

THE RELATIONSHIP BETWEEN STUTTERERS' COGNITIVE AND AUTONOMIC ANXIETY AND THERAPY OUTCOME

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Following therapy, a group of 33 stutterers showed a statistically significant reduction in stuttering and adjustive behaviors, as well as in certain indices of autonomic and cognitive anxiety. The decrease in stuttering correlated negatively with a pretreatment measure of autonomic anxiety. In contrast, the reduction in adjustive behaviors correlated negatively with a pretreatment measure of cognitive anxiety. This suggests that the anxiety determinants of speech improvement among those who stutter are different for different categories of fluency failure.

INTRODUCTION

It has long been contended that stutterers are speech doubters (Wyneken, 1868). Stuttering has been seen as the result of their negative beliefs about speech (Sheehan, 1970; Bloodstein, 1958, 1981). These contentions have led to a number of studies in which the speech-associated attitudes of stutterers have been explored (Knower, 1938; Erickson, 1969; De Nil and Brutten, 1986).

Recently, the Erickson S-24 scale, developed by Andrews and Cutler (1974), has been used to evaluate the communication attitudes of stutterers. It has also been employed in therapy outcome studies like those of Guitar (1976). He found that the pretreatment attitude of stutterers on the S-24 was the best predictor of treatment outcome among the measures he used. Furthermore, Guitar and Bass (1978) reported that stutterers whose attitude scores did not normalize during therapy had poor long-term outcomes.

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Stutterers have not only been seen as having negative speech attitudes, they also have been viewed as being generally more anxious than non-stutterers (Fowlie and Cooper, 1978; Bloodstein, 1981). Some have suggested that this difference in reactivity is in part genetically determined (Brutten and Shoemaker, 1967). Other theorists have taken the opposing position that the anxiety shown by stutterers is environmentally determined and speech specific (Johnson et al., 1956; Bloodstein, 1958). However, data supporting the notion that stutterers are more anxious than nonstutterers is equivocal (Boland, 1953; Molt and Guilford, 1979). Moreover, the evidence for the presumed relationship between anxiety and stuttering is at best scarce (Ingham, 1984). Possibly this is why outcome studies have not been run to determine if the results of therapy are related to the extent to which anxiety is present among those who stutter. Yet, many speech therapists believe that a relationship exists between anxiety and stuttering (Turnbaugh, Guitar, and Hoffman, 1979), and their therapy often incorporates procedures that are aimed at reducing speech-associated anxiety. These facts led to the present study, which was designed to determine the relationship, if any, between anxiety and the outcome of therapy for those who stutter.

METHOD

Subjects

Thirty-three male stutterers, ranging in age from 13 to 16, were the subjects of the present study. Each of them was diagnosed as a stutterer, independently of the experimenters, and referred for therapy to the Department of Phoniatriy of the University of Utrecht's Academic Hospital.

Procedure

Prior to therapy and again a year later, about 7 mo after the termination of therapy, each of the subjects was videotaped as they read aloud a 384-syllable passage in the presence of the same experimenter. These tapes were used to determine, relative to the number of syllables, the frequency of: 1) fast repetitions of sounds, syllables, or one-syllable words; 2) silent or oral prolongations; and 3) slow repetitions or interjections of a sound, syllable, word, or phrase.

The observed speech disruptions were assigned to three different failure categories in keeping with the fact that those that fall into the first two are generally viewed as representing stuttering behaviors, while those in the third category are usually regarded as representing adjustive behaviors (Wingate, 1964; Brutten and Shoemaker, 1967; Janssen and Kraaimaat, 1980).

All three categories of the behaviors that interfered with the forward flow of speech were separately scored by two of the experimenters as a

means of determining external reliability. For this purpose, Sander's (1961) formula was used to assess interobserver agreement as to the specific syllables and type of fluency failure displayed by a randomly selected sample of 10 of the 33 subjects studied. The average agreement across the categories was 83%.

Anxiety was autonomically and cognitively assessed. During the pre- and post therapy oral reading sessions and during the 10-min quiet period that initiated each of these sessions, the subjects' skin conductance and heart rate were continuously measured. Silver electrodes were placed on the first and third finger of the subjects' left hand so that their skin conductance could be determined. Standard plate electrodes were used to record the heart rate from EKG leads that were attached to the right wrist and left leg. Both the skin conductance and heart-rate measurements were stored by means of a FM tape recorder.

The autonomic data from the quiet and oral reading segments of the pre- and posttherapy sessions were analyzed off-line by means of a digital computer. The computer was programmed to score both the skin conductance level and the number of spontaneous fluctuations in conductance. It also converted the interbeat intervals in ms into average heart rate per min. These data permitted the experimenters to compute the change that occurred in the autonomic anxiety measures between the quiet and oral reading segments of both the pre- and posttherapy sessions. More specifically, the mean skin conductance and spontaneous fluctuations during the quiet period and the first 60 sec of oral reading and the mean heart rate during quiet and the first 20 sec of oral reading were determined so that the change scores in the pre- and posttherapy sessions could be compared.

Cognitive anxiety was assessed by having the subjects fill out the emotional reaction portion of the Speech Situations Checklist (S.S.C.) (Brutten, 1973) after completing the oral reading in both the pre- and posttherapy sessions. In addition to this inventory, which explores the expectation of difficulty in various speech situations, the subjects rated on a 5-point scale the extent to which they experienced anxiety during each of the oral readings.

Therapy, which was given by experienced speech therapists, took place over 80 hr. The first 70 one-hr sessions occurred over 4 consecutive wk. The remaining 10 booster sessions were held bimonthly. The therapy was given in groups of about 12 stutterers and involved training in relaxation and regulated breathing, desensitization of speech-associated anxiety, cognitive-restructuring, and self-control.

RESULTS

As Table 1 makes apparent, both the three categories of fluency failure and the two self-report indicants of anxiety were significantly lower in

Table 1. Pre- and Posttreatment Measures of Fluency Failures and Both Cognitive and Autonomic Anxiety

	Pretreatment		Posttreatment		t-value
	Mean	S.D.	Mean	S.D.	
Fluency failures					
Fast repetitions	4.28	7.15	1.61	3.42	2.23 ^a
Silent/oral prolongations	8.85	10.88	4.24	6.04	2.88 ^b
Slow repetitions/interjections	5.24	5.22	1.42	1.98	4.38 ^b
Cognitive anxiety					
Speech Situation Checklist	2.49	0.58	2.16	0.61	3.86 ^b
Experienced anxiety	3.30	0.85	2.52	0.80	3.80 ^b
Autonomic anxiety					
Skin conductance	0.15	0.10	0.11	0.10	1.98
Spontaneous fluctuations	3.21	3.56	1.29	3.69	2.27 ^a
Heart rate	14.01	8.34	12.91	8.21	0.62

^a $p < 0.05$, two-tailed.

^b $p < 0.01$, two-tailed.

the posttreatment condition than they were prior to therapy. In addition, the measures of autonomic anxiety were descriptively somewhat lower than they were in the pretreatment phase. However, only the reduction in spontaneous fluctuations was found to be statistically significant.

The relationship between the pretreatment measures of anxiety and the reduction in fluency failures, expressed in terms of residual gain scores¹ (Kerlinger, 1975), is evidenced in Table 2. There it can be seen that the cognitive measures did not correlate significantly with the reduction in stuttering behaviors that was subsequent to therapy. The only statistically significant correlation was between the pretreatment S.S.C. scores and the posttreatment gain scores for the adjustive behavior category. Since this relationship was negative, higher pretreatment S.S.C. scores were associated with a lessened posttherapy reduction in this form of fluency failure.

With respect to autonomic anxiety, two statistically significant correlations were evidenced. These correlations, both negative, were between the pretreatment skin conductance levels and the gain scores in the stuttering behaviors. As such, the higher the pretreatment level of skin conductance, the less likely it was that stuttering repetitions and prolongations improved following therapeutic intervention.

Step-wise multiple linear regression analyses (Kerlinger, 1975) were run in order to determine if a combination of the pretreatment cognitive and autonomic anxiety measures would enhance the efficiency with which

¹ To facilitate interpretation of the data, the sign of the residual gain scores was reversed; high-gain scores were made to indicate greater improvement than did low-gain scores.

Table 2. Correlations Between Pretreatment Measures of Cognitive and Autonomic Anxiety and Posttreatment Gain Scores for Measured Fluency Failures

	Residual gain scores		
	Fast repetitions	Silent/oral prolongations	Slow repetitions/interjections
Cognitive Anxiety			
Speech Situation Checklist	-.14	-.13	-.36 ^a
Experienced anxiety	-.08	-.02	-.03
Autonomic Anxiety			
Skin conductance	-.61 ^b	-.37 ^a	-.20
Spontaneous fluctuations	-.23	-.26	.03
Heart rate	-.08	-.13	.11

^a $p < 0.05$, two-tailed.

^b $p < 0.01$, two-tailed.

improvement in stuttering and adjustive behaviors was predicted. These analyses showed that no combination of the anxiety measures furthered the prediction of the posttreatment gain scores.

DISCUSSION

Improvement was evidenced posttreatment, though normal fluency was not achieved. Nevertheless, the clients who were the subjects of this study showed fewer fluency failures following therapy than they did in the pretreatment period. Both their stuttering behaviors and the frequency of their adjustive behaviors decreased to a statistically significant extent. It is noteworthy, in this respect, that the reduction in the repetitions and prolongations that characterize stuttering correlated with and were predicted to an extent that exceeded chance by the pretreatment skin conductance measure of autonomic reactivity, but that the observed lessening in adjustive behaviors did not. In contrast, the decrease in adjustive behaviors correlated with S.S.C., a general situational measure of cognitive anxiety, while the reduction in stuttering behaviors did not. This suggests that the anxiety determinants of speech improvement were different for the different categories of fluency failure.

Seemingly, the outcome of therapy was differently predicted by autonomic and cognitive measures of anxiety because different categories of fluency failure were involved. If this is the case, it indicates that we should neither ignore the difference between autonomic and cognitive aspects of anxiety in the treatment of those who stutter nor fail to distinguish among the forms of speech disruption when evaluating the effects of therapy (Brutten, 1975; Janssen and Kraaimaat, 1980; Brutten, 1986).

Outcome controversy is likely to result if either the analysis of anxiety or fluency failure is undertaken in a molar fashion (Guitar and Bass, 1978; Busta et al., 1980; Ulliana and Ingham, 1984).

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