# THE RELATIONSHIP BETWEEN COMMUNICATION APPREHENSION AND ACADEMIC ACHIEVEMENT AMONG COLLEGE STUDENTS

# JAMES C. McCROSKEY and JANIS F. ANDERSEN West Virginia University

A series of studies are reported which indicate that high communication apprehensives have lower academic achievement in traditional interaction-oriented educational systems than low communication apprehensives, but that no similar relationship exists in a communication-restricted educational system. Data are also reported indicating that high communication apprehensives prefer mass lecture classes over small classes while moderate and low communication apprehensives' preferences are the reverse. The implications of these results for choosing or designing instructional systems are discussed.

Communication between teacher and student plays a major role in traditional learning environments. Teachers must communicate with students for students to achieve maximum learning. It is through the process of communication that teachers translate the course content into a symbolic code which can be decoded and interpreted by students. Teachers who fail in this communication fail in their responsibility to educate students.

Student achievement is also partly determined by the student's communication behaviors. First, classroom questioning aids the student in concept clarification and concept integration. Second, students participate in determining the pace of content presentation through verbal and/or nonverbal feedback that communicates to the teacher whether learning has occurred. On the basis of this information, the teacher may decide to review old material, offer additional information to explain old concepts, or introduce a new idea. Third, in some classrooms, student communication is perceived to be so important that it is directly linked to evaluation of source performance. In these classrooms, a class participation evaluation is part of the course design and communication performance is directly influential on course grade.

Communication between teachers and students is not always adequate. There are two major barriers to sufficient teacher-student interaction. Large class

size is the most frequently noted barrier. The more students enrolled in a class, the less time for individual students to express their ideas in class. Nationwide, elementary and secondary teachers are citing reduced class size as an important concern in negotiation and bargaining meetings with school boards. Teachers argue that large classes do not allow time to communicate with all students and, thus, inhibit student learning. The severalhundred-student college lecture class has also been extensively criticized as being impersonal and ineffective. Some educators have argued for its elimination on the grounds that it does not allow for the amount of student-teacher interaction necessary for adequate student questioning, feedback, and learning. Most educators agree that increased class size results in decreased communication potential between students and teachers. Many further agree that large classes are detrimental to learning due to this decreased interaction potential.

The second major barrier to classroom interaction manifests its effect primarily in smaller classes. Even if there is ample opportunity for studentteacher interaction, some students are functionally unable to communicate because of communication apprehension. These students are so anxious about communication with teachers and other students that their anxiety interferes with their communication efforts. Based on a series of recent research studies, McCroskey (1975) has concluded that at least 15 to 20 per cent of all students suffer from debilitating oral communication apprehension. These students may be severely handicapped in small classes because they do not ask questions, give feedback, or participate in class discussions. Apprehensive students may learn less because they do not attempt to restructure the classroom presentation of information to meet their specific needs. They may also receive lower evaluations due to their failure to participate in classroom interactions.

### RATIONALE AND HYPOTHESES

The amount of success in a learning environment which can be attributed to student initiated communication has not been empirically determined. Previous research, however, has isolated four major predictors of student success in learning environments. First, measures of intelligence and aptitude are predictive of grade point average (GPA). Although intelligence tests are currently under serious attack, many investigations lead to the conclusion that the correlation of intelligence test scores and school grades is substantial (Thorndike & Hagen, 1969; Binder, Jones & Strowig, 1970). Correlations of .50 and .60 between intelligence scores and school grades are typical.

Prior achievement, as measured by standardized achievement tests, is a second major predictor of GPA. The validity of the American College Test (ACT) scores and the College Entrance Examination Board (CEEB) testing program have been clearly established (Hoyt & Munday, 1968; Schrader & Stewart, 1971). The correlations between achievement test scores and GPA generally vary from about .33 to .65, depending on the nature of the academic institution used and the homogeneity of ability in the group studied. Past grades in school are also predictive of future GPA. The correlations between high school grades and college freshmen grades are usually in the area of .50 (Bloom, 1964).

A third major predictor of academic success is the possession of certain nonintellectual personality variables. Cattell, Sealy, and Sweeney (1966) report that 25 per cent of the variance in GPA is associated with personality differences. When personality predictors are combined with achievement scores the predictive power can be increased to account for 33 per cent of the variance (Mandryk & Schuerger, 1974).

A final predictor of student success which we need to consider is expectation. Research indicates that teachers' expectations of their students' performance are highly predictive of the students' actual performance (Dusek, 1975), particularly in tutorial or semitutorial learning situations (Beez, 1968).

The various intercorrelations between factors which have been isolated to predict student performance contribute to some confusion in attempting to predict student GPA. When all previously isolated factors are combined in a predictive model there is at least 25 per cent of the variance in GPA left unexplained. More often, over 50 per cent is not explained. This study attempted to isolate one additional potential predictor of student achievement, student's level of communication apprehension.

As noted previously, intelligence, prior achievement, various dimensions of personality. and teacher expectations have been found to predict student achievement. Recent research has established a relationship between some of these predictors and communication apprehension, particularly personality and teacher expectations.

Communication apprehension is substantially associated with certain personality variables. McCroskey, Daly, and Sorensen (1975) found that communication apprehension is significantly correlated with many of the personality variables assessed by Cattell's Sixteen Personality Factor Questionnaire, namely cyclothmia, emotional maturity, dominance, surgency, character. adventurousness, trustfulness, confidence, self-control, and general anxiety. Several of these personality characteristics have been found previously to be predictive of student achievement, although the causal link between these variables and achievement has been elusive (Cattell, Sealy & Sweeney, 1966). Because of the intrinsic role played by communication in traditional education, we reasoned that these personality variables may attain their predictive power through their association with communication apprehension, which is the causal agent producing reduced communication, hence reduced learning in the traditional educational system. Thus, we hypothesized that high communication apprehensives will have lower achievement in a traditional educational system than will low communication apprehensives.

Communication apprehension has also been found to be associated with negative teacher expectations. (McCroskey and Daly (1976) found that teachers project greater achievement for a child identified with behaviors typical of a low communication apprehensive than a child with characteristic behaviors of a high apprehensive. Children identified with behaviors typical of high communication apprehension were projected to perform less well in all areas of the school environment. Since teacher expectations have been found to be linked with student achievement, as previously noted, we were again led to pose our hypothesis that high communication apprehensives will have lower achievement in a traditional educational system than will low communication apprehensives.

If communication apprehension were found to have a substantial negative correlation with intelligence or high school achievement, we would have even more reason to consider our hypothesis tenable. Such associations, however, have not been established. McCroskey, Daly, and Sorensen (1976), although finding numerous significant relationships between communication apprehension and personality variables, found no significant relationship between communication apprehension and intelligence among college students. Bashore (1971) found a slight negative relationship in a study of high school seniors, but the correlation was significant only for female students and his sample of 75 senior students in a specialized university laboratory school precludes generalization without extreme reservation. Notably, Bashore (1971) failed to find a significant correlation between communication apprehension and GPA in that same study.

The only previous research that presents evidence bearing directly on our hypothesis is that of Bashore (1971), parts of which are noted above. Bashore found communication apprehension to be significantly negatively correlated with scores on the American College Test (ACT), the Illinois High School Test (IHST), and the verbal portions of the College Entrance Examination Board (CEEB) test and the Preliminary Scholastic Aptitude Test (PSAT). These findings should be considered tentative, of course, because of the problems with the subject sample noted above. However, they do provide a modicum of support for the rationale underlying our primary hypothesis.

To this point our rationale has focused on the traditional educational system, the single teacher with a moderate number of students in a potentially interactive setting. Other teaching-learning systems have existed for many years, and the number of alternative methods appears to be increasing. These alternative systems range from the commonplace college lecture system, with upwards of 100 students receiving instruction simultaneously, to semitutorial, personalized systems of instruction. While our hypothesis should be expected to hold true for general academic achievement in college or high school, because most instruction in most high schools and colleges still employs the traditional system: whether it would hold for other systems would depend on the nature and extent of communication demands of the particular alternative system under consideration.

In order to examine the potential generalizability of our hypothesis beyond the traditional system, we considered achievement in one additional type of instructional system, the mass-lecture system. Because student-to-teacher communication is highly restricted in this type of system, nothing in our previous rationale would lead us to expect that communication apprehension should impact achievement.

Therefore, based on the rationale that communication apprehension will reduce student-initiated communication, and hence student achievement, in instructional systems that rely on student-teacher interaction but not in those that restrict such interaction, the following hypotheses were tested:

H1: High communication apprehensives will

have lower achievement in a traditional educational system than will low communication apprehensives.

H<sub>2</sub>: High and low communication apprehensives will not differ in achievement in a communication-restricted system involving instruction primarily employing the masslecture method.

It is important that our second hypothesis is framed as a null hypothesis and thus is not amenable to statistical confirmation. If it can not be rejected, as suggested by our rationale, the crucial concern in the interpretation of the obtained results is the power of the design and analysis employed to detect differences, if indeed any existed. We will address this issue in the results section below.

If the previous hypothesized relationships are found to be correct, it would follow that students may be intuitively aware of the impact different instructional systems have on their learning, at least on an affective level. While it is a virtual truism in higher education that students dislike mass-lecture courses, projection of student attitudes based on our knowledge of previous research on communication apprehension would suggest this attitudinal orientation would not be held by highly apprehensive students. They should find mass-lecture courses less threatening than, and thus preferable to, small classes which permit considerable interaction. For low and moderate apprehensives, those who seek communication and the rewards it can bring, the masslecture is probably too restrictive. Thus, these students should find small classes preferable to masslecture courses. Based upon this rationale, we posed the following interaction hypothesis:

H<sub>3</sub>: High communication apprehensives will express more positive attitudes toward masslecture classes than toward small classes that permit interaction, but low and moderate communication apprehensives will express more positive attitudes toward small classes that permit interaction than toward masslecture classes.

## METHOD

In order to test our hypotheses, studies based on four samples of college students were conducted. In each study Ss completed the Personal Report of Communication Apprehension, College Form (PRCA, McCroskey, 1970). Scores on the PRCA served as the operational definition of communication apprehension in all four studies. Although communication apprehension has been found to be a multidimensional construct (Wheeless, 1975; Daly & Miller, 1975), the PRCA was selected for these studies because its focus is on oral communication apprehension, the type of communication which underlies the rationale which led to our hypotheses.

The PRCA has been employed extensively in previous research involving communication apprehension and has consistently produced internal reliability estimates above .90 and test-retest reliability above .80 (McCroskey, 1970). On the basis of a survey of over 20 studies which employed the PRCA, McCroskey (1975) evaluated the reliability and the predictive validity of the instrument. He concluded that researchers "can employ the PRCA as an index of oral communication apprehension with confidence in both its reliability and its validity." In the present studies the internal reliability estimates for the PRCA ranged from .93 to .95.

The achievement data required for the first three studies were retrieved from university records. Coded student numbers were employed in this process to insure the maintenance of confidentiality of student records. The particular achievement data obtained for each study are noted below.

# Study 1

The first study was designed to test our first hypothesis. Achievement in a traditional educational system was operationalized as scores on the American College Test (ACT) taken by the Ss during their final year of high school. The ACT is one of the most widely administered measures of academic achievement and is employed to screen students for admission by many colleges and universities. At the institution where this study was

# APPREHENSION AND ACADEMIC ACHIEVEMENT

conducted, students are requested to submit ACT scores with their admission applications, but students are not excluded from admission on the basis of the scores. The scores available included not only the overall or composite score but also subscores for English, social science, natural science, and mathematics.

Ss in this study were 825 students enrolled in a basic course in communication during the 1974-75 academic year. Approximately half of the students were male, half female. The breakdown by academic rank was approximately 30 percent freshmen, 45 percent sophomores, 15 percent juniors, and 10 percent seniors.

#### Study 2

The second study was also designed to test our first hypothesis. Achievement in a traditional educational system was operationalized as the Ss' grade point averages through and including the spring semester of the 1974-75 academic year. Ss were 1454 students enrolled in two basic courses in communication during the 1974-75 academic year. The sex and academic rank breakdowns were the same as for Study 1. The GPAs available represented a minimum of one full academic year and up to a maximum of four years. Because of the coding systems to maintain confidentiality, it was not possible to identify Ss' sex or rank in the final data sets for any of these studies. Thus, these classifications could not be employed to reduce error variance in the data analyses.

### Study 3

The third study was designed to test our second hypothesis. Achievement in a communication restricted system was operationalized as the summed score from two 15-item, one 20-item, and one 50item multiple-choice (5-foil) examinations administered as regular exams in a mass lecture course in communication. The 709 Ss who took all four tests were enrolled in the course during the fall semester of the 1975-76 academic year. The sex and academic rank of the Ss were approximately the same as those of the Ss in the first two studies.

Our second hypothesis focuses on achievement in a communication restricted system involving instruction primarily employing the mass-lecture method. The course in which the study was conducted was ideally suited as the operationalization of that instructional system. Students in this class receive all of the content through mass lectures (there is no textbook) and there are no recitation or laboratory sessions associated with the class. Contact with the instructor is discouraged, questions during lectures are not permitted, and less than one percent of the students ever talk to the instructor about course content outside the classroom.

The test items had been tested previously and found to discriminate. The estimated reliability of the combined score for the 100 items on the four tests was .79.

#### Study 4

The fourth study was designed to test our third hypothesis. Attitudes toward mass-lecture and small classes were operationalized as the responses of Ss to two 5-point, Likert-type statements. The scales, which permitted a response option from strongly agree to strongly disagree, were as follows: "I prefer lecture courses to any other kind" and "I like small classes where we can have a good deal of discussion." These scales were included among 75 items in an attitude questionnaire to avoid calling attention to the research purpose.

The 275 Ss in the study were concurrently enrolled in two basic communication classes, one a twocredit class in interpersonal communication with enrollment per section limited to 25, the other a one-credit mass-lecture class in communication theory with enrollments per section ranging from 350 to 400. These Ss were selected because of this dual enrollment in the belief that this selection would mitigate against possible bias in response due to the type of class the S was currently taking.

The data were collected during the fall semester of the 1975-76 academic year. The sex and academic rank of the Ss were approximately the same as in the previous studies.

# Statistical Analyses

Ss in each study were classified as high, moderate, or low communication apprehensives on the basis of their PRCA scores. Two analyses were performed on the data from each of the first three studies. For the first analysis in each study, Ss scoring more than one standard deviation above the mean were classified as high apprehensives; Ss scoring more than one standard deviation below the mean were classified as low apprehensives; the remaining Ss were classified as moderate apprehensives. The second analysis in each study was conducted to examine the impact of extremes in apprehension (the points where the greatest impact was expected). In these analyses Ss scoring more than one and a half standard deviations above or below the mean were classified as extremely high apprehensives and extremely low apprehensives, respectively. High and low apprehensives in these analyses were the same as in the first analyses, except that the extremes were removed. A secondary analysis was not performed for the fourth study. The limited sample size would have made such an analysis questionable because of the very few Ss who would have constituted the extreme classifications.

Each of the dependent variables in the first three studies was submitted to single classification analysis of variance employing the two classification systems noted above. Although our hypotheses did not include references to moderate apprehensives, they were included in these analyses for purposes of comparison. Supplementary analyses including only high and low apprehensives and analyses including only extremely high and extremely low apprehensives were also conducted in order to determine effect sizes related to our specific hypotheses. The 0.05 level was set for significance of all of these tests.

The data from the fourth study were subjected to a two-factor analysis of variance with one repeated measure. The three apprehension levels served as one factor and the type of class to which responded (the repeated measure) served as the other. Since a significant interaction was observed, correlated t-tests were computed to test the effects predicted by our third hypothesis. The 0.05 level was employed for these tests.

Since single scales were employed as the dependent variable in this study, the question of their reliability should be considered. No direct estimate of their reliability, of course, was possible. Because the two scales were used as a measure of the same thing (attitude toward instructional systems), however, it was possible to examine them together as if they were a combined instrument. The obtained correlation between the scales was -.49 (the negative association, of course, was expected). Correcting this correlation for length would result in an internal reliability estimate of the two scales together of .66.

#### RESULTS

#### Study 1

The analyses of the data from the first study indicated support for our first hypothesis: as shown in Table 1, the effects attributable to communication apprehension were significant for the ACT composite score and all of the ACT subscores. The largest effects were found on the composite score and the social science subscore, the smallest on the mathematics subscore. Given the common methods by which social science and mathematics are taught, these findings lend credence to our rationale for the first hypothesis. Social science classes in high schools are typically much more interactionoriented than mathematics classes. It would follow, therefore, that level of communication apprehension would have greater impact in the former than the latter.

### Study 2

The results obtained from the second study also provide support for our first hypothesis (Table 1). The GPAs of high communication apprehensives were found to be significantly lower than those of

# APPREHENSION AND ACADEMIC ACHIEVEMENT

Communication	ACT						
Apprehension Classification	Composite	Natural English Science		Mathematics	Social Science	GPA	Course Test
Mean Scores							
Extreme High	21.12	19.50	22.92	21.69	19.81	2.46	84.39
High (minus extremes)	21.49	20.03	22.70	21.93	20.84	2.53	78.99
High	21.28	19.88	22.56	21.73	20.46	2.52	79.48
Moderate	21.73	19.88	23.00	22.56	20.95	2.56	79.59
Low	23.03	20.94	24.36	23.38	22.82	2.69	79.25
Low (minus extremes)	22.74	20.81	23.97	23.19	22.39	2.66	78.92
Extreme Low	24.80	22.15	26.55	24.85	24.85	2.91	82.25
F-Racios and Alpha Leve	ls						
Excluding Extremes					·		
F-Ratio	6.88	3.91	4.61	3.32	7.09	4.73	0.03
Alpha	∠.002	< .02	< .01	<.05	<.002	<.01	NSD
Including Extremes							
F-Ratio	4.10	2.65	2.90	1.79	3.84	3.54	0.36
Alpha	<.005	<.05	≺.03	NSD	<.005	<.01	NSD
Effect Size (Percent of	Variance)						
Regular High-Low	.04	.02	.02	.02	.04	.02	.00
Extreme High-Low	.21	.14	.15	.08	.19	.10	.00

			]	<b>TABLE</b>	1				
M	ean	Scores	, F.	Ratios,	an	ıd	Effect	Si	izes
n	Acl	hievem	ent	Variab	les	in	Studi	es	1-3

Dependent Variables

low communication apprehensives. The difference between the extreme highs and extreme lows was particularly striking, almost half a grade point.

### Study 3

Results of the third study indicate that our second hypothesis (the null hypothesis) can not be rejected. Obtained F-ratios, even when extreme apprehension levels were considered, did not even approach significance (see Table 1).

Because of the statistical impossibility of confirming a null hypothesis, we conducted a power analysis to determine the likelihood of our failing to reject this hypothesis because of low power. This analysis indicated that, with alpha set at 0.05, the power of this test to find a significant effect if it were present, even if it were very small (f = .10), was .73 and if it were only as large as f = .15, the power was .99 (Cohen, 1969). Such an effect size in this study, even if statistically significant, would account for less than one percent of the variance of the dependent variable. Consequently, low power must be rejected as an explanation for the lack of observed statistical significance.

### Study 4

The analysis of variance of the data from the fourth study indicated a significant interaction between level of communication apprehension and instructional system on the subjects' attitudes. Table 2 reports the observed means and the results of the tests related to our third hypothesis. As indicated in the table, the results provide support for the hypothesis. Not only were the differences in the

## McCroskey and Andersen

	TABLE 2
Mean	Attitudes of Students
Toward	Instructional Systems*

Apprehension		Instruction	al System			
Level	Ν	Mass Lecture	Small Class	Difference	t	р
High	44	3.16	2.80	. 36	6.51	∠.0001
Moderate	186	2.52	3.74	1.22	22.06	<.0001
Low	45	2.09	4.40	2.31	41.77	<.0001

\*Higher scores indicate more positive attitude, possible range of 1.0 to 5.0 with 3.0 the presume neutral position.

direction predicted, and statistically significant, but they also indicated that on an absolute basis high apprehensives were favorable toward mass lecture courses and unfavorable toward small classes. This interpretation is based on the presumed neutral point being 3.0, the number assigned to undecided responses. Moderate and low apprehensives recorded means in just the opposite direction. The data analysis indicated that 22 percent of the variance in the dependent variable was attributable to apprehension level.

### DISCUSSION

The theory upon which our hypotheses were based was that communication between student and teacher is a valuable component of many instructional systems, but that some students are much more likely to seek this communication while others are more likely to avoid it. Such student behavior is not unique to the learning environment, but rather is characteristic behavior of the individual because of the individual's level of communication apprehension. The results of these studies support both our hypotheses and our rationale leading to those hypotheses. When the instructional system studied permitted student-initiated interaction with the teacher, significant differences in achievement were observed between high and low apprehensives, but in a communication-restricted system, no such differences were observed.

The lack of statistical significance in our third study, although expected, requires special consideration. While we cannot specify the precise proba-

bility that the null hypothesis is confirmed, in this instance we have good reason to believe that our second (null) hypothesis is substantially correct. Since we did not expect to find a reliable difference in this study, we carefully designed the study to achieve as much power as was feasible so that any real effect present would not escape our attention. The power analysis noted above indicates that had an effect been present that would have accounted for as little as one percent of the variance, it would have been statistically significant. Such, of course, was not the case. Consequently, while we cannot exclude the possibility that there may be some very small relationship between communication apprehension and achievement in a communicationrestricted instructional system, there is good reason to believe that no meaningful relationship exists. In the absence of additional research indicating otherwise, decisions concerning choices of instructional systems should be made on the basis that no relationship exists.

The results of these studies raise an important question concerning traditional methods of classroom instruction as well as some of the newer instructional systems involving voluntary tutorial instruction. Communication from student to teacher is highly valued in both approaches, but these studies suggest that reliance on instructional systems emphasizing voluntary, student-initiated interaction with teachers penalizes a large number of students suffering from communication apprehension. They are placed at a competitive disadvantage because they are too apprehensive to engage in the behaviors required to achieve success. On the other side of the coin, the instructional system which consistently receives the most criticism from educators, the mass-lecture system, was not found to impose a penalty on the highly apprehensive student. This suggests, of course, that under ideal circumstances the instructional system employed should be tailored to the needs of the individual student—a communication-restricted system for high apprehensives and a communication-emphasized system for other students.

Such tailoring of instructional systems is likely to be received favorably by students. Their expressed attitudes, as indicated in our fourth study, indicate their preferences are in line with the decisions on instructional system recommended by the results of our studies on achievement.

While there is a need for further research on the impact of communication apprehension on learning in the various instructional systems (e.g., case study, PSI, fully mediated, independent study, CAI), it appears clear from this series of studies that no one instructional system will be superior for all students. One of the best predictors of the value of a given instructional system appears to be the interaction of communication apprehension level of the student and communication requirements of the system, the consideration of which has not previously entered into the construction or evaluation of new instructional systems.

#### REFERENCES

- BASHORE, D.N. Relationships among speech anxiety, IQ, and high school achievement. Unpublished masters thesis, Illinois State University, 1971.
- BEEZ, W.V. Influence of biased psychological reports on teacher behavior and pupil performance. Proceedings of the 76th Annual Convention of the American Psychological Association, 1968, 3, 605-606.
- BLOOM, B.S. Stability and change in human characteristics. New York: John Wiley and Sons, 1964.
- BINDER, D.M., JONES, J.G., & STROWIG, R.W. Non-intellective or self-report variables as predictors of scholastic achievement. *Journal of Educational Research*, 1970, 63, 364-366.

- CATTELL, R.B., SEALY, A.P., & SWEENEY, A.B. What can personality and motivation source trait measurements add to the prediction of school achievement? *British Journal of Educational Psychology*, 1966, 36, 280-295.
- COHEN, J. Statistical power analysis for the behavioral sciences. New York: Academic Press, 1969.
- DALY, J.S., & MILLER, M.D. The empirical development of an instrument to measure writing apprehension. *Research in the Teaching of English*, 1975, 9, 242-249.
- DUSEK. J.B. Do teachers bias children's learning? Review of Educational Research, 1975, 45, 661-684.
- HOYT, D.P., & MUNDAY, L.A. Your college freshmen: Interpretive guide to ACT research services for higher education. Iowa City, Iowa: ACH Research and Development Division, 1968.
- MANDRYK, T.R., & SCHUERGER, J.M. Crossvalidation of the HSPQ as a predictor for high school grades. Educational and Psychological Measurement, 1974, 34, 449-454.
- McCROSKEY, J.C. Measures of communication-bound anxiety. Speech Monographs, 1970, 37, 269-277.
- McCROSKEY, J.C. Validity of the PRCA as an index of oral communication apprehension. Paper presented at the annual convention of the Speech Communication Association, Houston, December, 1975.
- McCROSKEY, J.C., & DALY, J.A. Teachers' expectations of the communication apprehensive child in the elementary school. *Human Communication Re*search, 1976, 3, 67-72.
- McCROSKEY, J.C., DALY, J.S., &SORENSEN, G.A. Personality correlates of communication apprehension. *Human Communication Research*, 1976, 2, 376-380.
- SCHRADER, W.B., & STEWART, E.E. Descriptive statistics on college board candidates and other reference groups. In W.H. Angoff (Ed.), The college board admissions testing program: A technical report on research and development activities relating to the scholastic aptitude test and achievement tests. New York: College Entrance Examination Board, 1971, 79-115.
- THORNDIKE, R.L., & HAGAN, E. Measurement and evaluation in psychology and education. New York: John Wiley and Sons, 1969.
- WHEELESS, L.R. An investigation of receiver apprehension and social content dimensions of communication apprehension. Speech Teacher, 1975, 24. 261-268.