Language Anxiety: Its Relationship to Other Anxieties and to Processing in Native and Second Languages*

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This study investigated the factor structure underlying 23 scales assessing both language anxiety as well as other forms of anxiety. Three factors were obtained and identified as Social Evaluation Anxiety, State Anxiety, and Language Anxiety. Correlations were obtained between scores based on these factors and measures of short-term memory (a Digit Span test) and vocabulary production (a Thing Category test). These two measures were administered in both L1 (English) and L2 (French) versions. It was shown that Language Anxiety was correlated significantly with both Digit Span and Thing Category scores, but only in L2. Further analyses indicated that the French tasks were more anxiety-provoking than were the English ones and that for L1, digit span was more anxiety-provoking than was vocabulary. These results are interpreted in terms of the deficits created by anxiety during the cognitive processing of L2 stimuli.

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In reviewing the research into the effects of anxiety on second-language learning, Scovel (1978) found mixed results and sometimes contradictory conclusions. This problem stems, in part, from the definition of language anxiety adopted by researchers (cf. Horwitz, Horwitz, & Cope, 1986). There appears to be a need to distinguish between a general trait of anxiety, applicable across a number of situations, and an anxiety specific to language-learning situations (cf. Gardner, 1985).

In an exploratory study designed to investigate the relationship between Language Anxiety and other anxieties, MacIntyre and Gardner (1989) found two orthogonal factors. The first factor included scales of Trait, State, and Test Anxiety, among others, and was labeled General Anxiety. A second factor, defined by French Class, French Use, English Class, and Audience Anxieties, was labeled Communicative Anxiety. General Anxiety did not show a relationship with French vocabulary learning or production. Communicative Anxiety did show, however, a significant negative effect on the learning of French vocabulary by native speakers of English. This effect also emerged on tests for the written and oral production of similar items from long-term memory, and was replicated in the presence of covariates designed to eliminate "experience" as an explanation for this effect (see MacIntyre & Gardner, 1988a). More detailed analyses of the correlations between the individual anxiety scales and the language production measures found that the two French anxiety scales seemed to be responsible for the effects observed for the Communicative Anxiety factor.

Further evidence for a distinct form of anxiety related to language-learning situations comes from several sources. Lalonde and Gardner (1984) tested a causal model of various attitude and motivation factors in language learning. The data upon which their model was based did not support a role for Trait Anxiety; however, the role of Situational Anxiety, that is, Language Anxiety, was supported. Horwitz (1986), in a study
designed to validate the Foreign Language Classroom Anxiety Scale, found that correlations between Language Anxiety and other anxiety constructs were low enough to demonstrate that the scale could be discriminated from these constructs, including Trait Anxiety. Finally, Gardner, Moorcroft, and MacIntyre (1987) found significant correlations between two situation-specific anxiety scales (French Class Anxiety and French Use Anxiety) with a vocabulary production measure (the Thing Category Test), whereas a Trait Anxiety scale did not correlate with second-language production.

The literature concerned with Trait Anxiety seems to suggest that it has little (if any) role in the language-learning process. Conversely, a recent review of the literature associated with situation-specific anxiety in language learning (MacIntyre & Gardner, 1991) has revealed a considerable body of evidence suggesting that such anxiety negatively influences the language-learning process. Much of this work has been done in conjunction with investigations of causal models developed by Gardner (1985) and Clément (1987), although a smaller number of studies have been concerned with specific language-learning processes, such as performance on an oral test (see Young, 1986). Horwitz et al. (1986) have suggested that research should focus upon the more specific processes by which anxiety may impair performance in foreign-language contexts.

The specific manner in which anxiety, Language Anxiety for example, has been suggested to operate has been greatly influenced by cognitive psychology (Eysenck, 1979; Schwarzer, 1986). Anxiety can be viewed in terms of rumination and derogatory self-related cognition. From this perspective, Tobias (1986) has described the effects of anxiety in instructional settings, such as in a second-language course. Tobias separates learning from the instruction given in a classroom into three stages: input, processing, and output. The intrusive thoughts associated with anxiety can impair the ability of an individual to process information at each of these stages because the self-related cognition consumes cognitive resources that would otherwise be allocated to the task at hand.

Research into the effects of anxiety upon language learning has shown an understandable emphasis on the output stage in terms of production, performance, course grades, and other such criteria. Steinberg and Horwitz (1986) found that increased levels of anxiety influenced students' interpretations of ambiguous scenes. Anxious students showed less willingness to be interpretive in their comments and relied more upon descriptions of the scene itself. Tucker, Hamayan, and Genesee (1976) found that adolescent students who were more adventurous and less anxious tended to show higher levels of achievement in late-immersion classes. Similarly, Ely (1986) has found that language-class introversion tends to be associated with discomfort, unwillingness to volunteer answers, and poor performance in university language-classroom settings. Other studies have demonstrated that self-confident language learners show less anxiety, greater second-language proficiency, and more contact with the other language group in bilingual communities (Clément, Gardner, & Smythe, 1977, 1980; Clément, 1987). In addition, several studies have shown significant negative correlations between Language Anxiety and standardized tests (Gardner, Lalonde, Moorcroft, & Evers 1987), course grades (Trylong, 1987), and the production of French vocabulary (Gardner, Moorcroft, & MacIntyre, 1987). Thus, it is clear that Language Anxiety does affect second-language performance at the output stage.

At the input stage, during the initial processing of incoming information, attention and concentration are critical to the accurate representation of stimulus items in memory. Digit Span Test scores rely upon short-term memory and concentration (Finch, Anderson, and Kendall, 1976), may be sensitive to the effects of anxiety, and even have been treated as an index of anxiety by some clinical psychologists (Matarazzo, 1955; Hodges & Spielberger, 1969). Briefly, the Digit Span Test requires subjects to repeat strings of single digit numbers of
varying lengths, either forward, backward, or in both directions. This test has been used for such purposes as diagnosing memory dysfunction (Black, 1986), evaluating gifted children (Knoff, 1986), and examining the effect of State Anxiety (Hodges & Spielberger, 1969). The Digit Span Test has also been used in studies of bilingual cognitive processing by administering the digits in both languages (e.g., Hoosain, 1979, 1984; Mágiste, 1980).

Moldawsky and Moldawsky (1952) investigated the relative effects of anxiety upon the Digit Span and Vocabulary subtest scores on the Wechsler-Bellevue Intelligence Test. All subjects were tested in English, their native language. One group of subjects was exposed to anxiety-arousing instructions designed to induce feelings of inadequacy and failure. The other group was given neutral instructions. Results showed that the Digit Span scores of the anxious group were significantly lower than were those of a control group. Vocabulary scores were not differentially affected by the anxiety-arousing instructions. Considering these results, it might be expected that vocabulary measures would be less sensitive to the effects of anxiety than would memory for digits, at least in the native language. However, a number of the studies of language learners have investigated the effects of anxiety upon vocabulary learning (MacIntyre & Gardner, 1989; Gardner & MacIntyre, 1991) and have shown significant negative correlations.

The present study will attempt to replicate and extend the findings of MacIntyre and Gardner (1989) with foreign-language tasks and those of Moldawsky and Moldawsky (1952) with native-language tasks. The scales that were factor analyzed by MacIntyre and Gardner (1989) will be included with several additional scales to determine whether the same basic dimensions will replicate or whether new dimensions will be identified. This will be informative because the study by MacIntyre and Gardner (1989) found that the Communicative Anxiety factor was associated with impaired performance in French. Unfortunately, a potential difficulty with the interpretation of those results is that the scales associated with the Communicative Anxiety factor included both apprehension with speaking English (English Class Anxiety and Audience Anxiety) and with speaking French (French Class Anxiety and French Use Anxiety). Also, the production measures were administered only in French. Therefore, to examine the influence of the anxiety dimensions on both input and output measures, the Digit Span and Vocabulary tests will be administered in both English and French to Anglophone students with considerable training in French.

METHOD

SUBJECTS

Ninety-five subjects were tested in two groups. Subjects were volunteers from first-year university psychology classes who received course credit in exchange for their participation. Only subjects who had taken French in Grades 11 or 12 were recruited and the students in this sample had an average of eight years of courses in French as a second language.

MATERIALS

The materials included a forward Digit Span Test similar to that of the WAIS-R Intelligence Test, which was given in both English and French. In addition, the Thing Category Test, a six-item vocabulary measure, was administered, half in English and half in French. This test required the naming of elements of a category, such as things that belong in a suitcase. Subjects were given one minute to complete each category and questions were administered in counterbalanced order with each question being answered by half of the subjects in English and the other half in French.
The 23 scales described below were employed as measures of various forms of anxiety. The reliability coefficient ($\alpha$) accompanying the description of each scale was obtained in the current sample.

1. **French Classroom Anxiety** ($\alpha=.92$): 8 items, using a 6-point Likert response scale, were taken from MacIntyre and Gardner (1988b). This scale measures the degree of apprehension in the French classroom.

2. **English Classroom Anxiety** ($\alpha=.92$): 8 items, using a 6-point Likert response scale, were taken from MacIntyre and Gardner (1988b). This scale measures the degree of apprehension in the English classroom.

3. **Mathematics Classroom Anxiety** ($\alpha=.93$): 8 items using a 6-point Likert response scale from MacIntyre and Gardner (1988b). This scale measures the degree of apprehension in the Mathematics classroom.

4. **General Test Anxiety** ($\alpha=.56$): 8 items, using a True/False response format, were selected at random from Sarason (1980). This scale measures apprehension in various testing situations.

5. **Facilitating French Test Anxiety** ($\alpha=.56$): 10 items, using a True/False response format, were adapted from Alpert and Haber (1960) to focus on French examinations. This scale measures apprehension produced by French tests that is considered energizing and helpful to performance by the student.

6. **Debilitating French Test Anxiety** ($\alpha=.69$): 10 items, using a True/False response format, were adapted from Alpert and Haber (1960) to focus on French examinations. This scale measures apprehension about French tests that is considered disruptive and detrimental to performance by the student.

7. **Audience Sensitivity** ($\alpha=.80$): 10 items, using a True/False response format, were selected at random from Paivio (1965). This scale measures apprehension over being in front of a group of people.

8. **Personal Report of Communication Apprehension, Short Form** ($\alpha=.89$): 10 items, using a 6-point Likert response format, were taken from McCroskey (1978). This scale also measures apprehension about speaking to a group of people in the respondent's native language.

9. **Fear of Negative Evaluation** ($\alpha=.83$): 8 items, using a 6-point Likert response format, were taken from Watson and Friend (1969). This scale measures the extent to which the respondent feels apprehensive about the opinions that others hold of him/her.

10. **Trait Anxiety** ($\alpha=.69$): 8 items were taken from the Jackson Personality Inventory (Jackson, 1978) and adapted to use a 6-point Likert response scale. This scale measures the degree to which the respondent considers himself or herself to be a nervous person.

11. **French Use Anxiety** ($\alpha=.85$): 8 items, using a 6-point Likert response format, were taken from MacIntyre and Gardner (1988b). This scale measures apprehension at speaking French in public.

12. **Anxiety in Novel Situations** ($\alpha=.91$): 15 items, using a 5-point response scale, were taken from Endler, Edwards, Vitelli, and Parker (1983). This scale measures apprehension in unfamiliar situations.

13. **Anxiety in Routine Situations** ($\alpha=.84$): 15 items, using a 5-point response scale, were taken from Endler et al. (1988). This scale measures apprehension in daily routine situations.

14. **Anxiety over Physical Danger** ($\alpha=.88$): 15 items, using a 5-point response scale, were taken from Endler et al. (1988). This scale measures apprehension experienced in situations involving danger.

15. **Anxiety in Interpersonal Situations** ($\alpha=.93$): 15 items, using a 5-point response scale, were taken from Endler et al. (1988). This scale measures apprehension in social or interpersonal contexts.

16. **Situations Involving Social Evaluation** ($\alpha=.93$): 15 items,
using a 5-point response scale, were taken from Flood and Endler (1980). This scale measures the degree to which the respondent feels nervous when being evaluated by others.

17.-19. State Anxiety (α=.93, .92, & .95): The 20 items were taken from Spielberger (1983) and answered using a 4-point response scale. This scale, administered three times during the course of the experiment, measures anxiety experienced at the particular moment when the scale is administered.

The final measures resembled the Fear Thermometer developed by Walk (1956). Four Anxometers (anxiety thermometers) were drawn side by side on the same sheet of paper (see Appendix A). Anxometer “readings” were on the scale 1–10. These visual analog instruments required respondents to rate their levels of anxiety in each of the four production tasks. They are essentially one-item scales and therefore coefficient α is not appropriate. The four measures were:

20. English Categories Anxometer
21. French Categories Anxometer
22. English Digits Anxometer
23. French Digits Anxometer

PROCEDURE

After arriving at the testing room, all subjects were seated, given their course credit sheet, and reminded that they were not obliged to stay. A questionnaire containing the above anxiety scales was given to all subjects. After all participants had completed these scales, a French pretest was administered. Subjects heard 20 single-digit numbers, read in French from a tape recorder at the rate of one per second. They were instructed to write down the numbers as soon as they heard them. Subjects with less than 90% of these correct were eliminated from later analyses (n=2). Instructions were then given describing the upcoming Digit Span Test. Prior to beginning this test, however, subjects were asked to complete the first State Anxiety scale (Variable 17 above).

Digit Span testing was done in AB–BA form for the first group and BA–AB sequence for the second group, where “A” represents an English form of the digit span and “B” represents a French version. A two-minute break was given between the second and third tests during which respondents again completed the State Anxiety measure (Variable 18 above). The tests were administered from a tape recorder and subjects were required to write their responses on answer sheets, only after all digits in a string were completed. Because this test was administered in groups, all subjects heard all items. Scores were calculated based on the number of digits placed in their proper position, with a maximum score of 78 on each of the tests. Both the English and French versions of the Digit Span Test began with a string of four digits and proceeded to a string of nine, with two different strings presented at each level.

Following the four Digit Span tests, subjects completed the final State Anxiety scale (Variable 19 above). The Thing Category Test was then given (see MacIntyre, 1988) as a vocabulary production measure. The test items themselves were recorded in English and administered via a tape recorder. The three items requiring written English responses by the first group required written French responses from the second group, and vice versa. One group was given the version requiring English responses first and the other group began with the French responses. A sample item from this test is Name all the things that would be put in a refrigerator. One minute was given for subjects to respond to each item of this test.

The final experimental task was to complete the four Anxometers. Subjects completed all four ratings on the same sheet of paper and in the same order as the experimental tasks.
RESULTS

The results will be examined in three sections. First, the dimensionality underlying the anxiety scales will be examined by a factor analysis. Next, the relationship between anxiety and Digit Span and Vocabulary performance will be examined. Finally, the analyses involving the Anxometers will be considered.

One purpose of the present study was to attempt to replicate and extend the findings of MacIntyre and Gardner (1989); this study found two factors among 11 anxiety scales. The first factor, General Anxiety, included measures of Trait Anxiety, Test Anxiety, Computer Anxiety, Mathematics Class Anxiety, and three administrations of a State Anxiety scale. The second factor, labeled Communicative Anxiety, included scales of Audience Apprehension, English Class Anxiety, French Class Anxiety, and French Use Anxiety.

The present study included these scales (with the exception of Computer Anxiety) and 13 others to better define these “dimensions” and to clarify the implications of the analysis in the previous study. Therefore, the full 23 x 23 correlation matrix was subjected to a Principal Components Analysis. Based upon a scree plot of the eigenvalues, a three-factor solution was retained. The varimax rotated factor loadings for each of the three extracted dimensions appear in Table 1.

The first factor receives appreciable loadings (> .30) from 11 scales: 4 trait anxiety scales, 2 communication apprehension scales, 2 classroom anxiety scales—Mathematics and English 1 test anxiety scale, and 2 social evaluation anxieties. Consistent with previous labeling, this factor will be called Socio Evaluation Anxiety based on the high loadings (> .50) of Trait Anxiety as well as anxieties related to communication and social interaction.

The second factor is best defined as State Anxiety. A three of the State Anxiety measures load on this factor, along with Trait Anxiety. This pattern is meaningful because Sta

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<th>Table 1 Rotated Factor Matrix</th>
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<tr>
<td>Personal Report of Communication</td>
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<td>Audience Sensitivity</td>
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<td>Anxiety in Interpersonal Situations</td>
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<td>General Test Anxiety</td>
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<td>Anxiety in Routine Situations</td>
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<td>Math Classroom Anxiety</td>
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<td>State Anxiety 3</td>
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<td>Anxiety over Physical Danger</td>
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<td>French Classroom Anxiety</td>
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<td>Debilitating French Test Anxiety</td>
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<td>Facilitating French Test Anxiety</td>
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<td>French Use Anxiety</td>
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*=loading > .3; **=loading > .5

and Trait anxiety are closely linked both theoretically (Spielberger, 1983) and empirically (Chrisjohn, 1981; MacIntyre & Gardner, 1988a; 1989). Along with these four scales are loadings from Novelty Anxiety and Physical Danger Anxiety. This seems to indicate that those individuals who are prone to experience anxiety in novel situations also experienced anxiety during the testing portion of this study. The physical danger loading is more difficult to interpret but may reflect the moderate correlation usually obtained between the Physical Danger Anxiety and the Novelty Anxiety scales (Endler et al., 1988).
for the three State Anxiety scales that were the main defining variables for Factor 2. Finally, a score for Language Anxiety was produced by the sum of the scores on French Class, French Use, and Debilitating French Test Anxiety, while subtracting Facilitating French Test Anxiety scores.

The correlations between these three aggregated “variables” and the digit span and vocabulary production measures are presented in Table 2. Clearly, only Language Anxiety is associated with French performance. Both the French Digit Span and the French Categories scores were significantly negatively correlated with this anxiety. None of the correlations involving the English performance variables or the other two types of anxiety was significant.

The final analysis examines scores on the four Anxometers. These measures were administered as the final task and are essentially single-item anxiety measures scored on a scale of 1 to 10. Separate Anxometers measured the anxiety experienced during each of the four experimental tasks. The correlations of the Anxometers with the experimental tasks are also presented in Table 2. Each of the Categories tests correlates negatively and significantly with its corresponding Anxometer whereas neither of the Digit Span tests is correlated with its Anxometers.

The third factor receives high loadings (> .50) from all four French-related anxieties and is most appropriately identified as Language Anxiety. The negative loading of the Facilitating French Test Anxiety scale reflects the nature of that scale. Because this anxiety is seen as beneficial whereas the other three are detrimental to performance, a negative loading here was expected. Test Anxiety also loads appreciably (> .30) on this factor. Because two of the measures of French-related anxiety refer specifically to tests and examinations, the inclusion of the Test Anxiety scale on this factor is understandable. Finally, the Daily Routine scale also loads marginally on this factor, indicating that Language Anxiety is somewhat negatively associated with the levels of anxiety in everyday situations.

Based on the pattern of relationships suggested by the factor analysis, three aggregated variables were constructed. First, a variable called General Anxiety was formed by summing scores on the 11 measures defining Factor 1. The second variable, State Anxiety, was created by aggregating the scores
DISCUSSION

The results concerning the dimensionality of anxiety are informative and generally support the findings of a previous study by MacIntyre and Gardner (1989). That study found two dimensions of anxiety that were labeled General and Communicative Anxiety. As a followup, the more extensive factor analysis in the present study was somewhat more informative. The first factor was labelled Social Evaluation Anxiety because its composition resembled that derived from the previous study. High loadings were found for scales related to anxiety based on ego-threats that are presumed to underlie the trait anxiety construct (Endler, 1980; Spielberger, 1983).

The second factor was clearly a State Anxiety factor. In the previous study, State Anxiety scales appeared on the General Anxiety factor; however, in this study they define a factor of their own. This pattern might result from the state anxiety in the present study being somewhat higher than in the previous investigation. The experimental tasks were administered in groups with three experiment supervisors circulating around the room to ensure that the instructions were followed properly during the production tasks. These differences may have increased levels of anxiety in this situation as opposed to the more nonthreatening, individual testing conducted in the first study. This was not reflected in the questionnaire portion of the study because those anxiety scales were administered prior to the language performance tasks, whereas the State Anxiety scales were completed during the Digit Span tasks. Consistent with the previous study, however, was the loading of Trait Anxiety and State Anxiety on the same factor. In the present analysis, Novelty Anxiety also loaded significantly on this factor, along with the Physical Danger scale. The tasks involved in this experiment are certainly novel to most subjects, which would account for the loading of this variable on the State Anxiety factor. The correlation usually found between Novelty Anxiety and Physical Danger Anxiety would explain the loading of this variable on the State Anxiety factor (Endler et al., 1988).

The anxiety scales related to French situations formed a third factor. In addition to the French Class, French Use, and both French Test Anxiety scales, this factor also received loadings from Test Anxiety. Two situation-specific Test Anxiety scales also appear on this factor and the presence of correlations among the three forms of Test Anxiety is not surprising. Therefore, the loading of Test Anxiety on this factor should be expected. In addition, Horwitz (1986) found a significant correlation between the Foreign Language Classroom Anxiety Scale and a Test Anxiety scale. Somewhat unexpected was the marginal loading (~.30) of the Daily Routine scale on this factor. Because this loading is negative in sign, it supports the distinction between Language Anxiety and the more common forms of anxiety that are encountered in everyday life. A stronger interpretation would suggest that those who experience Language Anxiety tend to be relatively relaxed in daily life situations (but this finding should be replicated before such an interpretation can be accepted).
The correlations of the anxiety measures with the performance measures in this study show both convergent and discriminant validity, as was observed by MacIntyre and Gardner (1989). When the scales loading on each factor are added together, Language Anxiety is correlated with both French language measures, whereas the other variables are not. The correlation of Language Anxiety and Digit Span scores in French may indicate that this type of apprehension can disrupt concentration and the initial processing of linguistic stimuli at the input stage. Clearly, this would limit the ability of anxious individuals to acquire the new language because less information appears to be available in short-term memory. The correlation between Language Anxiety and the French Categories test scores again demonstrates the effect of anxiety on the output stage because the items would have to be recalled from long-term memory. Thus, in terms of Tobias' (1986) three-stage model of processing, anxiety seems to have a negative effect on both the input and output stages as investigated in this study.

Unlike Moldawsky and Moldawsky (1952), no effect of anxiety was observed for either of the English production measures. No English language measure correlated with the aggregated variables, though it should be noted that the English performance measures may not have been as difficult as were those used by Moldawsky and Moldawsky (1952). This would be consistent with the finding that anxiety tends not to impair performance on simple cognitive tasks (Spielberger, 1966; see also Scovel, 1978). The English Categories and Digit Span tests appear to be fairly simple cognitive tasks for this sample of university undergraduates.

The Anxometers demonstrate the effect of the various tests on the anxiety levels of the students. As might be expected, the French tasks aroused more anxiety than did the English ones. It is interesting, however, that both the Digits and Categories tasks aroused similar levels of anxiety when administered in French. In English, however, the Digit Span task was more anxiety-provoking than was the Vocabulary measure; Moldawsky and Moldawsky (1952) also found this to be the case. The significant correlations between the Categoriess test scores, in both English and French, and their associated Anxometers suggest that the anxiety aroused by these tasks impaired performance. The French and English Anxometers, however, were not correlated with their respective Digit Span scores. Consistent with this is the absence of significant correlations between the State Anxiety scores and the performance on the Digit Span, despite being administered before, during, and after this task. Clearly, in this sample, the Digit Span scores in both languages tend to be insensitive to variations in State Anxiety. It is possible that the testing environment might account for this, because digit span tests are often included as part of a battery of intelligence tests and are usually administered individually. In the present study, the purpose was not associated with intelligence testing and the Digit Span Test was administered in groups.

These results suggest that Language Anxiety can be discriminated reliably from other types of anxiety, as suggested by both Horwitz (1986) and MacIntyre and Gardner (1989). Given the limitations produced by Language Anxiety on two key stages of cognitive processing, it would be easy to understand why those with lower levels of anxiety, when compared to anxious students, tend to learn better (MacIntyre & Gardner, 1989), to be more willing to volunteer anxiety, answers in language class (Ely, 1986), and to be more socially active with the target language group (Clément, 1987). Comprehension would suffer among anxious students because of the short-term memory loss attributable to anxiety. Production would suffer as well because anxiety can intrude upon the long-term memory retrieval process. Language Anxiety has been considered as an important problem according to anecdotal reports (see Horwitz et al., 1986) and now evidence is accumulating to describe the specific processes that underlie this effect.
NOTES

'The loadings of scales related to anxiety in both the native and the second languages precludes identification of this factor as a form of language learning anxiety. The majority of items from all four of the scales focused on speaking and communication situations, hence the label Communicative Anxiety.

'This matrix can be obtained from the authors.

REFERENCES


APPENDIX A

Example: Please indicate your level of ANXIETY during the French Digit Span Test.

Figure A-1: The anxometer