J. W., & Hitchcock, J. L. (1989). The influence of situation and coping on relapse crisis outcomes after smoking cessation. *Journal of Consulting and Clinical Psychology*, 57, 443–449.
- Brown, S. A. (2001). Facilitating change for adolescent alcohol problems: A multiple options approach. In E. F., Wagner & H. B., Waldron (Eds.), *Innovations in adolescent substance abuse* (pp. 169–187). Oxford, UK: Elsevier.
- Brown, S. A., McGue, M., Maggs, J., Schulenberg, J., Hingson, R., Swartzwelder, S., et al. (2008). A developmental perspective on alcohol and youths 16 to 20 years of age. *Pediatrics*, 121(Suppl. 4), S290–S310.
- Burris, R. F., & O'Connell, K. A. (2003). Reversal theory states and cigarette availability predict lapses during smoking cessation among adolescents. *Research in Nursing & Health*, 26, 263–272.
- Burt, R. D., & Peterson, A. V. (1998). Smoking cessation among high school seniors. *Preventive Medicine*, 27, 319–327.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Falkin, G. P., Fryer, C. S., & Mahadeo, M. (2007). Smoking cessation and stress among teenagers. *Qualitative Health Research*, 17, 812–823.
- Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, 7, 286–299.
- Jannone, L., & O'Connell, K. A. (2007). Coping strategies used by adolescents during smoking cessation. *The Journal of School Nursing*, 23, 177–184.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Leatherdale, S. T., & McDonald, P. W. (2005). What smoking cessation approaches will young smokers use? *Addictive Behaviors*, 30, 1614–1618.
- Lewis-Esquerre, J. M., Colby, S. M., Tevyaw, T. O., Eaton, C. A., Kahler, C. W., & Monti, P. M. (2005). Validation of the timeline follow-back in the assessment of adolescent smoking. *Drug and Alcohol Dependence*, 79, 33–43.
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7, 83–104.
- Myers, M. G., & MacPherson, L. (2004). Smoking cessation efforts among substance abusing adolescents. *Drug and Alcohol Dependence*, 73, 209–213.
- Myers, M. G., & MacPherson, L. (2008). Adolescent reasons for quitting smoking: Initial psychometric evaluation. *Psychology of Addictive Behaviors*, 22, 129–134.
- Myers, M. G., MacPherson, L., Jones, L. R., & Aarons, G. A. (2007). Measuring adolescent smoking cessation strategies: Instrument development and initial validation. *Nicotine & Tobacco Research*, 9, 1131–1138.
- Myers, M. G., Stice, E., & Wagner, E. F. (1999). Cross-validation of the Temptation Coping Questionnaire: Adolescent coping with temptations to use alcohol and illicit drugs. *Journal of Studies on Alcohol*, 60, 712–718.
- Myers, M. G., & Wagner, E. F. (1995). The temptation-coping questionnaire: Development and validation. *Journal of Substance Abuse*, 7, 463–479.

- O'Connell, K. A., Gerkovich, M. M., Cook, M. R., Shiffman, S., Hickcox, M., & Kakolewski, K. E. (1998). Coping in real time: Using ecological momentary assessment techniques to assess coping with the urge to smoke. *Research in Nursing and Health*, 21, 487–497.
- O'Connell, K. A., Hosein, V. L., Schwartz, J. E., & Leibowitz, R. Q. (2007). How does coping help people resist lapses during smoking cessation? *Health Psychology*, 26, 77–84.
- O'Connell, K. A., & Martin, E. J. (1987). Highly tempting situations associated with abstinence, temporary lapse, and relapse among participants in smoking cessation programs. *Journal of Consulting and Clinical Psychology*, 55, 367–371.
- Sargent, J. D., Mott, L. A., & Stevens, M. (1998). Predictors of smoking cessation in adolescents. *Archives of Pediatrics and Adolescent Medicine*, 152, 388–393.
- Shiffman, S. (1984). Coping with temptations to smoke. *Journal of Consulting and Clinical Psychology*, 52, 261–267.
- Shiffman, S., Gnys, M., Richards, T. J., Paty, J. A., Hickcox, M., & Kassel, J. D. (1996). Temptations to smoke after quitting: A comparison of lapsers and maintainers. *Health Psychology*, 15, 455–461.
- Sobell, L. C., & Sobell, M. B. (1992). Time-line follow-back: A technique for assessing self-reported alcohol consumption. In R. Z., Litten & J. P., Allen (Eds.), *Measuring alcohol consumption: Psychosocial and biochemical methods* (pp. 73–98). Totowa, NJ: Pergamon Press.
- Stanton, W. R., Lowe, J. B., & Gillespie, A. M. (1996). Adolescents' experiences of smoking cessation. *Drug and Alcohol Dependence*, 43, 63–70.
- Sussman, S., Dent, C. W., Severson, H. H., Burton, D., & Flay, B. R. (1998). Self-initiated quitting among adolescent smokers. *Preventive Medicine*, 27, A19–A28.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.
- Zhu, S-H, Sun, J., Billings, S. C., Choi, W. S., & Malarcher, A. (1999). Predictors of smoking cessation in U.S. adolescents. *American Journal of Preventive Medicine*, 16, 202–207.