The Development and Validation of an Eating Self-Efficacy Scale

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Following from Bandura's (1977a) self-efficacy theory, an Eating Self-Efficacy Scale (ESES) was developed and its psychometric properties established. Factor analysis of the 25-item scale yielded two reliable factors — one concerned with eating when experiencing negative affect (NA) and the other with eating during socially acceptable circumstances (SAC). The ESES demonstrated good internal consistency, test-retest reliability, and convergent validity. A clinical study using this measure found that increases in ESES scores were significantly related to weight losses among weight loss program participants. A laboratory study using a mood induction procedure found that NA subscale scores predicted food consumption irrespective of whether negative affect was induced. This finding may indicate that people have difficulty accurately discriminating the specific circumstances under which their eating difficulties occur and/or that eating difficulties tend to be global in nature. The significant correlation of the two ESES subscales (r = .39, p < .001) supports these possibilities. The clinical and research utility of the ESES and the implications of the findings are discussed.

KEY WORDS: self-efficacy; overeating; weight reduction.

Bandura (1977a, 1977b) has proposed that behavior change requires both the belief that the changes will result in the desired outcomes (outcome expectancies) and the belief that one is capable of making the change (efficacy expectancies). These later expectancies have been termed "self-efficacy." Bandura believes that psychotherapy results in behavior change to the extent that

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it enhances clients' self-efficacy. Self-efficacy is distinguished from self-esteem in that the former describes confidence in coping ability in a specific situation while the latter is a judgment of self-worth. Accurately assessing self-efficacy requires a detailed analysis of the components of the desired behavior and the circumstances under which it must be performed — a "microanalysis" (Bandura, 1977a). Ideally, the behavior of interest is broken down into separate components and ordered by level of difficulty so that individuals can indicate their expectancies about each component. These expectancies can then be related to individuals' subsequent coping efforts when faced with each activity.

Self-efficacy theory has generated substantial research. Bandura and his associates have concentrated their investigations on the relations between self-efficacy and avoidance/phobic behaviors (e.g., Bandura, Adams, & Beyer, 1977; Bandura, Reese, & Adams, 1982), while others have extended research into the relations between self-efficacy and career choice and development (Betz & Hackett, 1981; Hackett & Betz, 1981), ability to tolerate pain during childbirth (Manning & Wright, 1983), social skills (Pentz & Kazdin, 1982), and physical skills (Feltz, 1982; Ryckman, Robbins, Thornton, & Cantrell, 1982). Generally, these studies have found that level of self-efficacy significantly predicts future behavior, and often does so better than past behavior (e.g, Bandura, et al., 1977, 1982; Ryckman et al., 1982).

Recently, investigators have begun to examine the role of self-efficacy in the treatment of addictive disorders, such as cigarette smoking, with promising results. Condiotte and Lichtenstein (1981) found that self-efficacy with regard to smoking was enhanced by smoking cessation treatment, and both DiClemente (1981) and Condiotte and Lichtenstein (1981) found a positive relation between postcessation efficacy and abstinence during follow-up. DiClemente found a significant relation between postcessation efficacy and relapse at 5-month follow-up, while Condiotte and Lichtenstein were able to predict length of abstinence during a 12-week posttreatment follow-up period ($r = .69, p < .001$). Condiotte and Lichtenstein also found a significant correspondence between activities on which individuals felt least confident about remaining abstinent at posttreatment and the conditions under which they later relapsed. For example, an individual least certain about controlling smoking when experiencing negative emotions was most likely to relapse when feeling those emotions. McIntyre, Lichtenstein, and Mermelstein (1983) recently found that posttreatment self-efficacy predicted smoking status at both 3- and 6-month follow-ups. Thus, there seems to be a strong relation between self-efficacy and initiation and maintenance of smoking cessation.

The smoking studies suggest that self-efficacy theory may provide a useful model for investigating the treatment of other addictive behaviors.

Wilson (1978, 1981) has suggested that research similar to the smoking cessation studies be conducted in the area of weight control. Psychologists treating obesity have tried to understand the factors determining both short-term and long-term outcome. Treatment outcomes are marked by extreme variability (Brownell, 1982), and thus far, the search for predictors for success has been relatively unsuccessful (e.g., Cook & Meyers, 1980; Weiss, 1977). Three studies have found, however, that measures of clients' perceived control over their food consumption and/or weight positively correlated with weight loss during treatment (e.g., Green, 1978; Hartigan, Baker-Strauch, & Morris, 1982; Stuart & Guire, 1977). Perceived control over food consumption and weight would appear to be very similar to self-efficacy with regard to eating. These results suggest that eating self-efficacy may be an important influence on dieting and weight loss success. Wilson (1978, 1981) hypothesizes that assessing individuals' levels of self-efficacy should allow prediction of weight loss during and posttreatment. As Hartigan et al. (1982) note, some obese individuals perceive that they have so little control over their eating (low eating self-efficacy) that successful treatment may first involve persuading clients that they *can* control their weight. Failure to do so may result in early attrition and/or treatment failure. Currently, no rigorously constructed scale exists to assess eating self-efficacy, so identification of such individuals is problematic.

Assessing individuals' self-efficacy may also have important implications for designing effective treatments. T. Rosenthal (1978) has suggested that therapy can be improved by recognizing and addressing disparities between clients' success in acquiring new behaviors and their (often still lower) levels of self-efficacy during treatment. Concurrent with predicting initial treatment outcome, clinicians and researchers are also interested in understanding and predicting long-term weight loss maintenance. While some individuals are able to maintain a weight loss over the long term, most experience difficulty doing this (Brownell, 1982). This lack of maintenance has been the nemesis of weight reduction programs. Self-efficacy theory may provide a useful theoretical framework within which to understand and remedy this situation. Condiotte and Lichtenstein's (1981) success in predicting smoking relapse situations suggests that situations in which relapse is likely can be identified and self-management strategies can be developed and employed in advance.

In addition to its potential predictive and therapeutic applications, the development of a measure of eating self-efficacy would facilitate research on the relation between self-efficacy theory and eating behavior. While Bandura assigns self-efficacy a causal role in psychotherapeutic behavior change, Borkovec (1978) and Eysenck (1978) have suggested that it is an epiphenomenal reflection of behavior change. The hypothesized causal role

of self-efficacy within the realm of eating disorders could be tested once a valid and reliable measure of eating self-efficacy was developed.

The current research reports the development and validation of an Eating Self-Efficacy Scale (ESES). While a variety of eating disorder assessment tools have recently been published (e.g., Garner, Olmstead, & Polivy, 1983; Gormally, Black, Daston, & Rardin, 1982; Hawkins & Clement, 1980; Stunkard, 1981), none specifically addresses the issue of eating self-efficacy. It is hoped that the ESES will serve as a useful research and clinical tool for the assessment of eating self-efficacy and its relation to weight change.

DESIGN OVERVIEW

The goal of study 1 was to develop items for the ESES. The goal of study 2 was to examine the psychometric properties of the ESES. The goal of study 3 was to examine gender differences on the ESES. The goal of study 4 was to examine the predictive validity of an ESES subscale in the laboratory. The goal of study 5 was to test the predictive validity of the ESES among weight loss program participants.

STUDY 1

The goal of study 1 was to develop and refine an item pool for the ESES.

Item Development

A 79-item version of the ESES was constructed in three stages, with several strategies being used to generate a comprehensive list of eating situations. First, all items from the Condiotte and Lichtenstein (1981) measure judged applicable to eating were extracted, yielding 37 items. To these, 37 items generated by the authors were added. Finally, to ascertain that all likely eating situations had been included, 25 introductory psychology students at the University of Illinois at Chicago (UIC) were asked to list at least 10 eating situations for experimental credit. Five situations mentioned by at least 2 subjects and not already included in the ESES were added to the questionnaire.

Method and Results

The 79-item version of the ESES was administered to 328 students at UIC who participated in partial fulfillment of their introductory psychology

course requirements. The subjects were asked to rate their difficulty controlling their eating on a 1 (no difficulty controlling eating) to 7 (most difficulty controlling eating) rating scale for each of the 79 conditions. Thus, high scores on the ESES indicate less eating self-efficacy.

Responses were subjected to a principal components factor analysis and the emerging 15 factors were rotated orthogonally. Two criteria were used to reduce the number of items. Only items loading greater than .4 on a single factor, and only factors containing at least 3 items were retained. This procedure yielded 5 factors containing 59 items. These factors reflected eating as a function of (1) socially acceptable circumstances (SAC), (2) negative affect (NA), (3) being alone, (4) passing time, and (5) social awkwardness.

The 59-item ESES scale was then administered to another sample of 362 introductory psychology students. Responses were factor-analyzed using a principal components factor analysis and the emerging 12 factors were rotated orthogonally. Again, only 5 of these factors contained at least 3 items with loadings greater than .4. The order of the first 2 factors was reversed; however, the specific item that had previously loaded on the 3rd through 5th factors of the ESES were scattered in a way that was not interpretable at this administration. Thus, the 34 items that had not loaded reliably on either of the first 2 factors were eliminated from the ESES. The final version of the ESES comprised 25 items, with 15 loading on the NA subscale and 10 loading on the SAC subscale. These 2 factors accounted for 27% of the cumulative variance (16% for the NA subscale and 12% for the SAC subscale). The ESES can be seen in Table I.

STUDY 2

This study examined the psychometric properties of the 25-item ESES. Measures of central tendency and variability, reliability (both internal and test-retest), and construct validity were investigated in a large female sample. As the primary use of the ESES is likely to be among dieting and/or overweight individuals, measures of central tendency and variability and the factor structure of the ESES were also examined within these groups.

METHOD

Subjects and Procedure. Subjects were 484 female UIC undergraduates who participated in partial fulfilment of their introductory psychology course requirements. Subjects completed the 25-item ESES, and questions on their height, weight, and dieting histories. They also completed the Restraint Scale, a 10-item questionnaire assessing concern with dieting and weight fluctua-

<div align="center">Table I. ESES</div>

For numbers 1–27 you should rate the likelihood that you would have difficulty controlling your overeating in each of the situations listed on the next pages, using this scale:

1	2	3	4	5	6	7

No
difficulty
controlling eating

Moderate difficulty
controlling eating

Most difficulty
controlling eating

For example, if you thought you had great difficulty controlling your eating when you are at parties, you might complete an item specifying parties this way:

Overeating at parties   1   2   3   4   5   ⑥   7

Please complete every item.
How difficult is it to control your. . . .

1. Overeating after work or school
2. Overeating when you feel restless
3. Overeating around holiday time
4. Overeating when you feel upset
5. Overeating when tense
6. Overeating with friends
7. Overeating when preparing food
8. Overeating when irritable
9. Overeating as part of a social occasion dealing with food—like at a restaurant or dinner party
10. Overeating with family members
11. Overeating when annoyed
12. Overeating when angry
13. Overeating when you are angry at yourself
14. Overeating when depressed
15. Overeating when you feel impatient
16. Overeating when you want to sit back and enjoy some food
17. Overeating after an argument
18. Overeating when you feel frustrated
19. Overeating when tempting food is in front of you
20. Overeating when you want to cheer up
21. Overeating when there is a lot of food available to you (refrigerator is full)
22. Overeating when you feel overly sensitive
23. Overeating when nervous
24. Overeating when hungry
25. Overeating when anxious or worried

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tion. These subjects were given the opportunity to return for further credit 7 weeks later. Eighty-five of the original subjects returned to complete the ESES again and to complete the Tennessee Self-Concept Scale (TSCS, Fitts, 1965), a 100-item questionnaire that yields a global measure of self-esteem.

<div align="center"><i>Results</i></div>

Measures of Central Tendency and Variability. The mean on the 25-item ESES was 80.92 (range 25–155), the median was 80, and the standard deviation was 26.50. The mean of the 15-item NA subscale was 42.15 (range 15–99),

the median was 39, and the standard deviation was 20.03. The mean of the 10-item SA subscale was 38.92 (range 10–66), the median was 40, and the standard deviation was 11.47.

In an additional analysis, measures of central tendency and variability were calculated separately for subjects who reported that they were dieting[3] (N = 217) and for subjects whose self-reported weights were greater than 20% over the ideal for their height based upon the Metropolitan Life Insurance Company norms (1959) (N = 72). The mean ESES score was significantly higher among dieters (M = 87.2, SD = 25.08, range 33–148) than among nondieters (M = 74.1, SD = 27.3, range 25–155; $t(391)$ = 4.96, p < .0001). Mean ESES scores did not differ among the obese (M = 85.4, SD = 29.1, range 32–155) and normal weight subjects (M = 80.4, SD = 26.3, range 25–147; $t(393)$ = 1.4, n.s.), however.

Reliability. Both internal consistency reliability and test-retest reliability of the ESES were assessed. To determine the internal consistency, coefficient alpha (Cronbach, 1951) was calculated for the ESES and its subscales. Alpha was .92 for the entire ESES scale, .94 for the NA subscale, and .85 for the SA subscale. The ESES and the item/total scale correlations on which coefficient alpha is based are listed in Table II. The high alpha coefficients indicate that the scale and subscales have highly satisfactory internal consistency. The test-retest reliability of the ESES over a 7-week period is also acceptable (r = .70, p < .001).

Construct Validity. The construct validity of a test is the extent to which it measures the theoretical construct it is intended to assess (Anastasi, 1982). Construct validity was assessed in this study by examining the underlying dimensionality of the ESES using a principal components factor analysis and by relating ESES scores to other variables with which they would be expected to be associated.

Responses were factor-analyzed using a principal components factor analysis and the emerging three factors rotated orthogonally. The first factor was identical to the NA subscale and accounted for 33% of the cumulative variance. Items from the SAC subscale loaded either on the second factor (7 items accounting for 15% of the cumulative variance) or on the third (3 items accounting for 7% of the variance). The results were essentially the same in a factor analysis of dieters' responses and in a factor analysis limited to obese subjects' responses. Perceived difficulty controlling eating apparently includes a very stable dimension of concern over difficulty controlling eating during negative affect situations and a fairly stable dimension of concern over eating during social occasions and/or when (good) food is available. The correlation between the two subscales was .39 (p < .001). This correlation indicates that, while there is some situational fluctuation, there also ex-

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[3]Dieters were identified by positive responses to the question "Are you currently attempting to lose weight?"

Table II. Item Analysis Summary for the ESES

		Correlation[a]		
		Entire scale	NA	SAC
1.	Overeating after work or school	.46		.54
2.	Overeating when you feel restless	.56	.53	
3.	Overeating around holiday time	.37		.50
4.	Overeating when you feel upset	.63	.73	
5.	Overeating when tense	.63	.73	
6.	Overeating with friends	.39		.47
7.	Overeating when preparing food	.37		.42
8.	Overeating when irritable	.65	.73	
9.	Overeating as part of a social occasion dealing with food—like at a restaurant or dinner party	.29		.47
10.	Overeating with family members	.46		.59
11.	Overeating when annoyed	.70	.78	
12.	Overeating when angry	.68	.78	
13.	Overeating when you are angry at yourself	.46	.73	
14.	Overeating when depressed	.64	.69	
15.	Overeating when you feel impatient	.59	.61	
16.	Overeating when you want to sit back and enjoy some food	.36		.60
17.	Overeating after an argument	.65	.73	
18.	Overeating when you feel frustrated	.73	.80	
19.	Overeating when tempting food is in front of you	.49		.64
20.	Overeating when you want to cheer up	.59	.55	
21.	Overeating when there is a lot of food available to you (refrigerator is full)	.46		.60
22.	Overeating when you feel overly sensitive	.71	.74	
23.	Overeating when nervous	.62	.72	
24.	Overeating when hungry	.39		.59
25.	Overeating when anxious or worried	.69	.78	

[a]Correlation of an item with the total scale where the variance of a particular item has been removed from the total score.

ists an underlying global perception of difficulty in controlling eating across a variety of circumstances.

To establish the construct validity of the ESES, its relations with eating behavior, weight, and cognitions about eating and weight were examined. It was predicted that ESES scores would be significantly and positively related to percentage overweight, Restraint Scale scores, previous dieting experience, and current dieting behavior, but negatively related to self-esteem as measured by the TSCS (recall that a high score on the ESES indicates low eating self-efficacy).

Subjects' percentage overweight was calculated by dividing their self-reported weights with those recommended for their heights by the Metropolitan Life Insurance Company (1959). There was a small but signifi-

cant positive correlation between percentage overweight and ESES scores (r = .15, p < .01). There was a strong positive relation between Restraint Scale scores and ESES scores (r = .47, p < .001). Recently, the Restraint Scale has been factor-analyzed and found to yield two dimensions—a concern with dieting dimension and a weight fluctuation dimension (Ruderman, 1982). The concern with dieting dimension contains items that relate to eating behavior and thoughts regarding food, while the weight fluctuation factor contains items dealing with actual weight fluctuations. The ESES was significantly positively correlated with both the concern with dieting factor (r = .45 p < .001) and the weight fluctuation factor (r = .38, p < .001). There were significant correlations between ESES scores and reported previous dieting (r = .23, p < .0001) as well as ESES scores and reported current dieting (r = .24, p < .001).

There is a social stigma associated with overeating (Brownell, 1982), and many contradictory social functions of food have been noted by some authors (Orbach, 1982; Wooley, Wooley, & Dyrenforth, 1979). Therefore, it is not surprising that perceived difficulty controlling food intake was negatively related to self-esteem, as measured by the TSCS (r = −.51, p < .001).

STUDY 3

The goal of this study was to examine gender differences on the ESES and to measure the central tendency and variability of ESES scores among males.

Method

Subjects and procedure. Subjects were 618 (303 males, 315 females) UIC undergraduates who participated in partial fulfillment of their introductory psychology course requirements. Subjects completed the 25-item ESES, questions on height, weight, and dieting history, as well as the Restraint Scale.

Results

Sex Difference on Measures of Central Tendency and Variability. The mean ESES score for males was 74.24 (range 25–175), the median was 73,

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[4]Previous dieters were identified by responses to the question "Have you ever dieted and lost at least 10 lbs. (even if you have regained the weight)?"

and the standard deviation was 30.28. The mean ESES score for females was 88.43 (range 25–175), the median was 88, and the standard deviation was 29.39. Females reported significanly greater perceived difficulty controlling their eating than males ($t(616) = 5.91, p < .0001$).

Reliability. The internal consistency among both sexes was similar to that obtained in study 2. Coefficient alpha for the scale and subscales was very high ($>.88$) and did not differ by sex.

Construct Validity. Again, the ESES demonstrated construct validity. Separate principal components factor analyses with orthogonal rotations of male and female samples yielded almost identical results. The NA subscale emerged as the first factor in both analyses, with the SAC items again loading predominantly on the second factor. Both analyses yielded a third factor containing the same three items, which also loaded on the second factor. For both males and females, a highly stable factor representing perceived difficulty controlling eating when experiencing negative affect and a fairly stable factor involving eating during socially acceptable circumstances accounted for over 54% of the variance.

For each sex, ESES scores were again significantly related to percentage overweight (r(males) $= .30, p < .001$, r(females) $= .28, p < .001$), total Restraint Scale scores (r(males) $= .40, p < .0001$, r(females) $= .52$, $p < .0001$), the concern with dieting subscale of the Restraint Scale (r(males) $= .38, p < .0001$, r(females) $= .54, p < .001$), and the weight fluctuation subscale of the Restraint Scale (r(males) $= .32, p < .001$, r (females) $= .39$, $p < .0001$). Dieters scored significantly higher on the ESES than nondieters among both males ($t(295) = 6.26, p < .001$) and females ($t(312) = 6.77$, $p < .0001$).

STUDY 4

To test the predictive validity of the NA subscale of the ESES, subjects were given the opportunity to participate in a taste test after having either a dysphoric or a nondysphoric mood induced. For subjects in the dysphoric mood condition, NA scores were expected to predict food consumption, with high scores corresponding to greater consumption. In the nondysphoric mood condition, NA scores were not expected to be related to food consumption.

Method

Subjects. Subjects were 79 female UIC undergraduates who had completed a screening battery that included the ESES and additional items concerning height and weight. Subjects representing a wide range of NA subscale scores and whose weight fell within 20% of ideal weight based on the

Metropolitan Life Insurance Norms (1959) participated. These subjects were part of a larger study, reported elsewhere (Ruderman, 1985), investigating the relation between negative affect and overeating. Only average weight subjects were included to control for the association between ESES scores and percent overweight found in studies 2 and 3 above. To keep the sample as homogeneous as possible, only females were included.

Materials: Concept Formation Task. This task (developed by Baucom & Aiken, 1981) is a bogus intelligence test that consists of either five unsolvable problems (dysphoric condition) or five solvable problems (nondysphoric condition). Each problem involves a series of 10 stimulus cards, each with eight features (large letter, small letter, letter *a*, letter *t*, circle, square, black letter, white letter) that appear in two stimulus figures. Each figure consists of the letter *T* or *A* written in large or small print, colored black or white, and framed by a circle or a square. Each of the two figures on a card involves a different four features. The combinations for the eight features into the two stimulus figures varies over the 10 cards in the series. For example, on the first card, the stimulus figure on the left is a large black letter *A* surrounded by a square; the stimulus figure on the right is a small white *T* surrounded by a circle. On card two, the left stimulus figure is a small white letter *A* surrounded by a square; the right stimulus figure is a large black letter *T* surrounded by a circle.

For each series of 10 cards, the subject's task is to identify which of the eight features is the "correct" one for that problem. The cards are presented one at a time, each for 10 seconds. After viewing each card, the subject responds "design 1" (stimulus figure on the left) or "design 2" (stimulus figure on the right), and the experimenter replies "correct" or "incorrect" to indicate whether the stimulus figure the subject selected contained the "correct'" feature. This feedback enables the subject to use a process of elimination to determine which feature is the "correct" one. Subjects in the nondysphoric condition are given veridical feedback so that they can arrive at the correct answer. Subjects in the failure (dysphoric) condition are given predetermined bogus feedback so that no correct answer is possible.

Procedure. Subjects were telephoned and invited to participate in two experiments, which would be run contiguously — one dealing with problem solving and the other with taste sensitivity. Interested subjects were scheduled for a 2:00 p.m., 3:00 p.m., or 4:00 p.m. session and were instructed not to eat for 2 hours before arriving.

Upon arrival, the subject was told that the first study concerned a culture-free intelligence test and that this was being tried out on students from the University of Illinois at Chicago since they came from many different cultural backgrounds. Before beginning the task, the subject was given the Multiple Affect Adjective Check List (MAACL; Zuckerman & Lubin, 1965) to complete. The subject then completed a sample problem followed by the

five concept-formation problems that constituted the "culture-free intelligence test". Subjects in the nondysphoric condition were given correct feedback on their responses, making it possible for them to solve the problems. After the "culture-free intelligence test" was completed, subjects were given the MAACL again. Following this, they completed a postexperimental questionnaire asking whether the experiment had been well explained, whether their questions had been adequately answered, and what they thought the purpose of the experiment to be.

Following this, the experimenter told the subject that the IQ study was over and that the taste test experiment would begin shortly. The experimenter explained that she would be running that study too since she was working as a research assistant for the psychology department. The experimenter explained that the study was concerned with people's sensitivity to salty tastes and presented the subject with three bowls of crackers labeled type T, type B, and type C (three commercially available crackers), each weighing 300 grams. The subject was told that she would have 10 minutes to rate the three types of crackers on three 5-item questionnaires. She was instructed to taste the crackers in a specified order – first type T, then type B, and then type C, in order to control for the effects of one taste upon another. Also, she was told that after she had made all the ratings, she could help herself to any remaining crackers, but that she should not change her initial ratings. The experimenter then left the room for 10 minutes. Upon returning, she gave the subject a second postexperimental questionnaire asking what she thought the purpose of the study to be and whether all her questions had been adequately answered. Then the subject was "debriefed" that the "culture-free intelligence test" was not a measure of intelligence. In addition, subjects in the failure condition were told that the problems had no solution. Following this, the experimenter weighed and measured the subject. After the subject left, the experimenter weighed the cracker containers.

Results

Three subjects were eliminated from the analysis because they were determined to be greater than 20% over their recommended weights. For the remaining 76 subjects, the mean NA subscale score was 44.57 (range 15–97), the median was 40.5, and the standard deviation was 21.91. Subjects weighed an average of 101% of their ideal weights (SD = 9%, range 86–119%), as computed from the Metropolitan Life Insurance Company norms (1959).

Manipulation Check. A comparison of change in MAACL pre- to posttest scores revealed that subjects in the dysphoric condition were significantly more dysphoric after the concept formation task than those in the nondysphoric condition ($t(74)$ = 6.09, p < .0001). The dysphoric group had

a 4.6-point increase on the MAACL, while the nondysphoric group had a 1.6-point decrease.

Food Consumed. In order to determine the influence of NA subscale scores and mood states on amount of crackers consumed, a regression analysis was performed. Mood was dummy-coded, with the dysphoric condition assigned a 1 and the nondysphoric condition assigned a 0. A regression equation including NA subscale score, mood, and the NA subscale by mood interaction was significant ($F(3, 72) = 2.95, p < .05$).

To assess the contribution of the interaction, a hierarchical multiple regression, as described in Cohen and Cohen (1975), was performed. The significance of the interaction term was tested by determining whether R^2 was significantly increased when the interaction was added to the equation after NA subscale score and mood had been entered. This test revealed that the interaction contributed only a trivial amount ($< .005$) to R^2. In a regression equation that included only NA subscale score and mood, NA subscale score contributed significantly to R^2 when added last ($\beta = .30, p < .001$) while mood did not. Thus, the NA subscale predicted food consumption, regardless of the individuals' mood state.

STUDY 5

Finally, to determine the predictive validity of the ESES in a clinical setting, participants in weight control clinics held throughout Chicago were administered the ESES pre-, mid-, and posttreatment, and their ESES scores were correlated to weight and weight change. It was predicted that weight would decrease over treatment and that eating self-efficacy would increase over treatment. In line with Bandura's (1977a) and Wilson's (1978, 1981) thinking, it was predicted that level of eating self-efficacy would predict subsequent weight loss and that increases in eating self-efficacy would be correlated with weight loss.

Method

Subjects and Procedure. Three Chicago area facilities (Michael Reese Hospital, Northwestern Memorial Hospital, and the Office of Applied Psychological Services at the University of Illinois at Chicago), which sponsored behaviorally oriented weight loss programs, were contacted and asked if they would be willing to participate in a study of their program participants. Leaders of all three groups agreed to participate, yielding 32 subjects (30 females, 2 males; 8 from Micheal Reese Hospital, 22 from Northwestern Memorial Hospital, and 2 from UIC). Subjects were primarily Caucasians

between 25 and 50 years of age. Participants at UIC were solicited through newspaper advertisements and received a 10-week program run by an advanced graduate student in psychology. Participants at Northwestern Memorial Hospital were either self-referred or referred by their physicians. They received a 13-week program administered by nurses and nutritionists. Participants at Michael Reese Hospital were hospital employees who responded to an advertisement in the hospital newsletter. They attended six therapy sessions run by a social worker. The mean weight of the 32 subjects at pretreatment was 222.7 lbs. (SD = 49.7 lbs, range 139–322 lbs.).

All subjects completed the ESES and were weighed at the first, middle, and last sessions. To replicate the work of Condiotte and Lichtenstein (1981), instructions on the ESES were different for this group. Instead of responding on a 1–7 rating scale, subjects were asked to give the probability, on a 0–100% scale, that they would be able to resist the urge to eat in each of the situations specified on the ESES.[5] Because the ESES was being revised concurrently with this data collection, some subjects received the original 79-item ESES version, while later subjects received the 59-item ESES version. However, all subjects received the same version throughout their entire participation in the project, and all subjects in the same clinic received the same version of the ESES. All data reported here are based on the 25 items that appeared on the final version of the ESES.

Results and Discussion

Treatment Effects on Weight and Self-Efficacy. A repeated-measures analysis of variance with time as the independent variable indicated that weight loss over the course of treatment was significant ($F(2, 46)$ = 33.14, $p < .0001$), with participants reducing an average of 12.2 lbs. by the end of treatment. A repeated-measures analysis of variance on ESES scores with time as the independent variable indicated that self-efficacy increased significantly over the course of treatment, as predicted ($F(2, 40)$ = 26.21, $p < .0001$). The mean self-efficacy rating was 929.1 (SD = 393.7) at pretreatment, 1450.6 (SD = 508.2) at midtreatment, and 1,626.0 (SD = 508.6) at posttreatment.

Relations Between Self-Efficacy and Weight Loss. As predicted, weight loss was significantly correlated with increases in ESES scores (r = .35, p

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[5]The reader should note that the ESES response scale was revised to a 1–7 scale after a 1–100% probability scale adapted from Condiotte and Lichtenstein (1981) elicited many complaints from clinic participants. Generally, they found small discriminations difficult to make (e.g., judging 65% vs. 70% probability of resisting the urge to eat), and many reported that it was cumbersome to estimate "the probability of *resisting* the urge to eat" rather than "the probability of eating."

< .04, one-tailed). Self-efficacy at any specific point in treatment was not significantly related to previous or subsequent weight loss during treatment. However, the variations in treatment length may have obscured the relations between eating self-efficacy and weight loss during phases of treatment. Because treatment duration varied from 6 to 13 weeks, the total length of the shortest treatment was the same length as the first half of the longest treatment. The heterogenity of subjects, treatment approaches, and treatment duration no doubt made testing the relations between eating self-efficacy and treatment progress difficult, and a more controlled investigation is needed. The overall correlation between increased efficacy during treatment and weight loss is encouraging, however.

DISCUSSION

The five studies presented above represent the first steps in establishing the usefulness of the ESES. The scale possesses adequate internal consistency and test-retest reliabilities, and its relations with other measures of eating behavior, weight, and self-esteem lend convergent validity to the scale. In a clinical study with participants in weight control programs, increases in ESES scores were significantly related to weight loss, as predicted. Overall, the ESES appears to be a psychometrically sound instrument. However, since the data presented here, with the exception of study 5, were obtained from female college students; additional research is needed to establish the scale's properties in other populations, particularly women in their 30s and 40s, who make up the majority of weight loss program participants. Also, further examination of the issues investigated in study 5 are needed. The sample in that study was small and consisted of a heterogeneous group of subjects enrolled in three different weight loss programs, which varied in length as well as in a number of other respects. A study using a larger sample in a more controlled clinic setting where treatment length is held constant would help to establish more clearly the relations between self-efficacy and weight change.

There was a sex difference in the reported level of difficulty controlling eating, with females indicating significantly more difficulty than males. The ESES did evidence similar degrees of internal consistency reliability and patterns of covergent validity among both sexes, however. It is unclear at this point whether women experience absolutely greater difficulty controlling their urges to eat or whether they are simply more aware of and intent on controlling these urges due to the pervasive social pressure on women to be slender (Chernin, 1981; Orbach, 1982). The issue remains unresolved, and further investigation is needed.

These studies clearly indicate that individuals' reports of perceived problematic eating situations fall into two categories—when they are experiencing negative affect or when they are in positive social situations in which eating is condoned. The NA and SAC subscales reliably emerged in four separate factor analyses and they evidenced high internal consistency. Moreover, the convergent validity of these scales is supported by their similarity to dieters' relapse situations, as identified by Marlatt and Gordon (1979) and B. Rosenthal (1981), and by their appearance in factor analyses performed on all subjects as well as on those who were dieting or overweight.

Our results, however, bring the accuracy of these self-reports into question. Subjects who reported most difficulty in controlling their eating when experiencing negative affect ate significantly more than those who did not, irrespective of their mood. While an explanation for this finding may lie in problems with the instrument, the sound psychometric properties of the ESES counter such an interpretation. We suggest, instead, that discerning the "reasons" or conditions that result in eating is a deceptively difficult task. Eating typically cooccurs with a simultaneous variety of internal states (e.g., hunger, anxiety, pleasure) and external circumstances (e.g., availability of appealing food, time of day). This plethora of relevant cues complicates any determination of which are related to any specific act of eating. Others have noted that individuals often fail in accurately reporting the reasons for and circumstances surrounding their actions (Nisbett & Wilson, 1977), and we suggest that the multicausality that is inherent in most eating situations increases the probability of inaccuracy here. This notion is similar to Bruch's (1973) observation that hunger is an acquired drive and eating is a learned behavior that can be associated with a number of both appropriate and inappropriate cues. This multiplicity of cues makes identifying the specific one related to a behavior difficult. One implication of this finding is that participants required to identify their reasons for eating as part of a research protocol or weight loss program may need extensive training on how to assess accurately the circumstances controlling their food intake.

Overall, the ESES meets the criteria for a psychometrically sound scale. It possesses good test-retest reliability, high internal consistency, convergent validity, and stable factors. Furthermore, changes in self-efficacy were correlated with weight change. This result, along with the finding that self-efficacy at any one point did not predict weight or weight loss during treatment, suggests that individuals anchor the scale differently (hence, no effect across subjects), but that they use the scale consistently across time. One clinical application of this result would be the early identification of clients whose ESES scores do not increase in treatment to determine if they are experiencing any specific (remediable) difficulties. The ESES should prove useful in subsequent research in self-efficacy theory. For example enhanced

efficacy is hypothesized to influence behavior change by increasing coping behavior (e.g., Bandura, 1977a). The ESES could be used to test this hypothesis among weight control program participants. It is hoped that the ESES will be a useful measure for investigators in the areas of self-efficacy and obesity, as well as for clinicians working with weight control program participants.

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