

INTEGRATIVE MOTIVATION, INDUCED ANXIETY, AND LANGUAGE LEARNING IN A CONTROLLED ENVIRONMENT

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This study examines the effects of both integrative motivation and anxiety on computerized vocabulary acquisition using a laboratory analog procedure as a microcosm of second language learning. An attempt was made to induce anxiety in one group of subjects by videotaping them while learning. Individual differences in integrative motivation were measured by aggregating relevant scales. Subjects higher in integrative motivation showed superior vocabulary acquisition and tended to initiate a translation more quickly than did those lower in integrative motivation. The anxiety manipulation did not appear to influence behavior during the learning trials. A second set of analyses revealed that subjects with more positive attitudes tended to respond more quickly and consistently to the attitude items. The results are discussed in terms of the operational definition of integrative motivation and its relation to anxiety.

Individual differences in second or foreign language learning have been attributed to both cognitive and affective factors. Initially, educational researchers were concerned primarily with the study of cognitive factors such as aptitude and intelligence (Carroll, 1963; Henmon, 1929). Over the past three decades, however, a considerable body of research has been directed toward the role of affective variables, such as motivation and anxiety.

The role of motivation in the language learning process has focused primarily on attitudinal/motivational characteristics that tend to correlate with various aspects of

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language learning. Perhaps the most widely researched motivation to learn another language has been the integrative motive. Such motivation stems from a desire to understand the language and culture of another group for the purpose of interaction (Gardner & Lambert, 1972; Lambert, 1974). It is operationally defined in terms of a composite of variables including measures of integrativeness, attitudes toward the learning situation, and motivation (Gardner, 1985).

Research in various school settings has indicated that integrative motivation and/or its components are related to various aspects of second language learning. Many studies have reported significant correlations with measures of achievement in a second language such as objective tests and course grades (Gardner, 1985). Other studies have shown that such variables are related to behavior in the classroom (Gliksman, Gardner, & Smythe, 1982), to the decision to stay in as opposed to drop out of language study (Gardner & Smythe, 1975), and to participate in bicultural excursion programs (Desrochers, 1977). The overriding conclusion from all of these in situ investigations is that integrative motivation promotes proficiency in a second language.

In an attempt to identify cause/effect relations, attention has also been directed toward using causal modeling paradigms in such settings. These studies have established the integrative motive as an important influence on performance in French as a second language courses. Lalonde and Gardner (1984), for example, tested a model that included the various components of the integrative motive as well as two personality dimensions as potential causes of achievement in a second language among university students. They found that the personality constructs were causally associated with attitudes and motivation, which in turn had causal influences on second language achievement. Using high school subjects, Gardner and Lysynchuk (1990) similarly found support for a model causally linking language attitudes and motivation to second language achievement.

Whereas positive language attitudes and motivation facilitate second language learning, language anxiety has been shown to impair the language learning process. Studies indicate that apprehension over communication in the second language can be debilitating to performance on a wide variety of second language tasks (MacIntyre & Gardner, 1991b). Language anxiety has been found to correlate negatively with global measures of achievement such as objective tests and course grades (Gardner, Smythe, Clément, & Gliksman, 1976; Horwitz, Horwitz, & Cope, 1986) as well as measures involving specific processes, such as vocabulary recall and short-term memory capacity (MacIntyre & Gardner, 1991c). The effects of language anxiety have been explained by postulating that anxiety consumes attention and cognitive resources that could otherwise be allocated to performance in the second language (MacIntyre & Gardner, 1989).

Steinberg and Horwitz (1986) induced anxiety by treating language students "coldly" and videotaping them describing and interpreting ambiguous scenes using the second language. A second group of students were treated "warmly" and were not videotaped.¹ Assessments indicated that the two groups did in fact differ in anxiety level. The results also showed that subjects in whom anxiety had been induced made fewer interpretative comments.

Other studies, not necessarily related to language learning, have employed the videocamera as a means of arousing anxiety (Cook, 1985; Cotton, Baron, & Borkovec, 1980), though most often they have not assessed anxiety to determine whether or not the manipulation was successful. Plant and Ryan (1985) argue that the camera induces a focus on the self rather than on the task at hand, a line of argument very similar to a popular explanation for the effects of anxiety (Eysenck, 1979; Schwarzer, 1986). Burgio, Merluzzi, and Pryor (1986) found that the presence of the camera enhanced differences between speakers who expected to do well in a conversation versus those with lower expectations; however, they did not find that the camera produced differences in the levels of self-reported anxiety.

Early research concerned with the role of attitudes and motivation in second language learning in the classroom environment often included measures of language anxiety (French class anxiety and French use anxiety) as part of the test battery. In general, the measures of anxiety tended to correlate negatively with the various motivation measures. In factor analytic studies, anxiety measures often loaded negatively on motivation factors (Gliksman, 1981) or contributed to factors defined in terms of self-confidence with the language (Clément, Gardner, & Smythe, 1977, 1980; Clément & Kruidenier, 1985). These studies found that self-confidence is associated with second language achievement and self-perceptions of competence. In either event, at the variable level, language anxiety scales correlated negatively with both achievement and self-perceptions of proficiency. This research, however, has never clearly explicated the functional relation between language anxiety and language attitudes and motivation.²

In a recent series of studies, both motivation and anxiety have been examined using a laboratory analog procedure to investigate language learning in a controlled environment. Generally, language learning is highly controlled in the laboratory by giving subjects several trials to learn a number of vocabulary pairs on a personal computer. This allows for measures of behavior while learning, such as the time spent trying to remember the response term or time spent studying a pair, to be taken in addition to learning scores. The external validity of these studies has been corroborated by converging evidence from the more traditional classroom studies (see, e.g., Gardner, 1985; MacIntyre & Gardner, 1991a). Thus, the laboratory analog is an important research approach because it provides information that would not be available in other contexts in that it permits a closer examination of the process of language learning.

Gardner, Lalonde, and Moorcroft (1985) classified subjects as either high or low in integrative motivation based on their scores on the Attitude/Motivation Test Battery. Over six trials of computerized vocabulary learning, integratively motivated subjects showed significantly better learning than did those who were less well motivated. The difference between the two groups was found to increase as trials progressed.

Gardner and MacIntyre (1991) examined the effects of both integrative motivation and instrumental motivation on vocabulary acquisition. Again, integrative motivation was defined in terms of scores on the Attitude/Motivation Test Battery. Instrumental motivation, on the other hand, was situationally determined by offering

approximately half of the subjects a monetary reward for superior performance on a learning task. Both integrative and instrumental motivation showed the expected effects on learning. The time spent on studying the vocabulary items was also influenced by the presence of an instrumental motivation on five of the six learning trials. On the final trial, when the criterion for obtaining the money either had been met or not, the instrumentally motivated group did not spend any more time studying. That is, as long as the possibility of financial gain was present, instrumental motivation was effective in increasing study time.

MacIntyre and Gardner (1989) employed a similar paradigm in a study of anxiety and language learning. Students were classified as being either more or less anxious in second language contexts based on a median split of "factor scores" from a principal components analysis. The less anxious group showed significantly higher levels of vocabulary learning and recall when compared to the more anxious group. No differences were found, however, in the time taken to learn the items. According to Tobias (1986), in an instructional setting, one would expect to find the effects of anxiety on either one measure or the other.

The laboratory analog method can be seen as a microcosm of the language classroom. Day by day, in the classroom context, the effects of affective variables, such as motivation and anxiety, could be expected to accumulate, leading to distinct differences in language achievement (Gardner, MacIntyre, & Lysynchuk, 1990). The source of these differences and their effects on specific cognitive processes, however, can be examined much more closely in laboratory analog contexts where control of many variables is much better.

The current study takes advantage of the laboratory analog paradigm to study simultaneously the effects of both motivation and induced anxiety on second language learning. As noted earlier, several studies have employed a videocamera to arouse anxiety with some success (Burgio et al., 1986; Steinberg & Horwitz, 1986). Using analyses of variance, attention will be directed toward the effects of integrative motivation and induced anxiety on both the overt performance during a learning task as well as latencies involved with cognitive processing while performing that task. Further analyses will examine the behavior of subjects while responding to the affective items, the correlations between affective scales and behavior during the learning trials, and the associations among the affective variables.

METHOD

Subjects

Forty-nine introductory psychology students participated in this experiment to meet course requirements. To ensure that the subjects did not know the vocabulary items in advance, only those who had not taken a university French course in the past and were not currently enrolled in one were recruited. Research has shown that individuals at this level do not know the French vocabulary items used in this study (Gardner et al., 1985). Therefore, the rate of learning can be attributed to charac-

teristics of the learning task itself, to the effects of relevant individual characteristics, and to the interaction between the two.

Materials

The method of this study was modeled after that of Gardner and MacIntyre (1991). This study was made up of two parts, both of which were presented to subjects via a microcomputer. For the first part, subjects answered 88 randomly presented Likert items to assess their levels of integrative motivation, anxiety, and social desirability responding. Subjects responded on a 7-point scale ranging from strongly disagree (1) to strongly agree (7). Nine scales representing components of motivation, integrativeness, attitudes toward the learning situation, and language anxiety were adapted from Gardner et al. (1985), a measure of communication apprehension was taken from McCroskey (1970), and a measure of social desirability responding was taken from Jackson (1974). All scales, with the exception of integrative orientation, had equal numbers of positively and negatively worded items to guard against acquiescence response bias. Scores on the negatively worded items were then recorded before computing scores on the scales, so that high scores reflect high levels of the variable in question. The computer recorded both a subject's response and his or her latency in making this response. The variables used and their Cronbach α reliability coefficients obtained in this study were as follows.

Components of motivation.

1. Motivational Intensity ($\alpha = .77$). Eight items comprised this scale. A sample positively worded item is "When I was taking French, I really worked hard to learn the language." One negatively worded item is "Compared to my other courses, I spent very little time studying French."
2. Desire to Learn French ($\alpha = .81$). This is an eight-item scale. A high score reflects a relatively strong desire to learn French. Sample positively and negatively worded items are "I wish I were fluent in French" and "I wish I had never studied French," respectively.
3. Attitudes Toward Learning French ($\alpha = .77$). This eight-item scale was scored such that high scores indicated positive attitudes toward learning French. An example of a positively worded item is "French is an important part of any school program in Canada." A sample negatively worded item is "I think studying French is boring."

Components of integrativeness.

4. Integrative Orientation ($\alpha = .69$). This is a four-item scale with all items positively keyed. It is designed to assess the importance of learning French to improve one's interaction with French Canadians. A sample item is "Studying French can be important because it allows one to be more at ease with fellow Canadians who speak French."
5. Attitudes Toward French Canadians ($\alpha = .76$). This is a 10-item scale. High scores indicate positive attitudes toward French Canadians. Sample positively and negatively worded items are "I would like to know more French Canadians" and "French Canadians have no reason to be proud of their culture," respectively.

6. Interest in Foreign Languages ($\alpha = .49$). This is a 10-item scale. A sample positively worded item is "I wish I could speak another language fluently." One negatively worded item is "Studying a foreign language is not a pleasant experience." High scores on this measure indicate a strong interest in foreign languages.

Components of attitudes toward the learning situation.

7. Attitudes Toward the Learning Situation ($\alpha = .83$). This scale is made up of four items assessing attitudes toward the French teacher, and four items assessing attitudes toward the French course. Within each of these categories, two items were positively worded and two were negatively worded. High scores indicate positive attitudes. Sample items are "Most of the French teachers that I had were very good" (positively worded) and "The last French course I took was very dull" (negatively worded).

Components of language anxiety.

8. French Use Anxiety ($\alpha = .86$). This is an eight-item scale. A high score indicates that subjects would feel anxious if they were called upon to speak French. A sample positively worded item is "When making a telephone call, I would get flustered if it were necessary to speak French." One negatively worded item is "I would feel calm and sure of myself if I had to order a meal in French in a French restaurant."
9. French Class Anxiety ($\alpha = .87$). This is an eight-item scale with high scores reflecting a high level of anxiety in the French classroom setting. Sample positively and negatively worded items are "I was always afraid that the other students would laugh at me if I spoke up in French class" and "I never understood why other students were so nervous in French class," respectively.

Additional measures.

10. Social Desirability ($\alpha = .36$). This is an eight-item scale adapted from Jackson (1974). Sample positively and negatively worded items are "My life is full of interesting activities" and "I find it very difficult to concentrate," respectively.
11. Communication Apprehension ($\alpha = .80$). Eight items were taken from McCroskey's (1970) Personal Report of Communication Apprehension. High scores indicate high levels of communication anxiety. A sample positively worded item is "I always avoid speaking in public if possible." One negatively worded item is "I have no fear of facing an audience."

In the second part of the study, subjects had six trials to learn 26 rare English/French word pairs presented on a microcomputer. The computer recorded the amount of time the subject spent viewing each English stimulus word (viewing time), their French response, and the amount of time they spent studying the English/French pair (study time). The computer also kept a record of subjects' self-ratings of anxiety before each trial using a thermometerlike visual rating scale (the anxometer; see MacIntyre & Gardner, 1991c).

Procedure

Each subject was tested individually for approximately 1 hr. All instructions were provided via the computer. Subjects were first given the items from the 11 scales presented in a unique, random order. Scores on seven of these scales were used to

form scores on composite variables. The variable of integrativeness is formed by aggregating scores on attitudes toward French Canadians, interest in foreign languages, and integrative orientation. Scores on the scale attitudes toward the learning situation were used to assess this composite variable, while scores on motivational intensity, desire to learn French, and attitudes toward learning French were summed to provide the measure of motivation. In turn, scores on integrativeness, attitudes toward the learning situation, and motivation were aggregated to provide the index of integrative motivation used in this study. For the analyses of variance that were performed using this factor, subjects above the median on this aggregate ($n = 24$) were deemed to be integratively motivated, while subjects below the median formed the low integratively motivated group.

For the learning phase of the experiment, subjects were told that they had six trials to learn a series of 26 rare French nouns, and an example was provided to illustrate how this was to be done. The English word and the prompt "Translation?" were first presented to subjects to view. This viewing time was limited to 10 s but subjects could press the RETURN key when they were ready to continue. At this point, subjects either typed in the French translation (including the article *le* or *la*), or, if they did not know it, they pressed RETURN. The English word then appeared on the screen with its French equivalent so that the subject could study it. The study time was limited to 10 s, but subjects could choose to press the RETURN key before the time expired. For each of the six trials, the same 26 pairs were randomly presented. The computer kept an ongoing record of viewing time, study time, and typed response. The typed responses were subsequently scored by the second author using the following scoring scheme (cf. Gardner & MacIntyre, 1991): Subjects received 1 point for the correct French article, 2 points for either the correct French noun or the correct article and a reasonable approximation of the French noun, or 3 points for the exact response.

Subjects were tested under one of two conditions, an anxiety condition or a control condition. Those subjects under the anxiety condition were videotaped during the learning phase of the experiment. To increase their anxiety, these subjects were presented with the following message on the monitor:

We are going to videotape you while you learn the French words in order to evaluate your behaviour. Although it is common for people to become anxious when being videotaped, please do not let this bother you. We are interested in your reactions while you are learning the French words and it is necessary to have the video recorder running.

The computer then beeped three times to alert the experimenter to turn on the videocamera, television monitor, videorecorder, and microphone. The videocamera focused on the subject's face, which the subject could see on the television monitor directly behind the computer screen. Subjects were taped to further induce anxiety, but these tapes were not examined.

Subjects in the control condition were not videotaped and did not receive these instructions. All subjects were asked to rate their level of anxiety before the first trial and following each of the six trials. They read the following instructions:

As part of each trial you will be asked how anxious you feel using a thermometer-shaped figure (anxometer). You will indicate your level of anxiety by pressing either the up or down arrows. Pressing the up arrow will cause the level to rise and pressing the down arrow will lower the level again. When the level shown on the screen indicates how anxious you feel, press RETURN to move on to the learning task.

The computer recorded subjects' level of anxiety and the time required to arrive at the judgment. Having completed all six learning trials, subjects were debriefed and thanked for their participation in the experiment.

RESULTS

The major purpose of this investigation was to study the effects of integrative motivation and induced anxiety on behavior associated with learning French vocabulary. There were three primary dependent measures—number correct, viewing time, and study time—obtained on each trial on the paired associates learning task. These were investigated in three $2 \times 2 \times 6$ split plot analyses of variance. The first factor was integrative motivation (high vs. low, as defined by a median split on the aggregate of the relevant measures [Variables 1–7]). The second factor was induced anxiety, as defined by whether or not subjects were videotaped while learning the words. The third factor was the within-subjects factor of trials.³

The analysis of the number correct yielded significant effects for integrative motivation, $F(1, 45) = 6.00, p < .05$; trials, $F(5, 225) = 161.58, p < .001$; and the interaction of integrative motivation and trials, $F(5, 225) = 2.93, p < .05$. As expected, integratively motivated subjects learned more pairs ($M = 29.77$) than those who were not integratively motivated ($M = 20.63$), and subjects learned more as trials progressed. Means for Trials 1–6 were 1.49, 12.84, 23.45, 31.35, 37.82, and 43.35, respectively.

The interpretation of the main effects must be tempered, however, because of the significant interaction between integrative motivation and trials (see Figure 1). Examination of Figure 1 will reveal that learning was better for integratively motivated subjects than for those who were not integratively motivated, in that the rate of learning was faster for the former than the latter. Although both groups were similar on Trial 1, they tended to diverge as trials progressed. Newman-Keuls post-hoc contrasts indicated that the integratively motivated subjects learned significantly more words on Trials 3–6 than those not so motivated.

The analysis of viewing time yielded significant effects for trials, $F(5, 225) = 16.13, p < .001$, and for the interaction between integrative motivation and trials, $F(5, 225) = 2.53, p < .05$. This interaction, plotted in Figure 2, shows that integratively motivated subjects start off viewing the English stimulus words longer than those not so motivated, but by Trial 3 the reverse is true. Newman-Keuls contrasts across trials for each group demonstrated a gradual decrease in viewing time from Trial 1 to Trial 6 for integratively motivated students. For the nonintegratively motivated students, on the other hand, the only significant contrasts involved the mean viewing time for Trial 6, which differed significantly from those for Trials 1–4.

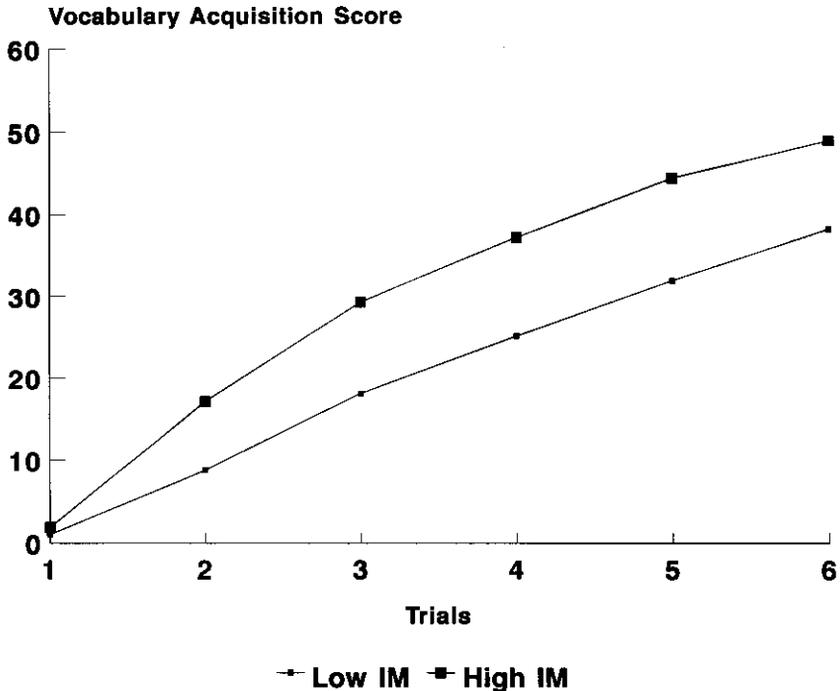


Figure 1. Vocabulary score by integrative motivation (IM) and trials.

The only significant effect for the analysis of study time occurred for trials, $F(5, 225) = 39.87, p < .001$. This resulted because study time was high initially and decreased over trials. Means were 140.33, 97.09, 83.17, 71.58, 58.01, and 43.34 s for Trials 1–6, respectively. Newman-Keuls tests indicated that Trial 1 was significantly higher than all other trials, and thereafter, except for adjacent trials, all other contrasts were significant.

Since no significant effects were found for induced anxiety on any of the three measures, it seemed important to assess individuals' perceptions of anxiety during the learning trials. These perceptions were elicited seven times throughout the learning task, just preceding every trial and immediately following the sixth (final) trial; thus, this analysis took the form of a $2 \times 2 \times 7$ split plot analysis of variance with the factors being induced anxiety, integrative motivation, and trials.⁴

Significant effects were obtained only for the main effects of trials, $F(6, 252) = 3.28, p < .01$, and integrative motivation, $F(1, 42) = 5.17, p < .05$. The effect for trials occurred because anxiety increased slightly from Trial 1 to Trial 2 and decreased thereafter. Means were 4.9, 5.0, 4.5, 4.2, 3.9, 3.6, and 3.4. Newman-Keuls contrasts suggested that there were two overlapping subsets of means, indicating a general decrease in mean anxiety as trials progressed. The effect for integrative motivation demonstrated that subjects who were integratively motivated reported less anxiety ($M = 3.14$) than those who were not integratively motivated ($M = 5.29$).

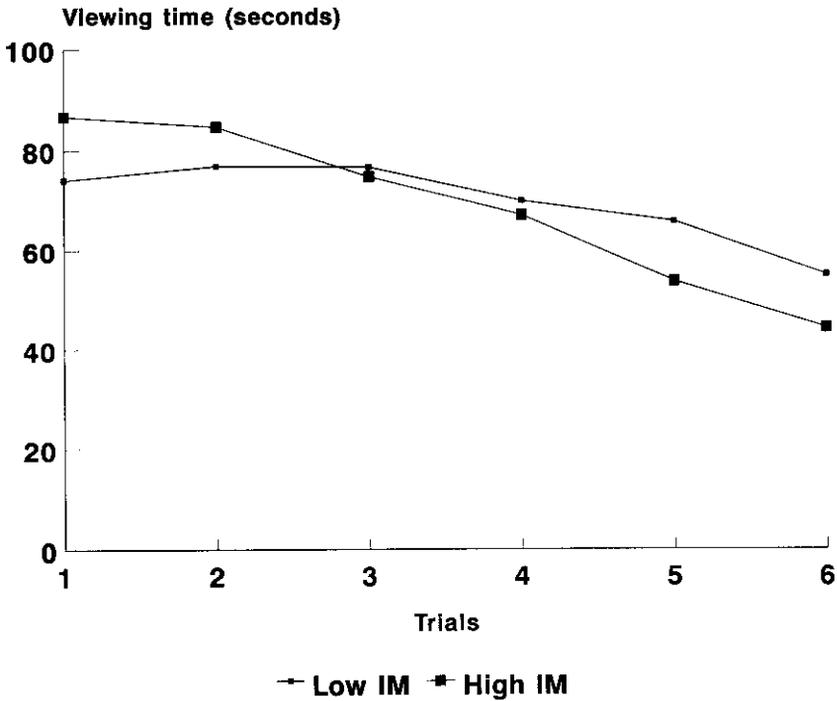


Figure 2. Viewing time by integrative motivation (IM) and trials.

Correlational Analyses

By presenting the Attitude/Motivation Test Battery by computer, we could assess the relation of scores on each attitude/motivation measure with various characteristics of the scales as well as the other features. Table 1 presents correlations of each of the measures used in this study with three indices of test-taking behavior—reaction times to the items, inconsistency in reactions, and social desirability responding. The index of reaction times to the items has been proposed as a possible means of detecting faking or desirability responding to questionnaire measures (Gardner & MacIntyre, 1991; Hsu, Santelli, & Hsu, 1989). The index of inconsistency of reactions was developed especially for the present study and is defined in terms of the standard deviation of an individual's responses to the items in each subtest; the lower the value, the more consistent is the individual in his or her ratings. The measure of social desirability responding was adapted from Jackson (1974). The higher the score on this measure, the more subjects are attempting to portray a socially acceptable picture of themselves.

As can be seen in Table 1, significant negative correlations were obtained between item reaction times and scores on the measures of attitudes toward French Canadians, interest in foreign languages, desire to learn French, and attitudes toward learning French. High scores were associated with faster reaction times. Significant correlations were also obtained between the index of inconsistency in responding

Table 1. Correlations between attitude/motivation measures and three measures of test-taking behavior

	Reaction Times	Inconsistency in Responding	Social Desirability
Motivational intensity	.15	-.01	.19
Desire to learn French	-.50**	-.77**	.29*
Attitudes toward learning French	-.42**	-.40**	.20
Integrative orientation	-.20	-.49**	.31*
Attitudes toward French Canadians	-.34*	-.05	.31*
Interest in foreign languages	-.36*	-.53**	.33*
Attitudes toward the learning situation	-.09	-.38**	.17
French use anxiety	.21	.41**	-.24
French class anxiety	.11	.02	-.28*
Social desirability	-.05	-.09	—
Communication apprehension	.09	.17	-.60**

* $p < .05$. ** $p < .01$.

and scores on the measures of interest in foreign languages, integrative orientation, attitudes toward the learning situation, desire to learn French, attitudes toward learning French, and French use anxiety. In all but one case these correlations are negative, suggesting that high scores on the attitude/motivation measure are associated with consistency in responses. The one exception is the French use anxiety measure, where the positive correlation suggests that low scores are associated with consistency. Finally, significant correlations were obtained between social desirability and six measures. Positive correlations were obtained with attitudes toward French Canadians, interest in foreign languages, integrative orientation, and desire to learn French. Negative correlations were obtained with the measures of French class anxiety and communication apprehension.

Table 2 presents correlations between the aggregate attitude, motivation, and anxiety measures and scores from the first and second half of the learning trials. The aggregate attitude/motivation indices are integrativeness, attitudes toward the learning situation, and motivation. These three components are in turn aggregated to form the variable integrative motivation (cf. Gardner, 1985). Other "predictor" variables in Table 2 are language anxiety (the sum of French class and French use anxiety), Anxometer A (the sum of anxometer scores preceding Trials 1-4), and Anxometer B (the sum of anxometer scores preceding Trials 5 and 6 and following Trial 6). The learning task measures refer to scores on the first three trials (A) and the last three trials (B) for learning scores, viewing time, and study time.

The correlations of the seven predictor variables with the six measures taken from the learning task show an interesting pattern. It will be noted that attitudes toward the learning situation, motivation, and integrative motivation correlate positively with vocabulary learning in both sets of trials and that language anxiety correlates negatively with vocabulary learning in the first set of trials. Two of the correlations with viewing time are significant, and none of the measures correlate significantly with study time.

Table 2. Correlations between the aggregate attitude, motivation, and anxiety measures and scores from the learning task

Predictor Variables	Predictor Variables												
	VOCA	VOCB	VTA	VTB	STA	STB	1	2	3	4	5	6	7
1 Integrativeness	.27	.19	.10	-.12	-.05	-.19	X						
2 Attitudes toward the learning situation	.39**	.40**	.00	-.30*	.19	-.21	.10	X					
3 Motivation	.35*	.33*	.07	-.23	.11	-.21	.61**	.54**	X				
4 Integrative motivation	.41**	.37**	.08	-.26	.08	-.25	.79**	.61**	.93**	X			
5 Language anxiety	-.35*	-.27	-.08	.11	.17	.23	-.30*	-.43**	-.46**	-.50**	X		
6 Anxometer A	-.21	-.07	.19	.34*	.15	.19	-.28	-.24	-.40**	-.40**	.20	X	
7 Anxometer B	-.18	-.07	.01	.22	.04	.17	-.24	-.12	-.43**	-.36**	.06	.80**	X

Note: VOCA = total of vocabulary acquisition scores Trials 1-3; VOCB = total of vocabulary acquisition scores Trials 4-6; VTA = viewing time for stimulus word Trials 1-3; VTB = viewing time for stimulus word Trials 4-6; STA = study time for paired associates Trials 1-3; STB = study time for paired associates Trials 4-6; Anxometer A = total of anxometer ratings 1-4; Anxometer B = total of anxometer ratings 5-7.

* $p < .05$. ** $p < .01$.

Correlations among the predictors are also shown in Table 2. The most noteworthy ones involve the negative correlations of all three anxiety measures with motivation and integrative motivation. The other correlations in the table show the degree of interrelatedness of the three components of the integrative motive and their relative contributions to the integrative motivation score in this study.

DISCUSSION

Based on the results of the analyses of variance, the major conclusion of the present study is that integrative motivation facilitates learning of vocabulary items. Integratively motivated subjects show a steeper rate of learning French/English vocabulary items than those who are not integratively motivated. The analyses of variance also reveal, however, an interaction between integrative motivation and trials for the measure of viewing time. The latter analysis shows that those who are integratively motivated tend to spend less and less time viewing the items as trials progress, while those who are less well motivated tend to maintain a consistent level of viewing time until the final trial. Although this may appear anomalous at first glance, the results for viewing time and number correct, taken together, show that integrative motivation is associated with higher levels of achievement and a willingness to initiate a response quickly. Integratively motivated subjects learn the items more quickly and consequently are willing to risk attempting an answer sooner as trials progress. Those with lower levels of integrative motivation tend to view the items for similar amounts of time before attempting a response, probably because their achievement level is not rising as quickly.

Some research has suggested that the initiation of a response may be associated with self-confidence in the second language. For example, studies in the language classroom indicate that students who are willing to take risks tend to have higher levels of achievement (Ely, 1986) and, moreover, that self-confidence is associated with the willingness to risk social interaction in the second language (Clément, 1987; Tarampi, Lambert, & Tucker, 1968). In the present study, students with higher levels of integrative motivation tended to initiate their response more quickly and to be correct more often. This cannot be explained, however, by suggesting that such subjects actually studied more, because there were no corresponding differences in study time. Rather, the students appear to have studied more efficiently in a similar amount of time. This replicates the finding by Gardner and MacIntyre (1991), who also found no effect for integrative motivation on study time. Although this consistency is noteworthy, it is always possible that a null result, even one that has been replicated, can be attributed to some aspect of the procedures or the instruments. For example, the presence of a time limit on study time may pressure students to proceed on to the next item. Therefore, the conclusion that integratively motivated subjects do not study for a greater amount of time should be taken cautiously.

While the results pertaining to the integrative motive emerged largely as expected, the attempt to induce anxiety did not appear to be as successful. It would seem that the presence of the videocamera was not, in itself, sufficient to provoke an anxiety response, especially since no effect for condition was found on the anx-

ometer measures. In their study, Steinberg and Horwitz (1986) found that anxiety was induced by the presence of a videocamera and an emphasis on evaluation. The present study did not find, however, that the videocamera induced feelings of anxiety. The differences between the two studies seem to lie in the social interaction and second language communication associated with the videotaping. Subjects in the anxiety condition in the Steinberg and Horwitz study were treated impersonally compared with those in the nonanxious condition, whereas subjects in the present study were all treated in a similar manner. Also, the activity required by Steinberg and Horwitz required spontaneous verbal production in the second language, whereas those in the present study silently typed their responses into the computer. Therefore, the different results might be attributed to a social-evaluation process rather than to the effects of videotaping. On the other hand, the Steinberg and Horwitz study did not include measures of motivation, and it is possible that the "anxiety" manipulation also reduced subjects' motivation. In any case, the negative social interaction, and the speaking requirements, rather than the videocamera itself, might well have been responsible for the observed effects in that study as well as the differences between that study and this one.

It is interesting to note that researchers often assume, as we did, that the presence of a videocamera will induce anxiety. Studies by Burgio et al. (1986), Cook (1985), Cotton et al. (1980), and Plant and Ryan (1985) each used this manipulation in research not involving language learning, but only one of them (Burgio et al., 1986) employed a manipulation check to assess whether or not anxiety was in fact aroused. Like the present study, that one too failed to demonstrate differences in self-reported anxiety.

The lack of an association between the presence or absence of the videocamera and anxometer scores is even more interesting given some of the results presented in Table 2. There it was found, quite unexpectedly, that scores on the anxometer measures correlated more highly with motivation than with language anxiety. The anxometer has been validated as a measure of anxiety in two previous studies (MacIntyre & Gardner, 1991a, 1991c), but in the present study it is more clearly associated with an absence of motivation. It seems possible, therefore, that subjects who were more motivated to learn French attributed any added stress in the videocamera condition to their own motivation rather than to anxiety (see Note 2).

There were two major findings that resulted from the analysis of test-taking behavior and its relation to scores on the attitude and motivation measures. First, the results indicate that, in general, high levels of positive attitudes and motivation tend to be more readily accessible and/or more consistent than less positive attitudes. French use anxiety (but not French class anxiety) also tends to be associated with inconsistency in responding. Considering high levels of attitudes and motivation and low levels of French use anxiety as favorable attributes, such results suggest that there is a tendency for favorable depictions of the self to be relatively automatic and consistent. Second, unlike previous studies (Gardner & MacIntyre, 1991; Glikman, 1981), there appears to be an association between social desirability responding and scores on a number of the measures. All three components of integrativeness correlate positively with social desirability, as does the measure of desire to learn

French. The negative correlations of two of the three anxiety measures with social desirability suggest that, in this study, individuals who tend to present themselves in a positive light tend also to present themselves as nonanxious. Despite the correlations, however, the association with social desirability is nonetheless quite low for all measures except communication apprehension. Previous research has shown little relationship between social desirability and measures of attitudes, motivation, and language anxiety (Glikzman, 1981) and, given that the relations here are relatively low, it seems reasonable to conclude that for most measures the relation to social desirability is not very pronounced.

The correlations among the attitude, motivation, and anxiety measures tend to be somewhat uneven. Whereas motivation correlates similarly with integrativeness and attitudes toward the learning situation, these latter two variables are relatively independent of each other. This pattern is somewhat different from other findings reported with students actually enrolled in language classes (see Gardner, 1985), where the three components tend to be related to each other. This anomalous pattern might well reflect the fact that students in the present study were not studying French, thus lowering any association between group-related attitudes (integrativeness) and classroom-related attitudes (attitudes toward the learning situation). Not surprisingly, therefore, motivation correlates more highly with the composite integrative motivation index than do the other two components. In addition, the measure of language anxiety tends to correlate negatively with the three components while the anxometer scores correlate negatively with the motivation component (and thus integrative motivation, as well). In this context, then, there is a tendency for subjects who are anxious about French to be less motivated to learn it than those who are not anxious.

The correlations also reveal that vocabulary learning is positively associated with the two components, attitudes toward the learning situation and motivation (as well as the combined aggregate, integrative motivation), over the entire learning session. It is interesting that these two components correlate significantly with achievement, whereas integrativeness does not. All of the students had dropped out of French training before university, and one might speculate that these correlations reflect a transfer of a residue of emotions left over from students' prior experiences with learning French. Integrativeness reflects attitudes toward other groups (associated with French and/or other languages) and does not appear to influence learning in this context, whereas the other components involve affective reactions directly associated with learning French and are implicated in the present laboratory context. There is a suggestion that language anxiety carried over from previous experiences also influences the learning of French in this context, but this effect appears to diminish as trials progress. Similar patterns were observed in studies by Gardner et al. (1985) and Gardner and MacIntyre (1991). It is interesting to note also that anxiety aroused prior to each trial (as measured by the anxometers) was unrelated to achievement. Other correlations between the various predictors and learning behavior in this study are generally low and not significant.

The results of this investigation have important implications for individuals interested in second language acquisition. First, they demonstrate that the laboratory

analog procedure can be used profitably to investigate the language learning process. No one (least of all the present researchers) would argue that a paired associate learning task focusing only on a few elements of vocabulary is anywhere near as complex as the acquisition of a second language in either the classroom or other settings. Nonetheless, because of the control that can be exercised, and the elimination of the many other factors that operate in the real world context, patterns that appear in the laboratory that are consistent with in situ findings help to strengthen and clarify generalizations made in those settings.

A second implication has to do with the relation among attitudes, motivation, anxiety, and second language learning that emerged. This raises the question: What is the difference between anxiety and motivation? In previous research, anxiety has been shown to have consistent, deleterious effects on behavior in the second language (MacIntyre & Gardner, 1991b), whereas attitudes and motivation tend to facilitate such behavior (Gardner, 1985). Perhaps anxiety and motivation are opposite ends of the same dimension, there being motivated, confident students and anxious, unmotivated students. Although this does not appear to encompass all of the anecdotal and empirical evidence on the subject (Gardner, 1985; Horwitz & Young, 1991), it is certainly consistent with many of the results presented here.

A better interpretation, however, would appear to involve a model in which anxiety and motivation are two separate dimensions with overlapping behavioral consequences. In factor analytic terms, anxiety and motivation might be viewed as two oblique dimensions, correlated yet distinguishable. This would imply that integratively motivated students are less anxious in second language contexts but that integrative motivation and anxiety would influence behavior in their own right. The causal sequence cannot be ascertained from the current data. For example, anxiety may lead to a reduction in motivation, or a lack of motivation may produce anxiety. Alternatively, some factors may influence motivation, as proposed in the socioeducational model of second language acquisition (Gardner, 1985), whereas other factors might influence language anxiety (MacIntyre & Gardner, 1989, 1991c).

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NOTES

1. A self-report scale (the Multiple Affective Adjective Check List [Zukerman & Lubin, 1960]) verified that the anxiety manipulation was successful.

2. A distinction has been made in the literature between facilitating and debilitating forms of anxiety. While a full discussion of the issue is beyond the scope of the present paper, we have noted elsewhere (MacIntyre & Gardner, 1991b) that facilitating anxiety is not the usual meaning of the term *anxiety* and has not been widely researched. Its strong conceptual link with motivation may make facilitating anxiety somewhat redundant, and in fact items contained on verbal report measures of facilitating anxiety are very similar to those on measures of motivation. We discuss the relationship between anxiety and motivation in the concluding paragraphs of this article.

3. Rather than dichotomizing integrative motivation to conduct the analysis of variance, we could have included the individuals' actual integrative motivation score as a continuous independent variable. An example of how to conduct such an analysis in conjunction with a repeated measures factor, and some of the interpretative difficulties that can result, is given by Gardner and MacIntyre (1990). We have opted here for the analysis using integrative motivation as a dichotomous independent variable because it is the most

parsimonious solution under the circumstances. We also, however, conducted the other analysis and obtained comparable results, in particular, the two interactions of integrative motivation with trials reported here.

4. Three subjects did not have an anximeter score on one trial because they inadvertently pressed the RETURN key twice, thus bypassing the measure. This resulted in the reduced sample size for this analysis.

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