

The Subtle Effects of Language Anxiety on Cognitive Processing in the Second Language

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Previous research has shown language anxiety to be associated with broad-based indices of language achievement, such as course grades. This study examined some of the more specific cognitive processes that may be involved in language acquisition in terms of a three-stage model of learning: Input, Processing, and Output. These stages were represented in a set of nine tasks that were employed to isolate and measure the language acquisition stages. A new anxiety scale was also developed to measure anxiety at each of the stages. Generally, significant correlations were obtained between the stage-specific anxiety scales and stage-specific tasks (e.g., output anxiety with output tasks) suggesting that the effects of language anxiety may be both pervasive and subtle.

A large body of previous research has shown that affective

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variables, including anxiety, attitudes, and motivation, influence language achievement (Gardner, 1985; Gardner & MacIntyre, 1992, 1993a; Skehan, 1989, 1991; Spolsky, 1989). Some of the strongest correlations between affective variables and achievement measures involve anxiety. However, Gardner (1985) maintained that not all forms of anxiety would influence second language learning: ". . . the conclusion seems warranted that a construct of anxiety which is not general but instead is specific to the language acquisition context is related to second language achievement" (p. 34).

Language anxiety can be defined as the feeling of tension and apprehension specifically associated with second language contexts, including speaking, listening, and learning. In the past few years, research has shown that language anxiety is the specific type of anxiety most closely associated with second language performance (Horwitz, Horwitz & Cope, 1986; MacIntyre & Gardner, 1989, 1991b). Two of the most common indices of language achievement are course grades and standardized proficiency tests; research consistently has shown significant, negative correlations between language anxiety and performance in these indices of language achievement (Clément, Gardner & Smythe, 1977, 1980; Gardner & MacIntyre, 1993b; Gardner, Smythe, & Lalonde, 1984; Horwitz, 1986; Phillips, 1992; Trylong, 1987). Horwitz et al. (1986) acknowledge the negative effects of language anxiety on broad-based measures such as course grades, but they suggest that researchers should study its more *subtle* effects, that is, the relation between language anxiety and more specific processes involved in language acquisition and communication.

Whereas much of the research into the role of anxiety in language learning has used broad-based measures, a small number of empirical studies have examined the more specific, subtle effects of language anxiety. In one such study, Steinberg & Horwitz (1986) examined the effects of anxiety-arousal on the content of descriptions of TAT pictures given in the second language. They found that students who were made to feel more anxious tended to be less interpretive in commenting on the

ambiguous scenes. MacIntyre and Gardner (1989) found that anxious students learned a list of vocabulary items at a slower rate than less anxious students and had more difficulty in the recall of previously learned vocabulary items.

These studies' results can be explained from a cognitive psychological perspective. A good deal of research has suggested that anxiety causes cognitive interference in performing specific tasks, such as those described in the previous paragraph. (See Sarason, 1980; Schwarzer, 1986.) Eysenck (1979) offered a *reconceptualization* of anxiety in terms of cognitive interference. He suggested that anxiety-arousal is associated with distracting, self-related cognition such as excessive self-evaluation, worry over potential failure, and concern over the opinions of others; therefore, the anxious person has his/her attention divided between task-related cognition and self-related cognition, making cognitive performance less efficient. This theory is able to explain the negative effects observed for language anxiety.

Eysenck (1979) further postulated that anxious students are aware of this interference and attempt to compensate by increased effort. Thus, anxiety may facilitate performance in cases where the increased effort more than compensates for the reduced efficiency of the cognitive processing. This type of result, however, has not been observed very often in empirical studies of language learning (cf. Chastain, 1976; Kleinmann, 1977¹), likely because the majority of language learning tasks used in previous research have been quite complex (MacIntyre & Gardner, 1991c). Of course, even when anxiety appears to facilitate or at least not to impair performance, one must consider the degree of effort invested in that performance. For example, it has been reported that anxious language students study more than relaxed students but their achievement does not reflect that effort (Horwitz et al., 1986; Price, 1991).

Some of the more subtle effects of language anxiety to which Horwitz et al. (1986) refer might be demonstrated by considering more than just overt performance. Eysenck (1979) noted that most anxiety research is focused exclusively on the quality of perfor-

mance and may overlook effects in other areas. A more complete analysis of the subtle effects of language anxiety would include specific task performance and the cognitive activity preceding that performance. A model offered by Tobias (1979, 1986) provides a useful way to begin to address this issue.

Tobias' model describes the effects of anxiety on learning as seen in three stages: Input, Processing, and Output. Although learning is a continuous process, Tobias' model draws the distinctions among the stages in order to isolate and explain the effects of anxiety. Tobias (1986) noted that these stages are somewhat arbitrarily defined, in that sharp distinctions among them are difficult to make, such as specifying the point at which one stops and the next one starts. Nevertheless, this model can be applied to study the roots of the effects of language anxiety.

The Input stage is meant to illustrate the learner's first experiences with a given stimulus at a given time. Input is concerned with the initial representation of items in memory. At this stage, external stimuli are encountered and internal representations are made; attention, concentration, and encoding occur. Because fewer items are available for processing or later retrieval, anxiety-arousal at this stage has an impact on all subsequent stages, unless the missing input can be recovered. For example, in second language learning, difficulties may arise if the language is spoken too quickly or if written material appears in the form of complex sentences. Anxious students may ask for sentences to be repeated more often or may have to reread text several times to compensate for missing input.

The Processing stage involves the cognitive operations performed on the subject matter: organization, storage, and assimilation of the material. This stage involves unseen, internal manipulations of items taken in at the Input stage. Therefore, latency is the primary indicator of activity at the Processing stage. Tobias (1986) suggested that anxiety impairs cognitive processing on tasks that are more difficult, more heavily reliant on memory, and more poorly organized. Each of these increases the demands on processing time. In second language contexts, the time taken

to understand a message or learn new vocabulary items would indicate activity at this stage.

Output involves the production of previously learned material. Performance at this stage is highly dependent on previous stages, in terms of the organization of the output and the speed with which items are retrieved from memory. It is at this stage that language learners are required to demonstrate their ability to use the second language. Performance at the Output stage can be measured by test scores, verbal production, and the qualities of free speech. Students who report "freezing" on tests (Horwitz et al., 1986) claim that the material has been learned but that their test performance does not reflect that learning. This would be a good example of interference at the Output stage.

The use of the term *stages* in Tobias' (1986) model should not be taken to mean that learning occurs in discrete sections. Although Tobias borrowed the terms *stages*, *input*, *processing*, and *output* from descriptions of computer processing of information, the use of these terms in this model seems to correspond more closely to developmental psychologists' use of the term *stages of development* in children (Smith, Sarason, & Sarason, 1982). In any event, the stages themselves may not have clear dividing lines that separate one from the other, and parts of the Input stage might not be complete before processing begins. In communicative situations, for example, the meaning of a message might be clear before the message has been completely delivered.

A study by MacIntyre and Gardner (1991b) employed Tobias' (1986) model in an investigation of the effect of anxiety on input and output in both native and second languages. They used memory for numbers as a measure of performance at the Input stage and scores on a vocabulary production test as a measure of performance at the Output stage. They observed significant correlations between language anxiety and second language performance at both the Input and Output stages. In a later experimental study, MacIntyre and Gardner (in press) used a video camera to arouse anxiety during a vocabulary learning task that had been divided into the Input, Processing, and Output

stages. They found that the anxiety aroused by the video camera reduced the participants' performance, particularly at the Processing and Output stages.

Tobias (1986) notes that the stages are, however, interdependent. Each stage depends on the successful completion of the previous one. For example, difficulty in performance at the Output stage may be caused by deficits created at the Input or Processing stages. Therefore, the negative correlation between language anxiety and second language production observed in previous studies might be indicative of problems at any of the three stages.

The current study extends MacIntyre and Gardner's (1991b) study and offers a more complete analysis of the types of language learning processes that might be affected by language anxiety. To accomplish this, we developed specific tasks that examined language learning in terms of the input, processing, and output components. Some tasks followed students' performance through more than one of the stages, thus permitting examination of the interaction of the stages of learning.

This study was correlational in design, treating language anxiety as a stable individual difference in order to examine the spontaneous variation among students. It should be noted that correlations involving such specific tasks are somewhat attenuated because attention is being directed to very specific processes at a given moment rather than to the more conspicuous, cumulative effects of these processes.

By extension, Tobias' (1986) model might suggest that anxiety itself can be measured at each stage. MacIntyre and Gardner (1991c) noted that existing scales of language anxiety have been primarily focused on output. To address this issue, we developed a new anxiety measure structured around Tobias' three-part model. The new measure attempts to take into account the role played by anxiety at each of the three stages, with items referring to input, processing, and output.

Participants

The participants in this study were recruited from first-year credit courses in French-as-a-second-language at a large, monolingual (English) Canadian university. A total of 97 students volunteered (73 females and 24 males) for the study following a brief in-class presentation. Only students with English as their native language were recruited and all participants were paid a participation fee of \$15 upon completion of the study.

Materials

Language Anxiety Measures

We developed three scales to focus on the stages of learning identified by Tobias (1986). Each six-item scale included three positively worded and three negatively worded items. The items are presented in Appendix A.

Input Anxiety. This scale refers to the apprehension experienced when taking in information in the second language ($\alpha=.78$).

Processing Anxiety. This scale refers to the apprehension experienced when learning and thinking in the second language ($\alpha=.72$).

Output Anxiety. This scale refers to the apprehension experienced when speaking or writing in the second language ($\alpha=.78$).

To assess the validity of the new scales, the following measures of language anxiety were also administered:

French Class Anxiety (Gardner, 1985). This 8-item scale assessed the degree to which the respondent felt nervous during French class ($\alpha=.91$).

French Use Anxiety (MacIntyre & Gardner, 1988). This 8-item scale measured the degree to which respondents felt anxious using French outside the classroom ($\alpha=.90$).

Table 1
Correlations Among the Measures of Language Anxiety

	Input	Processing	Output	French Class	FLCAS	French Use
Input	1.00					
Processing	.77*	1.00				
Output	.64*	.67*	1.00			
French Class	.67*	.70*	.82*	1.00		
FLCAS	.62*	.69*	.81*	.91*	1.00	
French Use	.64*	.64*	.72*	.78*	.79*	1.00

FLCAS=French Language Class Anxiety Scale

* $p < .001$.

Foreign Language Classroom Anxiety Scale (FLCAS, Horwitz et al., 1986). This 8-item scale, a short form of the 33-item FLCAS (see MacIntyre, 1992), assessed the degree to which the respondent felt anxious during language class ($\alpha = .90$).

We computed correlations to examine the validity of the input, processing, and output anxiety scales in relation to existing scales of language anxiety (Table 1). The correlations among all six scales were positive and significant, suggesting that students who are anxious in one context (e.g., in French class) likely will be anxious in other contexts (e.g., using French); students who experience anxiety at one stage (e.g., input) likely will be anxious at the other stages as well.

Actual Achievement

Course Grades. Final grades were used as a measure of attained proficiency. To obtain the grades, students were asked at the time of the testing to sign a release form allowing the researchers to obtain the final mark for the students from the Department of French. The final grades were available for 94 of the 97 participants (three individuals did not sign the release form).

Performance Measures

Each of the following performance measures was chosen to provide scores for one or more of the stages. These scores were classified according to the relevant stage as follows: scores based on the production of French were classified at the Output stage, scores measuring the time spent studying or responding to a test were considered Processing, and scores that required very basic recognition or rapid, simple repetition (without comprehension) were classified as Input scores.

Three measures represented the Input stage:

Word Span. Nouns were flashed rapidly on the computer screen (one second each) in strings of between four and nine words. Half of the strings were composed of familiar words (e.g., *le verre*) and half with unfamiliar words (e.g., *le seigle*) taken from lists provided by Desrochers (1980). Participants were asked to repeat the strings as accurately as possible. Scores were computed by counting the number of words repeated in their correct order.

Digit Span. Twenty-four strings of random digits were read from a tape recording at the rate of one digit per second. When the string was finished, subjects were instructed to write as many digits as possible in their correct position in the string (cf. MacIntyre & Gardner, 1991b). Half the strings were read in French and half in English. The strings varied from four to nine digits in length. The number of digits in their correct position were counted separately for the French Digit Span and the English Digit Span.

T-scope. Participants used the computer mouse to indicate whether a word presented on the computer screen, representing a number from one to nine, was a French word (e.g., *deux*) or an English word (e.g., *two*). Half the words were presented in English and the other half in French. A total of 48 French and 48 English items were presented at random. The number of words correctly identified as English or French were counted (Score) and the time taken to respond correctly was recorded by the computer (Latency).

The following three tasks provided the measures of the

Processing stage. (For clarity, it should be noted that the Paired Associates Learning task combines measures of the Processing and Output stages.)

French Achievement. The 100-item, multiple-choice French Achievement Test (cf. Gardner & MacIntyre, 1993b) was administered in the current study, with a time limit of 25 minutes. The test is focused primarily on grammar elements. For each item, participants circled the correct answer from a list of four alternatives. The test does not require the production of French and we therefore considered it to be primarily a processing task.

Paragraph Translation. Fifteen lines of a moderately difficult, poetic passage in French (Rilke, 1937, p. 113) were presented, one line at a time, on the computer screen. A 5-minute time limit was imposed. Instructions encouraged subjects to move back and forth to reinput information as a means to maximize accuracy. The translations were scored by an independent, bilingual judge. Responses were provided in English, therefore, the scores reflect the processing, rather than the output, of French material.

Paired Associates Learning. Following MacIntyre and Gardner (in press), 16 relatively uncommon English-French noun pairs were presented on the computer. Participants could study each noun for as long as they wished and this time was recorded (Study Time). After each noun had been presented three times, participants were tested for their recall of the French noun when prompted by its English translation. Both the accuracy (Score) and latency (Test Time) of the responses were recorded. Following the test, participants could choose to further study the nouns (up to a maximum of three more presentations of each noun) and this time was recorded. A second test, similar to the first, followed. Again, the score and latency for this test were recorded. The latency measures represent the Processing stage and scores for the tests represent the Output stage.

Finally, besides the test scores from the paired associates learning, the following three tasks measured the Output stage:

Thing Category. Participants were asked to write down as many elements of a category as they could think of (e.g., adjectives

that describe people), with three categories in English and three in French (MacIntyre & Gardner, 1989). One minute was given for each category. The number of words produced in each language provide the scores for this test. This test involves the production of French and therefore represents the Output stage.

Cloze Test (cf. Gardner & MacIntyre, 1993b). A paragraph was presented on the computer with every fifth word replaced by a blank, with a total of 25 blanks. Participants were given a 5-minute time limit and could complete the blanks in any order. The responses were scored by an independent, bilingual judge. The number of blanks filled in with an appropriate French item provided the score.

Self-Description. Participants were asked to describe themselves for one minute in English and one minute in French. Half were to begin with the French version and half with English. Their responses were recorded on cassette tape. The number of ideas expressed in each language as well as the number expressed in both languages (i.e., the overlap) were counted by an independent, bilingual judge. That judge also rated the speech quality of each description along the following dimensions (cf. Young & Gardner, 1990): Fluency (degree of fluidity in the speech), Sentence Complexity (use of complex sentences), Depth (use of superficial vs. more personal items), and Accent (degree of speech sounding like a native speaker for French description only).

Procedure

The students were tested in two stages. First, they completed a questionnaire containing the measures of language anxiety and the French Achievement Test. Administration of this questionnaire took approximately one hour and was conducted in small groups. Following this, participants were requested to make appointments for individual testing sessions that also lasted approximately one hour. These included the remaining tasks described above, which were presented in one of 24 random orders.

Results and Discussion

The most general measure of French achievement in this study was course grades. There were significant negative correlations between Grades and scores on each of the Input, Processing and Output anxiety scales (Table 2). These correlations were greater than expected, perhaps partly due to the short time between the testing sessions and the final exams (from 1 to 4 weeks). They might also reflect a self-fulfilling prophecy, in which anxious students first perform poorly early in the course, then have their anxiety reinforced by continued poor performance, leading them to higher levels of anxiety over the final exam and finally to poor performance on that exam.

Final grades in a course may represent, in part, the cumulative effects of anxiety on learning throughout an academic year. Thus, the highest correlations between achievement and language anxiety would be expected on this type of broad-based measure. The rest of the tasks included in this study are more specific in

Table 2
Correlations of Anxiety Scales with Performance Measures

Stage	Measure	Anxiety Scale		
		Input	Processing	Output
n/a ¹	Final Course Grades	-.52**	-.60**	-.51**
Word Span				
I	Score	-.26*	-.27*	-.21*
Digit Span				
I	French Digit Span	-.04	-.03	-.09
I	English Digit Span	.11	.17	.11
T-Scope				
I	French Recognition	-.07	-.03	-.14
I	English Recognition	.10	.01	.01
I	French T-Scope Latency	.20*	.18	.21*
I	English T-Scope Latency	-.04	.02	.01

Table 2 (continued)
 Correlations of Anxiety Scales with Performance Measures

Stage	Measure	Anxiety Scale		
		Input	Processing	Output
French Achievement				
P	French Achievement Test	-.55**	-.65**	-.54**
Paragraph Translation				
P	Paragraph Translation Score	-.41**	-.51**	-.33**
Paired Associates Learning				
P	Study Time for Test 1	.21*	.27**	.09
P	Time to do Test 1	.22*	.24*	.11
O	Score on Test 1	-.19*	-.23*	-.21*
P	Study Time for Test 2	.17	.20*	.09
P	Time to do Test 2	.05	.13	.08
O	Score on Test 2	-.07	-.11	-.08
Thing Category				
O	French Categories	-.24*	-.22*	-.24*
O	English Categories	.02	.12	.05
Cloze Test				
O	Cloze Test Score	-.44**	-.45**	-.49**
Self-Description				
O	English Description Length	.04	-.06	-.04
O	French Description Length	-.41**	-.48**	-.36**
O	Overlap	-.30**	-.38**	-.25**
O	French Accent	-.44**	-.40**	-.42**
O	French Fluency	-.44**	-.47**	-.41**
O	French Sentence Complexity	-.53**	-.48**	-.50**
O	French Depth	-.12	-.03	-.14
O	English Fluency	-.04	-.03	-.06
O	English Sentence Complexity	-.22*	-.14	-.21*
O	English Depth	.17	.16	.09

I=Input Task; P=Processing Task; O=Output Task

¹Final Course Grades do not represent any one stage but are based on performance at all three stages.

* $p < .05$, one tailed. ** $p < .01$, one tailed.

nature, representing more subtle effects of language anxiety (Horwitz et al., 1986).

Rather than considering each of the stages separately, the presentation of the results will consider each of the tasks and, where appropriate, the interrelation of performance at different stages. All of the correlations discussed below appear in Table 2.

In general, it can be seen that each of the six-item scales representing Input, Processing and Output anxiety showed similar patterns of correlations with each of the specific performance measures. This likely reflects high correlations and lack of strong differentiation among these three scales. For clarity, the discussion of the specific correlations between anxiety and each of the performance variables will focus on the anxiety scale associated with the stage represented by the variable (e.g., input anxiety with input tasks).

Three tasks focused attention primarily on the Input stage (Word Span, Digit Span, and T-Scope) and significant correlations with input anxiety were obtained for the Word Span and T-Scope tasks. The Word Span task shows a significant, negative correlation with input anxiety. Anxious students seem to experience difficulty holding discrete verbal items in short term memory. This may explain why anxious students have trouble comprehending long sentences (Horwitz et al., 1986). It also suggests that, with anxious students, a smaller number of verbal statements enter the Processing stage.

For the Digit Span test, neither the French nor the English versions were significantly correlated with any of the three anxiety measures. This appears to contradict both the results of the Word Span test and the findings of an earlier study that showed that memory for numbers in French was impaired by language anxiety (MacIntyre & Gardner, 1991b). However, the present Digit Span test has only half as many items as that in the previous study, and this diminished variance of the measure might account for the null result. Further study is required to draw a firm conclusion about this issue.

The final measure at the Input stage, T-Scope, shows a more

complex pattern of anxiety effects. A small, positive correlation was observed between the Input Anxiety scale and the French T-Scope Latency, but this scale did not correlate with the number of items correctly identified in French. Anxious students appeared to be slightly slower to recognize that a word was being presented in French, but their accuracy of identification did not appear to suffer, given the extra time devoted to the task. It does appear that the time required to recognize even the simplest items is somewhat affected by language anxiety, and this effect probably would be magnified as stimuli become more complex.

The Paragraph Translation test score represented the Processing stage. Translation accuracy was significantly, negatively correlated with Processing anxiety. Anxious students were not able to translate the passage as well as did their more relaxed counterparts. The poetic nature of this passage required students to guess at the meanings of some terms, and it appears that the more anxious students did not guess as often as the more relaxed ones. This may reflect anxious students' unwillingness to risk an incorrect or incomplete translation: they may avoid responding in order to avoid guessing.

The Paired Associates task combined measures of the Processing and Output stages. The Processing stage measures were the time taken to study the vocabulary items for both tests and the time taken to complete the two tests; the two Output measures were scores on each of the tests. Three of the four Processing measures show significant, positive correlations with processing anxiety: study time for Test 1, study time for Test 2, and Test 1 latency. These results indicate that more anxious students tended to take more time to study the words and to complete the first test. These effects likely arose because language anxiety interferes with both encoding and recall processes. (See MacIntyre & Gardner, 1991b.) As might be expected, scores on the first test were negatively correlated with Output anxiety. Thus, even though anxious students tended to study longer and to take longer to complete the first test, they obtained lower scores than the more relaxed students. On the second test, following further study,

neither Processing nor Output anxiety were significantly correlated with the time taken to complete the test or the scores. Thus, the extra time spent studying the words eventually paid off for the more anxious students.

Taken together, the results from this task seem to indicate that anxious students are capable of showing high levels of achievement, given sufficient time to study (cf. Tobias, 1986). Furthermore, when test scores correlated with anxiety, the time taken to complete the test correlated with anxiety; when the correlation between anxiety and test scores was nonsignificant, the correlation between anxiety and test latency was nonsignificant. These data support Eysenck's (1979) suggestion that extra effort can compensate for the interference created by anxiety, and the effect seems to extend to test taking behavior as well. (See Sarason, 1980, 1986.)

These findings also underscore the interdependency among the stages of learning found by MacIntyre and Gardner (in press) who used a paired associates learning task with the same three stages. They found that anxiety aroused by the introduction of a video camera impaired language learning and production. Their results and those of the present study clearly show that anxiety affects language learning at each of the three stages and that the effects appear cumulative.

Three measures focused on the Output stage: Thing Category Test, Cloze Test, and Self-Descriptions. In each case, significant negative correlations were observed between Output anxiety and performance at the Output stage. A significant negative correlation was found between Output anxiety and scores on the French version of the Thing Category Test. This seems to indicate that language anxiety interferes with a student's ability to retrieve appropriate second language items from memory. The absence of a correlation between Output anxiety and performance on the English version of this test suggests that the retrieval difficulties are restricted to second language items. These findings replicate the results of earlier studies (MacIntyre and Gardner, 1989, 1991b).

In addition, we found a significant, negative correlation between the Cloze Test Score and Output anxiety. As with the French Thing Category Test, this effect probably results from interference during the search for appropriate items from memory. However, the correlation between anxiety and performance on the Cloze Test ($r = -.49$) is significantly higher than the correlation of anxiety with performance on the Thing Category test ($r = -.24$) ($z = 2.30, p < .05$ —see Meng, Rosenthal, & Rubin, 1992). Both the Thing Category Test and the Cloze Test primarily require the retrieval of appropriate vocabulary items from memory. The stronger correlations with the Cloze Test may result from its greater difficulty and because this difficulty compounds the effects of anxiety.

The final Output measure involves the participants' Self-Descriptions. The number of ideas expressed in the French Self-Description was significantly, negatively correlated with Output anxiety. This anxiety was not significantly correlated with the number of ideas expressed in the English Self-Description. In addition, the overlap between the English and French descriptions was significantly negatively correlated with Output anxiety.

The length of the self-descriptions and the degree of overlap between the French and English versions may be lower for anxious students because they lack the vocabulary to fully describe themselves or to repeat items in both languages. This vocabulary deficit (also observed on the Cloze and Thing Category tests) may be attributable, at least in part, to several anxiety effects. First, anxiety can disrupt the search for appropriate items in memory and slow the speed of recall during the time-limited task. Second, anxious students may possess a smaller vocabulary from which to draw appropriate responses and, assuming that students had equal exposure to the material in the French course, this vocabulary deficit may be partially attributable to interference from anxiety during previous attempts at vocabulary learning (MacIntyre & Gardner, *in press*). Last, these results for the self-descriptions might indicate that anxious students simply avoid describing themselves in French with more difficult linguistic

structures, structures that would be available for the English version of the task.

Ratings were also made of the quality of the self-descriptions. Anxious students were judged to have lower Fluency, lower Sentence Complexity, and less of a French Accent. The only rating for the English description that reached significance suggested a tendency for anxious students to be rated lower in English Sentence Complexity.

Taken together, the results from the self-descriptions suggest that anxious students tended to produce shorter descriptions in French and were either unable or unwilling to attempt to provide the same items in both languages. Further, there was a lack of a correlation between the anxiety scales and the length of the English description. Whereas the quality of spoken French seems to be harmed by language anxiety, comparable English tasks seem not to be.

Summary

The specific tasks used in this study were developed according to Tobias' (1979, 1986) model of learning in order to examine the roots of the effects of language anxiety. Eysenck (1979) suggests that anxiety disrupts cognitive processing but that increased effort can compensate for the effects of anxiety on the quality of observed performance, i.e., at Tobias' (1986) Output stage. According to Eysenck (1979), most research has concentrated on the quality of performance (Output) and assumed that the degree of effort remains relatively constant (Input, Processing).

The present results demonstrate the value of considering more than just the Output stage. With the T-Scope task, anxiety was correlated with longer latencies to categorize the words but was not associated with the number of errors. Thus, anxious students appeared to be more cautious in making their judgments, but this strategy compensated for potential effects on accuracy. Similar results occurred for the Paired Associates Learning task. Neither scores on the second test nor the time required to complete

it were correlated with language anxiety. Language anxiety was, however, associated with increased time spent in studying the pairs. The increased effort at the Processing stage during the learning trials eventually reduced the effects of anxiety at the Output stage.

The mirror image of these results can be observed for the Word Span, Cloze Test, Paragraph Translation, Self Descriptions, Thing Category and French Achievement tests. These tests required the students to respond in a fixed amount of time; increased effort at the Processing stage (in the form of taking longer to complete the task) was not possible. For all these measures, language anxiety was negatively correlated with performance quality at the Output stage.

Further, the present results support several previous studies in showing that language anxiety tends to correlate with measures of performance in the second language but not in the native language (Gardner, 1985; Horwitz et al., 1986; MacIntyre & Gardner, 1989, 1991b). This study also replicates the findings of previous studies showing that global assessments of proficiency, such as course grades and standardized achievement tests, are negatively associated with anxiety (Horwitz, 1986; Gardner, Smythe & Lalonde, 1984; Gardner & MacIntyre, 1993b).

The potential effects of language anxiety on cognitive processing in the second language appear pervasive and may be quite subtle. Performance measures that examine only behavior at the Output stage may be neglecting the influence of anxiety at earlier stages as well as ignoring the links among stages. (See MacIntyre & Gardner, *in press*.) The combined effects of language anxiety at all three stages may be that, compared with relaxed students, anxious students have a smaller base of second language knowledge and have more difficulty demonstrating the knowledge that they do possess.

Note

¹It should also be noted that neither of these studies employed a measure of language-related anxiety; Chastain (1976) studied test anxiety and Kleinmann (1977) used scales of facilitating and debilitating anxiety developed by Alpert and Haber (1960).

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Appendix A: Items for the Input, Processing, and Output Anxiety Scales

Input Anxiety Scale

- I am not bothered by someone speaking quickly in French.
- It does not bother me if my French notes are disorganized before I study them.
- I enjoy just listening to someone speaking French.
- I get flustered unless French is spoken very slowly and deliberately.
- I get upset when I read in French because I must read things again and again.
- I get upset when French is spoken too quickly.

Processing Anxiety Scale

- Learning new French vocabulary does not worry me, I can acquire it in no time.
- I am anxious with French because, no matter how hard I try, I have trouble understanding it.

The only time that I feel comfortable during French tests is when I have had a lot of time to study.

I feel anxious if French class seems disorganized.

I am self-confident in my ability to appreciate the meaning of French dialogue.

I do not worry when I hear new or unfamiliar words, I am confident that I can understand them.

Output Anxiety Scale

I never feel tense when I have to speak in French.

I feel confident that I can easily use the French vocabulary that I know in a conversation.

I may know the proper French expression but when I am nervous it just won't come out.

I get upset when I know how to communicate something in French but I just cannot verbalize it.

I never get nervous when writing something for my French class.

When I become anxious during a French test, I cannot remember anything I studied.