USE AND MEANING OF ENGLISH SPATIAL PREPOSITIONS FOR

JAPANESE AND SPANISH-SPEAKING STUDENTS OF

ENGLISH AS A SECOND LANGUAGE

By

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SYMBOLS AND CONVENTIONS EMPLOYED

<u>In the Text</u>

* -Indicates ungrammaticality, as conventionally used by linguists

Cap Letters...example FROM -Refers to the depiction on the multidimensional scaling map

Underline...example <u>from</u> -Refers to the word in normal use or to the concept

<u>In the Appendixes</u>

_____ -Indicates strong connection and the formation of a cluster

_ _ _ _ _ _ _ _ _ -Indicates some connection and the formation of a loose cluster

CHAPTER I

INTRODUCTION

The Problem and Its Setting

English as a second language (ESL) research has shown that mastery
of prepositions for the non-native speaker is one of the last and most
difficult achievements. Through error analysis Richards (1971:205) has
examined prepositions and shown them to be (for English as a second
language learners, regardless of nationality) major sources of second
language learners' errors. Merio (1978:42) has statistically proven
prepositions to be the most problematic area for Finnish and Swedish
learners of English. In another study of Czech learners' errors,
Duškova claims that "the largest number of nonce mistakes were regis-
tered among prepositions" (Duškova 1969:15). Classroom teachers report
that experience with intensive supplemental drill programs on preposi-
tions indicates that the number of errors can be reduced but that the
overall proportion to total number of errors committed remains unac-
ceptably high, especially with intermediate and advanced students.

The frequency of occurrence of these small function words makes
their correct use desirable. Some estimates of the extent of words
which belong to the general class of words called prepositions range
as high as 9 percent of a corpus (Ghadessy 1974:307). Although gram-
marians differ on their classifications, it can be noted that no text

totally excludes such common words as <u>on</u> or <u>in</u>, whereas, depending on
the topic, common nouns such as <u>dog</u> or <u>boy</u> may be altogether omitted.
Prepositions are essential. They occur through texts of every type and
a large number are included in the major lists of the 500 most common
words (Gleason 1961:159). Prepositions comprise a form class, called
"function words," which is relatively stable. One linguist has com-
mented that "new prepositions are rare. The probability of a new [one]
in the next decade is entirely negligible" (Gleason 1961:158). Because
they can be readily identified as a corporate group and because they
show a lack of flux, prepositions are ideal for an in-depth study.

With the extent of the problem established, speculation on its
possible causes can follow. It is possible that the assignment of
meaning to words called prepositions is arbitrary and bears little
resemblance across languages. The fact that mastery is elusive for
the second language learner may be because no adequate explanations or
rules are possible. Each case may be fixed by custom rather than by
any systematic organization approximating a "rule."

A second possible explanation may be the result of a lack of
teacher correction. Possibly because prepositions are largely function
words, rather than meaning-carrying words or because they are so small
that their incorrect use does not hamper the listener's overall compre-
hension, second language learners do not receive the amount or kind of
feedback necessary to motivate correction of errors. If prepositions
are considered petty by teachers, mistakes are largely ignored, seldom
corrected. Since communication is the primary goal and intended mes-
sages of the second language learner comprehensible although erroneous,
teachers rarely give the kind of affective or cognitive disapproval

which would motivate the learner to overcome difficulties in this domain.

Hypotheses

The third possible cause is the starting point for the study at hand. I believe that English learners from different nationalities have different conceptions of the spatial universe and that their categorizations (the inventory of spatial prepositions available in their native languages) are sufficiently different from those of English to cause interference. In the study which follows I propose to illustrate the following hypotheses:

1. That both language groups will exhibit a problem with common prepositions.

2. That Spanish-speakers will differ from Japanese in the types of mistakes made.

3. That Japanese ESL students will display less understanding of the use and meaning of prepositions than their Spanish-speaking counterparts, due perhaps to the historical closeness of the two Indo-European languages.

4. That writing samples will reveal that both groups avoid using prepositions they are confused about.

5. That a comparison of semantic space representations for the three experimental groups will yield basic similarity along with distinct major differences in categorization of spatial prepositions.

Prepositions, it is obvious, cannot be directly translated from one language into another. There are overlaps and discrepancies—splits and coalescences (Brown 1980:52-54). As Clark (1968:427) states, "few

grammatical distinctions can be made among prepositions; their distinctions should be called semantic." Harvey M. Taylor, in lectures at the University of Hawaii, suggested that teachers of English attempt to make the inherent semantics of each English preposition clear for their students (Shinkawa 1979:177). This is not easy to do because even dictionaries typically define a preposition by listing its substitutes rather than indicating the denotative or connotative content of the preposition. Native speakers unerringly choose prepositions because they are able to judge, through a series of mental procedures, which preposition conveys the desired meaning. For example, over and above have roughly the same meaning, yet above differs on two scores from over. Above implies a greater extent of verticality than does over. Additionally, above does not indicate the perpendicularity that over implies.
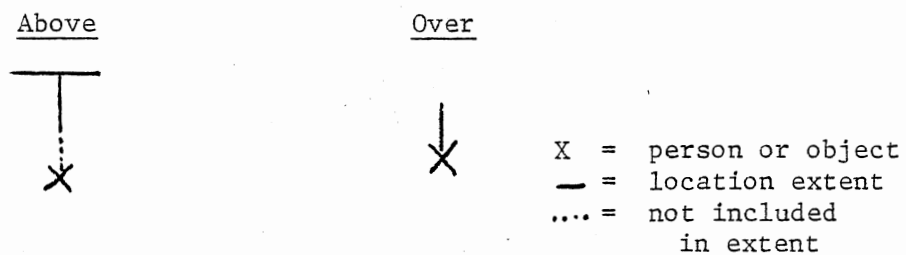
Figure 1. Above/Over Compared.

While many prepositions are substitutes for one another, as Ghadessy's (1961:307-316) elaborate study of the possible extent of overlaps for a wide range of prepositions has shown, there are some cases where substitution is not permissible without altering meaning:

1. He was wearing a bandage <u>over</u> his eye.

2. He was wearing a bandage <u>above</u> his eye.

Other structures do not allow substitution:

3. Mt. Everest is 29,000 feet <u>above</u> sea level.

4. *Mt. Everest is 29,000 feet <u>over</u> sea level.

5. The patient's temperature is <u>above</u> normal and rising even higher.

6. *The patient's temperature is <u>over</u> normal and rising even higher.

(Heaton 1965:11)

These small and subtle differences between prepositions (additional examples of which I will provide subsequently) are obvious areas of possible confusion for those learning English as a second language. Another interesting source of difficulty lies in the differing parts of speech assigned to carry the prepositional message in different languages. Hockett (1958:192) has noted that "many languages differ from English in having no separate class of prepositions." Some, like Chinese, use a verb. Others "achieve equivalent meanings morphologically, within single words: Eskimo/<u>qavuna</u>/'to the south' and /<u>qavani</u>/ 'in the south'" (Hockett 1958:192).

The various parts of speech employed by other languages are possible indicators of underlying differences in conception or categorization among language groups. The present thesis will seek to investigate the relationship of language and thought in the specific area of spatial prepositions. This intriguing possibility has been mentioned by Roger Brown. He speculates, "Differences between languages in their parts of speech may be diagnostic of differences in the cognitive psychologies of those who use the languages" (Brown 1961:508).

For this study, prepositions were chosen as the focus of attention because of the presumed objectivity of spatial reality. People, regardless of language, might be expected to see the same space relationships between objects or persons, although this is open to dispute. However, as we shall see, the separate way this objective reality is carved up, labeled, and used for communication varies from language to language. This variation, a unique testimony to human creativity, is exactly what makes the task of learning a second language occasionally problematic. Spatial relations typify this situation and are the focus of the three experiments to be detailed.

Purpose of the Study

The purpose of the current study is to investigate the meaning of English spatial prepositions for foreign students attempting to learn English, in order to determine a probable cause of difficulty for mastery. The study will consider whether there are any measurable differences in use or perception of prepositions between two differing language groups, Spanish-speakers and Japanese.

Among the questions the study will address are whether one group has more problems than another in achieving mastery, whether the nature of the errors made is the same or different for the two groups participating, pointing to native language interference, and whether the problem with prepositions is basically a grammatical or semantic one for the ESL learners. I hope to make an addition to the growing corps of substantiating research in the area of linguistic relativity by probing the semantic field of spatial prepositions, as it affects the perceptions of Occidentals and Orientals. The hypotheses are that, contrary

to error analysis expectations, the two groups studied, Japanese and
Spanish-speakers, will display different amounts and types of errors,
and that the chief source of difficulty is meaning-related, rather than
rule-based; semantic more than syntactic. Native language interference
is strongly suspected as a major obstacle to complete comprehension and
accurate use of spatial prepositions. It is presumed that prepositions
are largely language-specific cognitive constructs which differ because
of the way various languages divide the same reality of the spatial
universe.

To date no research has been conducted on English learning as a
function of Second Language students' perceptions of spatial preposi-
tions. No previous study exists which would compare or contrast bilin-
gual's conceptions about this sub-group of function words in the target
language, English. The small amount of prior investigation has been
uni-lingual.

Review of Previous Studies

Before an outline of the procedures to be followed in the present
investigation, a summary of previous recent studies on prepositions and
their shortcomings will be useful. Ghadessy (1974:307-316) attempts to
classify four major prepositional patterns and then analyze them in
terms of D. S. (degree of substitutability). His lengthy study pri-
marily tries to provide a functional, formal (grammatical definition for
the word "preposition." His work emcompasses all words labeled preposi-
tions (including unlike, short of, failing, except); he uses no sub-
groups, no divisions based on meaning. His main concern is structural.
Herbert H. Clark's (1968-421-431) germinal study selected 33 English

prepositions and asked ninth-grade Americans to perform three tasks:
free-association, free-sorting, and preposition substitution. He
pioneered the use of multidimensional scaling and thus made a large
contribution to the study of semantic fields. Unfortunately, for two
reasons his findings are fallacious and misleading. The word group
he selected was not homogeneous enough for multidimensional scaling
because he included several time-related prepositions (e.g., during,
until, after) along with many spatial prepositions. Due to the nature
of the tasks required, Clark's study erroneously displayed opposites
(for example, over and under) paired together, violating the proximity
premise of scaling, about which more will be discussed in a subsequent
section. His findings supported his well-known "minimal contrast rule,"
that if a stimulus has a common "opposite" (or antonym) it will always
elicit that opposite more than anything else. I believe that by asking
for an inappropriate task (free association, a spoken response) Clark
derived a misleading configuration. Paper and pencil judgments, it
seems, yield a more considered response of similarities than do immedi-
ately required oral assessments such as he requested. Accordingly, the
present study will involve written rather than spoken judgments.

Grimm and Schöler (1976:165-183) brilliantly conducted a study on
the German language's thirty-two spatial prepositions. They overcame
Clark's deficiency by narrowing their field of inquiry solely to German
spatial prepositions. Their study was not contrastive, but they did
note that there are not one-to-one correspondences between prepositions
across languages, and so gave incentive to the current study.

The same basic mistake made by Ghadessy and Clark of not sepa-
rating spatial prepositions from prepositions of concession, time or

cause, pervades the work of most error analysts. Involved in studying all types of errors, (verb tenses, subject-verb agreement, etc.), Richards (1975) and Bhatia (1974) both err in lumping all prepositions (e.g., with, for, as well as to, beside) in one large category. The present study overcomes the drawback of faulty overgeneralization by focusing on a definable subset, only those prepositions which refer to space, position or location.

This study is conceived to follow a logical sequence of steps. Each of the three procedures to be detailed is important in relation to the other procedures; each experiment is a natural consequence of the preceding one. The first experiment is a diagnostic test to determine the extent of the problem. With this preliminary test the student strategy of avoidance can be circumvented. This step is a necessary prelude to the second experiment, error analysis of student compositions, since error analysis of this type cannot account for avoidance (to be discussed shortly).

The second experiment, scrutiny of writing samples and categorization of errors, determines if the learner's errors are largely syntactic or semantic. If the findings show errors to be a result of semantic confusion, the third experiment is to be implemented. The third component of the present study investigates the semantic space or interrelatedness of the category "spatial prepositions" and produces a graphic array by means of a multidimensional scaling. Three such scalings, one for each nationality, are produced, with those of the Japanese and Spanish-speakers to be compared to the American reference group. If semantic differences exist, they will clearly be pictured.

Before detailing the three experiments, I will offer as background

to the study, an explication of the theoretical bases upon which the present study rests.

CHAPTER II

THEORETICAL CONSIDERATIONS

The two underlying hypotheses which have exerted a substantial

influence on the conception and execution of the present study are

the linguistic relativity hypothesis (LRH) and the contrastive analysis

hypothesis (CAH). Both issues remain unresolved yet persist as

fascinating hypotheses. A brief overview of these theoretical con-

siderations will serve as an orientation to the basic assumptions

prompting the current investigation.

Linguistic-Relativity Hypothesis

To date no conclusive answer has been offered to the questions

raised by the most notable exponent of linguistic relativity, Benjamin

Lee Whorf. Along with his inspiring teacher and colleague, Edward Sapir,

Whorf succeeded in arousing considerable interest for a theory put

forth in the eighteenth century by Johann Herder (Clark & Clark 1977:

516) and subsequently developed by Wilhelm von Humboldt, who believed

"the living power of the word had shaped a people's construct of the

world about them" (Waterman 1963:67).

Familiarly known to most as the Sapir-Whorf Hypothesis, the

linguistic-relativity hypothesis claims that language influences the

way people perceive and organize the world about them and that "the

thinking processes of the speakers of one language are not the same as

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thinking processes of the speakers of any other language" (Carroll 1964:106).

Despite Whorf's numerous examples from American Indian languages, so different from known European languages, there has been little empirical evidence to support the theory and this has led to a more moderate version than that claimed by Whorf. The moderate version does not posit a different world view or philosophical orientation for a Navaho because he doesn't speak English; however, it does assert that there are differences among languages as regards the categories that speakers must attend to. Eight years after editing Whorf's treatise, Language, Thought and Reality, Carroll states that "there is some promise that further research may confirm the relevance of these categories in directing behavior" (Carroll 1964:109). For the present, investigators are cautious about making global statements on findings in support of the hypothesis, yet the continuing research being carried out attests to its vitality. Lenneberg (1956) and Berlin and Kay (1969) pioneered relativity research with color terms. Carmichael and Hogan's (1932) early study on the effect of labels on memory tends to support the hypothesis. In their classic experiment they found that when subjects were briefly exposed to ambiguous figures and later asked to reproduce them, the reproductions were influenced by which of two labels was arbitrarily assigned during the initial exposure. They found, for instance, that O—O was later reproduced like O⌒O if it had been assigned the label "eyeglasses," but reproduced like O═O if it had been labelled "dumbbells" (Clark & Clark 1977:556).

Further research which lends support to the power of words to affect thought is Norman Maier's "two string" problem solving experiment.

He found that some subjects, requested to solve a problem and provided with a pair of pliers, had difficulty in conceiving of the pliers together with string as a possible pendulum rather than as a tool. Apparently, the label "pliers" prevented the subjects from readily availing themselves of the "weight" property of the pliers (Carroll 1964:85). This experiment corroborates Whorf's description of every language as a "vast pattern-system, different from others . . . which . . . analyzes nature, notices or neglects types of relationships and phenomena, channels . . . reasoning, and builds the house of . . . consciousness" (Whorf 1956:252).

Anthropologists have been more supportive of the hypothesis than have linguists. Edward T. Hall echoes Whorf with the cultural anthropologist's view that

> There is a growing accumulation of evidence to indicate
> that man has no direct contact with experience per se but
> that there is an intervening set of patterns which channel
> his senses and his thoughts, causing him to react one way
> when someone else with different underlying patterns will
> react as his experience dictates (Hall 1959:145-146).

As the subject at hand is spatial prepositions, two examples drawn from the physical world will help to illustrate the above point. The natural phenomena of rain is universal, however, in English "We go out in the rain" but "the Arab goes under rain" (Hall 1959:132). Another instance in which we overlook our own language-imposed thought patterns also deals with the observable universe. The constellation Ursa Major (Big Bear), visible in any hemisphere, was so called because its points were seen by the ancients to resemble a bear. In English it is familiarly called "The Big Dipper," but this name is only localized. The stars in

formation may resemble something quite apart to others who have never used or seen a dipper (Whorf 1956:164).

The challenge which lies ahead for those who see a measure of truth in Whorf's intriguing hypothesis is to find a means of empirically testing it. The most notable modern exponent of the theory that language affects thought, Eleanor Rosch, has researched extensively with superordinate concrete categories (for example, "furniture," "tools") and finds that "many categories may be culturally relative" (Rosch 1975:193). Her most prominent investigation is in the domain of colors, which she regards as ideal for empirical research in light of their physical invariance.

Rosch, with an empirical basis, stipulated three conditions necessary to have a valid test of the effect of a natural language lexicon on thought, and as will be shown, the third experiment to be outlined meets all of the following criteria of Rosch:

a. We must have at least two natural languages whose lexicons differ with respect to some domain of discourse--if languages are not different, there is no point in the investigation.

b. The domain must be one which can be measured by the investigator independently of the way it is encoded by the users [i.e., color spectrum wave lengths].

c. The domain must not differ grossly between the cultures whose languages differ (Rosch 1974:107-108).

Spatial prepositions are uniquely suited to a cross-lingual study of the type outlined by Rosch because, seemingly, spatial reality can objectively be viewed by all. The lexical items involved in the present study, prepositions dealing strictly with space, will be

seen to differ, not grossly, but by degrees. In addition to simply
pointing to differences in the lexicon, an empirically based measurement
device will be used, that of multidimensional scaling. Later, before
beginning a report of the study itself, an introduction to the relevant
method will be detailed. At present, the necessary introduction to the
second underlying hypothesis is given.

Contrastive Analysis Hypothesis

The second hypothesis basic to the present study is the contrastive
analysis hypothesis (CAH). Both the linguistic relativity hypothesis
(LRH) and the contrastive analysis hypothesis are posited with three
varying degrees of strength; strong, weak and moderate versions exist.
The writer endorses the moderate version for both hypotheses. Although
the preferred versions are mild, their endorsement is strong, since both
notions are fundamental to the present undertaking.

A brief summary of the history of the application of contrastive
analysis to the field of second language acquisition would show that CAH
dominated the field from 1945 to 1965 and is remarkably vigorous still,
despite controversy in the sixties and seventies. Contrastive analysis
was originally developed by Charles Fries (1945), expanded and clarified
by Robert Lado, and was most useful in providing a framework for the
development of useful pedagogical grammars (Spolsky 1979:252), such
as the famous study of Spanish and English by Stockwell, Bowen and
Martin (1965). Their contrastive study indicated that the most diffi-
cult items in the target language would be those for which there was
no counterpart in the native language.

In the original or strong version of CAH, such as typified by

Stockwell, Bowen and Martin, the ability to predict errors was the major

function of the synchronic study of two different languages in contact.

In the wake of harsh criticism by those who felt that interference from

the native language was only a partial explanation for learners' mis-

takes, a weaker, i.e., diagnostic version emerged. The moderate form,

here espoused, accounts for a combination of predictable and diagnos-

able errors and is summed up by Oller and Ziahosseiny:

> The categorization of abstract and concrete patterns (in-
> cluding time sequenced events) according to their perceived
> similarities and differences is the basis for learning;
> therefore wherever patterns are minimally distinct in form
> or meaning in one or more systems, confusion may result.
> Conversely, where patterns are functionally or perceptu-
> ally equivalent in a system or systems correct generaliza-
> tion may occur (Oller & Ziahosseiny 1970:185-186).

Thus, small differences cause big trouble, as will be shown in the

ensuing portions of this study.

Two other notable theories arose and for a brief time contested

for dominance as the leading theoretical basis for understanding the

cause of learners' mistakes. Today, there is less concern over which

is supreme, and more acceptance of the valid contribution each theory

can make. The two once-competing theories place emphasis on actual

committed errors by second language learners rather than on hypothesized

errors. The two theories concern error analysis and interference, and

deserve attention.

Considering errors to be developmental, like those children make

in acquiring a language, Corder and followers interpret errors as

systematic, occurring as strategies in the learning process. With

error analysis, Corder makes the basic distinction between "errors of

performance (slips, of the tongue or pen, i.e., mistakes) which are unsystematic and errors of competence (markers of transitional competence) which are systematic (Bhatia 1974:338). Burt and Kiparsky likewise capitalize on this Chomskyan differentiation in popularizing the technique of error analysis with their book, The Gooficon (1972).

Error analysis is a valuable addition to the theoretical base of second language teaching theory and has practical application for remedial work. It helps a teacher determine what a student knows and what remains to be learned. As propounded by Jack Richards, error analysis accounts for several possible sources of learner errors, such as over-generalization, ignorance of rule restrictions, and incomplete application of rules. Richards calls these "intralingual errors" and contrasts them with "interlanguage errors" which he excludes from discussion (Richards 1975:205).

The notion of "interlanguage," a term coined by Selinker in 1972 (Spolsky 1979:254), represents a system that is distinct from both the native language and the target language. Each learner's idiosyncratic transitional system becomes the object of study in this third perspective on the process of second language acquisition. This notion states that "a learner changes his errors as he proceeds . . . and that not all learners make the same mistakes" (Esser 198:183). A valuable insight generated by this theory is the discovery of fossilization, a failure to go beyond an incompletely learned internalized grammar. The similarity between error analysis and interlanguage is close, and Spolsky sees Selinker's idea as an expansion upon or "relabeling" of error analysis (Spolsky 1979:255). Following this brief summary, a discussion of the comparative merits of the prevailing

theories is in order.

Despite the strength error analysis shows by not making a priori judgments, the theory has a serious drawback. Kleinmann (1977) points out that because of its reliance on observable errors, error analysis fails to explain the phenomenon of avoidance (the natural tendency to avoid using a grammar pattern or sound one is unsure of). He concludes that contrastive analysis "should not be abandoned as a diagnostic tool for learner difficulty in the target language" because of its unique ability to predict potential cases of avoidance (Kleinmann 1977:106). I concur. Even Jack Richards, the leading advocate of error analysis, acknowledges the merit of contrastive analysis in saying, "Interference from the mother tongue is clearly a major source of difficulty in second-language learning, and contrastive analysis has proved valuable" (Richards 1975:214).

Clearly, no one analysis can account for every error in language learning, but together, each theory supplements the deficiencies of the other. No longer involved in discrediting the preceding theory to create credibility for the successive theory, investigators are beginning to agree with Esser (1980) that "even if all the just mentioned reasons for the explanation of errors are taken into account, contrastive analysis remains an important factor in error analysis . . . for the learner's mother tongue will always be present as a factor of interference or support" (Esser 1980:183).

Thus, the revitalized hypothesis of contrastive analysis is seen by many to harmonize rather than to compete with other approaches. It can be a predictive and diagnostic aid to the teacher's attempt to understand the nature of learner's errors. Because contrastive analysis

is "only one of many variables which one must re-evaluate in second language teaching" (Bhatia 1974:338), the present study incorporates the contributions of both error analysis and contrastive analysis for the current investigation of the role mother tongue plays in shaping concepts in a second language. With the theoretical bases known, focus now can be given to the details of the three experiments.

CHAPTER III

THE STUDY

Study 1. Diagnostic Test

Methods and Design

Subjects

Two classes at the intermediate level at the OSU English Language
Institute were selected to participate in the study. Although in
different sections, with different teachers, the students were studying
the same material in identical grammar, composition, and reading text
books in their 7-hour-a-day intensive English course. The two classes,
A and B, were about equally divided between the two language groups,
Spanish and Japanese. Class A contained 6 Japanese and 6 Spanish-
speakers. Class B contained 4 Japanese and 4 Spanish-speakers. This
yielded a total of 20 subjects under surveillance, 10 who speak Japanese
and 10 who speak Spanish (8 of these from Venezuela, 2 from Costa Rica).
(The other class members, from nations such as Mali, Greece, Lebanon,
and Thailand, participated in the preposition test but did not have
their compositions analyzed, nor did they figure into the overall study.
The students were not aware that the scores of only two language groups
were critical for the current study.) These two language groups were
deemed appropriate to study because the author has a structural

knowledge of both languages and was therefore prepared to offer explanations based on contrastive analysis.

Test Design

The first of three procedures was to administer a diagnostic test over spatial prepositions to each of the 20 subjects. The major advantage of a test of this type is that it covers the desired range of subject matter. The examiner can control exactly what material is being tested. The student strategy of avoidance (Brown 1980:178), whether syntactic or lexical, is therefore counteracted. As discussed earlier, in writing compositions students can easily circumvent their known pitfalls by avoiding weak areas of competence; therefore, examination of student production errors, the second of two procedures here employed, is supplemental to a diagnostic test of the sort to be described.

To prepare the diagnostic test it was first necessary to choose a list of English spatial prepositions with which to then compose a test. After consulting several studies, Clark (1968), Ghadessy (1974) and Grimm and Schöler (1976), I chose the latter's list of 32 spatial prepositions as a model. Some substitutions and modifications were made in line with the goal of considering only the most basic prepositions. The criteria for inclusion on the list of 33 prepositions to be used in the first two experiments (Appendix A) were:

strictly spatial terms	Ruling out, for example, despite, since
non-archaic forms	Ruling out, for example, betwixt, amongst
limited usage	Ruling out, for example, aboard, abreast of

No two-word verbs were used. These were ruled out on the basis of

juncture and stress. The movement test is also valid for determining whether an item is a preposition or a particle. Consider the examples:

    7. The buyer looked <u>over</u> the horses.

    8. The buyer looked the horses <u>over</u>.

    9. The horses looked <u>over</u> the fence.

  10. *The horses looked the fence <u>over</u>.

<div align="center">(Falk 1978:191)</div>

Some of the prepositions (for example, <u>past</u>, <u>behind</u>, <u>along</u> and 17 others by one estimate)(Hockett 1958:193) have adverb homonyms, called "prepositional adverbs," but these words were used strictly as prepositions, that is, with an object (noun) following.

A 33 item fill-in-the-blank, multiple choice test was constructed with the chosen prepositions (Appendix B). In constructing each of the 33 sentences containing a blank, clues were given within each sentence as to the correct answer.

Example: We waited for our friends _____ the tearoom

              because it was cold outside.

    Choices: through, at, toward, in

In this instance, both <u>in</u> and <u>at</u> would be correct choices without the clue, "because it was cold outside." However, with the clue, the one most suitable answer becomes <u>in</u>.

Occasionally for a particular item, the three decoys among the four choices included a choice which would be semantically acceptable and, if chosen, would convey the intended meaning reasonably well. This was done deliberately to ascertain whether students could detect and employ the nuance of meaning between two similar prepositions as

in the following:

>Example: While waiting in line for the bus, Tom turned and
>
>looked over his shoulder at the man standing directly
>
>_____ him.
>
>Choices: on the side, behind, beyond, over

Both beyond and behind convey meaning, yet the student's perception of

the extent of distance is being tested. Beyond is clearly much

farther, and an incorrect choice. Most questions had only one straight-

forward answer, in this case, on.

>Example: I'm sorry that I stepped _____ your foot.
>
>Choices: in, on, at, to

In the actual administration of the test students were given as much

time as needed to complete it. Everyone finished within 30 minutes

and most within 20 minutes. Students were instructed to read each

question several times before answering and to choose the best answer

if more than one seemed acceptable.

Test Results

The results pictured in Tables I, II, and III clearly support

Hypothesis 1, that the intermediate Japanese and Spanish-speaking

ESL students have not mastered common prepositions. Only two of the

ten Japanese scored above average (70%) on the diagnostic test.

Less than half of the ten Spanish-speakers (only 4) scored above

average (Table 1). This performance at the intermediate level shows

inadequate proficiency.

Tables I, II, and III lend positive support to Hypothesis 3 by

demonstrating numerically and substantively that Japanese made

slightly more mistakes than Spanish speakers. The Japanese average 9.7 mistakes per person while the Spanish average 8.6 per person (Table I). However, a X^2 statistical test indicates no significance between groups for a sampling of this size. Table III substantiates Hypothesis 3 that each of the two groups has its inique problems, not shared by the other. The groups performed differently; indicating that each group has a different set of troublesome prepositions. While the Japanese mixxed ten prepositions more than 50 percent of the time, the Spanish-speakers missed only eight items half of the time. Table III reveals that of the major errors only 3 prepositions (over, below, beyond) are mutually problematic for both groups. Table II gives a closer look, revealing often that a major problem (meaning more than 50 percent missed) for one language group is often a minor problem (meaning less than 50 percent missed) for the other group, as in the case with from.

Significance of Results

The findings above are counter to the claims of error analysis advocates such as Jack C. Richards (1971) who contend that people from differing language backgrounds routinely make the same mistakes. I maintain that a look at the error frequencies on the above diagnostic test yields evidence to support Hypothesis 2 that there are serious disparities in performance between two such diverse groups, one Oriental, one Occidental, as Japanese and Spanish-speakers. Richards discounts interlanguage errors, that is, errors caused by the inter- ference of the mother tongue, in favor of intra-lingual or develop- mental errors, which are "the sort of errors we might expect from

TABLE I

DIAGNOSTIC TEST RESULTS

	Japanese			Spanish-speakers	
	No. Missed Out of 33	Score on Test		No. Missed Out of 33	Score on Test
Subject 1	-16	47%	Subject 1	- 9	70%
Subject 2	-10	67%	Subject 2	- 4	87%
Subject 3	- 8	74%	Subject 3	-11	64%
Subject 4	-11	64%	Subject 4	- 7	77%
Subject 5	- 9	70%	Subject 5	- 5	83%
Subject 6	- 9	70%	Subject 6	-10	67%
Subject 7	-14	54%	Subject 7	- 9	70%
Subject 8	- 4	87%	Subject 8	-11	64%
Subject 9	- 6	80%	Subject 9	- 6	80%
Subject 10	-10	67%	Subject 10	-14	54%
	-97			-86	
Average	9.7	68%	Average	8.6	71.6%

TABLE II

NUMBER AND PERCENT OF ERRORS FOR EACH ITEM
OF DIAGNOSTIC TEST BY NATIONALITY

		Spanish-Speakers		Japanese	
		Count	Percent	Count	Percent
1.	into	1	10%	1	10%
2.	through	–	0	4	40%
3.	under	2	20%	3	30%
4.	near	–	0	4	40%
5.	among	3	30%	2	20%
6.	against	7	70%	5	50%
7.	past	8	80%	3	30%
8.	between	–	0	–	0
9.	out of	–	0	3	30%
10.	across	2	20%	3	30%
11.	over	6	60%	5	50%
12.	behind	1	10%	1	10%
13.	above	8	80%	4	40%
14.	on top of	1	10%	0	0
15.	on	–	0	–	0
16.	around	–	0	–	0
17.	by	5	50%	1	10%
18.	up to	6	60%	4	40%
19.	toward	3	30%	5	50%
20.	opposite	4	40%	3	30%
21.	in	–	0	–	0
22.	to	3	30%	5	50%
23.	below	7	70%	5	50%
24.	beside	–	0	1	10%
25.	in front of	1	10%	1	10%
26.	beyond	7	70%	8	80%
27.	inside	1	10%	5	50%
28.	outside	–	0	1	10%
29.	at	–	0	2	20%
30.	far from	2	20%	1	10%
31.	from	4	40%	6	60%
32.	along	2	20%	6	60%
33.	in the middle of	2	20%	5	50%

TABLE III

PREPOSITIONS MISSED BY 50% OR MORE ON DIAGNOSTIC TESTS

	Spanish-speakers				Japanese	
	Preposition	Percent			Preposition	Percent
1	above	80%		1	beyond	80%
2	past	80%		2	from	60%
3	below	70%		3	along	60%
4	beyond	70%		4	below	50%
5	against	70%		5	over	50%
6	over	60%		6	to	50%
7	up to	60%		7	inside	50%
8	by	50%		8	toward	50%
				9	against	50%
				10	in the middle of	50%

anyone learning English as a second language" (Richards 1971:205).
Richards cites 36 examples of typical intralingual errors on preposi-
tions made by ESL students from 11 different native language back-
grounds in support of his premise that interference from a speaker's
native language is not the major factor in errors. I find his premise
as illustrated to be as unconvincing as the lumping together of all
prepositions (time, cause, concession, space) in the chart (Richards
1971:217-218) he uses to illustrate his point. Admittedly, there are
areas of mutual weakness, yet each group has its unique problems. In
the portion which follows, the results of the second procedure, which
was carried out with the same 20 subjects, will highlight some of the
diverse problem areas.

Study 2 is suggested by the nature of the findings of Study 1.
By definition, a multiple choice test such as used in Study 1 provides
students with answers. Study 2, which involves student-written
compositions subjected to error analysis, is designed, instead, to
elicit authentic subject-produced errors. Its purpose is to seek
further support for Hypothesis 2, that errors for both groups differ
in type, for Hypothesis 3, that Japanese perform with less ability
than Spanish-speakers of the same level, and possibly to offer support
for Hypothesis 4, that students frequently use an avoidance strategy
when confused. The second study in the series of three will now be
detailed.

CHAPTER IV

STUDY 2. ERROR ANALYSIS OF STUDENT COMPOSITIONS

Design of Procedure

The second technique for comparison of Japanese and Spanish-speakers' competence with English spatial prepositions is an examination of production errors on student compositions. Four compositions per student were scrutinized. The topics were, "My Room at Home," "Sightseeing Spots in My Hometown," "An Afternoon in the Park," and a free "How to . . ." composition on any subject. These simple topics were chosen for two main reasons. First, it was assumed the students would be thoroughly familiar with the subject matter and therefore able comfortably to focus on their writing style. Secondly, the nature of the topics involved some spatial orientation.

The compositions, a total of 80 (four each for 20 students), were subjected to analysis and culled for errors relating strictly to spatial errors. Somewhat differently from the first experiment, the second procedure, in eliciting actual samples of student composed sentences, was designed to investigate the general area of under-standing and grammatical competence. The performance errors of each of the subjects are appended (Appendix C). I conceived a five-way categorization of errors and tabulated the errors accordingly. The categories chosen were:

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Procedure Results

A compilation of the English spatial prepositions freely used by the ten Japanese and ten Spanish-speakers was made and the number of mistakes involving each type of error was calculated. This was done separately for Japanese and Spanish-speakers.

Discussion of Results

As on the diagnostic test, the Japanese committed more errors than the Spanish speakers. The ratio of errors was 3:2. The Japanese committed 36 errors, an average of 3.6 each, while the Spanish speakers made 25 errors, an average of 2.5 each (Table VI). This finding supports Hypothesis 3 that Japanese will perform worse than Spanish-speakers. The Spanish speakers might be expected to have a slight advantage, and this notion is born out by the results.

It was further predicted, Hypothesis 2, that there would be a difference in type of errors as well as amount of errors. Table V clearly shows two important findings. The Japanese appear to have three main trouble spots: Unnecessary Additions, Substitutions, and Omissions, while the Spanish-speakers have only two major weaknesses: Unnecessary Additions and Substitutions. A statistical test was performed, omitting the last two of the five error types due to low frequency. The Chi-square test shows a significant association between type of speaker and type of error, x^2 (2df) = 13.82, $p < .01$.

The most startling discovery is that Spanish-speakers do not appear to have a significant problem with Omissions, while Japanese do. The Spanish speakers showed a greater awareness of syntactic requirements.

TABLE IV

CATEGORIZATION CODE FOR ERRORS ON COMPOSITIONS

Letter Designation		Name	Examples (J = Japanese; S = Spanish)
O	1.	Omission	J Sometimes we meet the tearoom again after dinner. S Everybody is looking his paper.
UA	2.	Unnecessary Addition	J After lunch we go to drive to somewhere S I could go to the beach if I lived near to the beach.
S	3.	Substitution	J There is a tv on the corner. S Two other people are walking on the park.
I	4.	Incomplete	J I jumped out bed. S Sometimes on Sunday we go out home and visit a park.
C	5.	Confusion with a simi-lar phrase	J In front of the wall there is blackboard S My favorite city has a clean and long seashore in one of its sides.

TABLE V

ERRORS ON COMPOSITIONS BY CATEGORY

Japanese		Spanish	
UA	8	UA	10
O	8	O	1
S	8	S	10
I	1	I	2
C	4	C	1
	36		25

TABLE VI

SPATIAL PREPOSITIONS FREELY USED ON 80 WRITTEN COMPOSITIONS
AND, IF USED, NUMBER OF ERRORS

10 Japanese		10 Spanish-speakers	
	No. of Errors		No. of Errors
in	7	in	4
on	7	on	2
at	5	at	3
to	7	to	8
in front of	2	--	
behind	1	in back of	1
out of	1	out of	1
onto	1	--	
around	1	--	
between	1	--	
near	1	near	3
from	1	from	1
out	1	on one side	1
--		into	1
--		--	
	36		25

That is, they do not fail to recognize that something belongs in a sentence slot, and every attempt is made to insert a filler, although frequently the choice is inaccurate. This would indicate that the problem for Spanish-speakers is semantic rather than syntactic. The high rate of Omissions by Japanese as contrasted with Spanish-speakers shows that their problem is probably syntactic as well as semantic, as regards correct use of spatial prepositions.

One additional finding, as pictured in Table VII, was made, although caution in generalization is advised. It was posited, Hypothesis 4, that both groups would avail themselves of an avoidance strategy where confusion existed, that is, that ESL students would not willingly use prepositions they were unsure of. Prudence in interpreting negative findings is always advisable; the lack of evidence does not substantiate a hypothesis sufficiently; however, the information gathered in the current study tends to suggest that in writing, students prefer not to employ certain prepositions they perform badly with. As shown in Table VII, the Spanish-speakers did not on their own initiative use a single one of the prepositions found in Study 1 to be a major source of error. Similarly, in Study 2, the Japanese employed only two of the ten prepositions found in Study 1 to be troublesome for their language group.

General Discussion and Significance

Charts like the ones above can be helpful in pinpointing specific types of errors actually made by second language learners from different language backgrounds. It is essential here to realize that the types of mistakes do vary from nationality to nationality.

TABLE VII

A COMPARISON OF TABLES 3 AND 6. FREE USE ON COMPOSITIONS
OF MOST FREQUENTLY MISSED ITEMS ON DIAGNOSTIC TEST

Spanish		Japanese	
Prepositions Missed by More Than 50% on Diagnostic Test	Number of Times Freely Used on 4 Compositions	Prepositions Missed by More Than 50% on Diagnostic Test	Number of Times Freely Used on 4 Compositions
1 above	0	1 beyond	0
2 past	0	2 from	1
3 below	0	3 along	0
4 beyond	0	4 below	0
5 against	0	5 over	0
6 over	0	6 to	7
7 up to	0	7 inside	0
8 by	0	8 toward	0
		9 against	0
		10 in the middle of	0

Common lumping together of mistakes is a false and wasteful over-simplification. Let me illustrate by considering the mistakes made on the first four prepositions. Japanese speakers had greater difficulty with the in/on substitution than did Spanish-speakers. An examination of the number of errors per group involving the word to shows no discrepancy--about an equal number of mistakes. However, with a close look at the cause of the errors, it will become apparent that the Japanese tend to omit to whereas the Spanish-speakers do not omit to at all; on the contrary, they have a preponderance of Unnecessary Additions. This finding illustrates the danger of believing Richard's premise that all second language learners commit similar errors.

The interesting finding that only one of the two groups had a syntactic problem but that both groups displayed semantic confusion has a bearing on the focus of further experimentation. The limited scope of the current study precludes an investigation of the syntactic problems. I shall focus instead on the semantic causes of the problem.

With spatial prepositions, as with other concepts, speakers of a language other than English will naturally tend to interpret the new concept in terms of the original formulation. This notion rests on the validity of Contrastive Analysis, to which Whorf (1956) lends support. In discussing grammatical patterns as interpretations of experience, Whorf (1956) comments on the difficulty of standing aside from one's own language, "which is a habit and cultural non est disputandum, and scrutinizing it objectively."
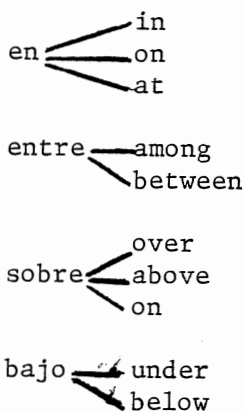
> And if we take a very dissimilar language, this language
> becomes a part of nature, and we even do to it what we have
> already done to nature. We tend to think in our own language
> in order to examine the exotic language (Whorf 1956:138).

Quite naturally, the habituated carving up of spatial perceptions is ingrained in a speaker's mind. When presented with a formal classification which is not the same as his own, the second language learner may have to unlearn concepts in order to relearn concepts. An example may help to clarify. Whereas, for nouns, English does not ordinarily make the three-fold distinction (as Arabic does) between single, dual, plural, with the prepositions between (2 things) and among (more than 2 things) this is the crucial difference. A German speaker does not care to make this differentiation and in fact uses one word zwischen to express both among and between. Likewise, Japanese use the same prepositional phrase no aida de to say among or between. It is not as if these groups did not perceive the same reality—namely, are there only two items or people on each side of a given thing, or are there more than two—it is just that two separate formal categories were not originally deemed necessary. Spanish-speakers, too, can see and perceive this difference, and, if pressed, can express this fine a detail, yet they typically use one word, entre, as suitable enough for their purposes.

It is quite true that "the English language system demands that the speaker use greater precision in describing spatial relationships" (Johnson 1978:37) than does the Spanish-speaker. This is even more true for the Japanese system of prepositions which allows on, over, above, upon to be expressed by the same phrase no ue ni. An illustration of the splits an ESL student must "learn" are as follows:

Splits

Spanish   Japanese

en — in / on / at

entre — among / between

sobre — over / above / on

bajo — under / below

no shita ni — de below / under / beneath

no ue de — ni / on / upon / over / above

no aida de — between / among
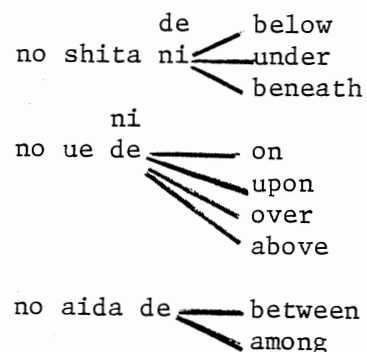
Because the second study clearly shows part of the problem to be semantic, for both groups, further research is indicated. Thus, Study 3 which follows will probe the perceptual categories of Japanese and Spanish-speakers in order to compare them against an American reference group. The premise to be tested (Hypothesis 5) is that differing language groups will demonstrate basic similarity with some distinct major differences in conceptualization as pictured in semantic space representations.

The semantic area, the investigation of mental categories, is at once the most difficult to investigate and the most intriguing of the three levels: lexical, syntactic and semantic. In order to accomplish an investigation of differing nationalities' "semantic space" (discussed in Appendix H), it is necessary to find an adequate tool of measurement. The device known as multidimensional scaling (MDS) (also discussed in Appendix H) is suited to just such an assessment. An understanding of the capability of the systematic computer-assisted procedure to be employed in Study 3 can be gained from the appended background material.

CHAPTER V

STUDY 3. MULTIDIMENSIONAL SCALING FOR AMERICANS,

SPANISH-SPEAKERS AND JAPANESE

Method

Materials

Twenty spatial prepositions (Appendix D) were selected for the
final and most important part of the study. The reduction in number
from 32 to 20 was a result of two major considerations. Essentially,
the COSPA computer program (Schönemann, Carter, James, 1979) to be
employed accommodates a maximum number of twenty items to be paired.
Influential also in the paring down of the original number of preposi-
tions was the desire to overcome the inherent weakness of an earlier
(Clark 1968) study of prepositions, which erred in including too
extensive a list. As discussed, Clark's study (1968) indiscriminately
included prepositions of concession, time and space. Kruskal and
Wish (1978:46) caution against the misrepresentations which may
result with multidimensional scaling (MDS) if a two dimensional space
is employed to describe data which requires additional dimensions.
Citing Rosenberg's data, Kruskal alerts users to the danger of
obtaining contradictory traits--cautious and daring, submissive and
impulsive, meditative and practical--very close together. Clark's
(1968) major hypothesis rested on the observable phenomena of

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opposites in close proximity. Understandably, fourteen years after his innovative study, much more is known about MDS and the fallacious findings of his early work can be put aside.

In the current study each of the twenty prepositions was paired with the other nineteen, yielding 190 grouped pairs. The pairs were randomized in three different orders and typed in booklets (labeled Forms A, B, C). The booklets were further divided in half, 95 items to each half. The step of halving was taken to prevent any possible fatigue effect on the students. A blank was typed to the left of each pair of prepositions (to...at; over...above, etc.) for the student's rating of similarity. The random ordering was further restricted by two provisos: 1) that no preposition occur in more than two consecutive pairings and 2) that each preposition appear in the first and last positions of a pairing roughly an equal number of times--for example, to appeared first when coupled with nine of the other prepositions, and last when paired with the ten other prepositions.

A rationale for the indicated number of prepositions to be in-cluded should be accompanied by a brief justification of exactly which prepositions were chosen to comprise the data base. The words selected were the twenty most frequent one-word prepositions. Frequency of occurrence was deemed to be the most significant basis for inclusion in the study as these words form a corpus with which foreign students regularly have contact. A compilation of spatial prepositions was made from a study of two published word frequency lists, the well-known Kučhera-Francis (1967) list and the newer American Heritage Word Frequency List (1971). Phrasal prepositions

such as "on top of" or "in front of" were excluded; only one-word prepositions were used. A comparison of the two sources (Appendix D) shows little significant divergence; the accord was remarkable. In both instances one half of the list (10 prepositions) were among the 100 most frequent words in English and all twenty spatial prepositions chosen for the study were found to be among the top 500 (the one exception: below). Once again, the fundamental nature of these function words is a major reason for determining how sufficient a grasp non-natives have of their correct usage.

Subjects

The booklets were completed by three separate native language groups: American, Japanese and Spanish-speakers, all of roughly college age. Thirty-three American undergraduate students enrolled in an introductory psychology class served as the primary group. They were volunteers who were awarded extra credit for their participation in the study. None of the students was trained in linguistics but all were native speakers of English. The average age of the American group was 24.

The second and third groups consisted of two distinct sets of foreign students enrolled full time at an English Language Institute: the second, Japanese and the third, Spanish-speakers. Both groups were at the intermediate-to-advanced level in their mastery of the English language, that is, about three-fourths through their course of study. No beginners or low-intermediate level students were included in order to insure that all subjects had had sufficient exposure to the twenty prepositions. There were fifteen students from

Japan in the second group, which averaged 21 years of age. All but two were undergraduates, and each had studied English in Japan prior to coming to the United States.

The Spanish-speaking group, largely Venezuelan, represented four different Latin-American countries: El Salvador, Equador, Honduras and Venezuela. There were thirteen in the native Spanish speaking group, ten of whom were planning to seek a master's degree. Each had studied English in his native country. The mean age was 28.

Most of the twenty students (10 Japanese, 10 Spanish-speaking) who participated in the two preliminary studies were also involved in the final study.

Procedure

Each subject received a booklet with a cover sheet containing instructions for completing the task. Briefly, the instructions requested that the student judge how close in meaning two prepositions were. On the basis of his judgment of the similarity of two items the subject was to rate them, using the numbers 1 through 7. A "1" would indicate that the two items were very similar and a "7" would indicate that the two items were very different. The numbers "2," "3," "4," "5," and "6" could be used to judge between the two extremes ("1" and "7"). Unlike the procedure in the Clark (1968) study with all types of prepositions, it was pointed out to the subjects that the pairs listed involved commonly used prepositions dealing with location, position or space. The instructions were reiterated in shortened form on the booklet itself.

All three forms (A, B, C) were distributed with approximately

equal frequency throughout the three nationality groups. Half of the task was performed on one day and the remainder at the next class meeting; that is, each student made 95 judgments the first day and another 95 at the subsequent class session. The task required between 15 and 20 minutes to complete each time.

Results

The sets of paired prepositions for 61 subjects formed the raw data for the multidimensional scaling procedure of the COSPA computer program (Schönemann, Carter and James, 1979) which is based on Horan's (1969) model. The algorithm used allowed the testing of the common space or commonality assumption which is vital to interpreting scaling results. Essentially, the question addressed is whether subjects in a group perform the task in a way consistent with their group. If the individual subjects perform in a highly idiosyncratic way, then depictions of word interrelationships based on grouped data would be misleading. To test this important assumption Horan (1969) developed a statistic to calculate a "goodness of fit." As a part of the computer program, the test determines how well the data of each subject fits the coordinate system derived from the complete group of subjects, for example, 1 Japanese subject tested against the Japanese group as a whole. At base is the rejection of the hypothesis that there is a random relationship between an individual subject's coordinates and the group's coordinate space.

The results obtained show that the subjects in each of the three groups were capable of making judgments about prepositions in a highly reliable way, consistent with those of their language group. The

assumptions for Horan's model were satisfied for all three sets of data. American subjects evidence an exceptionally high level of consistency. The Horan "V" statistics show that 27 American subjects out of 33 met or exceeded the .17 level. Using a binomial test the probability of obtaining 27 out of 33 events significant at or beyond the .17 level is less than .001. The test of the common space assumption for the Japanese produced a proportion of 13/15, $p < .001$, and the Spanish-speaking set produced 9/13, $p < .001$. These very high proportions illustrate that judgments made by subjects within a language group can be trusted to coincide to a high degree with the assessments of their group. The procedure yielded two further results. Also produced are maps for each group (APPENDICES E, F, G) which are plausible depictions of the interrelationships among the 20 spatial prepositions. The American array (APPENDIX E) is an intuitively satisfying, entirely believable map of common space among the twenty spatial prepositions. Finally, there appear to be interpretable similarities and differences between the American and foreign student maps, tending to support Hypothesis 5, that differences in conceptualization of spatial prepositions may be related to native language dominance.

A short orientation to the appended maps is helpful at this point. While specifically designed to illustrate Hypothesis 5, the third experiment clearly corroborates Hypothesis 1, showing that both language groups fail to match the American map perfectly. It likewise lends support to Hypothesis 2 in that the two groups differ in the type of discrepancies revealed.

The basic patterning for the maps of all three groups is one of

quadrants. The four fundamental opposing and counterbalancing con-
cepts, UP-DOWN IN-OUT each occupy a separate quadrant in a pleasing
array. All three language groups, English, Japanese and Spanish
are identical in their positioning of these elemental contrasts.
This perfect agreement for the extremes represents sufficient
resemblance of both the Spanish and Japanese maps to the American
map, thereby offering encouragement for the further examination of
the cognitive space depictions of each group. The large degree of
similarity provides the framework in which to investigate some of
the observable contrasts. Attention is directed to these discrepancies
which will be examined in detail.

For ease of reference in the ensuing discussion, the American
graphical representation (Appendix E) will be referred to by quad-
rants: upper right, upper left, lower right, lower left. The focus
here is not upon labeling the quadrants or clusters; yet, for the
practical purpose of referring unequivocally to various portions of
the "map," clusters will be assigned names. The names should be
considered as tentative, not definitive. Despite the speculative
nature of naming clusters, in the interest of a mutual point of
observation, it seems to be beneficial to label the dominant visible
American clusters. By dint of being native speakers, the Americans
are regarded as "experts" and will serve as a point of comparison for
both groups. Therefore it is the American clusters which are
designated. They are as follows:

TABLE VIII

MAJOR AMERICAN CLUSTERS

proximity cluster	BY, ALONG, NEAR
locality cluster	ON, TO, AT
entrance cluster	THROUGH, BETWEEN
enclosure cluster	IN, INTO
distal cluster	OUT, OFF, FROM
upward cluster	ABOVE, OVER, UP
downward cluster	UNDER, BELOW, DOWN
circum point	AROUND

Discussion Based on Observation of

Spanish-speakers' Data

The Spanish depiction (Appendix F) reflects overall agreement with the American data, with five major exceptions: OVER, AROUND, FROM, OUT, OFF and two notable others: BELOW and INTO. Because these words may possibly be problematic sources of influence from the native language, they are considered worthy of comment. The word OVER does not form the expected tight cluster with ABOVE and UP as it does in the American map; instead, OVER migrates to the upper right quadrant, toward ON. An explanation for this patterning may lie in the fact that in Spanish, both over and on are translated identically as sobre, en, or encima de. Thus, we can expect OVER to pull aside, more to the right, closer to the word ON, and indeed this does occur. Eve Clarke, in her study of

first language acquisition, has noted that English-speaking children first produce the word on at about age 2;0 or 2;6 and that they may overgeneralize on to convey any type of proximity or verticality, not that namely of "support" or contact (Clark and Clark 1977:205). This is precisely what happens in Spanish, as the language does not insist upon the criteria of support to distinguish the two identically translatable words.

The preposition AROUND can be seen to have left the upper left quadrant and to have moved to the upper right. For the Spanish it does not hover around the center as for the Americans, but exceeds NEAR, BY, ALONG (the American proximity cluster) in upward verticality and forms a proximity cluster of its own. Part of the cause for Spanish-speakers' tighter conceptual grouping of this preposition may stem from the possibility of translating all three words, around, near, and by with the same word, cerca (de). Thus we would expect a closer knit grouping on the Spanish graph and indeed we find it.

The third noticeable variation is the relative isolation of FROM. Unlike the distal grouping of Americans, in which OUT, OFF and FROM form equidistant points of a triangle, FROM in the Spanish graph neither clusters with OUT and OFF nor appears in the same quadrant. This lack of linkage can be predicted on the basis of two related conceptualizations. The first of such considerations is that the Spanish word de (from) is also commonly used in a large variety of non-spatial expressions which are usually translated into English by the prepositions on, in, to, by, at.

```
Examples:  de noche                    by night
           de intento                  on purpose
           de un trago                 at one gulp
           la senora del sombrero rojo the lady in the red hat
```

A considerable portion of the Spanish-speakers' confusion may result from the non-discrimination of spatial prepositions from manner preposi-tions. Thus, the apparent, "magnetic pull" of the IN, ON, AT, TO, BY prepositions on the right half of the cognitive map has caused FROM to be interpreted as close to them in meaning.

For the final non-quadrant matching item I will consider an addi-tional influence which also pertains to the location of FROM for Spanish-speakers and has an impact too on the Latins' conceptualizations of OUT and OFF. This second factor accounts for the non-appearance of the anticipated OUT, OFF, FROM cluster. The Spanish mapping or mental repre-sentation positions OUT and OFF in the upper left quadrant, a divergence from the American location in the lower left. This shift is of major interest in that it violates the positive and negative dimensions intu-itively assigned to the vertical axis above and below center. Americans conceive OFF and OUT negatively (minus height); Spanish-speakers positively (plus height). This dichotomy is explainable if it is pointed out that the Spanish word _fuera_ is variously translated as _off_, _out_ or _over and above_. Because of the _over and above_ interpretation, the Spanish speakers would naturally tend to place OUT and OFF (both translated as _fuera_ in Spanish) in a more upward position than Americans would, and for the Latins, these notions would bear less relationship to FROM (translated _de_ or _desde_).

Having offered possible interpretations of non quadrant agree-ment between Spanish and American mental reconstructions, I can now comment on the depicted difference in distance between two items. It will be remembered that distance in space on the graph should coincide with perceived distance in the mental representation of two

items. While the Spanish map shows many similarities to the American

in the representation of distance (two pairs, for example, OUT and OFF

plus THROUGH and BETWEEN are separated by nearly identical distances),

attention is drawn to the greater distance shown between IN and INTO

for the Spanish speakers. It may be noted that a decreasing number of

Americans make the distinction between static or stationery in

(within) and directional into so that these two concepts, once distinct,

tend to fuse in present speech. It is common to hear a native speaker

say:

    11. He put his hand in the icy water.

    12. He walked in the theater without buying a ticket.

The larger than anticipated distance between the two prepositions on

the Spanish scale probably reflects the retention of the discrimination

between movement and non-movement. Seemingly, the majority of Americans

no longer attend to this difference.

    Two final observations can be made regarding what at first appear

to be roughly comparable clusters. The lowest clusters for both

Americans and Spanish-speakers contain the same three items yet closer

scrutiny reveals a discrepancy. For most native English speakers

below represents a lower point than under (although at times they are

interchangeable). This difference is apparent in a sentence such as,

    13. The mountain climber, having reached the summit, gazed

        at the valley below him; There was ice under his feet.

The American configuration correctly displays this latent concept by

positioning BELOW further down the vertical axis than UNDER; however,

the Spanish-speakers' representation inaccurately does the reverse.

The Spanish speakers have misplaced BELOW and UNDER. In the Spanish

language there is no difference in the two words; both are translated
equally by the words _bajo_ or _debajo de_. It appears that the implied
difference of degree between the two English words, _under_ and _below_ is
misinterpreted or overlooked by foreign students.

An equivalent occurrence is observable with the highest Spanish
cluster. The Spanish word _sobre_ conveys both _over_ and _above_; no
separate words exist to distinguish the two. A faulty perception is
reflected in the Spanish placement of OVER higher than ABOVE. Appar-
ently, Spanish-speakers fail to correctly make the subtle difference
which is frequently employed by native English speakers in sentences
such as:

14. The pilot gave me a thrill when we flew _over_ our home-
    town, but I was even more excited when we flew _above_ the
    clouds.

An even clearer difference in implied position exists in the paired
sentences:

15. The robber wore a bandage _over_ his eye.

16. The robber wore a bandage _above_ his eye.

17. The waitress put the tablecloth _over_ the table.

18. The magician placed the tablecloth _above_ the table.

The preceding examination of the Spanish configuration has revealed
a large amount of similarity, showing that the students at the intermediate-
to-advanced level do have an adequate grasp of the spatial concepts
involved. The obvious visual differences call attention to the areas
of disagreement and evidence the fact that Spanish-speakers fall short
of duplicating the American representation of interrelationships. I
shall have more to say about the significance of such diversity and the

implications for ESL teaching after an equally close examination of the third common space configuration, that produced by the Japanese (APPENDIX G).

Discussion Based on Observation of Japanese Data

As with the comparison of the American and Spanish-speakers' dimensional scalings, investigation of the Japanese representation of spatial preposition interrelationships (APPENDIX G) will pursue three types of divergencies: non-quadrant match, greater distance between two items and dissimilar clustering of items. It will be apparent that many of the subtleties of English prepositional interrelationship are lost to the intermediate-level Japanese ESL student. A number of conceptualizations based on Japanese persist, as illustrated, and to a large extent, these are predictable, as will be shown in the commentary which follows.

Observation of the Japanese map reveals six prepositional items which do not occupy quadrants corresponding to the American: ON, IN, AROUND, BETWEEN, THROUGH, ALONG (the minor shift of DOWN, BELOW, UNDER will be ignored) and notable discrepancies in positioning with FROM and BELOW. These mismatches are interpretable and not unexpected on the basis of contrastive analysis.

We shall first look in the upper left quadrant of the Japanese semantic space in which a cluster loosely joins together OVER, UP, ABOVE and ON. The diffuse boundaries point up the Japanese hesitancy to judge items as completely identical based on their unsurety of English meaning. The startling fact is that in the Japanese language, the four concepts, over, above, on, upon are expressed by exactly the

same phrase, no ue ni (Ue means roughly "the upper part"). There is
no Japanese word corresponding to the preposition up; A Japanese verb
incorporates the meaning instead. Some examples will illustrate that
the same phrase is employed with differing (English) meanings:

Dentō wa tsukue no ue ni sagatte imasu.
An electric lamp is (hanging) over the desk.

Chōjō wa kumo no ue ni dete imasu.
The top of the mountain rises above the clouds.

Anata no bōshi wa sono isu no ue ni arimasu.
Your hat is on that chair
                                        (Vaccari and Vaccari 1975:64)

Thus, the crucial distinction of support or surface contact which
English speakers use to differentiate on from above is of negligible
importance to Japanese as reflected by the lack of lexical precision
of their language on this one point. For this reason, the item ON is
not located in the right quadrant with other English fixed locus
prepositions such as AT or TO, but has been situated by Japanese
speakers in the same quadrant as ABOVE and OVER. Because of the identi-
cal translations for the words in Japanese, a left quadrant cluster
such as ON, ABOVE, UP, OVER is not surprising. Some awareness that in
English on belongs with at and to is shown by the near borderline
position of ON in the Japanese configuration.

Another observable difference exists between the Japanese and
American placement of IN. For the Japanese, IN does not reside with
INTO in the lower right quadrant but is elevated to the upper right
fourth of the semantic space. A triangular arrangement of AT, TO, IN
is suggested for this quadrant as all three of these words may be
rendered as ni in Japanese. In light of this similarity with at and
to the Japanese doubtlessly tend to conceptually link in with the

other two; thus they raise IN from the lower right quadrant. The word <u>ni</u> indicates "in the proximity of" or "in the direction of" and includes in its realm an area rather than a fixed point. Edward T. Hall contrasts English and Japanese clearly in saying that for native speakers of English, "space is treated in terms of a coordinate system. In contrast, the Japanese and many other people work within <u>areas</u>. They name 'spaces' and distinguish between one space and the next" (Hall 1959:203). Hence, the fixed locus <u>at</u> for English speakers varies from the Japanese concept of <u>at</u> (translated <u>ni</u>) or <u>in</u> (translated <u>ni</u>) which are more approximate and diffuse, incorporating a larger sphere.

A discussion of IN leads to comment on the nearness of BETWEEN to IN. Ideographically the characters used in Japanese for <u>among</u>, <u>between</u> and <u>inside</u> are related, so there is a natural tendency for the Japanese to place the two prepositions BETWEEN and IN in a close-knit group. This relationship holds true for all three of the language graphs in the present study. Somewhat differing for the Japanese map, however, is the noticeable removal of THROUGH from the centrality grouping. Both American and Spanish scaling revealed the close conceptualization of the four items IN, INTO, BETWEEN, THROUGH but the Japanese fail to include THROUGH with the other three. Instead, THROUGH is shifted to a position close to FROM, a seemingly less related item. The explanation is not mysterious. When <u>through</u> indicates position without motion it can be translated by <u>kara</u>, the same word used to mean <u>from</u> in Japanese. There is no difficulty in understanding the reason that the Japanese placed THROUGH next to FROM once it's known that the two words can be identically translated.

It once more appears that the native language is influencing judgment of similarity. The two prepositions <u>from</u> and <u>through</u> are judged by Japanese to have a closer relationship in English than is warranted.

Similarly, both the Japanese and Spanish-speakers indicated a higher degree of relatedness than did the Americans for AROUND with the other proximity prepositions: NEAR, BY. For both foreign groups, their understanding of <u>around</u> as "in the vicinity of" may not match that of Americans, "<u>somewhere</u> in the vicinity (radius) of." The difference is a subtle one. Like other subtle differences here noted, it is overlooked by the students.

As in the Spanish cluster, in the loose Japanese grouping of BELOW, UNDER, DOWN their item, BELOW, is positioned slightly higher than UNDER and this indicates a small but observable disparity with the American map. Just as was the case with Spanish, Japanese conveys the two meanings, <u>under</u> and <u>below</u> with the same post-positional phrase, (<u>no shita ni</u>). The Japanese have not matched the Americans map's placement of BELOW and it may be inferred that native language inter-ference has occurred in this instance.

All of the details and specific items discussed in this section are further expansion upon what is readily observable in the three multidimensional scaling coordinate maps. The appended interpreta-tions are valuable as an accompaniment to actual examination of the common space maps. By definition, the researchers' explication is speculative and somewhat subjective. The real value of such a study lies in providing each observer the opportunity to refer to the ob-jective reality of the data. Any observer can avail himself of the visual array of geometrical coordinates and thereupon form his own

hypothesis.

It will be useful at this point to state the general findings of such a study after the lengthy and detailed discussion above. The specific contrasts described are of interest in so far as they offer an amount of substantiation for Hypothesis 5, that for the three groups basic similarity of agreement about spatial prepositions is coupled with distinct differences in conceptualization. The semantic spaces for the three groups do reveal interesting disparities. It may be conjectured on the basis of the findings that, along the lines of linguistic relativity, there is a possible indication of differing interpretations for spatial reality among Japanese, Spanish-speakers and Americans.

Furthermore, Hypothesis 2, that the two foreign groups will differ in regard to type of problems is supported by the fact that the two groups have some mutual problems but differ on which prepositions are misplaced. This is the same finding as in Experiments 1 and 2. To succinctly recapitulate the above discussion, in comparing MDS maps, the Japanese showed discrepancies with ON, IN, AROUND, BETWEEN, THROUGH, ALONG, FROM, while the Spanish-speakers displayed divergent representations for OVER, AROUND, FROM, OUT, OFF, BELOW, INTO. Only three items, AROUND, BELOW, FROM, were a mutual problem; otherwise, the groups showed difficulty with separate sets of prepositions. This data tends to imply that the two intermediate groups exhibit imperfect knowledge of spatial prepositions for different reasons.

As regards Hypothesis 2, that intermediate Japanese ESL students will perform less well than the Spanish-speaking counterparts, the data does tend in this direction when the mean Horan values for

both foreign groups are compared to the mean Horan value of the
American reference coordinates; however, the t-test performed fails
to yield any statistical significance for a sampling of this size.

Significance

The multidimensional scaling results for the three language groups,
Japanese, Spanish and English, show fundamental agreement coupled with
obvious differences. On the basis of wider exposure to the language
and native use, the Americans' semantic space is considered to reflect
an "expert" point of view and as such is the reference against which
the other two groups are compared. If foreign students are to learn
English they must approximate the understandings of those who speak
the language as much as possible.

The MDS depiction offers clear evidence in support of Hypothesis
1, that some major concepts as well as some subtleties of English
spatial prepositions have eluded the grasp of two groups of foreign
students attempting to learn English. Near alignment has been reached
by intermediate Japanese and Spanish-speaking ESL students, but given
the utterly fundamental nature of these function words, occurring as
they do in the 500 most used words of the English language, any
divergence should be noted.

Conceptual differences appear largely to stem from the inherent
specificity of English. Spanish and Japanese prepositional systems,
also, have "a paucity of terms where we have a rich array" (Whorf 1956:
203). Certainly "the English language system demands that the speaker
use greater precision in describing spatial relationships than does
the informal Latin-American language. . . ." (Johnson 1978:40). The

same holds true for Japanese, whom I have shown to employ considerable overlap in the use of spatial terms and thus less refinement in this instance. (Perhaps the potential for exactness in English is precisely what makes the language desirable to foreigners as an international medium of communication; it is also what makes the language problematic.)

Because some "concepts, not considered worth expressing in [one] idiom may be treated as absolutely indispensable to the intelligible rendering of the proposition [in another language]" (Sapir 1921:90), it appears that a presumed universality of spatial conceptualization without sufficient qualification would be misleading. There are differences. The Spanish and Japanese, for example, are not habituated to making statements about space relationships on the basis of contact vs. non-contact, whereas this decision is effortlessly effected by English speakers.

Implications

The chief import of such findings is pedagogical. In light of foreign students' incomplete conceptualization of salient and subtle differences necessary for mastery of English, ESL teachers should take an active role in pointing out the crucial distinctions regarding spatial prepositions. The ability to use English correctly differs greatly from the ability to verbalize the rules and (in the case of prepositions) underlying assumptions which give the language structure and regularity. To be an effective teacher, an ESL instructor needs to be aware of learners' possible areas of conflict or inadequate comprehension. Because of the frequent use of the twenty common prepositions employed in the final study, it appears that spatial

prepositions, no less than verb tenses, deserve attention in the ESL classroom. Where there are non-correlating terms, supplemental classroom time might be spent in pointing out to students where essential distinctions lie along the lines of Whorf's theory of teaching a foreign language, which includes first making the student semi-conscious of his own grammatical framework so as to have patterns lose their "binding power over him" (Whorf 1956:225-26). Assuredly, if an intelligent and motivated student is made aware of possible sources of faulty hypotheses, he can more readily avert a potential problem. The intermediate level is the recommended point for this type of instruction. By this time the ESL student will have been introduced to the use and meaning of all English prepositions and can profit from sharpening his perceptions of any differences not brought out in his earlier study. Introducing beginning students to points of possible contrast between two languages is not advisable as this may actually provoke rather than prevent mistakes.

Recommendations

It is apparent that college level American freshmen are able to make meaningful and consistent judgments about spatial concepts in English. The map-like depictions resulting from multi-dimensional scaling of these assessments offer an objective visual resource against which foreign students' judgments can be compared. Further testing of various nationalities might yield helpful insights for ESL teachers into the problems people of differing native languages have in acquiring English as a second language and might possibly have a bearing on notions of interference and fossilization. It is

recommended that, where a larger number of intermediate-level students is available, this increased sampling be retested. Statistically significant results might ensue.

It would be interesting to test the same individual several times, at various levels of ability, to determine whether alignment with Americans becomes progressively closer. A potentially enlightening study would be to examine effects of different learning techniques on conceptualization with multidimensional scaling as the evaluative device. (Would visual or cognitive presentations of spatial preposi- tions, for example, yield a different map than would the audio-lingual approach?)

Finally, the diagnostic value of comparing multidimensional scaling for ESL students' judgments against those of Americans might be extended to other grammatical areas or where there are subtle yet distinctive differences in meaning, as with the overlapping meanings of modal auxiliaries. Much research remains to be carried out in the area of semantic space. The more that is known about the underlying inter- relationship of words, the more can be imparted to students of English as a second language.

CHAPTER VI

SUMMARY

A final overview of the three investigations is in order. Conceived as a three-pronged investigation, the present study examines five basic hypotheses about the learning difficulties of two groups of ESL students, Japanese and Spanish-speakers. The hypotheses are:

1. that both language groups will exhibit a problem with common prepositions in writing and perception,

2. that Spanish-speakers will differ from Japanese in the types of mistakes made,

3. that Japanese ESL students will display less understanding of the use and meaning of prepositions than their Spanish-speaking counterparts, perhaps due to the historical closeness of the two Indo-European languages,

4. that writing samples will reveal that both groups avoid using prepositions they are confused about, and

5. that a comparison of semantic space representations for the three groups examined will yield basic similarity along with distinct major differences in conceptualization of spatial prepositions.

The hypotheses are formulated on the basis of classroom experience and the impact of two basic theoretical considerations: the contrastive analysis hypothesis and the linguistic relativity hypothesis.

The findings of Study 1, the Diagnostic Test, touch upon

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Hypotheses 1 and 3. The results of Study 2, Error Analysis of Student

Compositions, lend support to Hypotheses 2, 3 and 4, while the final

part of the series, Study 3, Multidimensional Scaling for 3 Language

Groups, substantiates the claim in Hypothesis 2 but inconclusively

lends support to Hypothesis 5.

Significance and General Discussion of Findings

The exact causes of learner difficulty are hard to pin-point.

Many theories abound. Whorf speaks of covert categories in each

language, explaining that the reactance of each category is based on

a complex web of presuppositions (Whorf 1956:83). These presupposi-

tions clearly differ as evidenced in the experiments above. Likewise,

with various covert categories of exotic languages

> where they have been thought to be recognitions of objective
> differences it may rather be that they are grammatical cate-
> gories that merely accord up to a certain point with objective
> experience. They may represent experience, it is true, but
> experience in terms of a definite linguistic scheme, not
> experience that is the same for all observers (Whorf 1956:92).

Different language systems can be contrasted according to the

degree of precision or exactness each offers. These splits and

coalescences (non-correlating items) can cause learner difficulties.

An additional source of trouble for the learner may be involved with

word order (preposition in SVO languages; postposition in SOV

languages like Japanese) or in the part of speech arbitrarily assigned

to a given concept. Is in the center of with its phrasal noun +

possessive element any less of a preposition than a one word entity

such as among? English, it seems, has both kinds of grammar constructs.

Japanese, on the other hand, nominalizes prepositions by using nouns

in the accusative case (Vaccari and Vaccari 1975:65).

    example: tsukue no ue ni   = on the desk
                 desk 's upper part at

Similarly, aida, soba and shita in the constructions no soba ni, no aida

ni, no shita ni (as shown on page 36) are nouns.

If each speaker is lingua-centric, assuming as Whorf claims, that

his assumptions are the only correct interpretations of data, then the

second language learner will have difficulty pegging a certain concept

into a new grammatical pattern or "part of speech." Sapir (1921)

has discussed just such arbitrary assignment of form to grammatical

concepts.

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APPENDIX A

THIRTY-THREE PREPOSITIONS USED IN

STUDIES 1 AND 2

1. into
2. through
3. under
4. near
5. among
6. against
7. past
8. between
9. out of
10. across
11. over
12. behind ·
13. above
14. on top of
15. on
16. around
17. by
18. up to
19. toward
20. opposite
21. in
22. to
23. below
24. beside
25. in front of
26. beyond
27. inside
28. outside
29. at
30. far from
31. from
32. along
33. in the middle of

DIAGNOSTIC PREPOSITION TEST

1. When Mary was walking near the small pond she slipped and fell
    _____ the water.
                          on, onto, inside, into

2. How did the bird get into the school room? It probably flew
    _____ the open window.
                          past, into, onto, through

3. He put a pad _____ the hot dish to protect the
    table.
                          under, below, on, by

4. He parked his car _____ the school so that he wouldn't
    have to walk far to attend class.
                          far from, around, near, up to

5. Dick is sitting _____ several of his friends.
                          along, toward, between, among

6. When he finished raking the leaves he leaned the rake _____
    the house.
                          on, to, over, against

7. Because the young girl was interested in only one thing, she walked
    _____ several shops until she came to the store
    which sold dolls.
                          beyond, past, over, through

8. He wanted to put the table _____ those two windows.
                          within, at, between, among

9. He took some money _____ his pocket and gave it to
    the cashier.
                          outside, out of, out, by

10. When I look outside my front window I can see my neighbor's house
    _____ the street.
                          along, across, opposite, toward

11. He didn't get wet because he held an umbrella _____ his
    head.
                          on, on top of, above, over

12. While waiting in line for the bus, Tom turned and looked over his shoulder at the man standing directly _____ him.

     on the side, behind, beyond, over

13. The clouds are far _____ our heads.

     above, over, on top of, on

14. The chimney is _____ the house.

     up, over, on top of, above

15. I'm sorry that I stepped _____ your foot.

     in, on, at, to

16. We were all sitting _____ the table, ready to eat, when the phone rang.

     near, among, around, toward

17. That house _____ the lake is my favorite house.

     by, in the middle of, up to, through

18. The thief walked _____ the door but he didn't go in because he heard a noise inside.

     at, up to, beyond, through

19. She automatically blinked her eyes when she saw the ball coming _____ her.

     toward, behind, beyond, far from

20. I thought it was the bank that was directly facing the post office, but I was wrong; instead, the movie theatre is _____ the post office.

     opposite, between, among, across

21. There is no money _____ my wallet.

     of, in, on, at

22. He drove his car _____ the service garage in order to have it repaired.

     at, to, out, from

23. The Davidsons live on the 32nd floor of a tall apartment building. It is very convenient for them because there are several shops _____ them on the ground floor.

     under, below, beside, on top of

24. My grandmother gestured with her hands for me to come sit _____ her. She wanted to tell me a secret.

     within, between, beside, toward

25. The weather was foggy and the driver did not see the stop sign _____ him.

     across, in front of, toward, up to

26. The camp director told the young boys not to cross the river or go into the forest. No one was allowed to go _____ the camp area.

    behind, out, on the side, beyond

27. When Tom received the letter from his father he hoped there was some money _____.

    into, on, inside, between

28. Our mother would not allow the dog to come into the house so he had to stay _____.

    beyond, by, beside, outside

29. The postman was standing _____ the door with a large package.

    up to, from, on, at

30. Dr. Phillips hated noise and wanted some peace and quiet so he built a house in a rural area, _____ the city.

    through, off, away, far from

31. When the award was announced, Jim walked _____ his seat in the audience up to the stage to receive his prize.

    out, away, from past

32. Tom and Mary walked hand-in-hand _____ the river path for an hour and a half on that spring day.

    among, across, along, toward

33. There was a small island _____ the lake and several trees grew there.

    within, inside, between, in the middle of

JAPANESE ERRORS WITH SPATIAL PREPOSITIONS

IN COMPOSITIONS

Classifi-cation	Preposition Involved	
		Subject 1
O	to	My friends come my home and then we go to the tearoom.
UA	to	After lunch we go to drive to somewhere.
O	at	Sometimes we meet the tearoom again after dinner.
C	in front of	In front of the wall there is blackboard.
C	behind	Behind wall there is another door.
		Subject 2
O	at	I stayed Holiday Inn.
I	out of	I jumped out of bed.
UA	to	At first we went to shopping.
O	in	I and my friend arrived Tulsa twelve-thirty.
		Subject 3
S	on	There is a bed in one side of my room.
S	on	In the other side there is a stereo set.
S	in	There is a tv on the corner.
O	in	You have to warm up the pot, then tea put the pot in.
O	in	If you make tea for four people, you have to put in five spoonfuls of tea.
		Subject 4
UA	at	I must eat dinner at somewhere else on Sunday evening because the cafeteria is closed.
UA	to	It was so hot that I didn't want to move to anywhere.
		Subject 5
S	in	There is a bed at the front corner of my room.
S	in	I wake up late and then I light a cigarette on my bed.
O	to	I come back the dormitory.

Classifi-cation	Preposition Involved	
		Subject 6
S	out	If you want to take down some money then you stand up in front of checking machine.
S	on	Following that you press some amount by the machine.
		Subject 7
O	from	I used airplane while I went from Fukuoka to Tokyo and we taked off from Narita Airport.
		Subject 8
UA	to	My city is facing to ocean and there are many parks and places for sightseeing.
UA	at	A lot of people spend their time at there on weekend.
S	onto	In the morning and evening rush many people are crowded on the street.
UA	around	I like a lot of places, but my favorite place is a around of big lake which's name is Towada lake.

SPANISH-SPEAKERS' ERRORS WITH SPATIAL

PREPOSITIONS ON COMPOSITIONS

Classification	Preposition Involved	
		Subject 1
UA	near	I go to the church nearby my house.
UA	to	By twelve o'clock I come back to home.
		Subject 2
O	at	Everybody is looking his paper.
UA	from	I left from Stillwater at 7:00 pm and arrived to Ardmore at 8:00 pm.
UA	to	Ardmore is near to Texas.
		Subject 3
UA	at	I go back at home at 12:00.
S	to	I remember my family and I have to write for them.
		Subject 4
UA	near	Near of my bench there are two old people.
S	in	Two other people are walking on the park.
S	to	On the whole, I always go into the bed by 12:30 p.m.
		Subject 5
S	near	I am sitting on the bench in a beautiful lake.
		Subject 6
UA	to	We continued our trip via to Dodge City.
S	on	In the back wall there is a light brown door which is the bathroom entrance; in the left wall is the main door.
S	on	When he was a youth he worked like peon in a farm.
		Subject 7
UA	to	I need to go to another building to attend to the lab class.
S	into	He was sent to exile.
S	in	It's possible to improve your English if the student practices and has a good attendance to in the lab.
S	at	All my family is in my birthday party.

Classifi- cation	Preposition Involved	
I	out of	Sometimes on Sunday we go out home and visit a park.

Subject 8

C	on one side	My favorite city has a clean and long seashore in one of its sides.

Subject 9

UA	to	I could go to the beach if I lived near to the beach.
I	in back of	On the yard back me there is a couple of children.
UA	to	In the afternoons, after dinner, generally we take a nap; sometimes we go around to town.
S	on	My classroom is at second floor in the old U.S.D.A. Building.
O	to	I came Stillwater four months ago.
O	on	The floor there is blue carpet.
C	in front of	There is a big blackboard in front of the classroom.

Subject 10

|		
C	between	Hirakata is in the middle part of Osaka and Kyoto and the Yodo River run through between Kyoto and Osaka.
S	on	When my birthday comes my family goes to a trip.
S	near	My parents' old house is in sea-beach, so we can enjoy swimming.
O	at	There is large American national flag on the ceiling in my room. When I went to bed I always looked it.

APPENDIX D

COMPARISON OF FREQUENCY

| Twenty Prepositions Used in Study 3		Rank	
		American Heritage Word Frequency Book	Kučera-Francis
1.	TO	5	4
2.	IN	6	6
3.	ON	14	16
4.	AT	20	18
5.	FROM	23	26
6.	BY	27	19
7.	UP	50	55
8.	OUT	51	51
9.	INTO	61	58
10.	OVER	82	80
11.	DOWN	84	101
12.	THROUGH	102	93
13.	AROUND	122	163
14.	OFF	147	143
15.	BETWEEN	159	126
16.	UNDER	170	130
17.	ALONG	177	268
18.	BELOW	182	684 through 693
19.	ABOVE	222	313
20.	NEAR	259	477 through 481

AMERICAN MDS
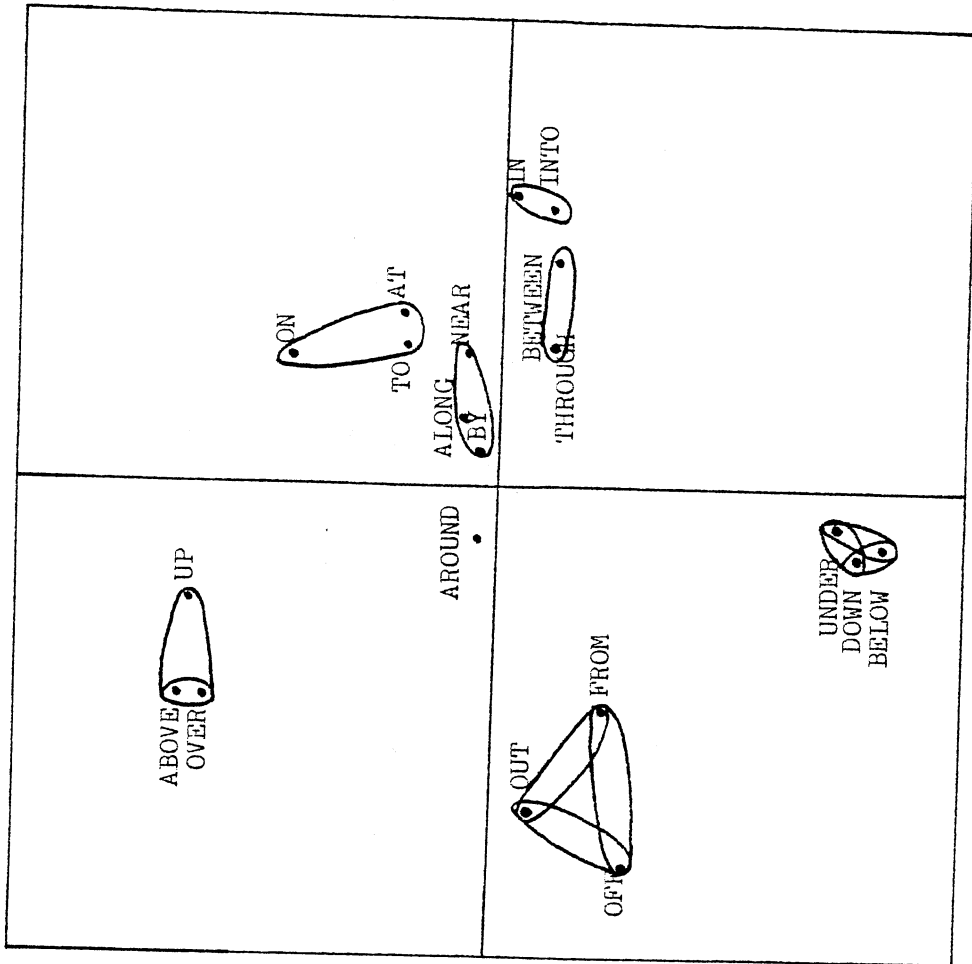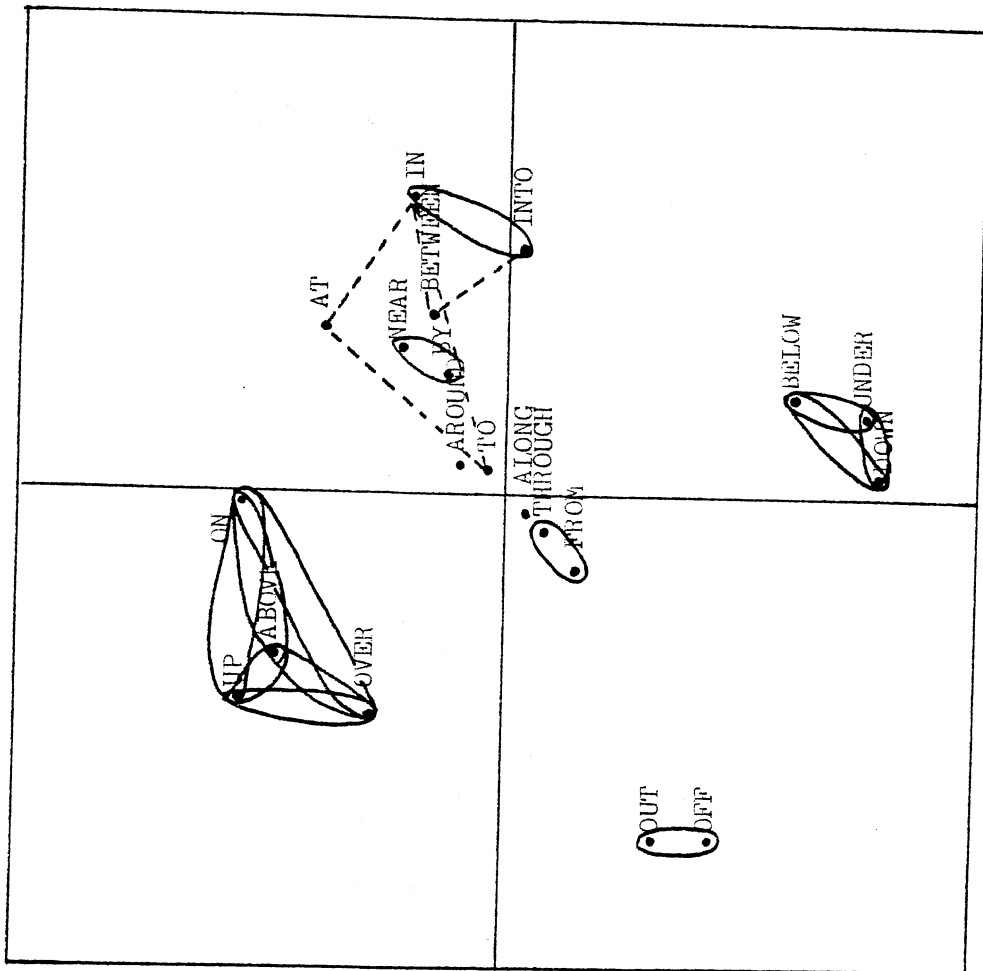
SPANISH-SPEAKERS MDS
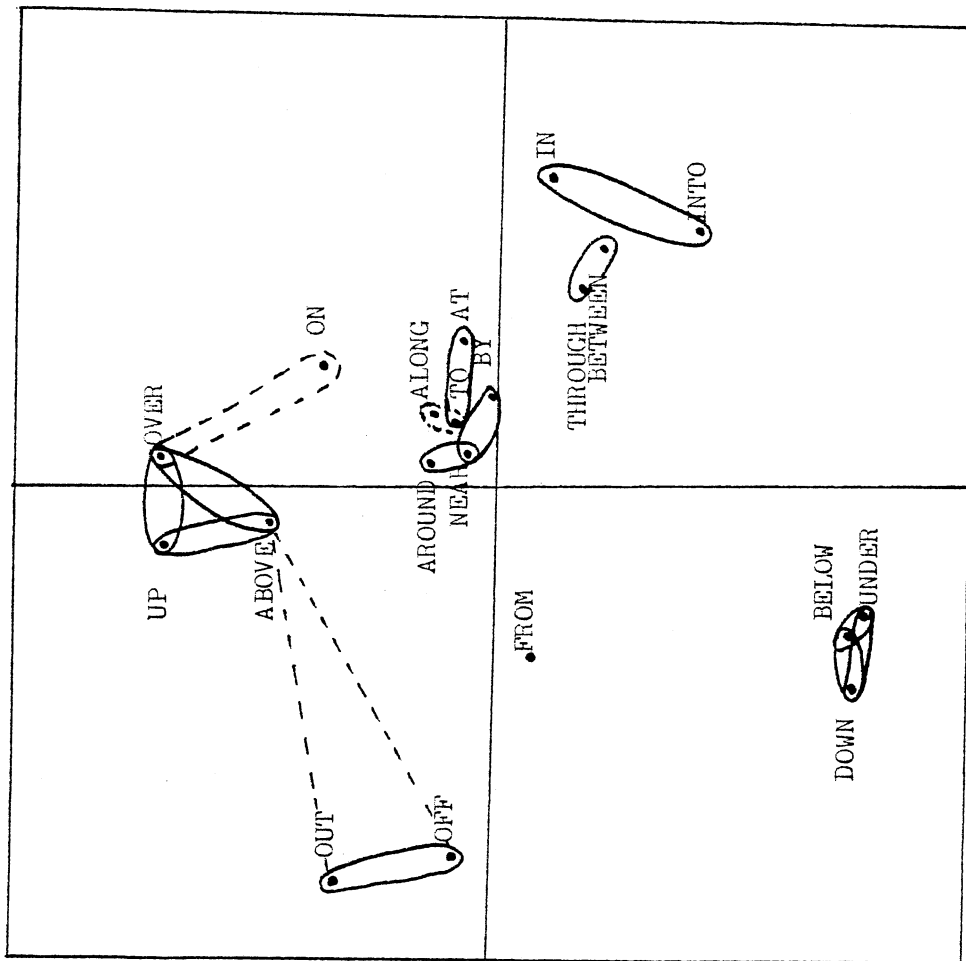
APPENDIX G

JAPANESE MDS

APPENDIX H

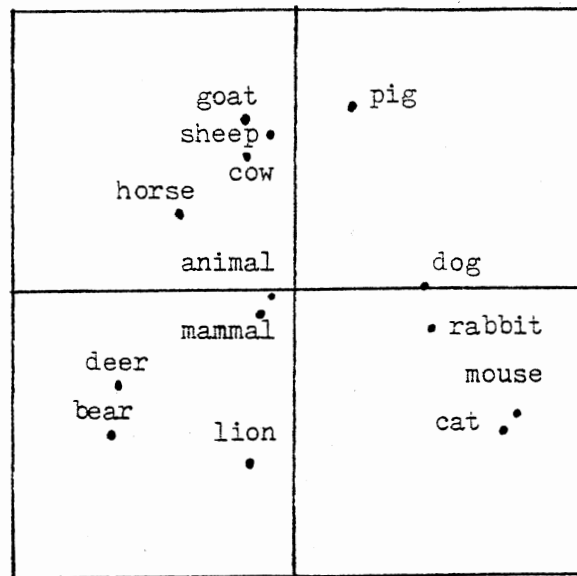BACKGROUND ON MULTIDIMENSIONAL SCALING

Multidimensional scaling refers to a set of mathematical techniques which work backwards from people's judgments of similarities of objects to construct a "map" of the interrelationship among a group of concepts. The method, chiefly developed by Shepard (1962) and Kruskal (1964), starts with a complete set of two-way comparisons. Typically, people are exposed to all possible pairings of words within a semantic domain and asked to rate how similar the two words are on a scale of 1 to 7. The average ratings, once submitted to a computer program, yield a spatial representation consisting of a geometric configuration of points, each of which represents an object. This set of geometric co-ordinants, or "map" reflects the "hidden structure" or semantic space (defined elsewhere) and as an empirical, visual representation, aids comprehension of data. The map-like configuration of points represents the data in that the more similar two words are rated on the average, the closer they are in the spatial representation. Likewise, "the larger the dissimilarity (or the smaller the similarity) between the two objects, as shown by their proximity value, the further apart they should be in the spatial map" (Kruskal & Wish 1978:7).

After following a systematic procedure using the Multidimensional scaling algorithm, and obtaining a configuration, it is then important to interpret the diagram. As Kruskal observes, "When multidimensional

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scaling yields useful insights, these generally result from examining the configuration" (Kruskal & Wish 1978:9). By looking at the arrangement of points, a careful observer can ascertain what crucial, identifiable features or "dimensions" underlie the schema. With this information, researchers can attempt to develop indicators of variables which can be measured. Several semantic domains have been studied using MDS methods. These include color terms, kinship terms, pronouns and emotion names (Clark and Clark, 1977:435).

An example would prove useful at this point. Rips, Shoben and Smith (1973), for instance, have successfully illustrated the semantic space for a group of animals. The overall picture is satisfying in that it fits our intuitions: the more similar we judge two animals to be, the closer they are on the "map." As shown, the researchers used a two dimensional scale. The horizontal dimension was interpreted as depicting size (large animals to the left, small animals to the right). The vertical dimension was seen to measure ferocity (the lower an animal was, the more fierce it was judged).

SEMANTIC SPACE FOR MAMMALS

From Rips, Shoben, and Smith (1973:10)

Figure 2.   Example of Multidimensional Scaling.

Although this tidy illustration makes the notion of dimensionality appear easy to label, the opposite is the case. In some instances it is useful to seek a description for the salient characteristics on which the similarity judgments seem to have been made; at other times these are previously known or ignored. The computational procedure can be structured to arrange the patterning of judgments into 2, 3, 4 or n dimensions. Researchers are more concerned with the appropriate dimensionality (that which is most helpful in analyzing the data) than with the "correct" dimensionality (the hypothetical true dimensionality which underlies the data (Kruskal and Wish 1974:48). Subjects are rarely told in advance which underlying characteristics to consider as this is deemed material to discover (if possible) rather than to impose.

A brief explanation of multidimensional scaling such as this should include clarification of the term "dimension." "Dimensionality" and "the number of dimensions" both refer to the number of coordinate axes, that is, the number of coordinate values used to graph a point in space. This notion is similar to the number of factors in factor analysis. "'Dimension' is also used to refer to some underlying characteristic of the objects under study." (Kruskal and Wish 1974:48). It should be noted that many relevant attributes do not vary enough to show up as salient dimensions.

For the current study, two dimensions were chosen. Points were graphed on the basis of two sets of coordinates. Although a higher number of dimensions is possible, the difficulty of visual interpretation increases proportionately; it is much more useful to read a two-dimensional map than one which is incomprehensible. For ease of use,

Kruskal recommends a two-dimensional scale, "For example, when an MDS configuration is desired primarily as the foundation on which to display clustering results, then a two-dimensional configuration is far more useful than one involving three or more dimensions" (Kruskal and Wish 1978:58).

It can confidently be assumed that the more important and interesting aspects are well displayed in two dimensions and the present study holds the dimensions to two in order to offer easy graphical depiction.

Despite the naturalness of the question, "How does MDS work?" the answer is not within the scope of this inquiry. The procedure by which multidimensional scaling obtains the geometric configuration of points from raw proximity judgments is very complex. "Even statistical techniques such as the analysis of variance and linear regression are simple to explain by comparison. Because the operations are much more complicated, they are "practically never performed without the aid of a computer" (Kruskal and Wish 1978:16). Warren Torgerson sums up the procedure as involving three basic steps.

> In the first step, a scale of comparative distances
> between all pairs of stimuli is obtained. The second
> step involves estimating an additive constant and
> using this estimate to convert the comparative distances
> into absolute distances. In the third step, the
> dimensionality of the psychological space necessary to
> account for these absolute distances is determined, and
> the projections of the stimuli on axes of this space are
> obtained. (Torgerson 1952:402).

A reiteration of the central ideas on which MDS is based will be helpful at this point and later as the data is interpreted. When objects differ on a number of attributes they can be described as being in an "attribute space" (Horan 1969:139). This common perceptual space Clark describes as "semantic space" by which he means "a geometrical

representation of the meanings of a set of related words, each of which
is indicated as a point in space" (Clark and Clark 1977:566). On this
semantic space, "distances and dissimilarities should correspond (Kruskal
1964:1). Similarly, the smaller the interpoint distance, the more
similarity exists between two items.

The notions of semantic space, dimensions and factors are all based
on the assumption that word sense consists of components and that the
more components two words have in common, the more similar they are in
meaning. These understandings have emerged from the tradition called
the quantificational approach to meaning. The history of the quantifi-
cational approach, a comparatively recent development, can easily be
sketched. The fundamental premise of the new, more objective measuring
devices is a structural or schematic view of knowledge, a well accepted
idea traditionally credited to F. C. Bartlett (1932). Shavelson (1975:
71) defines the term derived from this type of view, "cognitive structure,"
as "a hypothetical construct referring to the organization (relationships)
of concepts in long-term memory." The task of assessing the strength
of the interrelationships among concepts has notably been carried out
by Johnson (1964, 1965), Shavelson (1972, 1973, 1974) with the word
association method, by Johnson, T. 1969, Miller, 1969 with the card-
sorting method, and by Shavelson (1974) and Fillenbaum and Rappoport,
1971 with graph-building models. The more sophisticated procedures
such as hierarchal clustering (Johnson, 1967) and MDS (Shavelson, 1972)
are later innovations.

Each of these elaborate techniques represents a forward step in
the realm of psycholinguistics, chiefly because the investigators'

own biases or intuitions are not being tested; instead, the judgments of other people serve as the basis from which researchers can extract latent dimensions (Clark and Clark 1977:432).

VITA ⊃

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