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Abstract

The applicability of Schwartz and Garamoni's (1986, 1989) States of Mind (SOM) model for assessing the influence of cognitive-behavioral therapy on cognitive functioning was evaluated with social phobics. The SOM model states that a positive dialogue (i.e., a 2:1 ratio of positive to negative thoughts) is optimal for effective coping. Social phobics receiving either a cognitive-behavioral or educational-supportive group treatment were compared for SOM change, as were subjects meeting criteria for improvement or nonimprovement. Also the study compared the predictability of the SOM ratio with a ratio based on percent of negative thoughts. Subjects in both treatments evidenced negative monologue (i.e., a preponderance of negative thoughts) at pretreatment. A significant Treatment × Time interaction showed that, although the groups did not differ at posttreatment, those in the cognitive treatment reached positive dialogue at a 6-month follow-up while the other group did not. Improvers also attained positive dialogue at follow-up while nonimprovers did not. The SOM and the negative thought ratios performed similarly in predicting most outcome measures, suggesting that neutral thoughts (the only distinction between the two) serve little function for persons with problems of social phobia.

Keywords: cognitive assessment, cognitive treatment, states of mind, thought-listing, social phobia

Despite a burgeoning interest in cognitive-behavioral treatments in the last decade (Kendall & Hollon, 1979), little is known about how cognitive processes change as a result of

psychotherapy. This problem is particularly vexing for researchers who design interventions to alter dysfunctional cognitive responses but are often unable to adequately test these hypothesized treatment mechanisms. Prior research has been limited by the lack of adequate cognitive assessment techniques. However, a more critical issue is the absence of empirically testable models that describe how cognitive processes are influenced by psychotherapy.

An exception to this situation is Schwartz and Garamoni's (1986, 1989) States of Mind (SOM) model, which emphasizes the relative *balance* of positive and negative cognition in psychopathology. Based on the golden section hypothesis, the model proposes that optimal cognitive functioning consists of a ratio of positive to the sum of positive and negative thoughts that approaches 0.618, or the golden section proportion. This asymmetrical balance of positive and negative thoughts is said to render negative events salient but not overwhelming, thus enabling one to cope with stress (Berlyne, 1971).

Schwartz and Garamoni's (1986, 1989) model defines five different states of mind, each characterized by different values of the SOM ratio of $P/(P + N)$. Three SOMs involve an internal dialogue because, as Schwartz and Garamoni (1989, p. 275) state, "they capture the dialectical interaction between positive and negative thoughts." The first of these dialogic SOMs is *positive dialogue*, with a "set point" of 0.618. This SOM has a possible range of 0.56 to 0.68, and, as previously mentioned, is hypothesized as being optimal for coping with stress. The second SOM is the *internal dialogue of conflict*, with a set point of 0.50 and a range of 0.45 to 0.55, and is associated with mild levels of psychopathology. The third SOM is *negative dialogue*, with a set point of 0.38 and a range of 0.32 to 0.44, and is associated with the moderate degree of pathology that may characterize many clinical samples of depressed or anxious persons.

The use of a set point to define these SOMs is premised on the notion that people monitor their thoughts relative to some fixed value, and when discrepancies occur, coping processes are initiated to restore some form of balance. Consequently, functional individuals are hypothesized to strive to maintain a set point that approaches the positive dialogue proportion of 0.618, while substantial deviations in either direction from this set point represent increasing degrees of psychopathology.

The final two SOMs do not have specific set points because either positive or negative cognition predominate, such that any dialectic process is relatively absent or reduced. The SOM of *positive monologue* involves values ranging from 0.69 to 1.00, and is characterized by insufficient attention to negative events that may signal important threats and serve a motivational function. This SOM ratio may be related to pathological states like acute mania. The SOM of *negative monologue* involves values ranging from 0.31 to 0.00 and, because it is characterized by extreme negativity, is believed to be associated with severe pathology as manifested in profound depression or acute stages of a severe panic disorder.

Empirical evaluation of the SOM model is just beginning. Reanalysis of previously published assessment studies has shown that samples attain SOM ratios consistent with the model's predictions of SOM set points for varying degrees of pathology. Also, in these reanalyses (Schwartz & Garamoni, 1986, 1989), results from five treatment studies revealed that all pretreatment SOMs were in the internal dialogue of conflict, negative dialogue, or negative monologue categories. However, at posttreatment assessment, two-thirds of the

groups evidenced SOMs that fell within the positive dialogue range, while the remaining one-third fell within the internal dialogue of conflict category.

Although Schwartz and Garamoni suggest that participation in therapy is associated with a shift toward the SOM of positive dialogue, Schwartz and Michelson (1987) conducted a more extensive analysis of how treatment process and outcome covary with change in SOM. They found that the SOM ratio for a sample of agoraphobics participating in one of four types of cognitive or behavioral treatments shifted to the positive dialogue range by midtreatment and, generally, remained at this SOM level throughout a 3-month follow-up. Also, when subjects were classified for improvement and endstate functioning, high-functioning and improved subjects both evidenced SOM ratios in the upper end of positive dialogue or lower end of positive monologue from midtreatment to follow-up. In contrast, low-functioning and nonimproving subjects progressed only to the internal dialogue of conflict category and generally remained in this SOM through follow-up.

Schwartz and Michelson's (1987) results were generally consistent with the SOM model. However, the paucity of studies examining the SOM model relative to therapy outcome limits our knowledge of the generalizability of Schwartz and Michelson's findings for other clinical disorders and treatments. Consequently, the first purpose of the present study was to replicate several tenets of the SOM model tested by Schwartz and Michelson. These questions included: (a) Do patients begin treatment with dysfunctional SOMs? (b) Do they shift to functional SOM levels at posttreatment? (c) Likewise, do patients who improve shift to functional SOMs at posttreatment and follow-up? (d) Finally, does exposure to a cognitively oriented treatment produce a more stable shift in SOM level than exposure to a noncognitive treatment?

The second purpose was to provide further comparative data regarding the validity of the SOM model. In a recent study, Heimberg, Bruch, Hope, and Dombeck (1990) compared the SOM model to Kendall and Hollon's (1981) "power-of-nonnegative-thinking" model in predicting anxiety and performance responses of social phobic patients. The latter model suggests the use of a ratio that differs from the SOM ratio only in the inclusion of neutral thoughts in the denominator of the following ratio: $N(P + N + Ne = \text{total})$. The two ratios were equally predictive of criterion measures, suggesting that neutral thoughts may contribute little to the internal dialogue of persons with problems of social phobia.

Heimberg, Bruch, Hope, and Dombeck (1990) also evaluated Schwartz and Garamoni's (1989) contention that the SOM ratio is unaffected by the method of cognitive assessment (e.g., endorsement vs. thought listing). They found that the endorsement method was less likely to classify patients in the more pathological SOM categories than thought-listing. However, since the thought-listing assessment followed exposure to a phobic situation while the endorsement measure was part of a questionnaire packet, stress of the exposure may have temporarily induced a lower SOM, as discussed by Schwartz and Garamoni (1989). This finding does not imply that thought-listing is less valid but only that any assessment collected after an exposure experience may be more responsive to greater arousal. In Schwartz and Michelson's (1987) study, SOM data were collected during a think-aloud procedure in which verbalizations of thoughts were audiotaped during a 1-mile walk. The present study used a thought-listing procedure as in Heimberg, Bruch, Hope,

and Dombeck (1990) and provides a further evaluation of the effect of different assessment methods on the SOM ratio.

Method

Subjects

Subjects in this study were 11 women and 19 men aged 21 to 44 (M = 30.5), who completed all pretreatment, posttreatment, and 6-month follow-up assessment measures at the Phobia and Anxiety Disorders Clinic, University at Albany, State University of New York. These 30 subjects completed all phases of a comparative treatment study for social phobia reported by Heimberg, Dodge, et al. (1990). Four additional subjects were dropped because of missing data on several measures. Sixteen subjects reported social interaction as their primary fear, while 14 subjects reported fears in performance-related situations such as public speaking or working while being observed. Eighteen subjects (60%) had completed college, 19 (63%) were currently employed, and 20 (67%) had never been married.

All subjects were screened with the Anxiety Disorders Interview Schedule (ADIS; DiNardo, O'Brien, Barlow, Waddell, & Blanchard, 1983) or the ADIS-R (Barlow, 1985), and received a primary diagnosis of social phobia according to DSM-III (American Psychiatric Association, 1980) or DSM-III-R (American Psychiatric Association, 1987) criteria. Information on the ADIS procedure, its reliability, and on other exclusion criteria may be found in Heimberg, Dodge, et al. (1990). Subjects were also rated on the Phobic Severity Rating Scale developed by Watson and Marks (1971), and only those receiving a rating of 4 (i.e., moderate impairment) or greater on this 9-point scale were included in the treatment study (M = 5.57, SD = 1.15).

Procedures and Treatment Conditions

As described in Heimberg, Dodge, et al. (1990), subjects were assigned randomly to either a cognitive-behavior group treatment (CBGT) package (n = 14) or an educational-supportive therapy (ES) group (n = 16). Groups met weekly for twelve 2-hour sessions, with 4–7 subjects per group, and were conducted by a male-female cotherapist team. Therapists included one PhD clinical psychologist and five advanced doctoral students in clinical psychology. The PhD served as a cotherapist for two groups in each treatment condition and supervisor for the rest. Further information about therapist training and monitoring of treatment credibility may be found in Heimberg, Dodge, et al. (1990). CBGT consisted of cognitive restructuring (i.e., teaching clients to identify, analyze, and dispute dysfunctional thoughts), exposure to simulated phobic situations, and homework assignments for *in vivo* exposure. ES combined educational presentations and supportive group psychotherapy. In the first half of a session, a lecture-discussion format was used to present topics of relevance to social phobia, while in the second half group members shared concerns about upcoming anxiety-provoking events and were given homework assignments. ES was devised as a credible placebo condition for the evaluation of CBGT, and in fact, the two treatments were rated as equally credible (Heimberg, Dodge, et al., 1990).

Assessment
Two weeks prior to treatment, at posttreatment, and at a 6-month follow-up, subjects completed a battery of self-report measures, engaged in an individualized behavioral simulation of an anxiety-provoking situation, and received clinician ratings following a semistructured interview. The behavioral simulation was a behavioral role-play involving a situation that typically evoked high levels of social anxiety for the individual subject.

Thought-Listing
Cognitive responses to the behavioral simulation were assessed with the thought-listing procedure used previously with socially anxious college students (Cacioppo, Glass, & Merluzzi, 1979; Heimberg, Nyman, & O'Brien, 1987). Immediately following the simulation, subjects were given prepared forms and asked to record the thoughts they experienced about the situation. Trained raters independently categorized thoughts as positive (facilitating relaxed and effective performance), negative (hindering relaxed and effective functioning), or neutral (unclassifiable). Heimberg, Dodge, et al. (1990) report interrater agreement values (Cohen's kappas) for a subsample of subjects as $\kappa = .79$ for positive thoughts and $\kappa = .93$ for negative thoughts.

Improvement[1]
As previously mentioned, Watson and Marks' (1971) Phobic Severity Rating Scale (PSR) was administered at pretreatment screening, and this rating was repeated at posttreatment and follow-up by an independent clinician. *Improver* ($n = 18$) and *nonimprover* ($n = 11$) status was based on PSR ratings, and improvement was defined as (a) a decrease of at least 2 rating points *and* (b) posttreatment and follow-up ratings that were *both* below 4 (i.e., the level defined as clinically impaired).

Outcome Measures
Beck Depression Inventory scores (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and subjects' subjective report of anxiety prior to and during the behavioral simulation served as outcome criteria to be predicted by SOM and percent negative thoughts scores. Subjects reported their subjective anxiety, both during the anticipatory period (3 min prior) and during the performance period of the behavioral simulation, on a 0–100 Subjective Units of Discomfort Scale (SUDS). Subjects were prompted for ratings at 1-minute intervals, resulting in three SUDS ratings for the anticipatory phase and five SUDS ratings for the performance phase. Individual ratings were averaged within these two periods when calculating correlations with the cognitive ratio scores.

Calculation of SOM and Percent Negative Thoughts Ratios
The formula for the SOM ratio was $P/(P + N)$, while the formula for the percent negative thoughts ratio was $N/(P + N + Ne)$. However, Amsel and Fichten (1990) have argued that calculation of ratios based on these raw frequencies may lead to spurious results because of problems created by zero frequencies of positive or negative thoughts. For example, an individual's SOM ratio will always have a value of 0 when the frequency of positive thoughts is 0, regardless of the number of negative thoughts, and a value of 1 when there

are no negative thoughts, regardless of the number of positive thoughts. Amsel and Fichten (1990) provide evidence suggesting that a constant of 1.0 added to the frequency of positive or negative thoughts when either (but not both) of these values is 0 produces results most comparable to those of uncorrected scores. Although their evidence was based on a sample of undergraduates, Heimberg, Bruch, Hope, and Dombeck's (1990) results with social phobics corroborated this finding. Thus, a constant of 1.0 was added, when necessary, in calculating SOM and percent negative thoughts ratios.

Results

Because the data were in the form of proportions, subjects' SOM and percent of negative thought scores were submitted to an arcsine transformation prior to conducting all analyses. Also, a multivariate analysis of variance comparing treatment groups on pretreatment SOM, percent negative thoughts, BDI, and SUDS scores yielded no significant group differences.

Change in SOM Due to Treatment

The current sample of social phobics attained a pretreatment SOM of 0.287 (SD = 0.13), placing them in the negative monologue category. To assess the effects of treatment on the level and temporal pattern of SOMs, a 2 (Treatment) × 2 (Time, i.e., posttreatment and follow-up) repeated-measures analysis of covariance was computed. Pretreatment SOM ratio served as the covariate.

There was no significant main effect for either treatment or time. There was, however, a significant, $F(1, 28)$ = 6.03, $p < .02$, Treatment × Time interaction. As shown in Figure 1, tests of simple main effects revealed that the treatment groups did not differ in SOM at posttreatment, $F < 1$, but did differ, $F(1, 28)$ = 9.34, $p < .01$, at 6-month follow-up. This difference was due to the ES group's shift from a posttreatment SOM of internal dialogue of conflict to a 6-month follow-up SOM of negative monologue. In contrast, the CBGT group progressed from aa posttreatment SOM of internal dialogue of conflict to a 6-month follow-up SOM of positive dialogue. Thus the treatment containing explicit cognitive components appears to have fostered patients' continued use of more adaptive self-statement processes following cessation of group sessions.

A 2 (Improver vs. Nonimprover) × 2 (Time) repeated-measures analysis of covariance was computed to evaluate the association between SOM level and improvement status. This analysis yielded only a significant main effect for improvement status, $F(1, 26)$ = 8.20, $p < .01$, but no effect for time $F(1, 27)$ = 2.87, n.s., and no interaction, $F(1, 27)$ = 1.72, n.s. Subjects who met criteria for improvement evidenced on the average higher SOM ratios at the posttreatment and 6-month follow-up assessments. In fact, while improvers' pretreatment SOM of 0.297 placed them in the negative monologue range, their posttreatment and 6-month follow-up SOM ratios (adjusted means of 0.631 and 0.666, respectively) placed them in the optimal SOM category of positive dialogue.
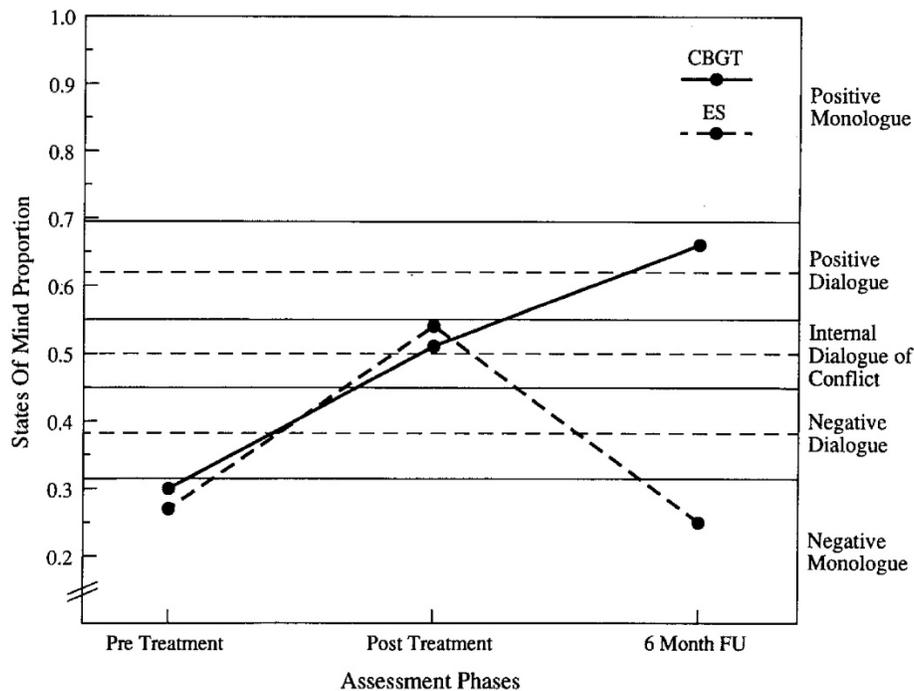
Figure 1. States of mind (SOM) trajectories based on adjusted means for the cognitive-behavioral group treatment (CBGT) and educational supportive group treatment (ES) across assessment phases. Solid lines indicate upper and lower limits of the SOM ranges and dotted lines indicate SOM set points.

Comparison of SOM and Percent Negative Thoughts Ratios

Similar 2 × 2 repeated-measures analyses of covariance were performed on the negative thoughts ratios to compare the sensitivity of this index to the SOM ratio. Results for the treatment analysis (i.e., CBGT vs. ES) yielded no significant effects. Consequently, this measure was not as sensitive as the SOM ratio in detecting the enhanced maintenance of positive thinking associated with participation in CBGT.

In contrast, results for the relation of improvement status to cognitive functioning yielded a significant main effect for improvement, $F(1, 26) = 6.04$, $p < .05$, but no significant effect for time and no significant Improvement × Time interaction. This finding shows that subjects who met criteria for improvement evidenced a lower percentage of negative thoughts at the posttreatment and 6-month follow-up assessments.

Correlations with Outcome Measures

Zero-order correlations between SOM and percent negative thoughts ratios and treatment outcome measures are presented in Table I. Although the Phobic Severity Rating was used previously to categorize patients as improved/nonimproved, it is included here to directly examine the magnitude of its covariation with the cognitive measures.

Inspection of Table I shows that neither cognitive index was significantly related to these outcome measures at pretreatment assessment, a possible artifact of restricted range. At posttreatment both the SOM and percent of negative thoughts ratios were significantly associated with self-report of depression, subjective report of anxiety (SUDS-P) during the behavioral simulation, and the independent clinician's rating of impairment. This pattern was reproduced in most respects at the follow-up assessment except that no correlation was found with the BDI. However, *t* tests for differences between dependent correlations revealed that the coefficients for percent of negative thoughts and the two SUDS ratings at follow-up were significantly greater (both $p < .05$) than the corresponding SOM coefficients. Although the latter finding was unexpected, the general pattern of the results suggests that the SOM ratio was as sensitive in predicting the outcome criteria as a previously existing index. This result should not be surprising because, similarly to Heimberg, Bruch, Hope, and Dombeck (1990), the SOM and percent negative thought ratios in the present study were highly correlated at all three assessment points (i.e., *r* ranged from −.82 to −.85, $p < .001$).

Table I. Comparison of Correlations between SOM Ratio, Percent Negative Thought Ratio, and Outcome Measures[a]

	Pretreatment		Posttreatment		Follow-up	
	SOM	PNT	SOM	PNT	SOM	PNT
Measure	ratio	ratio	ratio	ratio	ratio	ratio
BDI	−.20	.23	−.38[b]	.39[b]	.00	.13
SUDS-A	.03	−.12	−.27	.24	−.23	.43[b]
SUDS-P	−.28	.19	−.37[b]	.41[b]	−.34[b]	.53[c]
Phobic Severity Rating	−.19	.09	−.42[b]	.35[b]	−.44[b]	.48[c]

a. **Note:** SOM = states of mind, PNT = percent negative thoughts, BDI = Beck Depression Inventory, SUDS-A = Subjective Units of Discomfort Scale-Anticipatory, and SUDS-P = Subjective Units of Discomfort Scale-Performance

b. $p < .05$

c. $p < .01$

Discussion

The purpose of the present research was to conduct additional tests of the applicability of the SOM model for charting changes in cognitive functioning due to participation in psychotherapy. The present sample of social phobics engaged in negative monologue (0.287) prior to treatment, achieved the internal dialogue of conflict level at posttreatment, and, depending on treatment condition, progressed to positive dialogue (i.e., CBGT) or slipped back to negative monologue (i.e., ES) at a 6-month follow-up assessment. Despite the greater degree of pretreatment negative thinking in our subjects as compared to Schwartz and Michelson's (1987) subjects ($M = 0.437$), the trajectory of cognitive change in both studies was similar, in that treated groups fell within the positive dialogue category at follow-up. The similar trajectory in both studies is consistent with the SOM model's premise that individuals monitor their thoughts and strive to maintain a balance of positive and nega-

tive elements that approximates the positive dialogue setpoint. However, whether the pretreatment SOM differences between the two studies are because of sample fluctuations, client factors (e.g., diagnosis, co-morbidity), or different assessment methods cannot be answered by the present data.

Findings from this study extend previous research by showing that a treatment that explicitly emphasizes cognitive aspects of anxiety and cognitive coping responses (i.e., CBGT) was able to sustain and augment increased positive thinking at the time of follow-up. The fact that CBGT subjects attained a follow-up SOM of 0.667, placing them in the upper range of positive dialogue, may suggest a specificity effect. In other words, the significant interaction suggests that continued practice of cognitive skills leads to a greater preponderance of positive thoughts occurring in subsequent exposures to phobic situations. The credible comparison treatment (ES) failed to sustain any initial gains in subjects' degree of positive thinking. The fact that there was no main effect but only an interaction for treatment, suggests that although the ES treatment increased clients' enthusiasm, the absence of explicit coping skills to use once treatment was over resulted in a return to more dysfunctional cognition. Hence, unless a treatment targets a particular dimension that is salient to a client's problem, the SOM ratio may revert to its pretreatment level.

Analysis of the relationship between improvement status and SOM yielded only a significant main effect. Since improvers attained a posttreatment SOM of positive dialogue and then maintained this SOM at follow-up, the present results support Schwartz and Garamoni's (1986, 1989) contention that positive dialogue is optimal because of the information-processing properties of positive asymmetry. With the almost 2:1 ratio of positive to negative thoughts, the individual's appraisal of internal and external events should enable the person to remain focused on ways in which to cope with situations. Also, the significant inverse correlations between the SOM ratio and a relative index of improvement (i.e., Phobic Severity Rating) suggests that cognitive change is not just "inside the head" since severity ratings were made by clinicians not involved in the administration of treatment.

Although only correlational, the relationship between SOMs and the BDI and SUDS suggests that greater degrees of positive asymmetry relate to less fearful and pessimistic perceptions. More research is necessary, however, to describe the pattern of relationships between the SOM ratio and various outcome criteria, given the evidence for desynchrony among measures of anxiety's triple response channels (Nietzel, Bernstein, & Rossell, 1989).

Another purpose of the present study was to compare the utility of the SOM and percent of negative thoughts ratios in their roles as either predictor or criterion variables. Heimberg, Bruch, Hope, and Dombeck (1990) and the present research are the only studies to have directly compared these two approaches. The percent of negative thoughts ratio was derived from the assumption that negatively biased cognition has a greater effect on coping and adjustment than positive cognition (Kendall & Hollon, 1981). Results from the present study demonstrate that the two ratios are highly correlated and that both showed a similar pattern of covariation with other variables. The two exceptions to this pattern were that treatment condition influenced change in the SOM but not percent of negative thoughts and that percent of negative thoughts compared to SOM correlated more substantially with SUDS ratings at follow-up. In combination with Heimberg, Bruch, Hope, and Dombeck's

(1990) data, the present findings suggest that the neutral thoughts score, which is the only substantive difference between the two ratios, contributes little additional information to our understanding of the internal dialogue of social phobics.

Given the more extensive theoretical underpinnings of the SOM model with its emphasis on "relative balance," it appears that this model possesses great explanatory power. Nevertheless, future research should address the degree to which SOM findings generalize across different assessment procedures. Presently the cognitive assessment literature provides a mixed picture of the generalizability of results across assessment methods. Both Clark's (1988) literature review and Fichten, Amsel, and Robillard's (1988) multiple studies of though frequencies showed few differences between the results produced by endorsement vs. thought-listing methods. In contrast, Heimberg, Bruch, Hope, and Dombeck (1990) found differences in classification of subjects in SOM categories depending on whether the SOM ratio was based on an endorsement or thought-listing procedure. Also, the differences noted between the mean pretreatment SOMs of Schwartz and Michelson's (19887) subjects and those in the present study suggest that the think-aloud method may characterize clinical subjects as less dysfunctional than would a thought-listing method. Consequently, it is important in evaluating the SOM model that future research compare multiple methods of assessment within the same study.

Note

1. Total *N* for this analysis was 29 because one subject could not be scheduled for the 6-month follow-up interview that precedes the clinician's Phobic Severity Rating.

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