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Cognitive, Affective, Personality, and Demographic Predictors of Foreign-Language Achievement

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ABSTRACT The ability of cognitive, affective, personality, and demographic variables to predict second-language acquisition among college students was investigated. An all possible subsets regression analysis was used to compare the proportion of variance in foreign-language achievement explained by each variable. The analysis revealed that variables from each of the 4 domains were important predictors of foreign-language achievement. Overall, academic achievement, as measured by GPA average, was the best predictor, explaining 11.5% of the variance in foreign-language achievement. Foreign-language anxiety, the next best predictor, explained 10.5% of the variance. The educational implications of these findings for understanding foreign-language achievement are discussed, along with suggestions for future research.

Foreign-language instructors are accustomed to observing a wide range of performance in their courses. Whereas some students excel in learning a foreign language, many students underachieve, or do not achieve their desired level of proficiency. In an attempt to understand that phenomenon, researchers have investigated a multitude of factors that may affect language learning. Although Ehrman and Oxford (1995) noted that the majority of those studies focused on cognitive variables (e.g., language aptitude, cognitive ability, study habits), affective (e.g., anxiety, self-perceptions), personality (e.g., locus of control, individualism), and demographic (e.g., age, number of previous foreign languages studied) variables also seem to be related to foreign-language achievement (Ehrman & Oxford, 1995; Gardner, Tremblay, & Masgoret, 1997).

Only a few studies have examined the role of cognitive, affective, personality, and demographic variables concurrently. Gardner et al. (1997) stated that “there is a lack of research examining the relationships among all those variables simultaneously” (p. 344). Two studies that investigated the relationships of several classes of variables to foreign-language achievement are Gardner et al. (1997) and Ehrman and Oxford (1995). Specifically, Gardner et al. (1997) found substantial relationships between foreign-language achievement and noncognitive variables. Those authors noted that when foreign-language achievement in French classes is assessed using relatively objective measures that are administered at the same time as other measures, foreign-language anxiety, self-confidence, and perceived foreign-language ability are most highly related to achievement. Unfortunately, Gardner et al. tested 34 variables simultaneously with only 102 participants. Because the subject-to-variable ratio was only slightly more than 3:1, less than the 5:1 minimum recommended for multivariate analyses (Thompson, 1990), the subsequent path coefficients likely were unstable.

Ehrman and Oxford (1995), whose students comprised a large sample of adults enrolled in intensive training language courses at the Foreign Service Institute, reported that cognitive variables exhibited the strongest correlations with foreign-language achievement, followed by affective factors, then personality variables. However, because those authors reported only zero-order correlation coefficients, the impact of each variable was considered in isolation. As such, it is not clear how each of the variables relates to foreign-language achievement in the presence of other factors. Moreover, no comparisons were made with respect to the proportion of variance explained in foreign-language achievement. That consideration is potentially important because, as Pedhazur (1982) noted, “Inspection of zero-order correlations is not sufficient to reveal the potential usefulness of variables when they are used simultaneously to predict or explain a dependent variable” (p. 104).

Thus, the purpose of the present study was to examine further the role of various cognitive, affective, personality, and demographic variables in foreign-language achievement. That is, we investigated which variable domains best predict second-language acquisition among college students by comparing the proportion of variance in foreign-

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language achievement explained by each possible combination of factors. Proportion of variance explained is the measure of effect size recommended for regression analyses by research methodologists and statisticians (Cohen, 1988). We used the following three cognitive variables: overall academic achievement (as measured by GPA), study habits, and students’ expectations of their performance in a foreign-language course. In addition, we used four affective variables; namely, foreign-language anxiety, perceived intellectual ability, perceived scholastic competence, and perceived self-worth. The four personality variables comprised levels of cooperativeness, competitiveness, individualism, and locus of control. Finally, we considered the following seven demographic factors: gender, age, semester course load, number of countries visited, number of high school foreign-language courses taken, status of present foreign-language course (i.e., required or elective), and foreign-language proficiency of immediate family members. Thus, 18 independent variables were selected to keep the ratio of participants to variables greater than 10 to 1 (i.e., 184 students to 18 variables), which exceeds the minimum recommended ratio in multiple-regression analyses for obtaining reasonably stable effect-size estimates (Tabachnick & Fidell, 1989). An extensive review of the literature revealed that the majority of studies published in the area of foreign-language achievement reported an inappropriate subject-variable ratio.

**Literature Review**

**Cognitive Variables**

According to Sparks and Ganschow (1991, 1993a, 1993b), the acquisition of a foreign language is impeded primarily by native-language learning difficulties in mastering the phonological, syntactic, and semantic codes of language. As such, those authors contend that affective variables (e.g., anxiety) are not causes of foreign-language learning problems but are side effects of having difficulties coding the native language (Sparks & Ganschow, 1991, 1995). Sparks and Ganschow first termed that theory the Linguistic Coding Deficit Hypothesis (Sparks & Ganschow, 1991, 1993a, 1993b) before renaming it the Linguistic Coding Differences Hypothesis (LCDH; Sparks & Ganschow, 1995). Apparently, the LCDH is based on the work of Velutino and Scanlon (1986), who found that poor readers have difficulties processing the formal and the structural characteristics of written and spoken words.

According to Sparks and Ganschow (1995), support for the LCDH stems from comparisons of low- and high-achieving foreign-language learners, which have revealed consistently that the former have significantly lower levels of native-language ability and foreign-language aptitude. Because college students with native-language deficits (i.e., differences) tend to have lower levels of overall academic achievement than do their counterparts, one may reasonably assume that, to the extent that the LCDH prevails, students’ overall GPA would be related to foreign-language performance. That is, students with overall high academic achievement also tend to have the native-language aptitudes that were found by Sparks and Ganschow (1991, 1993a, 1993b, 1995) to predict high levels of foreign-language achievement. One would expect that finding to be true especially at universities like the one in the current study, where the vast majority of foreign-language students are enrolled to fulfill a bachelor of arts degree requirement for majors that traditionally require stronger verbal skills. Positive relationships between mathematics proficiency and foreign-language achievement and between reading performance and foreign-language achievement have been reported (Hart, 1993). Yet, surprisingly, to date no study appears to have used GPA to investigate the relationship between second-language acquisition and academic achievement at the college level.

Research has shown repeatedly that the most successful learners are those who use learning strategies that tend to be the most optimal for second-language acquisition (Ehrman, 1989; Ehrman & Oxford, 1990; Oxford, 1989; Oxford & Crockhall, 1989; Skehan, 1989). Because learning strategy use is a component of study habits, it is likely that the latter would be related to foreign-language achievement. Oxford (1989) noted that “language learning strategy research has suffered from an overemphasis on metacognitive and cognitive strategies, which are admittedly very important, at the expense of other strategy types that are also very useful” (p. 2). Thus, the inclusion of study skills in the present investigation represents an attempt to use a more global measure of learning strategies to respond to that concern. A positive relationship between study skills and academic performance has been reported consistently in the literature (Al-Hilawani & Sartawi, 1997; Blustein et al., 1986; Jones & Slate, 1992). Moreover, Jones, Slate, Perez, and Marini (1996) concluded on the basis of a series of studies conducted by Jones and Slate (1992) that study skills account for approximately 15% of the variance in undergraduate students’ grades. Onwuegbuzie, Slate, Paterson, Watson, and Schwartz (2000) documented that study habits explain approximately 5% of the variance in achievement in research methodology courses. We hypothesized that study habits would be related to foreign-language achievement.

Ganschow and Sparks (1991) noted that students’ perceptions of the ease of learning foreign languages are the foremost indicators of their propensity to experience foreign-language learning difficulties. According to Horwitz (1990), students enroll in foreign-language classes with preconceived beliefs about how to learn a language, together with expectations as to their ability to accomplish the task. Apparently those beliefs and expectations can affect students’ foreign-language performance. Ganschow et al. (1994) theorized that negative beliefs and expectations possessed by some students enrolled in foreign-language classes have been acquired because their written and oral native-language skills have prevented them from attaining the
same levels of academic achievement as their counterparts who competently use their native language. Furthermore, the low expectations of many foreign-language students make them unreceptive to language input, thereby debilitating the learning process (Krashen, 1980). Students’ expectations of their final grades also are likely a measure of their confidence in learning foreign languages, which Clément and his colleagues (Clément, 1980; Clément & Kruidenier, 1985; Clément, Dörnyei, & Noels, 1994) have shown is related positively to achievement. Onwuegbuzie, Bailey, and Daley (1999) found that students’ expectations of their future performance is the best predictor of their levels of language anxiety. Thus, we hypothesized that students’ expectations of their achievement in foreign-language courses may be related positively to their ultimate performance.

Affective Variables

A myriad of studies have documented that language anxiety is one of the primary predictors of second-language acquisition (Horwitz, Horwitz, & Cope, 1986; MacIntyre & Gardner, 1989, 1991a, 1991b). Specifically, a moderate negative relationship between language anxiety and various measures of foreign-language achievement consistently has been found (Gardner, Lalonde, Moocroft, & Evers, 1987; Gardner & MacIntyre, 1993; Gardner, Moocroft, & 1987; Gardner, Smythe, & Lalonde, 1984; Horwitz et al., 1986; MacIntyre & Gardner, 1991c; Mettler, 1987; Phillips, 1992; Price, 1991; Trylong, 1987; Young, 1986). Moreover, Gardner and MacIntyre (1993) found that language anxiety is the best single correlate of achievement. Foreign-language anxiety has been related to performance in oral examinations (Phillips, 1992; Scott, 1986), to the production of vocabulary (Gardner, Moocroft, & MacIntyre, 1987), and to teachers’ ratings of achievement (Trylong, 1987). Because foreign-language anxiety appears to be one of the best predictors of foreign-language achievement (Gardner, 1985), any model that seeks to predict foreign-language achievement that does not include a measure of foreign-language anxiety likely would be underspecified.

Horwitz et al. (1986) contended that perhaps no other field of study poses as much of a threat to students’ self-concept as does language study. Clément and his associates (Clément, Dörnyei, & Noels, 1994; Clément, Gardner, & Smythe, 1977, 1980; Clément & Kruidenier, 1985) found that self-confidence is related to proficiency in second-language acquisition, perhaps because students with low levels of self-confidence tend to have lower motivation to learn a foreign language (Clément, 1980). Because perceptions of self-confidence with respect to foreign-language learning also have been found to be related to foreign-language achievement (Clément et al., 1994), other self-perception dimensions may play a role in foreign-language classes. In particular, we hypothesized that perceived intellectual ability, perceived scholastic competence, and perceived self-worth may be predictors of foreign-language achievement.

Personality Variables

A review of the literature examining personality variables and foreign-language achievement yielded reductive and oversimplified theoretical frameworks that resulted in meager results (Dunkel, 1947; Kawczynski, 1951). However, even studies that included many potential personality factors have generated few significant findings. Lalonde and Gardner (1984), for example, examined 18 personality measures taken from the Jackson Personality Inventory (Jackson, 1974) and found that the only significant relationship was a negative one between innovation, a characteristic of persons who value new ideas, and achievement. This study may have suffered from lack of a situation-specific focus in some of the measures, suggesting that Lalonde and Gardner may have been premature in their conclusion that personality plays no direct role in foreign-language achievement.

Other researchers since Lalonde and Gardner have highlighted some significant relationships. For example, social interdependence has been found to play a role in the foreign-language learning context. Specifically, Reid (1987) reported that foreign-language students typically do not report being engaged in cooperative learning activities. Oxford (1989) contended that lack of opportunity may stem from the fact that many foreign-language instructors, consciously or unconsciously, incorporate instructional methodologies that promote competition and deemphasize cooperation. Limited research (Gunderson & Johnson, 1980; Jacob & Mattson, 1987; Sharan et al., 1985) has shown that when students are taught specifically to be cooperative, their foreign-language skills tend to improve, as do their motivation levels, altruism, and attitudes toward their peers.

Furthermore, the fact that foreign language may be the subject that most necessitates continual evaluation by the instructor, as well as regular and overt peer evaluation because of its emphasis on public speaking, may often give students the impression that their foreign-language competence is being rated against that of their peers (Horwitz et al., 1986). Thus, it is likely that level of social interdependence may play a role in determining levels of foreign-language achievement. Because no prior research has examined the roles of individualism, competitiveness, and cooperation within the same study, we investigated their simultaneous contributions to student performance. Oxford (1990) indicated that the three components “deserve far greater attention than they have received from researchers and teachers” (p. 44).

Locus of control is considered to be a primary factor in determining levels of academic achievement among college students (Linder & Janus, 1997), high school students (Sterbin & Rakow, 1996), and even at-risk students (Whitmore, 1990). That phenomenon is defined as a polar construct in which individuals attribute their successes and fail-
ures either to their own behaviors (i.e., internal locus of control) or to external factors that they cannot control (i.e., external locus of control; Tomlinson, 1987). In her qualitative analysis of student interviews, Price (1991) found that the “discrepancy between effort and results” led even some high-achieving students “to feel less in control in language classes than in other courses” (p. 105). Thus, we hypothesized that locus of control may be a predictor of foreign-language achievement.

Demographic Variables

Oxford (1993) reported that gender differences exist with respect to language learning strategies. Specifically, women tend to use more conscious strategies. In particular, women are more apt to use strategies that are metacognitive (i.e., planning, evaluating, or organizing); affective (i.e., emotional and motivational); and social (Oxford, 1993). Women also have been found to possess better listening skills than men (Larsen-Freeman & Long, 1991); however, few studies at the college level have compared the foreign-language performance of men and women. Gender comparisons conducted on the language development of first-language learners have led to evidence that women have a greater propensity for native-language learning than do men. Among the explanations provided to explain the gender differences, the neurolinguistic and socialization theories appear to be the most popular. With respect to the former theory, some researchers (Kimura, 1987) contended that the advantage that women have over men regarding native-language development results from men’s brains being more lateralized than those of women. According to those theorists, the language centers of men are more concentrated in the left hemisphere, whereas, for women, they are more globally represented.

Regarding socialization, Chambers (1995) and Tannen (1991) posited that the superiority of women over men in language development stems from their greater motivation and determination to conform to social structures and norms through language. Those authors argued that women are more socially sensitive in their language use. Chambers (1995), who reviewed the literature in that area, concluded that women tend to use “fewer stigmatized and non-standard variants than do men of the same social group in the same circumstances” (p. 103). Those theories of native-language learning, coupled with the limited research on learning strategies on second-language learning, led us to hypothesize that women may have higher levels of foreign-language achievement than men do.

Scarcella and Oxford (1992), Schleppegrell (1987), and Singleton (1989) found that age is related to second-language acquisition. According to Ehrman and Oxford (1995), younger students are more likely to attain fluency learning a foreign language, whereas older individuals are more able to comprehend and to apply grammatical rules and to bring their extensive life experiences into the foreign-language learning context. Oxford (1992) theorized that the relationship between age and foreign-language achievement depends on the stage at which the language is being learned, the prior experience of the student, the level of cognitive maturity, and the mode in which the language is being received, as well as various other social-psychological factors.

Liebman (1984) and Newport (1986) reported that the ability to acquire mastery of the fine points of language, such as phonology and morphology, as well as the capacity to speak a second language without an accent, deteriorates severely with age. Moreover, it is possible that older adults perform more poorly than do their younger counterparts on a variety of cognitive tasks in which a quick response is needed—as is often the case when learning a foreign language—in part because of situational and motivational variables that are extraneous to ability. According to Onwuegbuzie, Bailey, and Daley (1999), cautiousness is one such extraneous-ability variable, in which lower levels of second-language performance reflect, in part, students’ reluctance to pronounce, to translate, or to write words in the target language about which they are uncertain. Research suggests a positive relationship between cautiousness and age past adulthood (Schaie & Gribbin, 1975). In addition, experimental studies indicate that older adults tend to make more errors of omission than commission (Okun, 1976; Okun, Siegler, & George, 1978). Given those findings, together with the result of Onwuegbuzie et al. (1999) that older students tend to have higher levels of foreign-language anxiety, we hypothesized that there may be a negative relationship between age and foreign-language achievement.

Because foreign-language courses often are rated by students as being among the most difficult in their degree programs (Onwuegbuzie et al., 1999), those who carry a heavy semester course load while enrolled in foreign-language classes likely will have insufficient time to learn the target language. It is logical to expect that the more courses that students take overall, the more likely they will be to underachieve in foreign-language courses because of competing demands for study time. Thus, semester course load was included in the study as a potential predictor of foreign-language achievement. Also, we hypothesized that elective status of the course may be related positively to foreign-language achievement.

Research has shown repeatedly that language aptitude is positively related to foreign-language achievement (Gardner et al., 1997). Sparks and Ganschow (1991) and Sparks, Ganschow, and Patton (1995) argued that language aptitude is the foremost predictor of foreign-language achievement. Thus, because it is reasonable to assume that the more high school foreign-language courses a student takes, the greater her or his language aptitude, we hypothesized that the former also may be a predictor of second-language acquisition.

Motivation refers to a student’s attitude, interest, and effort to learn a foreign language (Gardner et al., 1997). According to Gardner and his colleagues (Gardner, 1985;
Gardner et al., 1997), motivation plays a fundamental role in foreign-language learning. Oxford and Shearin (1994) theorized that motivation levels will be high only if students expect to succeed and to value that success. Because students who take foreign-language classes as an elective are more likely to expect success or to value the learning context than are students who take these classes as a degree requirement, the former will likely experience higher levels of achievement.

Similarly, one may assume that students who have visited many foreign countries and whose immediate family members speak one or more foreign languages proficiently are more inclined to appreciate the benefits of foreign-language acquisition, and, consequently, are more motivated to learn a language than are their counterparts. That is, it is likely that the number of foreign countries visited by individuals is an indication of levels of integrative motivation. According to Clément (1980), integrative motivation pertains to individuals’ positive affective predispositions toward the second-language community. Clément (1980) theorized that, provided that contact with members of the target language is positive, the more frequent the contact, the more motivated an individual will be to learn the foreign language and the more confident he or she will be to use it. Thus, we hypothesized that the number of countries visited and the foreign-language proficiency of immediate family members may be related positively to foreign-language achievement.

Method

Participants

The sample comprised 184 students enrolled in Spanish (60.3%), French (27.2%), German (9.8%), and Japanese (2.7%) introductory, intermediate, and advanced courses at a midwestern university. Students participated voluntarily and were required to sign an informed consent document. A Kruskal-Wallis one-way analysis of variance (ANOVA) revealed no differences in foreign-language achievement ($p > .05$) among students enrolled in the four language areas. In addition, ANOVA revealed no achievement differences ($p > .05$) with respect to level of course (i.e., introductory, intermediate, and advanced). Therefore, the responses of all participants were combined.

The ages of the respondents ranged from 18 to 71 ($M = 22.5, SD = 6.4$); 34.2% were men. The participants consisted of freshmen (16.4%), sophomores (18.6%), juniors (30.1%), seniors (31.7%), and graduate students (3.3%). Those students represented more than 30 degree programs from the Colleges of Business Administration, Education, Fine Arts and Communication, Health and Applied Sciences, Liberal Arts, and Natural Sciences and Mathematics, with a mean GPA of 3.1 ($SD = 0.6$). The majority of students (60.3%) were required to take the language course as part of their degree program. The overall course load of the participants ranged from 1 to 9 ($M = 5.1, SD = 1.2$). In addition, 84.8% of the participants had studied a foreign language formally in high school, whereas 33.2% had done so in college. The majority of students (56%) had never left the United States; of those who had, the number of countries visited ranged from 1 to 9. Approximately one fifth (18.5%) of the students had immediate family members whose native language was not English.

Instruments and Procedures

A battery of instruments used in this study included the Foreign Language Classroom Anxiety Scale (FLCAS), the Self-Perception Profile for College Students (SPPCS), the Social Interdependence Scale (SIS), the Academic Locus of Control Scale (ALC), the Study Habits Inventory (SHI), and the Background Demographic Form (BDF). Participants were given the questionnaire packet containing the six instruments during the fourth week of the semester. They were instructed to complete the battery of instruments at home and to return it within 2 weeks.

The FLCAS, developed by Horwitz et al. (1986), is a 33-item Likert-type questionnaire that assesses the degree to which students feel anxious during language class. The scale has been shown to be both reliable and valid, with an alpha coefficient of .93 and an 8-week, test-retest coefficient of .83 (Horwitz, 1991; Horwitz et al., 1986). Validity was established (Horwitz, 1991) via significant correlations with communication apprehension, as measured by McCroskey’s (1970) Personal Report of Communication Apprehension, and with test anxiety as measured by Sarason’s (1978) Test Anxiety Scale. Aida (1994), using a sample of 96 students in a second-year Japanese course, reported a Cronbach’s alpha coefficient of .94.

The SPPCS is a 54-item scale comprising 13 subscales (Neemann & Harter, 1986). Many of the subscales were not considered relevant for this study (e.g., perceived athletic competence, romantic relationships, close relationships, parent relationships, and morality). Thus, we used the following three subscales: (a) perceived intellectual ability, (b) perceived scholastic competence, and (c) perceived self-worth. According to Neemann and Harter, the reliabilities of the subscales, as assessed by coefficient alpha, range from .84 to .86.

The SIS, developed by Johnson and Norem-Hebeisen (1979), is a 22-item, 5-point Likert-type questionnaire measuring individuals’ cooperative, competitive, and individualistic perceptions. Scores on the cooperative (7 items) and individualistic (7 items) scales range from 7 to 35, whereas scores on the competitive scale (8 items) range from 7 to 40. The higher the score on each scale, the more cooperative, competitive, or individualistic the respondents consider themselves to be. Scores on the scales are relatively independent so that a student conceivably could receive a high score on all three scales. Jones, Slate, and Marini (1995) found that reliability, as measured by coefficient alpha, is...
.94 for the cooperative scale, .85 for the competitive scale, and .73 for the individualistic scale.

The ALC, developed by Trice (1985), has 28 true-false items related to personal control over academic outcomes. Scores range from 1 (strongly internal locus) to 28 (strongly external locus). Coefficient alpha reliability has been found to range from .68 (Agnew, Slate, Jones, & Agnew, 1993) to .70 (Trice, 1985).

The SHI, developed by Jones and Slate (1992), consists of 63 true-false items that assess the typical study behaviors of college students. Thirty items describe effective study behaviors and 33 items specify ineffective study behaviors. The latter items are key-reversed such that total scale scores range from 0 to 63, with high scores indicating good study skills. The SHI has been found by its authors to be reliable, as measured by a mean alpha coefficient of .85 and a 2-week test-retest coefficient of .82. Validity of the SHI has been established through significant correlations with college students’ grades (Jones & Slate, 1992). The BDF, developed specifically for this study, extracted relevant demographic information such as age, sex, ethnicity, degree program, year of study, native language, and countries visited.

Finally, foreign-language achievement was measured using students’ course averages. The global measure was selected over isolated measures of specific skills to maximize the external validity (i.e., generalizability) of the findings. Use of numerical averages according to the diverse achievement measures reflected in the course grades of this study is consistent with Gardner and MacIntyre’s (1993) recommendation to include “many different measures of second-language achievement in studies concerned with affective correlates of achievement” (p. 182). To adjust for differences in teacher characteristics (e.g., effectiveness, experience, motivation, and testing and scoring standards), we used standardized course averages instead of raw averages. Standardized course averages (i.e., z scores) were computed for each student by subtracting the average achievement score of the foreign-language class to which the student belonged from the student’s course average and then dividing by the class standard deviation.

Data Analysis

Pearson’s product–moment correlation coefficients (i.e., zero-order correlation coefficients) were used to assess the relationship between foreign-language achievement and each of the 18 independent variables. Correlation coefficients, which can vary from −1 to +1, help to determine both the magnitude and direction of pairwise relationships. The sign of the magnitude verifies whether the relationship is positive or negative, whereas the numerical part of the correlation coefficient indicates the magnitude of the relationship. The closer the correlation coefficient is to 1 or −1, the greater the relationship between the variables.

Unfortunately, although the correlation coefficient is perhaps the most common inferential statistic used by researchers, it is subject to a serious limitation. Specifically, because a correlational analysis can be viewed as assessing the contribution of an independent variable in isolation to a dependent variable, it typically does not honor, in the optimal sense, the nature of reality that most researchers want to study. The reason is because most phenomena involve multiple effects. Tatsuoka (1973) asserted the following:

The often-heard argument, “I’m more interested in seeing how each variable, in its own right, affects the outcome” overlooks the fact that any variable taken in isolation may affect the criterion differently from the way it will act in the company of other variables. It also overlooks the fact that multivariate analysis—precisely by considering all the variables simultaneously—can throw light on how each one contributes to the relation. (p. 273)

Thus, multiple regression was the major analysis used in the present study. Multiple regression is a statistical procedure in which scores on one or more variables (i.e., independent variables) are used to predict scores on another variable (i.e., dependent variable). Specifically, we used all possible subsets (APS) multiple regression (Thompson, 1995) to identify an optimal combination of cognitive, affective, personality, and demographic variables (i.e., independent variables) that predicted levels of foreign-language achievement (dependent variable). All possible models involving some or all of the independent variables were examined (Thompson, 1995). In APS regression, separate regressions are computed for all independent variables singly, all possible pairs of independent variables, all possible trios of independent variables, and so forth, until the best subset of independent variables is identified according to some criterion. For this study, the criterion used was the maximum proportion of variance explained (R²), which provides an important measure of effect size (Cohen, 1988). That is, R², which lies from 0% to 100%, measures the extent to which the independent variables involved in the model combine to predict the dependent variable. The utility of effect sizes is that they can be compared across studies. According to Hocking (1976), APS regression leads to an identification of the model with the largest R² for each of the number of variables considered. APS regression is different from stepwise regression, in which the order of entry of variables is based solely on statistical criteria. Stepwise regression is not guaranteed to find the model with the largest R² (Hocking 1976), and thus most statisticians do not recommend this type of analysis, preferring the use of APS regression (Hubert, 1989; Thompson, Smith, Miller, & Thomson, 1991).³

We also used multiple regression techniques to assess the relative contribution of each of the independent variables in the prediction of foreign-language achievement (Tabachnick & Fidell, 1989). Specifically, we used squared semipartial correlation coefficients and squared partial correlation coefficients to assess each variable’s unique contribution. Squared semipartial correlation coefficients, also known as part correlations, represent the amount by which R² is
reduced if a particular independent variable is removed from the regression equation. That is, squared semipartial correlation coefficients express the unique contribution of the independent variable as a proportion of the total variance of the dependent variable (Cohen, 1988). According to Tabachnick & Fidell, (1989, p. 151), “the squared semi-partial correlation is a very useful measure of the importance of an independent variable.” Similarly, squared partial correlation coefficients express the unique contribution of the independent variable as a proportion of $R^2$. In this study, we used squared partial correlation coefficients like $R^2$ directly as effect-size estimates (Cohen, 1988).

We used Cohen’s (1988) criteria to assess the contribution of the independent variables. According to Cohen, for multiple regression models in the behavioral sciences, squared partial correlation values between 2% and 12.99% suggest small effect sizes; values between 13% and 25.99% indicate medium effect sizes; and values of 26% and greater suggest large effect sizes. These same criteria were used to assess whether the proportion of variance explained by the independent variables, $R^2$, was suggestive of a small, medium, or large effect.

Results

Table 1 reports the correlations between foreign-language achievement scores and each of the cognitive, affective, personality, and demographic variables.

**Correlations With Cognitive Variables**

Of the three cognitive variables, two were significantly related to foreign-language achievement (see Table 1). Those variables were academic achievement and a student’s expectation of her or his achievement in a foreign-language course. Specifically, students with the lowest levels of foreign-language performance tended to have the lowest levels of overall academic achievement and the lowest expectations of their achievement in the foreign-language course.

**Correlations With Affective Variables**

Three of the four affective variables were significantly related to foreign-language achievement, namely, foreign-language anxiety, perceived intellectual ability, and perceived scholastic competence. Only perceived self-worth was not associated with foreign-language performance. Those findings suggest that low foreign-language achievers tended to have the highest levels of foreign-language anxiety and the lowest levels of perceived intellectual ability and perceived scholastic competence.

**Correlations With Personality Variables**

Levels of cooperativeness and individualism were associated with foreign-language achievement. Specifically, stu-

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<tr>
<th>Variable</th>
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<tr>
<td>Cognitive</td>
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<td>Expectation of foreign-language achievement</td>
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<td>Affective</td>
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<td>Foreign-language anxiety</td>
<td>-.33***</td>
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<tr>
<td>Perceived intellectual ability</td>
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</tr>
<tr>
<td>Perceived scholastic competence</td>
<td>.29***</td>
</tr>
<tr>
<td>Perceived self-worth</td>
<td>.02</td>
</tr>
<tr>
<td>Personality</td>
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<tr>
<td>Cooperativeness</td>
<td>-.22**</td>
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<tr>
<td>Competitiveness</td>
<td>.12</td>
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<tr>
<td>Individualism</td>
<td>.15*</td>
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<tr>
<td>Locus of control</td>
<td>-.08</td>
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<tr>
<td>Demographic</td>
<td></td>
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<tr>
<td>Gender</td>
<td>.16*</td>
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<tr>
<td>Age</td>
<td>-.07</td>
</tr>
<tr>
<td>Semester course load</td>
<td>.03</td>
</tr>
<tr>
<td>Number of countries visited</td>
<td>.04</td>
</tr>
<tr>
<td>Number of high school foreign-language courses taken</td>
<td>.17*</td>
</tr>
<tr>
<td>Status of present foreign-language course course</td>
<td>-.11</td>
</tr>
<tr>
<td>Foreign-language proficiency of immediate family members</td>
<td>-.04</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001.

Dents with the lowest levels of foreign-language achievement tended not to be individualistic but were oriented toward cooperativeness.

**Correlations With Demographic Variables**

Two of the seven demographic variables significantly correlated with foreign-language achievement: gender and the number of high school foreign-language courses taken. That is, low foreign-language achievers tended to be men and to have taken the least number of high school foreign-language courses.

**Multiple Regression Findings**

The APS multiple regression analysis (Table 2) revealed the following variables that contributed significantly ($p < .001$) to the prediction of foreign-language achievement: foreign-language anxiety, gender, academic achievement, expected overall average for current language course, and value placed on cooperative learning. The five items comprised two cognitive variables (academic achievement, students’ expected level of achievement in their foreign-language courses), one affective variable (foreign-language anxiety), one personality variable (cooperativeness), and one demographic variable (gender), which combined to explain 34.2% of the variation in foreign-language achievement. We used Cohen’s (1988) criteria to assess the predic-
tive power of a set of independent variables in a multiple regression model; the proportion of variance explained indicates a large effect size because it exceeded 26%.

The selected regression model suggests that students with the lowest levels of foreign-language achievement tended to have at least one of these characteristics: male, low-academic achievers, high levels of foreign-language anxiety, low expectations of their overall average for the current language course, and valued cooperative learning. The squared semipartial correlation coefficients (Table 2) indicate that overall academic achievement was the best predictor, explaining 11.5% of the variance in foreign-language achievement. Foreign-language anxiety, the next best predictor, explained 10.5% of the variance. Expectation of overall average for the current language course explained 5% of the variance, followed by gender and value placed on cooperative learning, each of which explained 3.6% of the variance. Table 2 also reports the squared partial correlation coefficients. As recommended by Cohen (1988), we used the values to assess the effect sizes with respect to each of the selected independent variables. The criteria set by Cohen (1988) for squared partial correlation coefficients suggest that the effect sizes pertaining to academic achievement and foreign-language anxiety approached moderate levels, whereas those pertaining to expectation of overall average for the current language course, gender, and value placed on cooperative learning, were small.

**Comparison of Findings From Correlational and Multiple Regression Analyses**

The correlational analyses revealed that the following nine variables were significantly related to foreign-language achievement: foreign-language anxiety, gender, academic achievement, expected final foreign-language course average, and cooperativeness; perceived scholastic competence, perceived intellectual ability, individualism, and number of high school foreign-language courses taken. The APS regression analysis indicated that the following five variables predicted foreign-language performance: foreign-language anxiety, gender, academic achievement, expected final foreign-language course average, and cooperativeness. A comparison of the sets of variables indicates a high degree of similarity. Nevertheless, although perceived scholastic competence, perceived intellectual ability, individualism, and number of high school foreign-language courses taken were identified by the correlation analysis, they did not appear in the multiple regression model. That apparent inconsistency should not be surprising because of the differences between correlational and multiple regression analyses. In most cases, univariate/bivariate and multivariate analyses of the same data tend to yield results that differ with respect to statistical significance and effect sizes (Fish, 1988).

An analysis of the intercorrelations among the nine independent variables helps us explain why the four variables that emerged as significant in the correlational analysis were no longer identified as important in the regression analysis. Perceived scholastic competence was related to three variables that were significant predictors of foreign-language achievement, namely: foreign-language anxiety, academic achievement, and expected final foreign-language course average (see Table 3). That finding suggests that, once the three variables are in the regression model, the predictive power of perceived scholastic competence is diminished. In other words, by itself, perceived scholastic competence is an important predictor of foreign-language achievement. However, in explaining second-language acquisition, knowledge of students’ perceived scholastic competence does not appear to be as important as does knowledge of their GPA, their expected final foreign-language course average, and their level of foreign-language anxiety. That result is not surprising, especially with respect to the latter two variables, because they are more directly pertinent to foreign-language learning than is perceived scholastic competence, which is a more global construct. Also, overall academic achievement is more important than

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**Table 2.—Selected Multiple Regression Model for Predicting Foreign-Language Achievement**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>Standard error</th>
<th>t value</th>
<th>Standardized coefficient</th>
<th>Squared semipartial correlation (%)</th>
<th>Squared partial correlation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.64</td>
<td>0.89</td>
<td>-0.73</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Foreign-language anxiety</td>
<td>-0.40</td>
<td>0.09</td>
<td>-4.28***</td>
<td>-0.29</td>
<td>10.5</td>
<td>13.8</td>
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<tr>
<td>Gender</td>
<td>0.34</td>
<td>0.12</td>
<td>2.82**</td>
<td>0.17</td>
<td>3.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Academic achievement</td>
<td>0.50</td>
<td>0.10</td>
<td>5.08***</td>
<td>0.32</td>
<td>11.5</td>
<td>14.9</td>
</tr>
<tr>
<td>Expectation of foreign-language achievement</td>
<td>0.02</td>
<td>0.01</td>
<td>2.39*</td>
<td>0.17</td>
<td>5.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Cooperativeness</td>
<td>-0.31</td>
<td>0.10</td>
<td>-3.11**</td>
<td>-0.19</td>
<td>3.6</td>
<td>5.1</td>
</tr>
</tbody>
</table>

*Note. Model $R^2 = .342, F(5, 178) = 18.47; Adjusted $R^2 = .323.

*p < .05, **p < .01, ***p < .001.
is perceived scholastic competence to predict foreign-language achievement, probably because performance is a more reliable indicator than self-perception.

Similarly, failure for perceived intellectual ability to be included in the regression model, despite being significantly correlated with foreign-language achievement, can be explained by the fact that the variable was related to both foreign-language anxiety and expected final foreign-language course average (Table 3). That failure indicates that perceived intellectual ability does not add to the prediction of foreign-language performance once the variables are in the model.

Because individualism was related to foreign-language anxiety and cooperativeness (Table 3), the latter two variables, once in the regression model, likely made the inclusion of the former variable redundant. In particular, the high correlation between individualism and cooperativeness ($r = -.64$) indicates a large degree of overlap between the variables; cooperativeness appeared to dominate individualism with respect to the prediction of foreign-language achievement.

Finally, the presence of foreign-language anxiety, gender, expected final foreign-language course average, and cooperativeness in the regression model apparently diminished the role of number of high school foreign-language courses taken. In particular, it is likely that little or no exposure to high school foreign-language courses tends to induce low expectations of one’s ability to perform in foreign-language classes, in addition to relatively higher levels of foreign-language anxiety. Consequently, once anxiety and course expectation are modeled, knowledge of students’ foreign-language exposure in high school is no longer particularly informative in terms of foreign-language performance.

**Discussion**

The purpose of this study was to explore the contributions of various cognitive, affective, personality, and demographic variables with respect to the prediction of foreign-language achievement. This study is unique for the following reasons: (a) Achievement at all levels in the college foreign-language curriculum and in more than one foreign-language was studied, (b) a global measure of achievement was used, (c) raw scores were converted to standardized scores to adjust for differences in teacher grading characteristics, and (d) an adequate subject-to-variable ratio was maintained.

The major finding in this study is that each class of variables was represented in the selected regression model. The fact that a cognitive variable (academic achievement) explains the greatest proportion of the variance in foreign-language achievement is consistent with Ehrman and Oxford (1995), who found that this class of variables occupies the first tier regarding explanatory power. The finding that an affective variable (foreign-language anxiety) was the next best predictor of foreign-language achievement also is in accordance with those authors, because they concluded that "affective factors . . . are clearly the second echelon" (Ehrman & Oxford, 1995, p. 82). Academic achievement and foreign-language anxiety combined to explain approximately 22% of the variance in foreign-language achievement, which represents a medium to large effect size.

Two prior investigations in particular have reported that foreign-language anxiety explains a greater proportion of variance in foreign-language achievement than that found in the present study. Sanchez-Herrero and Sanchez (1992) reported that student anxiety in learning a foreign-language accounted for 38% of the variance in English achievement among sixth-, seventh-, and eighth-grade students in a public school in Madrid, Spain. However, those authors used stepwise regression procedures and an anxiety instrument with only modest internal-consistency reliabilities. Thus, their findings should be viewed with caution. Horwitz (1991), after partialing out test anxiety, estimated that foreign-language anxiety accounts for approximately 25% of the variance in foreign-language performance. Because the

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**Table 3. Intercorrelations Among Independent Variables With Significant Zero-Order Correlations**

(With Foreign-Language Achievement)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>1. Foreign-language anxiety</td>
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<td>2. Gender</td>
<td>.14*</td>
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<tr>
<td>3. Academic achievement</td>
<td></td>
<td>-.03</td>
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<tr>
<td>4. Expected final foreign-language course average</td>
<td></td>
<td></td>
<td>-.46***</td>
<td>-.02</td>
<td>.20**</td>
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<tr>
<td>5. Cooperativeness</td>
<td></td>
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<td></td>
<td>-.11</td>
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<td></td>
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<tr>
<td>6. Perceived scholastic competence</td>
<td></td>
<td></td>
<td></td>
<td>-.40***</td>
<td>-.10</td>
<td>.30***</td>
<td>.21*</td>
<td>.07</td>
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<tr>
<td>7. Perceived intellectual ability</td>
<td></td>
<td></td>
<td></td>
<td>-.37****</td>
<td>-.12</td>
<td>.06</td>
<td>.13*</td>
<td>.07</td>
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<tr>
<td>8. Individualism</td>
<td>.16**</td>
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<td>9. Number of high school foreign-language courses taken</td>
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<td>-.20**</td>
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<td>.04</td>
</tr>
</tbody>
</table>

* $p < .05$. ** $p < .01$. *** $p < .001$. 

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sample size in that study was extremely small (n = 29), however, the 10.5% of the variance explained by foreign-language anxiety in this study is likely a more accurate reflection. Nevertheless, researchers should investigate the predictive power of foreign-language anxiety in the presence of other variables.

To the extent that overall GPA may be a global measure of native-language aptitude, the finding that overall academic achievement is the best predictor of foreign-language achievement is consistent with Sparks and Ganschow (1991, 1993a, 1993b), who contended that native-language learning difficulties in mastering the phonological, syntactic, and semantic codes of language play the largest role in impeding the acquisition of a foreign language (Sparks & Ganschow, 1991). Because the percentage of variance in achievement explained by foreign-language anxiety in the present study remained large, even after controlling for academic achievement (i.e., an indicator of native language problems), it is unlikely that Sparks and Ganschow (1995, p. 240) are justified in their contention that “the problems of most FL learners will not be found by studying affective variables but by investigating how language differences affect foreign-language learning.”

If foreign-language anxiety was solely a consequence of native-language differences, then, after controlling for academic achievement, anxiety would have had no, or at least substantially lower, predictive power. It is possible that for some individuals, native-language learning problems are the main reason for their low levels of foreign-language performance, whereas for other students, anxiety is a debilitating factor. Thus, researchers should continue to explore the extent to which students with no diagnosable native-language learning differences suffer from the debilitating effects of foreign-language anxiety.

The fact that both low-achieving and high-anxious students tend to have the lowest levels of foreign-language achievement also seems to contradict Onwuegbuzie et al. (1999), who found that high academic achievers tend to have higher levels of foreign-language anxiety than do their low-achieving counterparts. On closer examination, however, the two sets of findings suggest that instructors should not assume that students who have high levels of academic achievement do not experience difficulties while learning foreign languages. It is likely that, although many high academic achievers are able to attain relatively high levels of performance in foreign-language classes, they still experience high levels of foreign-language anxiety. In the last year, an author of this study used several students’ reports of anxiety to ascertain that two of them were suffering from partial hearing loss and a third from previously undiagnosed Attention-Deficit/Hyperactivity Disorder. The GPA of the two students with hearing loss was 3.8 on a 4-point scale. Those observations underscore the importance of determining the anxiety levels of students with both low levels and high levels of academic achievement. Also, our findings suggest that interventions focusing on anxiety management and reduction may be helpful for both groups of students. In any case, researchers should investigate the potential causal relationships among academic achievement, foreign-language anxiety, and foreign-language performance.

Level of expectation, the second cognitive variable, was the third most important predictor of foreign-language achievement. The finding that students who have low expectations of their foreign-language ability tend to have low levels of foreign-language achievement might reflect the fact that students have an accurate perception of their foreign-language ability. However, that finding also suggests that a self-fulfilling prophecy prevails in which students who have low expectations of their foreign-language ability exhibit behaviors that may lead to underachievement. Onwuegbuzie et al. (1999) found that students with low self-perceptions of academic competence and foreign-language performance were more anxious. MacIntyre, Noels, and Clément (1997) reported that, with actual language proficiency controlled, anxious students tended to underestimate their competence relative to less anxious students. Researchers should continue to explore the relationship between student expectations and achievement.

Gender, a demographic variable, explained 3.6% of the variance in foreign-language achievement. Men appear to have lower levels of foreign-language achievement than do women. That finding may reflect Oxford and Ehrman’s (1993) observation that women tend to use more conscious learning strategies (e.g., metacognitive planning) than do men. However, further research is needed to determine the generalizability of that finding. To the extent that that result has high external validity, a female-oriented foreign-language culture, which is similar to the female-based “library culture” reported by Jiao, Onwuegbuzie, and Lichtenstein (1996) and Jacobson (1991) may exist, in which men (a) are less comfortable in the particular learning context, (b) may perceive that the domain is more female based, and (c) act in ways that do not maximize their ability to learn. Marsh (1995) found that female middle school students had more positive attitudes about foreign-language study than did their male counterparts.

A personality variable, cooperativeness, was the final factor that made an important contribution to foreign-language achievement. The finding that students who are oriented toward cooperative learning tend to underachieve in their foreign-language classes suggests that instructors might consider using cooperative learning groups to solve in-class problems. Cooperative learning “refers to a particular set of classroom techniques that foster learner interdependence as a route to cognitive and social development” (Oxford, 1997, p. 443). Although no single method is likely to increase student achievement, instructors could con-
sider emphasizing group work in a variety of formats (Koch & Terrel, 1991). As recommended by Foss and Reitzel (1988), students could be asked to practice reading a script orally to members of their group before reciting it in front of the whole class. Cooperative groups also could be used to practice any role-playing activities. Assigning roles such as secretary or reporter to individual students may improve self-esteem for some learners and increase effectiveness of cooperative groups (Oxford, 1997). Use of such groups also could reduce the need for instructors to call on students at random, because that action appears to increase anxiety levels (Daly, 1991).

**Conclusion**

The findings from this study largely parallel those of Ehrman and Oxford (1995) because, in this study, cognitive and affective factors appear to play the largest role in predicting foreign-language achievement. Thus, the present research represents a step nearer to determining the “degree to which . . . [Ehrman and Oxford’s] results utilizing an FSI sample—older, well educated, exceptionally highly motivated, and with a fairly clear personality structure—can be generalized to other, more common populations such as college students” (Ehrman & Oxford, 1995, p. 84). The finding that all four classes of variables were represented in the regression model highlights the complex nature of individual differences in foreign-language achievement. Although including factors such as motivation (Clément et al., 1994; Gardner, 1985; Gardner & MacIntyre, 1991; Tremblay & Gardner, 1995) and more specific measures of native-language aptitude (Sparks & Ganschow, 1991; Sparks, Ganschow, & Patton, 1995) possibly would have increased the percentage of variance explained, by maintaining the recommended subject-variable ratio we provide reliable evidence to account for more than one third of the variance in foreign-language achievement at the college level. Using Cohen’s (1988) criteria, that proportion represents a large effect size. Nevertheless, more than 65% of the variance remains unexplained. Thus, researchers should investigate the contributions made by other cognitive, affective, personality, and demographic variables to the prediction of foreign-language achievement in college.

**NOTES**

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1. Course grades were not constructed from letter grades, a potentially unstable approach, but rather, from overall percentages according to both achievement measures (quizzes and examinations) and proficiency measures (oral interviews, compositions). Instructors in this study determined final numeric percentages by averaging scores from items such as examinations, quizzes, dictations, oral interviews, homework, compositions, and participation. Although some aspects of these grades are more subjective than others (participation), grades arrived at in this manner provide a realistic measure of college-level foreign-language achievement.

2. The Kruskal-Wallis test is the most powerful nonparametric test for examining three or more independent groups. It has 95% of the power of the F statistic (ANOVA) to detect existing differences between groups. This technique tests the null hypothesis that all samples are from the same population. In this study, the Kruskal-Wallis test was used to compare the language groups instead of the parametric ANOVA because the number of Japanese students (n = 5) was small; therefore, a normal distribution could not be assumed for their anxiety scores. For a further discussion of use and interpretation of partial f tests in multiple regression, the reader is referred to Hollander and Wolfe (1973).  

3. Although stepwise regression is used by many researchers in foreign-language research, many statisticians (Beasley & Leitner, 1994; Davidson, 1988; Edirsooriya, 1995; Lockridge, 1997; Moore, 1996; Thompson, 1995; Welge, 1990) identified three problems associated with this technique. First, at every step of the analysis, computer packages use incorrect degrees of freedom to compute statistical significance. Unfortunately, these incorrect degrees of freedom tend to bias significance tests in favor of declaring trivial effects as significant. Second, not only does undertaking k steps of analysis not lead to the best predictor set of size k but it is also possible that none of the predictors entered in the first k steps are even among the best predictor set of size k. Third, because the order in which the independent variables are entered in the model is influenced by sampling error, which at any step can lead to misspecification of the model and because stepwise regression typically involves several steps, this technique often produces results that are difficult to replicate (Thompson, 1995). For an extensive discussion of the major flaws associated with stepwise regression, see Huberty (1989) and Thompson, Smith, Miller, and Thomson (1991).

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