
The Learning Style Preferences of ESL Students

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Following a review of the literature on learning styles and cognitive styles for both native speakers (NSS) and nonnative speakers (NNSS) of English, this article presents the results of a questionnaire that asked 1,388 students to identify their perceptual learning style preferences. Statistical analyses of the questionnaires indicated that NNS learning style preferences often differ significantly from those of NSS; that ESL students from different language backgrounds sometimes differ from one another in their learning style preferences; that other variables such as sex, length of time in the United States, length of time studying English in the U. S., field of study, level of education, TOEFL score, and age are related to differences in learning styles; and that modifications and extensions of ESL student learning styles may occur with changes in academic environment and experience.

During the past decade, educational research has identified a number of factors that account for some of the differences in how students learn. One of these factors, learning styles, is broadly described as “cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (Keefe, 1979a, p. 4).

Considerable research in the general area of learning styles has been done with students whose native language is English (Cavanaugh, 1981; Hodges, 1982; Stewart, 1981) and with English speakers learning a second language in the United States and Canada (Ballinger & Ballinger, 1982; Birckbichler & Omaggio, 1978; Genesee & Hamayan, 1980; Hansen & Stansfield, 1981, 1982; Hosenfeld, 1979; A.G. Ramirez, 1986; Wong Fillmore, 1976).

Research on cultural differences in learning styles indicates, for example, that members of industrialized societies and members of nonindustrial societies respond to visual illusions quite differently (Glick, 1975). Lesser, Fifer, and Clark (1965), who studied ethnic

groups in elementary schools, found that the pattern of mental abilities (e.g., visual, spatial, abstract, and numerical) displayed by middle-class and lower class Chinese children differed from the pattern displayed by middle-class and lower class Jewish children. Flaugher's (1971) later study with high school students showed similar differences; indeed, research by M. Ramirez and Price-Williams (1974) and R.R. Gonzales and Roll (1985) has questioned the validity of standardized intelligence tests on the basis of cross-cultural differences in cognitive style. Research by Witkin (1976) has shown differences in the global and abstract functioning in different cultures: Different modes of thinking are characteristic of different cultures.

If, indeed, learners outside the mainstream of American culture exhibit unique learning style characteristics, then ESL students may use most of their time and effort trying to adjust to their new learning situations. Therefore, identifying the learning style preferences of nonnative speakers (NNSs) may have wide-ranging implications in the areas of curriculum design, materials development, student orientation, and teacher training.

After summarizing a generation of research on learning styles, this article describes the results of a self-reporting questionnaire designed to determine the perceptual learning styles of ESL students. The questionnaire was administered to 1,234 ESL students in 39 intensive English language programs and to 154 native-speaking university students, and the responses were statistically analyzed to identify the relationship of learning style preferences to such variables as language background, major field of study, level of education, TOEFL score, age, sex, length of time in the United States, and length of time studying in the U.S.

LITERATURE REVIEW

Native Speakers of English

Thirty years ago, educational theorists and researchers were investigating the concept of cognitive style: how the mind actually functions, how it processes information or is affected by each individual's perceptions. Various groups of researchers have worked with pieces of this complex cognitive profile; each group has its own taxonomy and terminology, though some appear to overlap.

For example, Witkin (1976), Witkin, Moore, Goodenough, and Cox (1977), and Witkin, Moore, Oltman, et al. (1977) have written widely about *field independent* (analytic) versus *field dependent*

(global) approaches to experiencing the environment and processing information, Kagan (1966) and Kagan and Messer (1975) have discussed *conceptual tempo*: reflectivity (slower, more calculated guesses) versus impulsivity (quick, risk-taking guesses) in the responses of learners. Hill (1971) has investigated *cognitive style mapping*, an inventory process that references preferred types of media, instructional strategies, and structure of the environment. Messick and Associates (1976) have listed more than 20 dimensions of cognitive style, including those of Witkin and Kagan and sensory (perceptual) modality preferences. Kolb (1976, 1984) has introduced the terms *accommodator*, *diverger*, *converger*, and *assimilator* to describe particular student approaches to learning. Gregorc (1979a, 1979b) has done extensive work with his categories of learning—*concrete sequential*, *abstract sequential*, *abstract random*, and *concrete random*—which serve as indicators of a learner’s mediation abilities and capacities.

In the mid- to late 1970s, paradigms began to be developed to identify the more external, applied modes of learning styles. *Style* refers to a pervasive quality in the learning strategies or the learning behavior of an individual, “a quality that persists though the content may change” (Fischer & Fischer, 1979, p. 245). Seminal research by Dunn and Dunn (1972) resulted in *The Learning Style Inventory* (Dunn, Dunn, & Price, 1975), a self-reporting questionnaire that enables public school students to identify their learning style preferences. Among the 21 identified learning styles, R. Dunn (1983) and Dunn and Dunn (1979) have reported on *perceptual* learning styles, a term that describes the variations among learners in using one or more senses to understand, organize, and retain experience.

Research with U.S. school children (R. Dunn, 1983, 1984; Reinert, 1976) has demonstrated that learners have four basic perceptual learning channels (or modalities):

1. Visual learning: reading, studying charts
2. Auditory learning: listening to lectures, audiotapes
3. Kinesthetic learning: experiential learning, that is, total physical involvement with a learning situation
4. Tactile learning: “hands-on” learning, such as building models or doing laboratory experiments

Research that identifies and measures perceptual learning styles relies primarily on self-reporting questionnaires by which students select their *preferred* learning styles (see Babich, Burdine, Allbright,

& Randol, 1975; Dunn, Dunn, & Price, 1975, 1979; Kolb, 1976; Reinert, 1970).

The research findings of the Dunns and their colleagues verify that most students do correctly identify their learning strengths, particularly when an element is strongly preferred or rejected (R. Dunn, 1984). Dunn and Dunn (1979) found that only 20-30% of school age children appear to be auditory learners, that 40% are visual, and that the remaining 30-40% are tactile/kinesthetic, visual/tactile, or some other combination. Price, Dunn, and Sanders (1980) found that very young children are the most tactile/kinesthetic, that there is a gradual development of visual strengths through the elementary grades, and that only in fifth or sixth grade can most youngsters learn and retain information through the auditory sense. Carbo (1983), investigating the perceptual styles of readers, found that good readers prefer to learn through their visual and auditory senses, while poor readers have a stronger preference for tactile and kinesthetic learning.

Farr (1971), who asked postsecondary students to identify their learning style preferences through self-reporting questionnaires, reported that their preferred learning styles paralleled their actual learning strengths. In another postsecondary study, Domino (1979) found that college students taught in preferred learning styles scored higher on tests, fact knowledge, attitude, and efficiency than those taught in instructional styles different from their preferred styles.

The questions of the identification and classroom application of both student- and teacher-preferred styles are discussed in *Student Learning Styles: Diagnosing and Prescribing Programs* (Keefe, 1979b) and *Student Learning Styles and Brain Behavior: Programs, Instrumentation, Research* (Keefe, 1982). In addition, a host of articles on cognitive and learning styles (unfortunately, the two terms are sometimes used interchangeably) in elementary (e.g., Carbo, 1984; Pizzo, 1982), secondary (e.g., Douglass, 1979; Garger & Guild, 1984; Zampagna, Gentile, Papila, & Silber, 1976), postsecondary (e.g., Grasha, 1984; Pettigrew & Zakrajsek, 1984; Sapp, Elliott, & Bounds, 1983; Schmeck & Grove, 1979), adult education (e. g., Dorsey & Pierson, 1984), and vocational education (e.g., Birkey, 1984; Fourier, 1984; Gregorc & Butler, 1984; Walker, Merryman, & Staszkiwicz, 1984) journals attest to the breadth of current research.

Second Language Learners

Interest and research in second language learning styles has focused on cognitive styles (with some behavioral applications) and

on conscious learning strategies. Much of the work concerns the interaction of cognitive styles and affective variables with situational demands (Brown, 1974; Ely, 1986; Hatch, 1974; Heyde, 1977; Naiman, Fröhlich, & Todesco, 1975; Tarone, Swain, & Fathman, 1976; Tucker, Hamayan, & Genesee, 1976). Other studies have concentrated on the role of affective elements and cognitive styles in academic achievement (Abraham, 1983; d'Anglejan, Painchaud, & Renaud, 1986; Bassano, 1986; Bialystok, 1985; Chapelle & Roberts, 1986). Wong Fillmore (1986) has studied the process of learning English in bilingual and ESL classrooms, in particular the role of cultural factors in second language acquisition. The conscious learning strategies of NNS students (e.g., practicing, monitoring, inferencing, memorizing, and self-directed learning) have also been investigated (Bialystok & Frohlich, 1978; Carver, 1984; Krashen, 1982; Oxford-Carpenter, 1985; Wenden, 1984, 1986a).

Finally, recent studies have investigated culture-specific modes of learning (Scribner & Cole, 1981; Wagner, Messick, & Spratt, 1986). Omaggio (1978) and Cohen (1984) have indicated that NNSs can successfully identify and describe second language learning strategies. Other research includes Wong's (1985) discussion of the "sensory generalist" learning style of limited English proficient Asian students and Wenden's (1986b) overview of the successful language learner. This research in second language learning has revealed that individuals vary in the strategies they employ because of differences in learning styles, affective styles, and cognitive styles.

There is no published research that describes the perceptual learning style preferences of NNSs. Preuniversity ESL students, with their variety of language and cultural backgrounds and their differences in age and previous education, often come together in intensive English language programs in which they are taught homogeneously by teachers who have little knowledge of learning styles. ESL instructors often use methods and materials that have been developed with the learning needs of native speakers of English in mind. In many cases, neither students nor teachers are aware that difficulty in learning class material, high frustration levels, and even failure may not rest solely in the material itself. The study reported in this article was designed to provide baseline data for future research on the perceptual learning style preferences of NNSs and to provide insights for the ESL classroom.

THE SURVEY: DESIGN, SUBJECTS, AND PROCEDURES

A self-reporting questionnaire was developed on the basis of existing learning style instruments, with modifications suggested by NNS informants and U.S. consultants in the fields of linguistics, education, and cross-cultural studies. The survey, which was constructed and validated for NNSs, consisted of randomly arranged sets of 5 statements on each of the six learning style preferences to be measured: visual, auditory, kinesthetic, tactile, group learning, and individual learning (see Appendix). Validation of the questionnaire was done by the split-half method. Correlation analysis of an original set of 60 statements (10 per learning style) determined which 5 statements should remain within each subset.

The survey, including instructions for administration, was mailed to 43 university-affiliated intensive English language programs across the United States, the faculties of which had volunteered to participate in the study. All NNSs in high intermediate or advanced ESL classes in those programs were asked to respond on a voluntary basis to the questionnaire as it applied to their learning English as a foreign language. In addition, 154 native speakers of English involved in various graduate and undergraduate major fields at Colorado State University voluntarily completed the survey instrument. A total of 1,234 questionnaires were returned from 39 of the 43 participating intensive English language programs. Respondents representing 98 countries, 29 major fields of study, and 52 language backgrounds completed the questionnaire. Table 1 summarizes data on the respondents for eight variables.

The individual student variables and the responses from the questionnaires were statistically analyzed. Preference means for each set of variables were classified into three ranges: major, minor, and negative learning style preferences. Analysis of variance and multiple comparison of means tests were run on the preference means ($p < .05$). (Significance from the multiple comparison of means analysis was determined on the basis of the Scheffé test because it is the most valid test for unequal sample sizes and the only one of the seven SPSS multiple comparison of means tests that uses paired comparison of means and maintains total experiment Type I error at $< .05$.)

RESULTS AND DISCUSSION

Generally speaking, the results of this study showed that ESL students strongly preferred kinesthetic and tactile learning styles. Most groups showed a negative preference for group learning.

TABLE 1
Overview of Learning Style Questionnaire Variables

Age	n	Language	n	TOEFL	n
15-19	342	Arabic	193	300-349	2
20-24	532	Spanish	205	350-399	9
25-29	235	Japanese	130	400-449	64
30-34	87	Malay	113	450-474	74
35-39	43	Chinese	90	475-499	97
40-44	16	Korean	118	500-524	120
45-49	4	Thai	47	525-549	104
50-54	3	Indonesian	59	550-574	73
55+	1	English	154	575+	63
		Other	261		

Length of time in U.S.		Length of time studying English in U.S.	
	n		n
Less than 3 months	428	Less than 3 months	511
3-6 months	272	3-6 months	266
7-11 months	149	7-11 months	133
12-17 months	151	12-17 months	131
18 months-2 years	66	18 months-2 years	48
Over 2 years	17	Over 2 years	13
Over 3 years	103	Over 3 years	53

class	n	Major field	n	sex	n
Graduate	424	Engineering	268	Male	849
Undergraduate	851	Business	277	Female	481
		Humanities	171		
		Computer science	130		
		Hard sciences	54		
		Medicine	43		
		Other	420		

Note: Discrepancies between the totals for each variable and the total number of subjects (or of NNSs) are due to the fact that not every subject supplied the requested information.

Surprisingly, one finding of this learning style preference study was similar to that of a prior pilot project (Reid, 1983): Among all the NNS language groups, Japanese speakers most frequently were significantly different in their preferences.

Graduate/Undergraduate and Male/Female

Graduate students indicated a significantly greater preference for visual and tactile learning than undergraduates, $F(1, 1230) = 29.520$, $p = .0000$, and $F(1, 1210) = 23.065$, $p = .0000$, respectively;

undergraduates were significantly more auditory than graduates, $F(1, 1225) = 7.147, p = .0076$. Both graduates and undergraduates strongly preferred to learn kinesthetically and tactilely. Males preferred visual and tactile learning significantly more than females, $F(1, 1281) = 4.144, p = .0420$, and $F(1, 1260) = 5.665, p = .0175$, respectively.

Major Fields

Statistical analysis did not provide as many significant differences as anticipated, but the results seemed logically consistent (see Table 2). In general, responses for all six major fields indicated that kinesthetic learning was a major learning style preference and that group learning was considered a negative learning style by students in all major fields except computer science. Visual learning was selected as a major learning style only by students in hard sciences; surprisingly, humanities majors were the least oriented toward visual learning. Students in four major fields preferred auditory learning as a major learning style: computer science, hard sciences, business, and medicine. Engineering and computer science majors were significantly more tactile than humanities majors (Scheffé test, $p < .05$); students in all fields except hard sciences indicated that individual learning was a minor learning style.

TABLE 2
Learning Style Preference Means According to Major Field

Major field	Learning style					
	Visual	Auditory	Kinesthetic	Tactile	Group	Individual
Engineering	13.28	13.36	14.58	14.10	11.39	12.34
Medicine	13.31	13.55	13.98	13.30	10.59	13.16
Business	13.07	13.58	14.48	13.81	10.70	12.65
Computer science	13.31	13.89	14.51	14.54	11.53	12.77
Hard sciences	13.70	13.83	14.25	13.83	10.42	13.65
Humanities	12.80	13.26	14.23	13.02	10.96	12.68

Note: Preference means 13.50 and above = major learning style preference; means of 11.50–13.49 = minor learning style preference; means of 11.49 or less = negative learning style preference.

Related learning styles research with native speakers of English suggests that students who shift majors during their academic careers enter fields that are more compatible with their cognitive styles (Witkin, Moore, Oltman, et al., 1977), and some research

suggests that people with certain learning styles probably prefer different content areas (Grasha, 1984). Further research into the learning style preferences of ESL students in major fields might focus on similarities to and differences from native English speakers.

Age and TOEFL Score

Although statistical analysis did not result in significant differences for these variables, the trends in learning style preferences were interesting. First, the older the student, the higher the preference means for visual, auditory, kinesthetic, and tactile learning. The learning style preferences of students with higher TOEFL scores more closely paralleled those of native speakers of English. Whether these trends indicate a difference in the ways older students or students with greater language proficiency respond to questionnaires or whether they indicate that these students generally approach learning with more sensory (perceptual) modalities is another area for future research.

Length of Time in the U.S. and Length of Time Studying English in the U.S.

Statistical analyses of these variables generally were consistent with analyses of previous variables. For example, respondents selected kinesthetic and tactile major learning styles, and their negative learning style was group learning. In addition, the auditory learning style demonstrated an interesting trend: The longer students had lived in the United States, the more auditory their preference became. Students who had been in the U.S. more than 3 years were significantly more auditory in their learning style preferences than those students who had been in the U.S. for shorter periods of time (Scheffé test, $p < .05$). Two research questions immediately come to mind. First, do students who have had more "in country" experience with the language simply become more comfortable with auditory learning? Second, and perhaps more important, do students *become* more auditory as they adjust to U.S. academic classrooms (that is, do their learning style preferences change) ?

Another interesting trend indicated that students who had studied English in the United States for more than 3 years were somewhat lower in their preference means for visual, kinesthetic, and group learning than all other student respondents. In addition, students

who had studied English in the U.S. for more than 3 years were less tactile in their learning style preferences than students who had been studying English in the U.S. for shorter periods of time. These results also raise a question: When students have lived and studied for an extended time in the U. S., do they adapt their learning styles to the demands of the educational system? In this study, the learning style preference means of the NNSs who had lived and studied in the U.S. the longest more closely resembled the preference means of native speakers of English.

Language Background

Nine language backgrounds, including English, were analyzed; Table 3 gives an overview of major, minor, and negative learning style preferences of students from the nine language backgrounds.

TABLE 3
Learning Style Preference Means According to Language Background

Language	Learning style					
	Visual	Auditory	Kinesthetic	Tactile	Group	Individual
Arabic	13.75	14.06	15.09	14.53	11.51	12.84
Spanish	13.39	13.29	15.11	14.18	10.79	12.79
Japanese	12.52	12.67	13.29	13.32	10.35	12.05
Malay	12.84	13.14	14.33	13.54	12.75	11.65
Chinese	13.55	14.09	14.62	14.52	11.15	12.41
Korean	14.07	13.73	14.58	14.48	11.42	12.46
Thai	13.40	12.83	14.63	14.09	11.49	12.94
Indonesian	13.41	13.78	13.90	13.47	11.15	13.07
English	12.12	13.82	13.64	12.69	10.08	13.13

Note: Preference means 13.50 and above = major learning style preference; means of 11.50–13.49 = minor learning style preference; means of 11.49 or less = negative learning style preference.

Visual learning. Of all language backgrounds, Korean students were the most visual in their learning style preferences; they were significantly more visual than U.S. and Japanese students (Scheffé test, $p < .05$). Arabic and Chinese language groups were also strong visual learners. The selection of visual learning as a minor rather than a major preference by native speakers of English appears to conflict with previous learning style research, much of which reports that “mainstream culture emphasizes visual learning through the written word” (Bennett, 1979, p. 266).

Auditory learning. Japanese speakers were the least auditory of all learners and were significantly less auditory than Arabic and Chinese speakers (Scheffé test, $p < .05$), who expressed a strong preference for auditory learning. Considering that the Arabic sound system most closely parallels English, this result is not surprising. However, the choice of auditory learning by Chinese speakers as a major learning style and the rather similar preference means of the Korean, Indonesian, and English speakers, all of whom chose auditory learning as a major learning style, are results that bear close examination in future research. Thai, Malay, and Spanish students identified auditory learning as a minor learning style.

Kinesthetic learning. Most ESL students strongly preferred kinesthetic learning as a major learning style. However, Japanese speakers were significantly less kinesthetic than Arabic, Spanish, Chinese, Korean, and Thai speakers (Scheffé test, $p < .05$). The strength of most ESL student preference means for kinesthetic learning (i.e., experiential, total physical involvement in learning) has implications for both teachers and students in intensive English language programs. Moreover, although the native speakers of English had the second lowest preference mean in this area, the mean is still indicative of a major learning style preference; it appears that U.S. university students also strongly prefer experiential learning.

Tactile learning. Native speakers of English were less tactile in their learning style preferences than all NNS language backgrounds and were significantly less tactile than Arabic, Chinese, Korean, and Spanish speakers (Scheffé test, $p < .05$). The strong tactile learning style preference expressed by most NNSs, coupled with the equally strong preference for kinesthetic learning, has implications for materials development and for teacher training in intensive English language programs. However, the fact that native speakers of English chose tactile learning only as a minor learning style, as well as the trend toward lower preference means for tactile learning for NNSs who had studied longer in the United States (see above), may indicate that NNSs should be encouraged to adapt their tactile preference to one that more closely parallels that of English speakers. Additional research might focus on how often U.S. academic classes (including laboratory work) employ tactile learning.

Group and individual learning. Every language background, including English, gave group work a minor or a negative preference mean. English speakers rated group work lower than all

other language groups and significantly lower than Malay speakers (Scheffé test, $p < .05$). Research with native speakers of English appears to parallel these findings. In a study of secondary school students, Vigna and Martin (1982) found that 84% of the students preferred to work alone. It is important to consider how much group work is done in university classes and in intensive English language programs. If virtually none of the respondents chose group learning as a major learning preference and if many of those respondents indicated that group learning was a negative style, some reexamination of curricula and teaching methods by both ESL and university teachers may be in order.

None of the language groups showed a strong (major) preference for individual learning; however, English speakers rated individual learning the highest, while Malaysian students, whose preference mean for group learning was the highest among the nine language backgrounds, had the lowest preference mean for individual learning. It is probable that culture—in particular, previous educational experience—enters into student learning style preferences for group and individual learning. Additional research will help to identify those cultural and educational differences.

Overview of ESL Learning Style Preferences

Table 3 shows some interesting trends. Arabic, Chinese, and Korean students appear to have multiple major learning style preferences. For the Arabic and Chinese speakers, these results may be due to the multiple cultures involved: Both language groups included students from several countries. Another reason may be that some language and cultural groups (e.g., Korean) may be predisposed toward very positive responses on questionnaires, while others (e.g., native speakers of English) appear to respond across all available options (positive to negative).

For reasons yet unknown (although culture may certainly play a role), Japanese speakers did not, as a group, identify a single major learning style; that may be why they differed significantly in so many of the statistical analyses. On the other hand, Spanish speakers were definite in their choice of preferences: They chose kinesthetic and tactile as major learning styles; group learning as a negative style; and visual, auditory, and individual learning as minor learning styles. Malay and Thai speakers appear to have similar learning styles; moreover, Malay and Arabic speakers were the only groups to identify group learning as a minor (rather than a negative) learning style. Finally, Indonesian speakers appear to be most closely related to native English speakers; both groups chose

auditory and kinesthetic as major learning styles, group learning as a negative style, and visual, tactile, and individual learning as minor styles.

The results of the ESL learning style questionnaire seem to parallel, support, and add to previous research in several ways:

1. ESL students often differ significantly in various ways from native speakers of English in their perceptual learning styles.
2. ESL students from different language (and by extension different educational and cultural) backgrounds sometimes differ significantly from each other in their learning style preferences.
3. Analysis of other variables, such as sex, length of time spent in the United States, major field, and level of education, indicates that they differ significantly in their relationship to various learning style preferences.
4. The data suggest that as ESL students adapt to the U.S. academic environment, some modifications and extensions of learning styles may occur.

ISSUES RELATED TO THE USE OF THE DATA

Two theoretical problems arise in applying the results of this learning style preference study to NNSs: (a) how to “match” students’ learning style preferences with “teacher styles” and (b) whether or not student learning style preferences are malleable.

Matching of Student and Teacher “Styles”

Research with secondary students (Hodges, 1982) has demonstrated that “approximately 90% of traditional classroom instruction is geared to the auditory learner. Teachers *talk* to their students, *ask* questions, and *discuss* facts. However . . . only 20% to 30% of any large group could remember 75% of what was presented through discussion” (pp. 30-31). To solve this problem, some learning style theorists suggest matching teachers’ and students’ styles. In this way, students are exposed to teaching styles that are consistent with their learning styles (Barbe, Swassing, & Milone, 1979; Dunn, 1984; Dunn & Dunn, 1979; Dunn, Dunn, & Price, 1978; Gregorc, 1979b; Hunt, 1979). G. Gonzalez (1977) urges teachers in bilingual classrooms to identify individual variables and determine various approaches to achieve interaction.

However, others (Cronbach & Snow, 1977), while agreeing that the development of effective teaching behaviors is essential to student achievement (Brophy, 1986), believe that basing instructional adaptation on student preferences does not improve learning and may be detrimental. From the educator's viewpoint, schools exist to serve both society and the individual; striking that balance must necessarily limit individualized education (Davidman, 1981). Moreover, even if researchers and educators successfully develop learning style assessment procedures, specify learning outcomes, and relate educational experience to them, the actual impact on classroom teaching may be limited unless teachers can be persuaded to use that knowledge (Grasha, 1984). One solution to this problem might be to educate teachers about the possible impact of teaching and learning styles and at the same time to develop a "culture-sensitive pedagogy" (Laboratory of Comparative Human Cognition, 1986).

Adaptation of Student Learning Styles

Researchers have discovered that for both native English-speaking and bilingual/NNS elementary school children, learning styles can change as the child develops (Barbe & Milone, 1981; M. Ramírez & Castenada, 1974). However, earlier studies reported that with secondary and postsecondary students, learning styles, like aptitude, were immutable, that they remained consistent, regardless of the subject taught or the environment (Copenhaver, 1979; Reinert, 1976).

More recent research has demonstrated that young adult and adult learning styles are moderately strong habits rather than intractable biological attributes, and thus they can be modified and extended (Davidman, 1981). According to Schmeck (1981), context and task influence the learning styles of native speakers of English; many individuals can change their strategies in response to the unique contextual demands of the instruction, the context, and the task. Dorsey and Pierson (1984) conclude that age and prior work experience influence learning styles, and their data indicate that the adult, especially after age 33, learns better by doing (kinesthetic learning). Finally, Fourier (1984) suggests that more mature students "learn intuitively to adjust to instructor cognitive styles" (p. 153).

In bicultural and multicultural environments, Tarone (1979) found that style shifting occurs when the same person responds to different contexts, and Cohen (1984) indicated that second language learners can use strategies which have been shown to be

successful to accelerate learning. Recent research results by O'Malley, Chamot, Stewner-Manzanares, Küpper, and Russo (1985) and O'Malley, Chamot, Stewner-Manzanares, Russo, and Küpper (1985) suggest that second language learners can improve their language performance by being trained to use specific strategies.

IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

If educators can assume that learning styles are adaptable, that learning style preferences can be identified and modified, and that unconscious or subconscious learning styles can become conscious learning strategies, then students, native speakers of English as well as NNSs, should be exposed to the concept of learning styles. Research with native speakers of English strongly suggests that the ability of students to employ multiple learning styles results in greater classroom success (Cronbach & Snow, 1977; Stewart, 1981).

Consequently, students should have the opportunity to assess their own learning style preferences and should be encouraged to diversify those preferences. Friedman and Alley (1984) suggest that teacher guidance can initially motivate students to identify and utilize their preferred learning styles and to take deliberate advantage of those preferences. If teachers can show students the variety and versatility of learning styles by providing experiences in different teaching styles, the resulting awareness and expansion of student learning styles may better allow students to meet the demands of academic teaching methods and assignments (Grasha, 1972).

Thus, one goal of instruction could be to help students identify and assess their individual learning styles. Another could be to allow students to sample unfamiliar teaching and learning styles. Indeed, a teacher who can "purposefully exhibit a wide range of teaching styles is potentially able to accomplish more than a teacher whose repertoire is relatively limited" (Smith & Renzulli, 1984, p. 49). Another curricular solution might be to devise alternative instructional situations to accommodate the variations in learning styles that may exist in a classroom. Of course, designing and implementing the curricular alternatives require skills in a variety of teaching styles as well as the ability to manage the complexities of such a classroom.

For NNSs, the concept of learning style preferences may be completely new. The fact that students learn in different ways and the possibility that students can adapt to a variety of instructional modes may come both as a surprise and a relief. Students whose previous education differed radically from the U.S. academic

environment may benefit particularly from a discussion of learning styles, a self-assessment instrument, and experience with alternative styles that will help them function better in a university classroom. Moreover, the understanding and use of different teaching styles by the instructor, as well as the awareness of individual learning styles by the student, may influence success in the classroom.

There are, of course, dangers in the misuse of learning style assessment, diagnosis, and prescription. First, turning questionnaire results into stereotypes used to pigeonhole individuals or cultural groups denies students the opportunity to develop fully. Moreover, the variables that affect learning in general education, and in second language learning in particular, are complex. A multiplicity of interacting factors must be taken into account: the compensating role of motivation, the nature of the learning task, the relationship between teacher and student, and other situational variables (Doyle & Rutherford, 1984). In short, learning style preferences of students cannot be the sole basis for designing instruction, and prescription based on diagnosis must be tentative, varied, monitored, and verified (Gregorc, 1979a, p. 236).

In addition to the problem of the complexity of identifying learning styles, Corbett and Smith (1984) discuss the problem of the reliability of such learning style instruments as the Edmonds Learning Style Identification Exercise (Reinert, 1970). Their study showed that individual variation tended to be consistent and therefore suggestive of external reliability but that group variation lacked consistency and therefore tended to be less reliable. Gregorc (1979b) lists three shortcomings of existing self-assessment instruments: (a) The instruments are exclusive (i. e., they focus on certain variables); (b) the students may not self-report accurately; and (c) the students have adapted for so long that they may report on adapted preferences. Finally, McLaughlin (1981), in discussing the problems of analyzing inventory data, states that research

has tended to identify people on the basis of socioeconomic status, ethnicity, or IQ, rather than functional characteristics such as cognitive style, motivation, and temperament. Perhaps the most important future development is the determination of those functional characteristics that, interacting with specific treatments, influence learning. (p. 345)

For all of these reasons, both teachers and students involved in identifying and using information on learning styles should proceed with caution and be aware that no single diagnostic instrument can solve all learning problems.

Many variables related to the learning styles of NNSs need further research and analysis. Future research projects might attempt to replicate this study and to assess the accuracy of student self-assessment through classroom observation and testing. Additional refinement of student variables and subgroups, as well as the addition of new variables, would extend the research. Translation of the questionnaire into students' native languages so that it can be administered to NNSs whose English is at an elementary level would provide baseline data for a longitudinal study of those students' learning style preferences. Questions concerning the evolution, modification, and/or expansion of learning styles, and the relationship of such changes to cultural adjustment, must be answered: Do the learning styles of NNSs change as they adjust to U.S. academic classes/teachers? Do students from some cultures or some major fields of study adjust more easily or have fewer adjustments to make?

The relationships between teaching and learning styles and developmental processes also need to be studied. For example, should beginning language learners be taught initially in their preferred learning styles in order, perhaps, to reduce what Krashen (1982) calls the affective filter? Certainly, work should proceed toward integrating the complex construct of learning. Second language researchers should focus on the long-term goal of an integrated student profile—cognitive, affective, perceptual, and environmental. They should move beyond impressionistic, often redundant descriptions and toward assessment procedures that will increase the student's independence and initiative in learning.

■

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APPENDIX

Perceptual Learning Style Preference Questionnaire

Name _____ Age _____ Date _____
 Native Country _____ Native Language _____
 Graduate _____ Undergraduate _____ Male _____ Female _____
 How long did you study English in your country? _____
 How long have you been living in the U. S.? _____
 How long have you studied English in the U. S.? _____
 What is your major field? _____
 Most recent TOEFL score? _____ Date of TOEFL _____

Directions: People learn in many different ways. For example, some people learn primarily with their eyes (visual learners) or with their ears (auditory learners); some people prefer to learn by experience and/or by “hands-on” tasks (kinesthetic or tactile learners); some people learn better when they work alone, while others prefer to learn in groups.

This questionnaire has been designed to help you identify the way(s) you learn best—the way(s) you *prefer* to learn.

Read each statement on the following pages. Please respond to the statements AS THEY APPLY TO YOUR STUDY OF ENGLISH. Decide whether you agree or disagree with each statement. For example, if you *strongly agree*, mark:

strongly agree	agree	undecided	disagree	strongly disagree
x				

please respond to each statement quickly, without too much thought. Try not to change your responses after you choose them. Please use a pen to mark your choices.