VALIDATION OF THE NON-AH SPEECH DISTURBANCE RATIO
AS A MEASURE OF TRANSITORY ANXIETY

THESIS

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

By

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December, 1974
Hartwig, Fenton W., Validation of the Non-ah Speech Disturbance Ratio as a Measure of Transitory Anxiety. Master of Arts (Clinical Psychology), December, 1974, 42 pp., 3 tables, references, 46 titles.

An investigation of concurrent validity of the Non-ah Speech Disturbance Ratio (Non-ah SDR) with the State Form of the State-Trait Anxiety Inventory (STAI). Twenty male college students talked on an anxiety-arousing topic before female audiences who rated observed anxiety. Each subject completed the State and Trait Forms of the STAI. Reliabilities were, by the Intraclass correlation for Raters on Day 1, .63 (p<.01) and Day 2, .20 (p<.05). Pearson's r for scorers was .98 (p<.01). The Non-ah SDR and all other measures of anxiety correlated. A partial correlation test found the naive ratings significantly determined by manifest speech disturbance, as measured by the Non-ah SDR. Certain categories of speech disturbance were only infrequently utilized and added little to the measure as a whole.
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VALIDATION OF THE NON-AH SPEECH DISTURBANCE RATIO
AS A MEASURE OF TRANSITORY ANXIETY

The recognition of changes in anxiety is critically involved in the process of psychotherapy. The clinician must be sensitive to the presence of anxiety in order to exploit its signification. Historically, such sensitivity, attained through the cumulative experience of the clinician, has been called "clinical intuition." In an attempt to relate how their intuition guides decisions regarding anxiety in their patients, psychologists have promoted a fantastic array of definitions or criteria for judging the state of anxiety. With recent attempts to clarify the construct of anxiety, new techniques are offered for objective measurement of anxiety.

Until recently, anxiety was largely viewed as a trait, or unitary construct. Accordingly, measures such as the Taylor Manifest Anxiety Scale (TMAS) and other tests derived from the Minnesota Multiphasic Personality Inventory were used as operational definitions. The current formulation of anxiety distinguishes between trait and state components of anxiety. Therefore, current measures of anxiety provide estimates of either state or trait anxiety. One such measure is the Non-ah Speech Disturbance Ratio (Non-ah SDR) developed by Mahl (1956). The Non-ah SDR is offered as a
means to evaluate anxiety as an ongoing and fluctuating condition of a person by way of his verbal behavior. Though former research showed the potential usefulness of the Non-ah SDR, it remained to be ascertained whether the measure would covary with a current operational definition of state anxiety.

The operational definition chosen to test for concurrent validity was the State Form of the State-Trait Anxiety Inventory (STAI), developed by Spielberger, Gorsuch, and Lushene (1970). They cite substantial evidence for the construct validity of the State Form of the STAI as a "sensitive indicator of the level of transitory anxiety experienced [p. 3]."

It was also expected that the Non-ah SDR and the Trait Form of the STAI correlate. There is substantial common variance between both Forms of the STAI when subjects are confronted with a situation that threatens their personal adequacy (Spielberger et al., 1970), as in the present study. Another objective of this study was to compare the anxiety ratings of naive judges to the Non-ah SDR and each of the STAI Forms. Former research with naive judges is ambiguous (e.g., Geer, 1966; Mehrabian, 1964). Since the naive ratings and the speech samples scored by the Non-ah SDR were to be obtained simultaneously, it was hypothesized that they would correlate. A correlation was also hypothesized between the judges' ratings and each of the STAI Forms. Another
purpose for obtaining naive ratings was to estimate the degree to which speech disturbance, as measured by the Non-ah SDR, may affect such ratings.

Verbal Indices of Anxiety

Studies of verbal behavior associated with anxiety were initiated by Laswell (1935), who devised a system for classifying tension during psychotherapy. Since then, studies relating verbal behavior to anxiety have flourished (e.g., Davids and Ericksen, 1955; Feshbach and Singer, 1957; Geer, 1966; Gynther, 1957; Ramond, 1953; Schwartzzenburg, Fieldstein and Jaffe, 1963). During this general period, there were several attempts to design a measure of anxiety, using verbal behavior indicants observed in psychotherapy (e.g., Dibner, 1956; Dollard and Auld, 1959; Dollard and Mowrer, 1947; Gleser, Gottschalk, and Springer, 1961; Gottschalk, Mayerson, and Gottlieb, 1967; Mahl, 1956).

The first major method of measuring anxiety through an analysis of verbal behavior was developed by Dollard and Mowrer (1943, 1947), who sought to establish an objective means for progress evaluation in casework. Their method, called the Discomfort-Relief Quotient (DRQ), purported to evaluate relief from tension which clients experienced. The procedure of scoring the DRQ involved "intuitively" categorizing words as either "drive producing" or "drive reducing" (Dollard and Mowrer, 1947). While some results with the
DRQ were moderately favorable (e.g., Kauffman, 1949; Wiener and Mehrabian, 1968; Zimmerman, 1950), others appeared generally unfavorable for its continued use (e.g., Auld and Mahl, 1956; Meadow, Greenblatt, Levine, and Solomon, 1952). However, the DRQ did stimulate the development of other verbal measures.

Content versus expressive measures.--There are two general approaches to the analysis of speech in evaluating anxiety. The first stresses the manifest content of speech and relies chiefly on its face validity. The premise of this approach is that an isomorphic relationship exists between certain quantitative aspects of content and the intensity of an emotional experience (e.g., Dollard and Auld, 1959; Auld and Dollard, 1966; Gottschalk and Gleser, 1969). Most of these studies are based upon psychoanalytic interpretive method.

The second approach is taken by those who emphasize the instrumental function of speech as manifested by its expressive features. In effect, this approach assumes that language is a vehicle for more than mere lexical meaning and that expressive components are not so determined by social control as is the lexicography of language. Inherent in this approach is that the expressive quality of speech may be linguistically unrelated but rather associated with the affective experience of the speaker. An advantage
claimed for the expressive measure of anxiety is that categories can be defined with reasonable clarity and objectivity, thus making for higher reliability relative to content analysis.

In addition to the above distinct approaches to relating verbal behavior to anxiety is the eclectic research that partakes of both approaches and emphasizes behaviors that are stable. Studies in this area were conducted by Aronson and Weintraub (e.g., 1972, 1967a, 1967b). Their position is that while certain verbal behaviors may reflect immediate reactions to stress, others indicate stable personality types. A few of the personality types found to have distinguishable patterns of verbal behavior are the "impulsive" (Weintraub and Aronson, 1964), "delusional" (Weintraub and Aronson, 1965), "depressed" (Weintraub and Aronson, 1967), and "sociopathic" (Eichler, 1966). According to Aronson and Weintraub (1972), the verbal behavior of an individual reveals an "adjustive habit pattern of expression (p. 265)."

Some of the expressive features of speech that have been associated with anxiety are "production and rate" (Goldman-Eisler, 1956), "silence" (Mahl, 1956, 1961), "grammatical aspects" (Sanford, 1942), "vocabulary diversity" (Johnson, 1944), "pauses" (Goldman-Eisler, 1956), and "speech disturbance" (Dibner, 1956a, 1956b; Mahl, 1959; Schwartzzenburg et al., 1963). Although other features may be shown to correlate with anxiety, "speech disturbance" has been the most promising means to evaluate transitory anxiety.
The rationale of using speech disturbance as a measure of anxiety is offered by Mahl and Schulze (1964): "Anxiety has a disruptive effect on finely coordinated behavior and speech is an instance of finely coordinated behavior, par excellence [p. 88]." Speech disturbance is construed to be a purely automatic generalized consequence of anxiety in the same way that general changes in muscular coordination or attention span are brought about by anxiety.

The perhaps earliest recognition of flustered speech as signifying anxiety was that of Freud (1901), who attributed such disturbance to internal conflict. Similarly, Sanford (1942) suggested that "roughness" in speech could be related to anxiety. The first method of measuring anxiety through an analysis of speech disturbance was developed by Dibner (1956a). Dibner called his method "cue counting" for its derivation from the accepted clinical cues of anxiety. However, "cue counting" was not merely a measure of speech disturbance. Among the cues were "signing," "laughing," "asking questions of the therapist," the statement,"I don't know," and "voice change," as well as signs of speech disturbance.

Speech disturbance ratio.--In a preliminary study, Mahl (1955) concluded that there are identifiable, discrete categories of speech disturbance which occur at varying rates. Moreover, Mahl proposed that by scoring interview typescripts
for the speech disturbance categories, a sensitive appraisal of a patient's changing anxiety level could be made. The measure that evolved from this preliminary research has become the Non-ah SDR. The "ah" category was found not to differentiate disturbed from normal speech (Kasl and Mahl, 1965).

The Non-ah SDR developed by Mahl (1959) has been employed in a number of studies which support its high reliability (e.g., Kasl and Mahl, 1965; Mahl, 1959; Siegman and Pope, 1972; Zimbardo, Mahl, and Barnard, 1963). The evidence is less clear with respect to the validity of the Non-ah SDR. The initial study of Mahl (1955), which resulted in the definition of speech disturbance categories, showed a positive correlation between ad hoc estimates of changes in patients' anxiety during psychotherapy and speech disturbance. In a more refined study, Mahl (1956) found that "anxious conflictual" phases of psychotherapy had significantly higher levels of speech disturbance than "low-anxiety successfully-defensive" phases. Boomer and Goodrich (1961) failed to replicate this study and concluded their results to be inconclusive.

In another study, Mahl (1956) correlated the speech disturbance levels of thirty-one psychiatric outpatients in their initial interviews with global ratings of the interviews made by independent observers. For the women patients, there was a significant correlation between the two measures, but ambiguous findings resulted for the male patients. The
results with males in this study were later examined and clarified by Kasl and Mahl (1965). In addition, this last study found a significant correlation between the Non-ah SDR and anxious topics during interviews and the Palm Moisture Index.

Panek (1959) found that GSR dips were preceded by rising Non-ah SDR gradients in psychotherapy. Zimbardo et al. (1963) correlated Sarason's Test Anxiety Inventory scores with levels of speech disturbance and found a significant relationship between them. Siegman and Pope (1972) found a positive correlation between anxious topics during interviewing and disturbed speech. This finding supported the earlier research of Kasl and Mahl (1965). These last two studies also concurred in finding that the Non-ah SDR fails to correlate with the TMAS. Lastly, a study by Geer (1966) failed to show a correlation between reported fear in response to the single multiple-choice item, "Speaking in front of a group" and the Non-ah SDR.

Method

Subjects

Subjects were 20 male college students taking an introductory course in psychology. They were recruited by a

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1 Twenty-one subjects made presentations. With the criterion of rejection, two minutes of silence, one subject was eliminated before obtaining 20 acceptable speech samples.
notice stating subjects were needed for an "attitude survey." There was no reference to "anxiety" or any other construct that would suggest the nature of the research or the task of speaking before a group.

**Raters.**—Twenty female students composed two audience groups of ten members each. These students were recruited by a notice, unassociated with the one addressed to prospective subjects, stating that participants would be involved in an "observation study" to see "how good a listener you are."

**Procedure**

An assistant received subjects in a waiting room, where each was given a numerical identification tag. In a separate room, the experimenter assembled each audience and distributed copies of the Rating Scale of Anxiety (see Appendix B) and a Letter of Thanks (see Appendix C). An orientation was then read to each audience which explained their assignment of rating each speaker's anxiety (see Appendix A). Emphasis was placed on the importance of not interrupting any of the speakers.

Each subject was individually called from the waiting room and escorted to the room where his respective audience waited. The experimenter deferred any discussion about the study until each subject had been led before the audience and seated at a table where a microphone was placed. At
this point, each subject was instructed to talk on the topic of "reasons for attending college" and "reasons you would provide to explain a possible failure in college" (see Appendix D). When the subject understood the directions, the tape machine was started and the subject was told to begin his talk.

When each subject had finished his presentation, he was returned to the assistant who directed him to fill out the Self-Evaluation Questionnaire (STAI), first, the X-1 Form (State Anxiety Form), and then the X-2 Form (Trait Anxiety Form; see Appendix G and H).

**Non-ah speech disturbance ratio.**--Each speech was transcribed from the recordings by a naive secretary. Scoring the transcripts for speech disturbance was done while both reading and listening to each speech (see Appendix F for a sample page of scored transcript and Appendix E for definitions of speech disturbance categories). The computation of the Non-ah SDR was done according to Mahl (1959). To preclude contaminated scoring, the STAI and ratings of anxiety were not examined until the Non-ah SDR had been computed for all subjects.

**State-trait anxiety inventory.**--The directions on the State Anxiety Form were modified, pursuant to Spielberger et al. (1970), to accord with the design of the study: subjects were instructed to respond to test items in terms
of their feelings during speech presentations (see Appendix G). There was no modification in the directions for the Trait Anxiety Form.

Scoring of the STAI was done according to the STAI Manual (Spielberger et al., 1970; see Appendix I). This procedure provides for a range of possible scores on each of the STAI Forms from a minimum of 20 to a maximum of 80. The higher the score, the greater is the reported anxiety measure.

Ratings.--The observed anxiety of each subject was rated by the naive judges on a scale from 0 to 100 (see Appendix B). There were no criteria given to the judges for arriving at their ratings other than the explanation that "0" would mean the total absence of anxiety, "50" would mean average anxiety, and "100" would indicate the most severe anxiety.2

Analysis of data.--Interscorer reliability in scoring the speech transcripts for the Non-ah SDR was estimated by Pearson's r. For this purpose, the total speech disturbances in each of ten transcripts were scored independently by the experimenter and a graduate student. Pearson's r was also computed between the independent total scores for each of the speech disturbance categories. For all tests other than reliability, only the scores of the experimenter were used.

2Experimenter was prepared to provide a dictionary definition of "anxiety" if questioned. Surprisingly, the task was not sufficiently ambiguous to prompt questions.
Interjudge reliability of the judges was estimated by the Intraclass correlation method. This test also provided a means of checking for the expected significant differences between both judges and subjects.

To test the hypothesis of a significant correlation between the Non-ah SDR and the STAI, Pearson's r was computed between the total scores on each Form of the STAI and the Non-ah SDR. The Hotelling formula was used to test for a significant difference between correlations obtained with each Form of the STAI and the Non-ah SDR.

Pearson's r was used to test the hypothesis of a significant correlation between the Ratings and each of the other anxiety measures. For each computation, the mean Rating of anxiety for each subject was used. The Hotelling formula was used to test for a significant difference between correlations with each of the STAI Forms. To estimate the extent to which observed speech disturbance, as measured by the Non-ah SDR, entered into the Ratings, a first-order partial correlation was computed. With this test, the effect of the Non-ah SDR on correlations between the Ratings and each of the STAI Forms was nullified.

Results

Interscorer reliability in scoring total speech disturbance according to the Non-ah SDR was highly acceptable ($r = .98$, $p < .001$). Interscorer reliability in scoring the particular categories of speech disturbance was also quite
high (see Table 1). With the exception of the category of "Omission," all interscorer r's were significant or approaching significance ($r = .54$, $p < .05$).

For the naive female judges, interjudge reliability was also acceptable for both audiences (Intraclass correlation of Day 1 audience = .63, $p < .01$; Day 2 audience = .20, $p < .05$). However, the Day 1 audience intercorrelated significantly better than the Day 2 audience ($z = 8.18$, $p < .01$).

Table 1
Comparison of Non-ah SDR Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean N. per Subject&lt;sup&gt;1,3,4&lt;/sup&gt;</th>
<th>Percentage of SD&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Part/Whole&lt;sup&gt;1&lt;/sup&gt; r&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Interscorer&lt;sup&gt;2&lt;/sup&gt; r&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition</td>
<td>9.5</td>
<td>.27</td>
<td>.79**</td>
<td>.96**</td>
</tr>
<tr>
<td>Sentence Change</td>
<td>5.6</td>
<td>.16</td>
<td>.60*</td>
<td>.59*</td>
</tr>
<tr>
<td>Tongue Slip</td>
<td>6.6</td>
<td>.19</td>
<td>.41</td>
<td>.53 n.s.</td>
</tr>
<tr>
<td>Incomplete Sentence</td>
<td>1.9</td>
<td>.05</td>
<td>-.44</td>
<td>.50 n.s.</td>
</tr>
<tr>
<td>Incoherent Sound</td>
<td>1.8</td>
<td>.05</td>
<td>.41</td>
<td>.88**</td>
</tr>
<tr>
<td>Omission</td>
<td>2.4</td>
<td>.07</td>
<td>-.24</td>
<td>.12 n.s.</td>
</tr>
<tr>
<td>Stutter</td>
<td>7.0</td>
<td>.20</td>
<td>.88**</td>
<td>.99**</td>
</tr>
</tbody>
</table>

**p < .01
*p < .05
<sup>1</sup>Based upon scores of examiner
<sup>2</sup>Based upon 10 randomly selected samples scored by experimenter and graduate student
<sup>3</sup>Mean total words per subject = 535 words
<sup>4</sup>Mean total speech disturbances per subject = 39.2 speech disturbances
As hypothesized, the Non-ah SDR correlated positively with the State and Trait Anxiety Forms of the STAI (see Table 2). (See Appendix J for scores used in intertest correlations and their means.) The difference between these correlations as tested by the Hotelling formula was insignificant ($t = .71$, n.s.).

As hypothesized, the Ratings positively correlated with each of the other anxiety measures (see Table 2). The highest correlation was between the Ratings and the Non-ah SDR. To see whether this correlation was higher than that between the Ratings and either of the STAI Forms, the Hotelling formula was computed. As a preliminary test, the correlation between the Ratings and Non-ah SDR was compared with the lowest correlation between the Ratings and STAI Forms (State Anxiety, $r = .49$). This difference proved to be insignificant (Hotelling formula $t = .81$, n.s.).

Table 2

Interest Correlations of Measures of Anxiety

<table>
<thead>
<tr>
<th>Measure</th>
<th>Non-ah SDR</th>
<th>A-state</th>
<th>A-trait</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratings</td>
<td>.65**</td>
<td>.49*</td>
<td>.53**</td>
</tr>
<tr>
<td>A-trait</td>
<td>.50*</td>
<td>.73**</td>
<td></td>
</tr>
<tr>
<td>A-state</td>
<td>.39*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05

**p < .01
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speakers</td>
<td>9</td>
<td>4368.57</td>
<td>17.78**</td>
</tr>
<tr>
<td>Judges</td>
<td>9</td>
<td>1110.42</td>
<td>4.51**</td>
</tr>
<tr>
<td>Remainder</td>
<td>81</td>
<td>234.67</td>
<td></td>
</tr>
<tr>
<td><strong>Day 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speakers</td>
<td>9</td>
<td>631.41</td>
<td>3.53**</td>
</tr>
<tr>
<td>Judges</td>
<td>9</td>
<td>850.10</td>
<td>4.75**</td>
</tr>
<tr>
<td>Remainder</td>
<td>81</td>
<td>178.84</td>
<td></td>
</tr>
</tbody>
</table>

**p .01
The first-order partial correlation between the Ratings and the State Anxiety of the STAI Form, nullifying the effect of speech disturbance (Non-ah SDR), was insignificant \((r = .32, \text{n.s.})\). The first-order partial correlation between the Ratings and the Trait Anxiety Form of the STAI was also insignificant \((r = .30, \text{n.s.})\).

The two-way analysis of variance (one Rating per cell) used in computing the Intraclass correlation also provided estimates of variance among judges and subjects. As expected, the variance estimates for both were significant on both days (see Table 3). However, a variance ratio on the judges showed a significant difference between them on Day 1 and Day 2 \((F = 6.918, p < .01)\). This difference revealed the probable source of the significant difference between the interjudge reliabilities of Day 1 and Day 2. Subjects of Day 2 were clearly a more homogeneous group with significantly less variance than those of Day 1. There was a non-significant variance ratio between judges on Day 1 and Day 2 \((F = 1.30, \text{n.s.})\).

Discussion and Conclusions

This study showed the Non-ah SDR to have concurrent validity with the State Form of the STAI as the operational definition of state anxiety. Inasmuch as the research design dictated that the Non-ah SDR would also correlate with the Trait Form of the STAI, it cannot be concluded that the
Non-ah SDR is a pure measure of state anxiety. The conditions known to enhance the covariation between state and trait anxiety and which existed in this study prevent such a distinction here. Of course, the current formulation of anxiety precludes there ever being a pure measure of either state or trait anxiety, since the latter is a predisposition to the former. We know that there are converse conditions which influence state anxiety level without appreciably enhancing the relationship between state and trait anxiety. Apparently, ego-involved tasks that elevate state anxiety result in state and trait anxiety components being correlated. Other stress situations such as physical injury increase state anxiety without the state and trait components significantly correlating (Hodges and Spielberger, 1966).

The obtained scores on both the State and Trait Forms of the STAI indicated that subjects were highly stressed by the research conditions. According to normative data presented by Spielberger et al. (1970), the mean score, 50.4, on the State Form for subjects in this study is at the 88th percentile for male college freshmen. Moreover, Lamb (1969) obtained a mean of 43.8 on the State Form for subjects "during speech." Relative to this last study, it was indicated that not only were the research conditions effective in eliciting anxiety, but also the immediate administration of the STAI "following speech" was effective.
Comparing the present results with the Non-ah SDR to those obtained by Kasl and Mahl (1965) provide some interesting findings. Both studies show substantial interscorer reliability (Kasl and Mahl, .96), although Kasl and Mahl used considerably more subjects. In addition, the speech sample obtained by them was several times greater than the sample used in this study. However, Geer (1966) would caution against using a small sample. Geer obtained a one-minute sample of speech and failed to find a significant correlation between the Non-ah SDR and self-reported anxiety and also ratings and self-reported anxiety. Apparently, the five-minute speech sample used here is sufficient to score for speech disturbance.

Conditions for this research were chosen to maximize the generalization of the results to normal populations. The choice of male subjects was made because studies here-tofore using males were the least clear with respect to the ability of the Non-ah SDR to measure state anxiety. Using males provided the most rigorous test of the Non-ah SDR. Also favorable to generalization of results was the quasi-normal stress situation used to obtain speech samples. College students are familiar with the task of talking before groups. Geer's (1966) unfavorable results made this monologic speech situation another rigorous test of the Non-ah SDR.
Perhaps the singular finding of the study resulted from post-hoc analysis of the Non-ah SDR speech disturbance categories. This analysis was performed to corroborate what appeared on inspection to be a disproportionate frequency distribution of the separate categories and their varied correlation with other measures of anxiety. Kasl and Mahl (1965) only reported category percentages for the Non-ah SDR, including the since rejected "Ah" category. Inasmuch as the "Ah" category alone accounted for nearly half the total speech disturbance, other categories were spuriously depressed. In addition, they mixed groups of subjects so that extrapolation to subjects in this study was not possible.

The present comparison of speech disturbance categories found certain categories to be of questionable value for normal populations. "Incomplete sentence" and "Omission" actually correlated negatively with the overall speech disturbance and together accounted for only ten per cent of total speech disturbance. Also, interscorer reliability for these categories was not acceptable. In addition, the category of "Incoherent sound," though it showed satisfactory reliability and approached significant correlation with overall speech disturbance, accounted for only seven per cent of total speech disturbance. In contrast, the categories of "Repetition" and "Stutter" together represented nearly half the total speech disturbance, as well as having
the highest interscorer reliabilities and correlations with total speech disturbance. Perhaps with normal populations, these two categories would be sufficient as a short form of the Non-ah SDR.

The fact that several of the speech disturbance categories were so little used posed the intriguing possibility that the Non-ah SDR may be a qualitative as well as quantitative measure of anxiety. Kasl and Mahl (1965) assert that the use of speech disturbance may deviate from habitual patterns under transitory stress and become unstable. It is suggested by the results here that there may in fact be stable patterns of speech disturbance characteristic of particular groups; that is, certain personality types use some of the categories more frequently and perhaps to the exclusion of others. It is also possible that some categories are more sensitive to change in level of state anxiety than others. Such findings would qualify the supposition of Mahl and Schulze (1964) that speech disturbance is a generalized consequence of anxiety. Indeed, if there are patterns of speech disturbance peculiar to types of personality, the consequence may be highly specific. In such case, a simple quantitative estimate of anxiety by serial count of speech disturbance would mask such differences.

Results here support the validity of naive rating of anxiety. They also demonstrate that speech disturbance is critical in determining judged anxiety. People generally
provide manifold indicants of their anxiety levels, such as squirming, flushing, avoiding eye contact, perspiring, and so forth; yet speech disturbance was the most important factor in our Ratings. In fact, while Ratings correlated significantly with both the State and Trait Forms of the STAI, both correlations were reduced to insignificance with the effect of speech disturbance nullified from the correlations. Apparently as the Non-ah SDR was the primary factor determining the correlations between the Ratings and STAI Forms, conditions affecting the relationship between the Non-ah SDR and STAI Forms also affected the Ratings; that is, with ego-involved stress conditions, Ratings also fail to differentiate between state and trait anxiety.

In conclusion, this study found that the Non-ah SDR co-varied with an operational definition of state anxiety, the State Form of the STAI. The Non-ah SDR also correlated with all other measures of anxiety. Judges' Ratings were shown to be critically determined by observable speech disturbance. A post-hoc analysis of the different speech disturbance categories disclosed that some of the categories could be eliminated without appreciably affecting the Non-ah SDR for normal populations. This finding points up the need to further investigate the possibility that the Non-ah SDR is a qualitative as well as quantitative measure of anxiety; that is, that it is sensitive to different population characteristics and levels of anxiety.
APPENDICES
Appendix A

Audience Orientation

In this study, you are required to do two things: The first is merely to be an audience for subjects and listen politely while they present short talks. The second thing is to estimate the level of anxiety that each of these speakers shows according to the Rating Scale given to you.

First, with respect to your being a member of the audience, each of you is to behave as naturally as you can without interrupting the speakers in any way. This, of course, means you should not ask questions or make comments. And, do not make any disturbance, such as laughing. Bear in mind that a recording is being made of each speech.

After each speaker has concluded his presentation, he will be taken from the room. At this time and not before, you are to rate the outgoing speaker's anxiety, using the Rating Scale as a reference. You are entirely free to determine your Rating on whatever evidence you think important. However, do not borrow from someone else's Rating. Whatever your Rating is, it should be indicated on a separate card for each subject along with his identification number. To check this, each subject will wear a large label with his number on it.
During the time that each speaker is present, keep your Rating cards face down; if you want to jot down ideas, put them on the back of your cards: On the front, you should indicate your assigned number and the identification number of each subject in the upper left-hand corner; in the upper right-hand corner, you should enter your Rating of anxiety.

Remember, the subjects will not know that you are estimating their anxiety, so to prevent prospective subjects from gaining information about the research, you must not talk about this study for two weeks.
Appendix B

Rating Scale of Anxiety

Directions: Estimate each speaker's level of anxiety as falling someplace between 0 and 100 in the space provided in the upper right corner of the rating scale form: 0 would mean "cool and undisturbed," 50 would mean "exhibiting average anxiety," and 100 would mean "he is about to faint." Base your estimate on whatever and all evidence you consider important. Please don't give everybody a 50! (Return this form to the experimenter at the end of the session.)
Appendix C

Letter of Thanks

Thank you for participating in the present study. We would appreciate your not mentioning this study to any other students for the next two weeks.

If you want more information about the study, contact Fenton Hartwig, 4114 Spokane Drive, Irving, Texas 75062.
Appendix D

Speaker Orientation

We are interested in learning why individuals choose to attend college and what factors they would attribute to possible failure in college. You are required to talk on this topic for five minutes. In this short time, we do not expect you to be comprehensive; and obviously, since we did not allow you any time to prepare for this talk, we are primarily interested in spontaneous response, rather than a rehearsed or formal presentation. Be sure that you talk only about yourself: your reasons for attending college and reasons you would provide to explain a possible failure in college.

Again, you are to talk about this topic for five minutes. I shall signal you both when to begin and when to stop. Since your talk will be taped, please remain seated and speak distinctly.
## Appendix E

### Definitions and Illustrations of the Non-ah Speech Disturbance Categories

<table>
<thead>
<tr>
<th>Code</th>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
<td>Sentence change. A correction in the form or content of the expression while the word-word progression occurs. To be scored, these changes must be sensed by the listener as interruptions in the flow of the sentence.</td>
<td>Well she's ... already she's lonesome.</td>
</tr>
<tr>
<td>R</td>
<td>Repetition. The serial, superfluous repetition of one or more words--usually of one or two words.</td>
<td>'Cause they... they get along pretty well together.</td>
</tr>
<tr>
<td>St</td>
<td>Stutter</td>
<td>He was ... he was sharing the office.</td>
</tr>
<tr>
<td>O</td>
<td>Omission. Parts of words, or rarely entire words, may be omitted. Contractions not counted. Most omissions are of final one or two parts of words and are associated with sentence change and repetition.</td>
<td>She mour ... was in mourning for two years before.</td>
</tr>
<tr>
<td>Inc.</td>
<td>Sentence Incompletion. An expression is interrupted, clearly left incomplete, and the communication proceeds without correction.</td>
<td>Then their anni... wedding anniversary comes around.</td>
</tr>
</tbody>
</table>

I'm sorry I couldn't get here last week so I could ... ah ... I was getting a child ready for camp.
<table>
<thead>
<tr>
<th>Code</th>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS</td>
<td>Tongue slip. Includes neologisms the transposition of entire words from their &quot;correct&quot; serial position in sentence, and the substitution of an &quot;unintended&quot; for an intended word.</td>
<td>We spleat the bitches (for &quot;split the beaches&quot;). He was born in their hou(se) . . . hospital and came to their house.</td>
</tr>
<tr>
<td>IS</td>
<td>Incoherent sound. A sound which is absolutely incoherent to the listener. It intrudes without itself altering the form of the expression and cannot be clearly conceived as a stutter, omission, or neologism.</td>
<td>If I see a girl now I'd like to take out I just . . . dh. . . ask her.</td>
</tr>
</tbody>
</table>

Appendix F

Sample Page of Scored Speech Transcript

I started college mainly because ah I want to get ahead in my job. I work for Moore Business Forms and I've been there about seven years now. And ah I work nights. I have to work nights so I thought well I'll go over there to school during the daytime and see if I can't better myself. Ah my biggest problems and hangups that slowed me and-and* at times I felt like quitting school.

I believe lot of it * I believe was due to bad counseling. Ah I get* go to one person to get counseling they tell me to take these courses *'nd then I go take them and they won't go towards my degree plan. And it just really seems to be ah not one person really seems to know what's going on. I believe as a freshman.* The freshman seems like the most difficult year that* they get the most* people get the most confused. And I think ah a good thing that school did come up with is ah * is pass-fail. At that way a student can take something even though he's scared of it. And ah I just* I just you know* I just believe it's a good thing. Ah I've taken a few courses that I nor* I* normally wouldn't* wouldn't have taken because I know that ah I might have
Appendix G

Self-Evaluation Questionnaire

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Appendix H

Modified Directions for Use with the Self-Evaluation Questionnaire

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you felt during the time that you talked before the audience; that is, indicate your choices as if you were presently talking before the audience. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your feelings best.
Appendix I

Scoring System of the STAI

Inasmuch as some of the STAI items are worded in a way that a high rating indicates a similar high level of anxiety (e.g., "I am tense.") while other test items are worded so that a high rating indicates low anxiety (e.g., "I feel pleasant."), there is reversed weighting for the latter items. For these items that indicate low anxiety with a high rating, the weighted scores of responses marked 1, 2, 3, and 4 are reversed to 4, 3, 2, and 1 respectively. The scoring weights for the A-state subscale are balanced to counter acquiescence set with ten items directly weighted and the other ten items weighted in reverse. The STAI A-trait subscale has seven reversed items and thirteen that are scored directly. The items which are scored with reverse weights on the STAI subscales are the following:

A-State scale: 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20
A-Trait scale: 1, 6, 7, 10, 13, 16, and 19

The handscoring procedure recommended by Spielberger, et al. (1970), was followed in scoring the STAI test forms. This method involves four steps:

(1) Determine the sum of the weighted scores for the direct items;
(2) Subtract the sum of the weighted scores for the reversed items;

(3) Add the appropriate constant (A-state, +50; A-trait, +35);

(4) The total equals the subscale score.

This procedure adjusts the reversed weighting of test items providing a total score that varies directly with the level of self-reported anxiety.
Appendix J

Scores on Measures of Anxiety

<table>
<thead>
<tr>
<th>Subject</th>
<th>Non-ah S.D.R.</th>
<th>Rated Anxiety*</th>
<th>STAI (State)</th>
<th>STAI (Trait)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.05340</td>
<td>20.3</td>
<td>53</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>.07095</td>
<td>55.0</td>
<td>66</td>
<td>47</td>
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<tr>
<td>3</td>
<td>.03979</td>
<td>38.2</td>
<td>43</td>
<td>23</td>
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<td>4</td>
<td>.08245</td>
<td>72.1</td>
<td>59</td>
<td>36</td>
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<tr>
<td>5</td>
<td>.17174</td>
<td>69.0</td>
<td>65</td>
<td>42</td>
</tr>
<tr>
<td>6</td>
<td>.03455</td>
<td>37.7</td>
<td>37</td>
<td>24</td>
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<tr>
<td>7</td>
<td>.03739</td>
<td>16.4</td>
<td>46</td>
<td>31</td>
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<td>8</td>
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<td>9</td>
<td>.07670</td>
<td>51.8</td>
<td>39</td>
<td>34</td>
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<td>10</td>
<td>.07787</td>
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<td>53</td>
<td>47</td>
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<tr>
<td>Day 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>.07635</td>
<td>39.5</td>
<td>37</td>
<td>25</td>
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<td>12</td>
<td>.06625</td>
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<td>20</td>
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<tr>
<td>Mean</td>
<td>.06499</td>
<td>46.93</td>
<td>50.4</td>
<td>33.7</td>
</tr>
</tbody>
</table>

*Means
References


Goldman-Eisler, F. The determinants of the rate of speech output and their mutual relations. Journal of Psychosomatic Research, 1956, 1, 137-143.


Weintraub, W., & Aronson, H. The application of verbal behavior analysis to the study of psychological defense mechanisms: II. Speech pattern associated with


