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## Stages and Processes of Self-Change of Smoking: Toward An Integrative Model of Change

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An integrative model of change was applied to the study of 872 subjects changing their smoking habits on their own. The subjects represented the following five stages of change: precontemplation, contemplation, action, maintenance, and relapse. Ten processes of change were expected to receive differential emphases during particular stages of change. Results indicate that self-changers: (a) use the fewest processes of change during precontemplation; (b) emphasize consciousness raising during the contemplation stage; (c) emphasize self-reevaluation in both contemplation and action stages; (d) emphasize self-liberation, a helping relationship, and reinforcement management during the action stage; and (e) use counterconditioning and stimulus control the most in both action and maintenance stages. Relapsers were found to respond like a combination of contemplators and people in action. Results are discussed in terms of developing a model of self-change of smoking and enhancing a more integrative general model of change.

Formalized treatment programs for smoking fail with a majority of smokers (Hunt, Barnett, & Branch, 1971). Nevertheless, 30 million Americans quit smoking in the past decade, with 70% to 80% quitting on their own (Adult Use of Tobacco, 1975). Furthermore, 70% of smokers surveyed indicated that if they were to quit, they would not attend a formal treatment program (McAlister, 1975). In spite of the preponderance of and preference for self-change approaches, research on smoking cessation has focused primarily on formalized treatments. The present study reports on the change processes that were emphasized by 872 self-changers representing five different stages of quitting smoking.

In one of the few studies on self-change, self-changers did not differ from individuals in formalized treatments on smoking habits, locus of control, and measures of the Jackson Personality Inventory (Pederson & Lefcoe, 1976). DiClemente and Prochaska (1982) also found that self-changers did not differ from subjects in two types of therapy programs in terms of smoking history variables,

including history of previous attempts to quit smoking. DiClemente and Prochaska (1982) found that self-changers did differ from therapy changers in terms of the processes of change that were emphasized in recent attempts to quit smoking. More importantly, both self-changers and therapy changers reported retrospectively that they had used affective and cognitive processes more during early stages of change and emphasized behavioral processes during later stages.

Perri, Richards, and Schulteis (1977) completed retrospective interviews with 24 successful and 24 unsuccessful college students who had made attempts to quit smoking on their own. The successful self-changers reported using self-reinforcement procedures significantly more than the relapsers. Although encouraging, this study was limited by focusing on just two stages and four processes of change. Baer, Foreyt, and Wright (1977) analyzed letters describing the quitting experiences of 51 self-changers who had maintained nonsmoking for at least 2 years. While most of the self changers used multiple techniques, the investigators were not able to discover any systematic clustering of their quitting methods.

Research to date on self-change approaches to smoking cessation has been limited by inadequate models of change and retrospective methodologies. The present re-

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search applied the transtheoretical model that has been developed both from the therapy literature (Prochaska, 1979; Prochaska & DiClemente, 1982) and from data on self-changers (DiClemente and Prochaska, 1982; Prochaska, DiClemente, Velicer, & Zwick, Note 1). The present research applied the model in a cross-sectional design to study self-changers who were in one of the following five stages of change: precontemplation, contemplation, action, maintenance, and relapse.

The transtheoretical model involves 10 processes of change receiving differential application during the five stages of change (Prochaska & DiClemente, 1982). The 10 processes of change are as follows: consciousness raising, self-liberation, social liberation, self-reevaluation, environmental reevaluation, counterconditioning, stimulus control, reinforcement management, dramatic relief, and helping relationships.

Based on the transtheoretical model (Prochaska & DiClemente, 1982) and previous research (DiClemente & Prochaska, 1982), the following predictions were made. Because precontemplators tend to be defensive and avoid changing their thinking and behavior, they would use the change processes significantly less than subjects in other stages. Because contemplators are seriously thinking about changing their smoking behavior, they would use consciousness raising the most to gather further information about their smoking. Because self-reevaluation appears to be a process that bridges contemplation and action, self-reevaluation would be used most in the contemplation and action stages. Because subjects in the action stage are most committed to making behavioral changes, they would use self-liberation, counterconditioning, stimulus control, and reinforcement management the most. No clear predictions had emerged from previous research on which processes would be emphasized during the maintenance and relapse stages.

## Method

### Subjects

There were 872 subjects from Rhode Island and Houston, Texas who volunteered to participate in the study in response to newspaper articles and ads. All subjects

were assigned to one of the following five groups, depending on the stage of change they currently were in:

*Long-term quitters (LTQs).* These 247 subjects represented the maintenance stage, since they had maintained their nonsmoking for at least 6 months. The mean duration of maintenance was 5.9 years. The mean age was 44 years, and there were 133 females and 114 males. They had begun smoking at a mean age of 17.2 years.

*Recent quitters (RQs).* These 134 subjects represented the action stage, since they had quit smoking on their own within 6 months of entering the study. The mean duration of time since they had quit was 2.2 months. The mean age of these subjects was 35 years, and there were 80 females and 54 males. They had begun smoking at a mean age of 16.6 years.

*Contemplators (Cs).* These 187 subjects represented the contemplation stage, since they were smoking regularly for the past year but reported that they were seriously thinking about quitting smoking in the next year. The mean age of these subjects was 40 years, and there were 113 females and 74 males. They had begun smoking at a mean age of 17.4 years.

*Immotives (I's).* These 108 smokers represented the precontemplation stage, since they reported that they had no intention of quitting smoking in the next year. The mean age of this group was 38 years, and there were 74 females and 34 males. Their mean age of beginning smoking was 16.3 years.

*Relapsers (RLs).* An exploratory group of 196 relapsers was included to investigate how individuals use particular change processes after having failed within the past year in their attempt to quit smoking. The mean age of this group was 36 years, and there were 129 females and 67 males. Their mean age of beginning smoking was 17.3 years.

Basic demographic data on the subjects indicated that they were middle-age and middle-class adults who began smoking as teenagers ( $M = 17$  years). The mean age was 40 and the median 37 years. Of the total sample 62% were married, 27% single, 16.5% divorced, and 5.8% separated or widowed. Of the total sample, 19.3% completed high school or less, 41.7% had attended some college classes, 17.8% had bachelor degrees, and 19.3% had some postgraduate education or a graduate degree. Approximately one half of the subjects had incomes of less than \$15,000; and 8% had incomes of more than \$30,000.

### Measures

*The processes of change test.* This test is a 40-item questionnaire that measures 10 processes of change in a statistically well-defined and highly reliable manner (Prochaska et al., Note 1).<sup>1</sup> Table 1 presents a sample item and the alpha coefficient for each process. There are four items representing each of the 10 processes. Subjects were asked to rate on a 5-point Likert scale how frequently they employed each item in the past month (1 = not at all; 5 = repeatedly).

*Smoking-status measures.* Saliva samples were taken from each subject to increase validity of self-reports via the bogus pipeline phenomenon (Jones & Sigall, 1971).

<sup>1</sup> Copies of the test are available from the authors.

Table 1  
*Sample Items and Alpha Coefficients for the 10 Processes of Change*

Processes	Alpha	Sample item
Consciousness raising	.88	I look for information related to smoking.
Self-liberation	.89	I tell myself I am able to quit smoking if I want to.
Social liberation	.81	I notice that public places have sections set aside for nonsmokers.
Self-reevaluation	.87	My depending on cigarettes makes me feel disappointed in myself.
Environmental reevaluation	.88	I stop to think that smoking is polluting the environment.
Counterconditioning	.88	I do something else instead of smoking when I need to relax.
Stimulus control	.81	I remove things from my place of work that remind me of smoking.
Reinforcement management	.78	I am rewarded by others if I don't smoke.
Dramatic relief	.91	Warnings about health hazards of smoking move me emotionally.
Helping relationships	.84	I have someone who listens when I need to talk about my smoking.

When subjects are aware that smoking status will be validated by physiological measures, the accuracy of self-reports increases. Because the laboratory in charge of analyzing thiocyanate levels was unaware of the latest techniques for extracting saliva from cotton swabs, they did not have adequate saliva for testing all subjects. There were adequate samples for 64% of the sample. Thus, thiocyanate levels were used to simply provide some group validation of self-reports. Thiocyanate data were available for 304 smokers ( $M = 296.9$ ;  $SD = 127.2$ ) and 250 nonsmokers ( $M = 148.6$ ;  $SD = 93.2$ ). A one-way analysis of variance (ANOVA) between these groups was highly significant,  $F(1, 552) = 235.1, p < .0001$ .

Self-report measures of smoking status were used in the present study for three reasons. First, the present study involved more than discriminating smokers from nonsmokers, since it also compared types of smokers (immotives, contemplators, and relapsers) and types of nonsmokers (recent and long-term quitters). Secondly, self-report measures were available for all subjects. Finally, recent evidence suggests that self-reports may be more valid indicators of smoking status than are thiocyanate levels (Petitti, Friedman, & Kahn, 1981).

### Procedure

When subjects called the Self Change Lab to volunteer, they were given the following information: The study would last for 2 years and they would be asked to complete a questionnaire and an interview every 6 months. In return the subjects would be paid \$4 for completing the questionnaire and \$4 for the interview and would be eligible for one of 10 bonus prizes ranging from \$50 to \$500 to be given every 6 months. The subjects were asked a series of five questions to determine which stage of change they were in. The present study reports cross-sectional data from the initial assessment. Longitudinal data will be reported in future publications.

### Results

Table 2 presents  $T$  scores for each of the five groups representing the stages of change on each of the 10 processes of change. A multivariate analysis of variance (MANOVA)

Table 2  
*T Scores of the 10 Processes of Change for the Five Stages of Change Groups*

Process	Group					F
	I	C	RQ	LTQ	RL	
Consciousness raising	45.3	53.1	48.5	48.6	52.2	15.64***
Self-liberation	41.3	48.2	55.9	51.3	50.8	40.82***
Social liberation	51.0	51.4	46.6	50.3	50.1	5.19**
Self-reevaluation	41.5	52.4	51.9	47.8	53.7	38.13***
Environmental reevaluation	44.3	50.8	48.9	51.4	51.4	12.22**
Counterconditioning	42.6	49.3	52.6	52.0	50.4	21.48***
Stimulus control	45.6	48.3	52.5	51.3	50.7	10.28***
Reinforcement management	45.2	49.4	53.8	49.6	51.0	12.41***
Dramatic relief	46.6	51.3	49.0	50.6	51.1	7.21***
Helping relationship	48.5	49.6	51.4	49.2	51.2	2.50*

Note. I = immotives; C = contemplators; RQ = recent quitters; LTQ = long-term quitters; RL = relapsers.  
 \*  $p < .05$ . \*\*  $p < .001$ . \*\*\*  $p < .0001$ .

for these data was significant,  $F(1, 40) = 11.199, p < .001$ . The first three dimensions of the MANOVA were significant. The significant MANOVA was followed up by separate ANOVAs because the 10 change processes have been found to be relatively independent (Prochaska et al., Note 1) and because the results from the separate ANOVAs can be more clearly communicated than results from discriminant function analysis. Table 2 presents the  $F$ s and probability levels for these one-way ANOVAs. The ANOVAs indicate that there were significant differences in how frequently the groups used each of the 10 processes of change.

To determine exactly which groups differed on how frequently they used each of the change processes, Newman-Keuls comparisons were run. Each of the five groups was compared on each of the 10 processes of change. Table 3 presents the results of the Newman-Keuls comparisons, indicating which groups differed from each other at a  $p < .05$  level or greater.

Relationships between the processes of change and the stages of change can be seen most clearly if the relapse group is temporarily bracketed. The relapse group was included as an exploratory group, with no predictions from the transtheoretical model about which processes of change would be emphasized by this group. More importantly, the results in Table 3 suggest that the relapse group behaves like a mixture of the contemplation and action groups.

Table 4 presents a diagram showing the stages in which particular processes of change are emphasized the most and the least. Table 4 indicates that, as predicted by the transtheoretical model, subjects in the precontemplation stage use 8 of the 10 processes significantly less than any other group. As predicted, consciousness raising is emphasized the most by individuals in the contemplation stage. Self-reevaluation appears to bridge contemplation and action, since it is emphasized in both stages. Self liberation is emphasized when subjects take action, as are helping relationships and reinforcement management. Counterconditioning and stimulus control appear to bridge action and maintenance since these two processes are emphasized in both stages. The only rela-

Table 3  
*Group Comparisons on Each of the Processes of Change*

Process	Comparisons of stage-of-change groups
Consciousness raising	I < RQ, LTQ < RL, C
Self-liberation	I < C < RL, LTQ < RQ
Social liberation	RQ < I, C, LTQ, RL
Self reevaluation	I < LTQ < C, RQ, RL
Environmental reevaluation	I < C, RQ, LTQ, RL
Counterconditioning	I < C, RL < RQ, LTQ
Stimulus control	I < C < RQ, LTQ, RL
Reinforcement management	I < C, LTQ, RL < RQ
Helping relationship	I, C, LTQ, < RL, RQ

Note. I = immotives; C = contemplators; RQ = recent quitters; LTQ = long-term quitters; RL = relapsers; < =  $p < .05$ , using Newman-Keuls tests.

tionship of social liberation to a stage is the unexpected finding that subjects in the action group emphasize this process the least.

## Discussion

The results of this study provide important data for enhancing our understanding of self-change of smoking and for developing a more integrative model of change. Assuming that the stages-of-change groups represent a cross-sectional analysis of quitting smoking, the following pattern emerges. As predicted from the transtheoretical model, subjects in the precontemplation stage used the processes of change the least. Specifically, the precontemplators used 8 of 10 processes of change significantly less than subjects in any other stage. This suggests that precontemplators process less information about smoking, spend less time reevaluating themselves as smokers, experience fewer emotional reactions to the negative aspects of smoking, and do little to shift their attention or their environment away from smoking.

What moves individuals into seriously contemplating change is not clear from the data. However, as predicted, once in the contemplation stage, subjects are the most likely to respond to feedback and education as sources of information about smoking. Along with this increased openness to information about smoking, contemplators report feeling

Table 4  
*Processes of Change Listed Under the Stages in Which They Are Emphasized Most*

Precontemplation (I's) <sup>a</sup>	Contemplation (Cs)	Action (RQs)	Maintenance (LTQs)
	Consciousness raising		
	Self-reevaluation <sup>b</sup>		
	Self-liberation		
	Helping relationship		
	Reinforcement management		
			Counterconditioning <sup>b</sup>
			Stimulus control <sup>b</sup>

<sup>a</sup> Eight processes were used the least in the precontemplation stage.

<sup>b</sup> Processes emphasized in two stages are shown overlapping both stages.

and thinking more about themselves in relationship to their problem behavior. As predicted, the increased reevaluation of themselves appears to carry over into action as subjects perhaps become upset enough with themselves and their smoking to make commitments to quit. As predicted, during the action stage subjects use both counterconditioning and stimulus-control procedures for actively changing their smoking behavior and environment. They report more self- and social reinforcement for their changes and rely more on helping relationships for support and understanding. It is interesting that the subjects experience less reinforcement during the maintenance stage, although they continue to emphasize counterconditioning and stimulus-control processes for coping with temptations to smoke.

The results also provide a view of how individuals respond after having recently relapsed following a period of quitting smoking. The subjects report emphasizing change processes that are used most often by individuals in the contemplation and action stages. Specifically, the relapsers used consciousness raising as often as contemplators, self-reevaluation as often as contemplators and recent-quitters, helping relationships as often as recent quitters, and stimulus control as often as subjects in the action and maintenance stages. The relapsers may be preparing themselves to quit smoking again as they engage in processes associated with contemplation. They may also be attempting to prevent complete relapse as they use action and maintenance processes to control their current levels of smoking.

These results provide support for recent modifications in the transtheoretical model of change. First of all, cathartic processes were originally thought to provide the bridge between contemplation and action (Prochaska & DiClemente, 1982). Rather than emotional experiences moving people to act, the results suggest that it is a combined cognitive/affective reevaluation process that carries over from contemplation into action. Second, the results suggest that the self-liberating process is emphasized most during the action stage. This result is consistent with earlier findings that commitments are realized once action is taken (DiClemente & Prochaska, 1982). Finally, counterconditioning and stimulus control processes appear to bridge action and maintenance rather than being emphasized just in action. This result is consistent with the view that maintenance is indeed an active stage of change rather than an absence of change (Prochaska & DiClemente, 1982).

The model and data of self-change could be used to increase the effectiveness of smoking cessation programs and to maximize self-help approaches. Rather than assume that all smokers coming for treatment are ready for action, as is the case in most behaviorally based programs (Prochaska & DiClemente, 1982), clients would be grouped according to which stage of change they are in. Research with clients applying for therapy indicates that there are clusters of clients in each of the stages of change (McConaughy, Prochaska, & Velicer, in press). Thus, smokers in the contemplation stage would begin with consciousness raising and self-reevaluation pro-

cesses, whereas smokers ready for action could begin to apply the more behaviorally-based processes.

Smokers preferring to quit on their own report that they would take advantage of self-help manuals. The problem is that current self-help manuals for smokers are not particularly effective (Glasgow & Rosen, 1978; Glasgow, Schafer, & O'Neill, 1981). The authors are currently developing and testing self-help manuals based on self-change data and models, with the anticipation of improving the effectiveness of such materials.

The present results provide both substantial support for the transtheoretical model of change as well as suggesting important modifications in the model. What is needed are longitudinal data to determine the predictive validity of the model as individuals move from one stage of change to another. Also needed are comparative studies with other problem behaviors to determine the extent to which change processes vary in emphasis as different problem behaviors are being changed.

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