

Self-Efficacy and Smoking Cessation Maintenance: A Preliminary Report¹

Carlo C. DiClemente²

Texas Research Institute of Mental Sciences

This study operationalized the construct of self-efficacy developed by Bandura and applied it to the problem of long-term maintenance of smoking cessation. A measure of self-efficacy for avoiding smoking was used to analyze the relationship between self-efficacy and subjects' ability to maintain posttreatment abstinence at a 5-month follow-up. Subjects were confirmed, heavy smokers who previously had quit smoking by three different procedures. Subjects were administered the self-efficacy measure and a demographic and smoking history questionnaire an average of 4 weeks after quitting smoking. Maintenance was assessed at 5-month follow-up. Two-thirds of all subjects successfully maintained nonsmoking at follow-up with no group differences for success. Maintainers (N = 42) did not differ from recidivists (N = 21) on any demographic or smoking history variables. However, maintainers did show significantly higher self-efficacy scores than recidivists. The measure of self-efficacy for smoking cessation maintenance demonstrated good internal consistency.

Self-efficacy is a theoretical construct postulated by Bandura (1977) as a cognitive mechanism underlying behavioral change. According to the theory, efficacy expectations determine whether coping behavior will be initiated and sustained in the face of obstacles. These expectations also provide a measure of the amount of energy to be expended in coping efforts. An individual's efficacy expectations with respect to a particular set of behaviors are considered relevant for coping efforts only for those

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²Address all correspondence to Carlo C. DiClemente, Adult Outpatient Services, Texas Research Institute of Mental Sciences, 1300 Moursund Avenue, Houston, Texas 77030.

specific behaviors. Thus, these expectations differ from outcome expectancies determined by previous performance (Bandura, 1977; Bandura & Adams, 1977) and from a generalized expectancy construct such as Rotter's (1966) concept of locus of control.

Bandura and Adams (1977) enumerated the critical dimensions necessary to operationalize the concept of self-efficacy. First, the magnitude of the expectation, defined as the expectation across task or situational difficulty, must be evaluated. Second, the generality of the expectation, which concerns how circumscribed the sense of mastery or efficacy is with regard to a particular set of behaviors, needs to be assessed. The third dimension requiring assessment is the strength of the expectation, i.e., how easily the expectation can be extinguished.

Several methodological features of the current investigation increase trust of self-efficacy for altering defensive behavior with adult snake phobias (Bandura & Adams, 1977; Bandura, Adams, & Beyer, 1977) and agoraphobics (Bandura, Note 1). These experiments supported the contention that efficacy expectations can predict the level of posttest performance independently of the different treatment approaches employed. However, posttest measures in these studies occurred from 1 week to 1 month after the measure of self-efficacy. Furthermore, predictions of future behavior extended over a relatively short period of time. The brevity of the follow-up period may have inflated the correlations between self-efficacy measures and behavioral measures either through demand characteristics or through remembered self-ratings. Moreover, treatment procedures have been quite successful in altering defensive behavior of phobics. A behavioral problem that has proved more difficult to modify and maintain would provide a different and possibly more stringent test for the construct of self-efficacy.

Cigarette smoking represents a behavior that has been very resistant to long-term modification (Bernstein & McAlister, 1976; Schwartz, 1977a, 1977b). Short-term smoking cessation has been produced by a wide variety of therapeutic techniques. However, substantial recidivism or relapse after 3 to 6 months is a common problem plaguing smoking cessation treatments (Hunt & Bepalec, 1974). The concept of self-efficacy may be useful for the study of this type of recidivism. Nonsmoking is a coping behavior that must be sustained to ensure long-term success. Recidivists may represent individuals who experienced initial success but subsequently failed to maintain coping behavior over time in the face of obstacles.

Marlatt and Gordon (1979; Marlatt, 1978) postulated a common relapse mechanism for smokers, alcoholics, and heroin addicts. After studying relapse episodes across these behaviors, they developed a cognitive-behavioral model of relapse that included the concept of self-efficacy hypothesized to interact with the ability to cope with high-risk situations.

Unfortunately, Marlatt and Gordon neither operationalized the self-efficacy concept in a measurable fashion nor used it prospectively.

The present study was designed to operationalize the concept of self-efficacy for smoking cessation and to apply it to recidivism and maintenance in smoking cessation. The purpose was to examine the relationship of a measure of self-efficacy with the successful avoidance of smoking behavior over a 5-month period. Self-efficacy was measured after initial successful smoking cessation. If self-efficacy is an important component of smoking cessation behavior, successful maintainers 5 months after initial success should show higher self-efficacy ratings than recidivists.

METHOD

Subjects

The subjects were 29 male and 34 female volunteers who had recently quit smoking. They were recruited over a 4-month period in a large southwestern city. Successful abstainers were defined as those individuals who were 99% free of their former habit (number of cigarettes smoked per day) for at least 2 weeks. The 1% leeway allowed for some lapses in the process of achieving abstinence without allowing for significant recidivism. All subjects were interviewed within 7 weeks of their quitting. The subjects were recruited from three types of cessation procedures.

Aversion Group. These individuals were 11 males and 7 females who had completed a commercial treatment program that cost \$500 and primarily used aversion procedures. The treatment was administered individually in hour-long sessions for 5 consecutive days and consisted of a combination of smoke satiation, rapid smoking, and mild electric shock administered during the act of smoking. Subjects were expected to stop smoking by the end of the treatment. As part of the treatment program, eight optional group education follow-up sessions were offered over the next 6 weeks. Volunteers were recruited through flyers handed out at the end of treatment or at one of the follow-up meetings.

Behavioral Management Group. These individuals were 6 males and 10 females who completed a commercial 9-week group treatment program that cost \$225. This treatment program utilized educational and behavioral techniques that included deconditioning and stimulus control procedures, a decisional balance sheet, group support and a buddy system, and a target quit date 5 weeks into the program. Subjects were recruited through flyers handed out at the final session of two such groups.

Self-Quitters. This group comprised 12 males and 17 females who had not attended any formal smoking cessation program. They were recruited through flyers posted around a large medical center and in response to a newspaper advertisement and a newspaper article on the study.

Generally, the subjects were well-educated, middle-class adults with a mean age of 35 years. They were heavy smokers averaging over a pack and one-half per day. On the average, they began smoking as teenagers, attempted to quit several times before, and had previously successfully abstained for periods of time ranging from several weeks to 6 months.

Measures

Self-Efficacy Questionnaire. A measure of self-efficacy for smoking avoidance was developed consisting of 12 separate situations or events that were strong cues to smoke (Table I). These situations were identified by subjects in a pilot study as important factors in relapse episodes. The 12 events were chosen to represent a range from rather innocuous types of situations to more stressful ones. The situations spanned both a variety of tasks and various levels of difficulty and seemed to satisfy the criteria of magnitude and generality as discussed by Bandura (1977). Subjects were asked to rate their degree of certainty that they could avoid smoking in each of the 12 situations on a 7-point Likert scale ranging from completely sure (7) to completely unsure (1). The Likert response format

Table I. Events of the Self-Efficacy Measure

| Events | r^a |
|---|-------|
| 1. When alone and feeling depressed | .75 |
| 2. When I am nervous | .74 |
| 3. With friends at a party | .65 |
| 4. Over coffee while talking and relaxing | .64 |
| 5. With my spouse or a close friend who is smoking | .76 |
| 6. At work when I am experiencing some pressure in my job | .75 |
| 7. At a bar or cocktail lounge having a drink | .67 |
| 8. When I wake up in the morning and face a tough day | .66 |
| 9. When I am happy and celebrating | .58 |
| 10. When I am bored and have nothing to do | .64 |
| 11. When I would experience an emotional crisis, i.e., an accident or death in the family | .73 |
| 12. When I see that I am gaining weight | .62 |

^aItem correlations with total self-efficacy scores for the 63 subjects in the study.

was designed to satisfy the criterion of strength of expectancy and gave the subjects some latitude to express the strength of their own expectations. Ratings of the subjects for each of the 12 events were summed to yield a single self-efficacy score reflecting the global sense of efficacy of each subject regarding his or her ability to avoid smoking and to continue abstinence.

Demographic and Smoking History Questionnaire. A questionnaire was used to gather information on basic demographic factors such as age, sex, education, and occupation of each subject and spouse. Additionally, information was obtained on the smoking history and habit of each subject: age began smoking, number of cigarettes smoked per day, years smoking, prior attempts to quit, and longest prior successful abstinence.

Follow-up Questionnaire. A follow-up questionnaire asked subjects to rate their difficulty abstaining from cigarettes and their current desire to smoke on a 5-point scale. They also answered a series of questions concerning current smoking habits, the number of cigarettes smoked since the quit date, weight gain, and the perceived advantages and disadvantages of quitting. Successes were asked about factors underlying success, while recidivists answered questions about failure. This questionnaire was designed to extensively explore maintenance and recidivism, consequently increasing the probability of accurate self-report.

Procedure

All subjects were interviewed by the experimenter as part of a larger study on the processes of change in smoking cessation (DiClemente, 1978). The interviewer was not affiliated with any of the treatment programs. Subjects were informed of the nature of the research and agreed to a follow-up phone call in the informed consent form. No subject was interviewed sooner than 2 weeks after quitting to ensure short-term success. Mean time for the initial interview was 4 weeks after quitting. Thus, all subjects were successful short-term abstainers at the initial interview and had achieved comparable performance goals.

After completing an informed consent form, subjects filled out a change process questionnaire rating 30 statements on how important these were in their quitting on a scale of 1 to 5 and a Periods of Change scale (DiClemente, 1978). The data from these measures were not included in the present study. Then subjects filled out the Demographic and Smoking History Questionnaire and the Self-Efficacy Questionnaire and were told they would be recontacted in 4 to 6 months.

All subjects were reinterviewed by phone 5 months after their quitting to assess maintenance using the Follow-Up Questionnaire. These

interviews were conducted by the same interviewer who initially talked with the subjects. Successful maintainers were those who remained 99% free of their habit over the 5-month period. Recidivists were those who failed to meet this criterion at follow-up.

RESULTS

Initial Group Comparisons

Group comparison results are summarized in Table II. Sex distribution was not significantly different, as measured by chi-square analysis. The three groups of subjects did not differ in the level of education achieved or in socioeconomic status, as measured by a 5-point, two-factor

Table II. Group Comparisons on Demographic and Smoking Variables^a

| Variables | Aversion group (<i>N</i> = 18) | | Behavioral management group (<i>N</i> = 16) | | Self-quitter group (<i>N</i> = 29) | |
|---------------------------------------|------------------------------------|-----------|---|-----------|--|-----------|
| | \bar{X} | <i>SD</i> | \bar{X} | <i>SD</i> | \bar{X} | <i>SD</i> |
| Demographic | | | | | | |
| Age ^b | 34.8 | 12.3 | 41.6 | 11.6 | 32.8 | 10.8 |
| Education | 4.5 | 1.5 | 5.1 | 1.2 | 5.3 | 1.4 |
| SES | 2.7 | .8 | 2.4 | .9 | 2.2 | .7 |
| Smoking | | | | | | |
| Age began smoking | 16.4 | 2.8 | 16.7 | 2.4 | 16.9 | 2.7 |
| Cigarettes per day | 35.0 | 12.7 | 37.9 | 12.7 | 30.4 | 17.5 |
| Years smoking ^b | 17.6 | 12.1 | 24.9 | 11.0 | 15.5 | 10.2 |
| Prior attempts to quit | 3.2 | 1.1 | 2.9 | 1.2 | 3.1 | 1.0 |
| Longest prior abstinence ^c | 3.8 | 1.8 | 2.2 | 1.3 | 4.0 | 1.8 |
| Weeks from quitting to interview | 3.8 | 1.4 | 4.3 | .79 | 4.5 | 1.4 |
| Self-efficacy | 74.0 | 10.0 | 71.3 | 7.4 | 70.1 | 10.6 |
| Maintenance | | | | | | |
| Maintainers | 13(71%) | | 10(63%) | | 19(66%) | |
| Recidivists | 5(29%) | | 6(37%) | | 10(34%) | |

^aComparisons were performed by a one-way ANOVA (*df* = 2,60) for variables and a chi-square comparison of maintainers and recidivists ($\chi^2 = 0.392$, n.s.). Ratings of the variables were as follows: Education - 4 = some college, 5 = college graduate; SES - 1 = highest, 5 = lowest; longest prior abstinence - 2 = 6 days, 3 = 1 month, 4 = 6 months.

^b*p* < .05.

^c*p* < .01.

(education and occupation) rating developed by Hollingshead and Redlich (1958). The groups also had similar smoking habits and histories. Individuals from all three groups were comparable in the age they began smoking regularly, the number of cigarettes smoked per day, and the number of prior attempts to quit. The elapsed time between the quit date and the first interview averaged 4 weeks and was not significantly different for the three groups.

A Newman-Keuls procedure was used to test the differences between significant group means. Behavioral management subjects were significantly older ($p < .01$) and spent significantly more years smoking cigarettes ($p < .01$) than either the aversion or self-quitter subjects. Although the groups did not differ on the number of previous attempts to quit, behavioral management subjects had succeeded in maintaining prior abstinence on the average of 1 week, which differed significantly from the 3- to 6-month average of the other groups. All significant group differences were attributable to the behavioral management group.

There were no significant initial group differences in the measure of self-efficacy. All subjects were relatively sure that they could avoid smoking in the future (Mean = 71.5). The average rating of the subjects for each of the 12 situations was a 6, which represented a "very sure" rating. The range of scores extended from a low of 43 to the maximum possible score of 84. Neither the type of change procedure nor the financial commitment demanded by the two commercial cessation programs produced significant differences in the self-efficacy ratings.

Maintenance Comparisons

At the 5-month follow-up, two-thirds of all subjects remained successful abstainers. There were no group differences in the proportion of successes to recidivists, as measured by chi-square analysis ($\chi^2 = .392$, n.s.). Additionally, there were no significant differences between successes ($N = 42$) and recidivists ($N = 21$) on any of the demographic or smoking history variables (Table III). However, differences between long-term successes and recidivists on self-efficacy scores were apparent. Successful maintainers at the 5-month follow-up had significantly higher self-efficacy scores measured at the time of their initial success than the recidivists, $F(1,61) = 8.7$, $p < .005$. Successes also reported greater weight gain, $F(1,61) = 9.5$, $p < .005$; and less difficulty maintaining non-smoking during the 5-month follow-up period, $F(1,61) = 63$, $p < .001$, than the recidivists. Self-efficacy and follow-up measures were the only variables that discriminated between the successful maintainers and the recidivists.

Table III. Comparison of Maintainers and Recidivists on Demographic, Smoking, and Follow-Up Variables^a

| Variables | Total sample (<i>N</i> = 63) | | Maintainers (<i>N</i> = 42) | | Recidivists (<i>N</i> = 21) | |
|---|----------------------------------|-----------|---------------------------------|-----------|---------------------------------|-----------|
| | \bar{X} | <i>SD</i> | \bar{X} | <i>SD</i> | \bar{X} | <i>SD</i> |
| Demographic | | | | | | |
| Age | 35.7 | 11.8 | 35.6 | 12.6 | 35.7 | 10.5 |
| Education | 5.1 | 1.4 | 4.9 | 1.4 | 5.3 | 1.5 |
| SES | 2.4 | .79 | 2.5 | .70 | 2.2 | .93 |
| Smoking | | | | | | |
| Age began smoking | 16.7 | 2.7 | 16.3 | 2.8 | 17.6 | 2.1 |
| Cigarettes per day | 33.2 | 15.2 | 34.9 | 14.5 | 29.5 | 14.0 |
| Attempts to quit | 3.1 | 1.1 | 3.0 | 1.1 | 3.2 | 1.0 |
| Longest prior abstinence | 3.5 | 1.8 | 3.6 | 1.7 | 3.3 | 2.1 |
| Years smoking | 18.5 | 11.5 | 18.7 | 11.8 | 17.9 | 11.2 |
| Self-efficacy ^b | 71.5 | 9.7 | 73.9 | 8.0 | 66.7 | 11.0 |
| Follow-up | | | | | | |
| Weeks from quitting to follow-up | 21.1 | 1.8 | 21.2 | 1.6 | 21.0 | 2.2 |
| Weight gain since quitting ^b | 2.9 | 1.6 | 3.3 | 1.5 | 2.1 | 1.4 |
| Difficult maintaining abstinence ^b | 2.8 | 1.5 | 2.0 | 1.1 | 4.4 | 1.0 |

^aRatings of the variables were as follows: Education – 4 = some college, 5 = college graduate; SES – 1 = highest, 5 = lowest; longest prior abstinence – 3 = 1 month, 4 = 6 months; weight gain since quitting – 2 = 4 pounds, 3 = 9 pounds, 4 = 14 pounds, 5 = 19 pounds; difficulty maintaining abstinence – 1 = easy, 5 = very difficult.

^b*p* < .005.

Consistency and Validity of the Self-Efficacy Measure

Analysis of subjects' responses on the self-efficacy measure demonstrated initial support for the rational construction of the scale. Pearson first-order correlations of individual scale items with the total scores yielded an average item correlation of .68 with a range of .58 to .76 (Table I). Item correlations are substantial and indicative of good internal consistency. Several statements from the change process analysis of this study (DiClemente, 1978) addressed the degree of subject commitment to quitting smoking and were examined for indications of discriminant validity. Subjects rated these statements on a 5-point scale (5 = extremely important; 1 = not important at all). Self-efficacy scores correlated minimally with subjects ratings of the follow-up statements "I made a commitment to myself to quit and stay off cigarettes" (*r* = .27) and "It was

really a day-to-day commitment not to smoke and to stay away from cigarettes that helped me to quit'' ($r = -.17$). These low correlations suggested that general retrospective judgments of the subjects' sense of commitment were independent of the self-efficacy ratings. More extensive measures of motivation and commitment to maintenance would be needed to comprehensively address this hypothesis.

Independence and relevance of the self-efficacy measure received preliminary support from an examination of its relationship with subject characteristics and follow-up measures. Self-efficacy scores showed no significant correlations with demographic variables and two significant but low correlations with smoking history variables: age began smoking ($r = -.25$) and cigarettes smoked per day prior to quitting ($r = .28$). There were the expected significant correlations between self-efficacy scores and the follow-up variables of weeks of successful abstinence ($r = .42$) and reported difficulty in maintaining abstinence ($r = -.45$).

Precipitants of Relapse. Follow-up subjects who relapsed were asked to describe the situation and the factors that were involved in their return to smoking. A comparison of these reported precipitants of relapse (Table IV) with the self-efficacy scale items (Table I) demonstrated a notable degree of similarity. The majority of relapsers reported at least

Table IV. Reported Precipitants of Relapse

| Subject ^a | Situational and emotional factors |
|----------------------|--|
| 102 | At work, feeling deprived; a very tense work situation |
| 110 | With a girl friend who smokes discussing personal and legal problems |
| 112 | At home, children making me tense; thinking a lot about smoking |
| 113 | At home, wife nagging and returning to smoking; missing smoking |
| 115 | Visiting family of origin; personal problem; stress; nervousness |
| 203 | At work, no particular stress; lack of attitude control |
| 209 | At work, borrowed a cigarette thinking I could smoke one |
| 211 | Normal day, no particular stress; feeling habit under control |
| 213 | At a hospital, husband very ill; personal crisis; missing smoking |
| 215 | Tired of thinking about and missing cigarettes; deciding to buy |
| 216 | On vacation, relaxing with daughter who was smoking |
| 301 | At work, stress of working on grant; job pressure; alcohol |
| 302 | At work, felt like smoking; borrowed one; quit exercising |
| 303 | Marital problems, discussion with wife who smokes; no exercise |
| 311 | At work, stress of reorganization; not staying physically active |
| 317 | Graduate school classes where others smoking; cocktail parties |
| 323 | At home, rewarding self for daily accomplishments; some depression |
| 325 | Upset about family and work problems; feeling sorry for self |
| 327 | At a hospital, nephew in car accident; failed to handle stress |
| 329 | Marital problems; hating way I look; tension; weight control |
| 332 | Camping trip with others who were smoking; social stress; weight |

^a Legend of subject numbers: 100 = aversion group; 200 = behavioral management group; 300 = self-quitters.

one precipitant closely related to the scale items. Only five subjects (203, 309, 211, 215, 302) described precipitants that were not related to the scale items. However, not all scale items were mentioned by the recidivists. No subject specifically reported drinking coffee, being at a bar or cocktail lounge, waking in the morning, or being happy or bored. Conversely, subjects did mention other factors, such as missing the habit of smoking and feeling the desire to smoke, overconfidence in their control of the habit, lack of physical exercise, and specific stressful situations, which were not included in the scale. In general, this comparison provided partial support for the construct validity of the self-efficacy questionnaire but also indicated areas requiring additional study.

DISCUSSION

The results of this preliminary study supported the usefulness of the theoretical construct of self-efficacy for the investigation of smoking cessation maintenance. First, differences in reported efficacy expectations measured during the initial stages of abstinence were related to the maintenance of abstinence at 5 months after cessation. Second, the measure of self-efficacy for smoking avoidance demonstrated good internal consistency and initial indications of validity and warranted further study. Third, there were preliminary indications that efficacy expectations have applicability and utility in the study of change in habitual behaviors.

A major finding of this research was that efficacy expectations appeared highly related to the ability to maintain smoking cessation. Average efficacy ratings were high and clustered in the upper half of the possible scores. Despite this restricted range, significant differences emerged. Since all subjects had achieved abstinence for equivalent periods of time at the initial interview, the differences between the maintainers and the recidivists were not attributable to performance factors. Successful abstention at the initial interview contributed on the overall high level of confidence of the subjects but did not account for the higher efficacy expectations of the maintainers. These results supported previous findings that efficacy expectations showed predictive superiority over past performance and involved more than performance self-evaluation (Bandura, 1977; Bandura & Adams, 1977).

Anecdotal information also indicated that individuals used but did not rely exclusively on previous performance to help them in assessing efficacy. While filling out the self-efficacy questionnaire, some subjects remarked on the difficulty giving a rating to situations they had not yet encountered and found it easier to rate situations they had already experienced as successful. Thus, subjects seemed to look to performance

accomplishments for assistance in their evaluations. However, even with a successful performance experience in the same or similar situations, subjects did not always give themselves a "completely sure" rating. They appeared to be going through a complex evaluative procedure that included but was not limited to a consideration of their past performance.

The subjects in this study demonstrated a remarkably high success rate at the 5-month follow-up. This was largely attributable to subject selection procedures. Relapse curves reported by Hunt and Bespalec (1974) and Hunt, Barnett, and Branch (1971) were essentially survival curves (Sutton, 1979; Litman, Eiser, & Taylor, 1979). Selecting subjects who had at least 2 and an average of 4 weeks of successful abstinence eliminated initial relapsers and raised the success rate for the survivors. However, this should not interfere with the major findings of this study since all subjects were affected equally. Additional research must determine whether self-efficacy measured during treatment and at the time of cessation will show the same relationship to maintenance found in this study.

Initial examination of the psychometric properties of the self-efficacy questionnaire supported continued use and revision of the measure. Existing questionnaire items contributed substantially and equally to the total scale score. However, the comprehensiveness of the questionnaire could be improved with the addition of statements that referred to physical exercise, health-related activities, the desire to smoke, testing of personal control over the habit, and the longing for the habit of smoking. Moreover, since stress played a large role in reported relapse episodes, a wider range and greater specificity of stress-related items could increase the sensitivity of the measure and has been suggested by Bandura (Note 1). More extensive use and examination of the measure would yield additional information on reliability and validity.

As measured in this study, self-efficacy appeared to be relatively independent of other subject characteristics. Ratings of self-efficacy did not relate to ratings of commitment to change and did not differ for the three groups of subjects. The rather large financial expenditure required by the commercial programs was expected to influence long-term success and efficacy expectations. They did not do so in this study. Self-quitters did not demonstrate more self-doubt regarding their ability to avoid smoking than the individuals who attended the structured programs. Conversely, the self-quitters did not show any more self-confidence by virtue of the fact that they had accomplished cessation on their own. The design and data of the present study did not allow for the complete elimination of alternate explanations of what the efficacy expectations were measuring. Efficacy expectations could be measuring a general motivation or expectation variable rather than the construct of self-

efficacy as discussed by Bandura. Nevertheless, preliminary indications of the independence of the measured self-efficacy from the other variables measured in the study were adequate and further research would be needed to resolve these issues.

The limitations of several measurement aspects of this preliminary study required some caution in interpreting the results. The measurement of both self-efficacy and maintenance relied exclusively on self-report. While the use of self-report in smoking research is a standard practice (McFall, 1978), no external confirmation of reported abstinence was included in the study. Self-report was also a necessary strategy for the assessment of subjects' expectations. However, no behavioral or previously validated measures of related variables were used in the study. Moreover, the actual self-efficacy measure represented an initial attempt to operationalize the self-efficacy construct for smoking cessation. The questionnaire did not constitute a definitive measure of the construct. Finally, the measurement of self-efficacy occurred only once in this study after the subjects had achieved successful cessation. Additional information about the reliability and validity of the measure and the actual development of efficacy expectations in the subjects could be answered only with further research.

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