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Quit Intention as a Predictor of Quit Attempts over Time in Adolescents with Psychiatric Disorders

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Abstract

Background—Rates of smoking among adolescents with psychiatric comorbidity are high, despite the well-known health risks. The current longitudinal study examined patterns of quitting behavior in adolescent smokers with psychiatric comorbidity.

Method—The study evaluated 191 inpatient adolescents who had been enrolled in a randomized controlled trial of motivational interviewing (MI) versus brief advice for smoking cessation, and assessed their intentions to quit smoking.

Results—Rates of quit attempts at post-hospital, 1-, and 6-month assessments were 23%, 17% and 17%, respectively. Adolescents who reported an intention to quit smoking (43%) were significantly more likely to report a quit attempt, regardless of psychiatric symptoms, cognitive factors, or substance use.

Conclusions—Intention to quit smoking appears to translate to substantial quit behavior, even in a high-risk adolescent population that may otherwise be viewed as uninterested in quitting, suggesting the need to proactively connect this population with adequate services and follow-up support.

1. Background and Objectives

Tobacco use continues to be the most common cause of preventable disease nationwide, with nearly 4.5 million adolescents continuing to smoke¹. Rates of smoking among adolescents with psychiatric comorbidity are also high, despite the increased and well-known health risks^{2, 3}. Even with most adolescent smokers reporting a desire to quit,

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Declaration of Interests

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

cessation attempts are often unsuccessful, and relapse is common. For example, in a review of 52 nationally representative studies that examined smoking cessation attempts in adolescents, the median prevalence of relapse was 56% within one month and 89% within 6 months of the longest quit attempt^{4, 5}. Despite these rates of relapse, there is a high prevalence of attempts at smoking cessation among adolescents, with 58% reporting a quit attempt in the past six months⁴. Interestingly, the literature suggests that adolescent smokers who attempt to quit report that their intention is to quit “completely and forever”^{4, 6, 7}. Successful quits may be even more challenging for high-risk adolescents, such as those with co-occurring psychiatric or substance use disorders. Adolescents who struggle with substance use disorders in addition to their cigarette smoking are at an increased risk for long-term health problems^{8, 9}. Treatment efforts are also more critical for this group, as adolescent smokers with psychiatric disorders are likely to become highly nicotine dependent adult smokers posing additional challenges to quitting^{2, 10}.

Research has identified behavioral and cognitive factors associated with adolescent smoking and quitting behavior, which could serve as useful targets for intervention. Past quit attempts, peer/family environment, perceived pros and cons of smoking, levels of motivation and confidence, and intention to quit have potential implications in behavior change¹¹. The literature yields equivocal findings in terms of the role of intention to predict future smoking in adolescents. Intention to quit smoking has been identified as an important moderator in smoking cessation^{12, 13}. There is support for the premise that a firm intention to not smoke in the future is protective against smoking^{14, 15}. Wakefield and colleagues examined smoking intention in a large, nationally representative cross-sectional survey of 12th graders who completed the Monitoring the Future survey. They found that regardless of level of current smoking, adolescents’ intentions were predictive of smoking status up to five years later¹⁶. Other studies have suggested that predicting smoking behavior based on intention can be difficult, given that intention to quit smoking is generally unstable. For example, Hughes and colleagues found that up to 34% of adult smokers changed their intentions to quit in one month’s time¹⁷. Moreover, there is inconsistency regarding the predictive utility of quit intentions, or more generally, the stage of change model, for smoking cessation in adolescents¹⁸.

While treatment studies have focused on increasing motivational properties associated with quit behavior, including self-efficacy and quit intention, few studies have investigated how these cognitions translate to behavior change over time. In our previous work utilizing the same dataset as the current study, we conducted a longitudinal clinical trial comparing Motivational Interviewing (MI) and Brief Advice (BA) to quit smoking among adolescent inpatient smokers who were hospitalized for psychiatric disorders, with results suggesting a positive effect of MI on self efficacy for quitting and an increase in intention to change in those with initially low levels of intentions; however, there was no effect of MI on long-term smoking outcomes¹⁹. Subsequent analyses revealed that confidence to quit smoking and the perceived cons of smoking were predictive of the adolescents’ baseline readiness to change²⁰. The current study extends the previous findings and aims to examine prospectively: (1) the relationship between intention to quit smoking and cessation behaviors over time in adolescent smokers with psychiatric comorbidity, and, (2) the effect of psychiatric symptoms, cognitive factors and substance use on intentions to quit smoking

over time. We hypothesized that adolescents' intention to quit smoking will be positively associated with their quit behavior, and that this relationship would be related to psychiatric symptoms, cognitive factors, and reported substance use.

2. Method

2.1. Participants

Participants were 191 adolescents (62.3% female; mean age = 15.4. $SD = 1.27$) who were admitted to a private psychiatric hospital located in the northeastern United States. The average current grade was 9th grade ($SD = 1.35$). The sample consisted of 94.8% Caucasian, 1.6% Hispanic/Latino, 9% African American, and 3.6% of other ethnicities. To be considered eligible, participants must have been between 13–17 years old, reported smoking at least one cigarette per week for the past four weeks prior to hospitalization, and had access to a telephone to schedule follow-up assessments. Exclusion criteria included patients who met Diagnostic and statistical manual, 4th edition (DSM-IV) criteria (APA, 2004) for a current psychotic disorder. On average, the participants' hospital stay was 9.11 days ($SD = 7.11$). Age of first smoked cigarette was before 11 years old. Approximately 64% ($n = 122$) were daily smokers, participants had a mean score of 4.9 ($SD = 1.2$) on the Fagerström Tolerance Questionnaire, modified for use with adolescents, and 69% ($n = 131$) met DSM-IV criteria for nicotine dependence. As reported in Brown et al. (2003), these adolescents had high rates of comorbidity with diagnoses including Mood Disorder ($n = 84$), Anxiety Disorder ($n = 105$), Disruptive Behavioral Disorders ($n = 150$), and Substance Use Disorder ($n = 136$)¹¹.

2.2 Measures

2.2.1. Intention to quit—Intention to quit smoking was measured by a single question. The question, "Are you planning to quit smoking in the next 30 days?" was asked at each assessment point. Responses were recorded as either "yes" or "no."

2.2.2. Self-reported smoking (quit behavior)—The Timeline follow-back (TLFB) procedure^{21, 22} at baseline assessed three months prior to hospitalization. The TLFB at each of the follow-ups was used to capture self-reported number of cigarettes smoked and quit attempts since the previous assessment. A quit attempt was constituted by a 24-hour period of abstinence from smoking. Monthly averages were derived for cigarette use and quit attempts using days when adolescents were not in an environment that restricted smoking. The TLFB was also used to assess whether teens reported consuming alcoholic drinks or illicit substances. Substance use was coded 0 for no reported use and 1 for use in the 30 days prior to assessment of intentions to quit.

2.2.3. Pros and Cons of smoking—The Adolescent Decisional Balance Scale²³ assessed the adolescents' perceived pros and cons of smoking. Nine statements reflected the perceived cons of smoking, and six statements reflected the perceived pros of smoking. Ratings were on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." Responses to the cons of smoking were summed to form a single aggregate scale ($\alpha = 0.83$), as were the responses to the pros of smoking ($\alpha = 0.67$).

2.2.4. Brief Symptom Inventory—This Brief Symptom Inventory scale²⁴ assessed psychological status and distress symptoms in the past seven days. The scale contained 53 items rated on a 4-point Likert scale ranging from “not at all” to “extremely.” Average scores on the BSI were 55.5 ($SD = 41.2$), with the range of scores (0–184).

2.2.5. Pressure to quit—Pressure to quit smoking was assessed upon hospital discharge by a single question. The question read, “How much pressure have you felt from your family, friends, or others to quit smoking?” Ratings were on a 5-point Likert scale ranging from “no pressure” to “extreme pressure.” Average rating on this item was 2.35 ($SD = 1.01$).

2.2.6. Motivation—Motivation to quit smoking was evaluated by asking a single question: “How motivated are you to quit smoking within the next month?” Responses were on an 11-point scale ranging from “not at all” to “extremely.” Average rating on this item was 4.89 ($SD = 3.68$).

2.2.7. Confidence—Participants’ confidence in their ability to change smoking behavior was asked by a single question: “If you try to quit smoking in the next month, how confident are you that you will succeed in quitting smoking?” Ratings were on an 11-point scale ranging from “not at all confident” to “very confident.” Average rating on this item was 4.90 ($SD = 3.57$).

2.2.8. Nicotine Dependence—Nicotine dependence was assessed with a modified version of the Fagerström tolerance questionnaire, which has been found to have adequate psychometric properties when used with adolescents²⁵. The scale contained 7 items rated on a 5-point Likert scale, with the exception of one yes/no item (“Do you smoke more during the first 2 hours than during the rest of the day?”). Cut-off scores, indicating the level of dependence, are as follows: 0–2 = no dependence; 3–9 = dependence. Range of scores on this measure are 0–9, with the average rating on this measure =4.9 ($SD = 1.83$).

2.3. Procedures

Adolescents were approached by staff and screened for a randomized controlled trial examining the effectiveness of MI in reducing smoking (see¹¹ for expanded description of the parent study). All participants provided written assent for participation in the study, and written consent was also obtained from a parent or legal guardian. In total, 1099 patients were screened for recruitment during the years of 1998 to 2001. Of these, 116 eligible participants were assigned to the motivational interviewing condition, and 75 to the brief advice condition. Adolescents in the brief advice condition received 5–10 minutes of advice to quit smoking as well as a self-help pamphlet. Participants in the MI condition also received up to six brief telephone sessions during the six months following hospital discharge. This condition also involved a parent intervention component, consisting of up to four brief telephone sessions. All participants completed an assessment battery at baseline, post-hospitalization, and at 1-, 3-, 6-, 9- and 12-months following hospital discharge. Follow up assessments were completed with 91–95% of all participants across all time points, and rates of missing data were not significantly different between conditions. Participants in both conditions were offered the transdermal nicotine patch (TNP) following hospital discharge.

2.4. Data analysis

All data analyses were conducted using R Statistical Software²⁶. We first examined associations among continuous and non-continuous variables of interest using Pearson product-moment and Spearman's rank order correlations, respectively. The relationships between each of the independent variables (intention to quit, cons of smoking, pressure to quit, psychiatric symptoms, substance use, motivation and confidence) and the dependent variable (quitting behavior) were examined (see Table 1). All models included demographics (age and gender), treatment condition, level of dependence, level of psychiatric symptoms (BSI) and the linear effect of time as planned covariates. The relationship between intention to quit and subsequent quitting behavior over time was examined using generalized linear mixed effects models²⁷ that accommodate assessment of repeated categorical binary outcomes and used a logit link function. The independent effect of intention to quit was assessed by adding each additional independent variable one at a time to covariate-adjusted models. Specifically, the variables cons of quitting, pressure to quit, substance use, motivation, and confidence at assessment were added one at a time to models that include the covariates and primary Quit Intention item (see Table 1 for results of final model).

3. Results

Rates of quit attempts following each assessment of intentions to quit in the next 30 days at post-hospital, 1-, and 6-month assessments were 23%, 17% and 17%, respectively (see Figure 1). Both motivation and confidence to quit at baseline were significantly correlated with intention to quit at hospital discharge ($r = 0.47, p < 0.05$, and $r = 0.34, p < 0.05$, respectively). Pressure to quit was significantly associated with quit days at 6 months ($r = -.163, p < 0.05$). Cons of smoking was significantly associated with intention to quit at hospital discharge ($r = .305, p < 0.05$).

Using GLMM, we used a sequence of models to systematically examine the relationship between intent to quit and subsequent quitting behavior over time. A first model presents relationships among planned covariates, treatment condition, and the odds of making a quit attempt following the post-hospital, 1- and 6-month assessments (See Table 1). With adjustment for demographic characteristics, significantly decreased odds of a quit attempt with higher levels of dependence ($p < 0.05$) and lower levels of psychiatric symptoms ($p < 0.05$), rates of quitting did not differ by treatment (MI vs. BA). In models adjusted for planned covariates, adolescents that reported an intention to quit smoking were significantly more likely to report a quit attempt ($b = 3.17, se = 0.47, p < 0.05$). In subsequent models that evaluated whether intentions to quit remained uniquely predictive of quit attempts, we found that perceived cons of smoking ($b = 0.02, se = 0.03, p < 0.49$) was not related to quit attempts. However, concurrent report of the use of substances was associated with lower odds ($p < 0.05$), increased concurrent motivation for quitting ($b = 0.24, se = 0.08, p < 0.01$) with higher odds, and increased concurrent confidence to quit smoking ($b = 0.15, se = 0.07, p < 0.05$) with higher odds of reporting a quit attempt. In all models, level of quit intention remained a significant independent predictor of quit attempts in the next 30 days ($p < 0.01$).

4. Discussion and Conclusions

In the present study, the main finding is that intention to quit smoking appears to translate to substantial quit behavior, even in a high-risk adolescent population, despite the well-known challenges of not being interested or confident in ability to quit, often common for adolescents in inpatient care²⁸. Furthermore, this relationship was significant over time and was not significantly impacted or moderated by psychiatric symptoms, cognitive factors, or substance use.

The reported quit attempt rates at post-hospital (23%), 1-month (17%), and 6-month (17%) assessments are encouraging, considering this high-risk sample. While these rates are lower than national studies reporting adolescent quit attempt prevalence of 58% in the past 6 months⁴, our sample represents adolescents with psychiatric comorbidity, suggesting an ability to initiate a behavior change despite these additional obstacles. Furthermore, 69% of the current sample met criteria for nicotine dependence. Previous studies have reported lower cessation rates in daily adolescent smokers. For example, Sargent and colleagues found that only 6.8% of daily adolescent smokers reported subsequent quit attempts, matching rates with adult smokers¹⁹.

The assessment of intention to quit, or quit readiness, in the current study revealed that 43% of the adolescents were intending to quit smoking at 30 days post-hospital. The literature suggests variability in the methodology used to assess quit intention. In the current study, we assessed proximal intention to quit by asking a single question: “Are you planning to quit smoking in the next 30 days?” Previous studies have also used a single item question to capture quit intention^{15, 17, 19}. For example, Wakefield and colleagues asked the single item question, “Do you think you will be smoking cigarettes 5 years from now?” in their evaluation of intention in 12th graders. More recently, Ramo and colleagues assessed quit intention in adolescents who were in inpatient treatment for substance use disorders by asking, “How likely is it that you will be a nonsmoker a year from now?”¹³. The current study assessed quit intention as clinically proximal, which may elicit a desirable response in a sample that is motivated to change as compared to assessing a hypothetical, future intention to quit. Proximal plans to quit have been associated with positive outcomes in smokers who intend to quit³³.

In this sample, quit behavior was associated with several cognitive factors, including motivation, and quit intention. Baseline motivation is a key variable in treatment and promoting behavior change, but it can also be challenging to assess as it is an indirect measure²⁹. Measuring an individual’s motivation within the context of smoking cessation treatment has generated much interest and has resulted in a range of assessment tools³⁰. Information regarding motivation state is helpful for the clinician to use in the course of treatment. For example, motivational interviewing seeks to understand a client’s current level of motivation, which is subsequently used in building motivation for behavior change³⁰. In the current study, motivation was assessed using a single item that was used previously^{11, 32}.

Some research suggests difficulty in motivating adolescents who are receiving substance use treatment to make changes in their smoking as commonly their frequency and intensity of smoking is higher when compared to adolescents in the general population^{34, 35}, yet other studies have found no significant impact of substance use severity on quit intentions in adolescent smokers¹³. We did not find an effect of psychiatric symptoms or substance use on the relationship between quit intention and quit behavior over time. That is, for adolescents who reported substance use or endorsed psychiatric symptoms, the ability to translate intention to action was not compromised, emphasizing the need for adequate follow-up services that will support quit behavior in this population. Overall, nearly half of the adolescents reported making at least one quit attempt, again highlighting the need to assist this population in maintaining abstinence after hospital discharge¹¹. A major strength of this study was the prospective nature of assessing quit behavior over time, particularly in such a high risk group of adolescent smokers. Limitations of the study should be noted. First, the sample consisted of a largely Caucasian (95%) sample of adolescents who were hospital inpatients with either a psychiatric or substance use disorder, therefore, caution should be taken when generalizing these findings to adolescent smokers in general. Second, quit attempts were obtained by self-report measures which may introduce bias. Third, the assessment included single item measures (e.g., quit intention) with unknown psychometric properties. While these items were used in previous studies, future studies would benefit from the inclusion of validated measures of these constructs. And fourth, the timing of our assessments at 1-, 6-months limited our ability to ask more detailed questions about changes in intentions over time using instruments to capture more fully a continuum of readiness. While the primary focus in this manuscript was to present data in support of questions specifically asking about intentions to quit in the next 30 days, a future study evaluating longitudinal changes in intentions is of great interest.

5. Scientific Significance and Future Direction

Overall, the strong relationship between intention to quit smoking and actual quit behavior over time is encouraging, particularly among such a high-risk population of adolescents reporting both substance use and psychiatric symptoms, and suggests the need to proactively connect this population with adequate services and support as well as follow-up care. Recommendations to bolster treatment efforts for such high risk groups are in line with the recent nationwide initiatives to develop and implement smoking cessation programs among adolescent smokers^{36, 37}.

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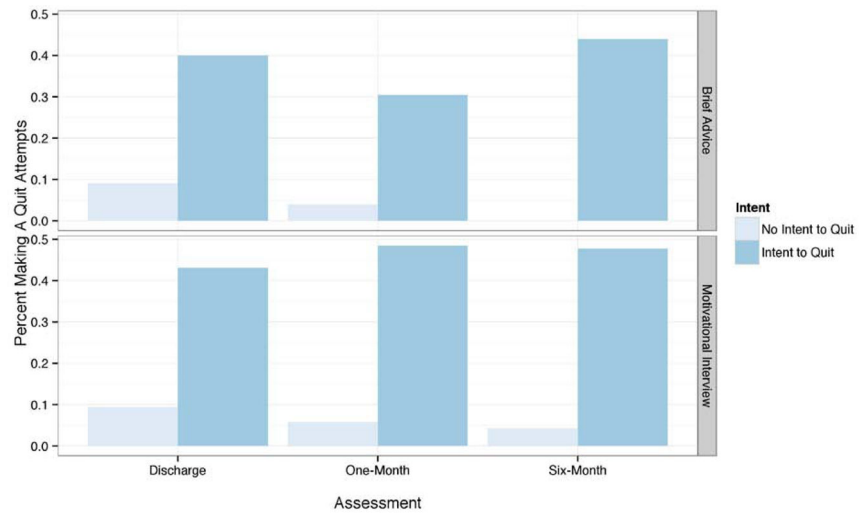


Figure 1. Percentage of adolescents in each treatment condition who reported a Quit Attempt in the 30 days after assessment of their reported Intention To Quit.

Table 1

Generalized Linear Mixed Effects Model Predicting Quit Attempts

Independent variable	<i>b</i> -value	SE	<i>p</i> -value
Intercept	-4.30	3.37	0.20
Time	-0.17	0.07	0.02
Age	0.19	0.21	0.38
Female	-0.32	0.56	0.56
Nicotine Dependence	-0.30	0.14	0.36
Psychiatric Symptoms	0.01	0.01	0.47
Treatment: MI	0.25	0.52	0.63
Quit Intention	3.17	0.47	0.00
Cons of Quitting ^{<i>I</i>}	0.01	0.03	0.78
Pressure	-0.11	0.26	0.66
Substance use	-0.03	0.01	0.05
Motivation	0.24	0.08	0.01
Confidence	0.15	0.07	0.02

^{*I*}The variables Cons of Quitting, Pressure to Quit, Substance use, Motivation, and Confidence at assessment were added one at a time to models that include the covariates and primary Quit Intention item. Effect estimates for Quit Intention remained statistically significant in all models ($p < 0.01$).