AUTHOR	Godfrey, Kathleen A.
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ABSTRACT

        English for speakers of other languages (ESOL) students
attending mainstream university courses for the first time struggle with
language proficiency issues and have to adjust to unfamiliar pedagogical
concepts, including an emphasis on critical thinking. The purpose of this
paper is to determine to what extent and to what degree ESOL and mainstream
teachers use questions to foster critical thinking skills. This study looks
at cognitive level questions, wait-time behavior, use of comprehension
checks, confirmation checks and clarification requests, as well as the
length, syntactic complexity and cognitive level of student responses. Two
advanced ESOL reading/writing classes and two entry-level mainstream writing
courses were the sites of this study. Classes were observed and audio-taped
with the results transcribed. Transcripts from whole-class discussions of
reading assignments and discussions with teachers were analyzed. Tabulations
of the question types in each group revealed that the mainstream teachers
asked a greater percentage of higher order (i.e., related to critical
thinking) questions, though the ESOL teachers asked far more questions.
Post-question wait-time was longer in the ESOL classes, and there were far
more comprehension and confirmation checks and clarification requests. Both
teachers made speech adjustments to help students ask higher order questions.
The results confirm that mainstream teachers in low-level writing classes
emphasize critical thinking skills whereas ESOL teachers, even in advanced
level writing classes, devote class time to both text comprehension and
critical thinking. Appendices include both transcription samples and
statistical tests. (Contains 49 references.) (KFT)

TEACHER QUESTIONING TECHNIQUES, STUDENT RESPONSES

AND CRITICAL THINKING

by

KATHLEEN A. GODFREY

2001

ABSTRACT

Title: Teacher Questioning Techniques, Student Responses and Critical Thinking

ESOL students attending mainstream university courses for the first time make many adjustments. In addition to struggling with general language proficiency issues, they have to adjust to unfamiliar pedagogical concepts, including the emphasis on critical thinking. The purpose of this paper is to determine to what degree and to what extent ESOL and mainstream teachers use questions to foster critical thinking skills. This study looks at cognitive levels of questions, wait-time behavior, use of comprehension checks, confirmation checks and clarification requests, as well as the length, syntactic complexity and cognitive level of student responses.

Two advanced-level ESOL reading/writing classes and two freshman-level mainstream writing classes participated in this study. The classes were observed and audiotaped two to three times each. The tapes were transcribed, and data from whole-class discussions of reading assignments, including tape transcripts and interviews with teachers, were analyzed.

Tabulations of question types in the two groups revealed that the mainstream teachers asked a greater percentage of higher order questions. However, the ESOL teachers asked a much larger number of questions. In addition, ESOL teachers repeated more lower order questions, whereas mainstream teachers tended to repeat higher order questions. Mean postquestion wait-time was longer in the ESOL classes

at 3 seconds as opposed to 1.4 seconds for the mainstream groups, but postresponse wait-time was under 1 second in both classes. There were significantly more comprehension checks, confirmation checks and clarification requests in the ESOL classes. Both teacher types made speech adjustments to help students respond to higher order questions. ESOL student responses were much shorter and much less complex than those of the mainstream students.

The results suggest that mainstream teachers in low-level writing classes emphasize critical thinking whereas ESOL teachers in advanced level reading/writing classes devote class time to both text comprehension and critical thinking. In addition, this difference in focus influences the interactional norms in the two class types, contributing to the adjustments ESOL students need to make when they enroll in mainstream classes.

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CHAPTER I

INTRODUCTION

Purpose

The purpose of this paper is to examine teacher questioning techniques and student responses in English to Speakers of Other Languages (ESOL) classes and lower level mainstream classes at the university level. The focus is on the degree to which teachers use questions to foster critical thinking skills, and how students respond to questions of varying cognitive levels. A goal of this study is to compare types of teacher questions and teacher wait-time in order to add further evidence to the body of research that has already been conducted on these topics. A second goal is to provide some clarification on the relative ability of beginning native and nonnative university students to respond appropriately to higher-order questions. A third goal is to examine the ways in which interactional norms differ between ESOL and mainstream classes, and how these differences affect the ability of nonnative speakers to succeed in mainstream classes. A further goal is to provide ESOL teachers with a means to evaluate the ways in which the development of critical thinking is facilitated in advanced level ESOL courses.

Statement of Problem

There is much talk about the need for critical thinking at the college level. A brief look at the vast amount of literature and research available on the development of

critical thinking available is all that is needed to ascertain that a major goal of many American universities is to instill critical thinking skills in students. But what exactly is critical thinking? According to Tsui (1998), it is impossible to offer a complete definitive definition of this complex skill. Critical thinking has been defined in a variety of ways, but, fortunately, there is much overlap between these definitions. Furedy and Furedy (1985) describe critical thinking as involving many skills, including "a disposition for disciplined inquiry, based on a readiness to question all assumptions and an ability to recognize when it is necessary so to question. Critical thinking also involves the capacity to carry out evaluations and analysis in a rational manner and an understanding of disinterested scholarship" (p. 52).

In spite of the emphasis on the development of critical thinking at the college level, efforts on the part of higher institutions of learning to develop this skill have not always been successful. Students' critical thinking skills improve as students progress in college, but performance generally remains under expected levels (Tsui, 1998). If native speakers are lacking in critical thinking skills, one has to wonder how nonnative speakers enrolled in mainstream university courses fare when they are expected to demonstrate higher-cognitive-level thinking. When it comes to critical thinking, the researcher of this study argues that the ability of these students to perform well in mainstream classrooms is impacted in three different ways. First of all, nonnative students are challenged by having to articulate thoughts in a second language in which grammar, vocabulary and pronunciation are still a struggle. These students may be

quite competent in using surface structures but often lack the ability to express more complex ideas in English. Second, many of these students come from educational systems in which questioning, examining issues from different sides, and giving personal opinions are not the norm. At American universities, however, this ability is crucial for success, and students from educational backgrounds in which learning connotes rote learning and extensive memorization are bound to face difficulty in adjusting to this unfamiliar expectation. For this very reason, many university ESOL programs include development of critical thinking skills as a goal of the curriculum. Last of all, it is generally recognized that critical thinking is a skill that takes many years to develop, and is an ability whose roots are laid during the first years of schooling in this country. It is questionable whether students who have not received this foundation are able to make up this lost time in a matter of months, in light of the second language skills they are still developing. As Cummins (1979) states, students who have not developed academic skills in their first language will have difficulty acquiring these skills in a second language. If a student has not been exposed to this skill in his/her previous educational experience, learning it at an American university at a time when the student is making a large number of cultural adjustments is challenging.

In addition to the cultural adjustments nonnative speakers make when they enroll in mainstream classes, they also make adjustments that are the result of the divergent interactional norms that exist in ESOL classes. Some of these norms are

influenced by the speech modifications that native speakers in general make in conversations with nonnative speakers outside the classroom. Other norms are a result of the unique communicative situation found in ESOL classrooms. For in these classes, linguistic forms have a dual role in that they can serve as a vehicle, but also be the focus and aim of the lesson itself (Seedhouse, 1995). This dual role of linguistic forms has confounded attempts to study ESOL classroom interaction but is a necessary component of any study.

In studying the development of critical thinking skills, there are good reasons to focus on teacher questioning techniques. First of all, teacher questions are one of the key features of classroom interaction. Gall (1970) claims that questions are "the basic unit underlying most methods of classroom teaching" (p. 719). Further, many educators believe that questioning techniques can be used to develop students' cognitive ability. According to Wilen (1987), "theory strongly suggests that teachers should ask higher-cognitive-level questions to have students apply learnings and think critically" (p. 8). For Unrau (2000), "there is no question that a teacher's ability to question artfully.... enhances the development of thinking through talk" (p. 57). Hunkins (1989) also states that students' thought levels are influenced by questions, and that questions at higher cognitive levels enable students to process and think about information with greater depth. Thus, the more use a teacher makes of higher-cognitive-level questions, the more stimulation there is of students' higher-level thinking.

Numerous comparative studies of teacher questions in the ESOL classroom demonstrate that teachers make adjustments in their questioning techniques when communicating with nonnative students. In these studies, the focus is frequently on the manner in which questioning techniques affect acquisition. In spite of the general interest at the college level in fostering critical thinking skills, little research has been done on the use of teacher questions and the development of critical thinking skills in ESOL classes. Without such research, little can be known of how nonnative students respond to questions of varying cognitive levels. Therefore this study attempts to examine the effects of teacher question techniques and student responses from the point of view of critical thinking development.

Definition of Terms

wait-time 1:   periods of silence that follow teacher questions

wait-time 2:   periods of silence that follow students' responses

present question: comprehension checks, clarification requests and
                          confirmation checks

sentence node: independent or dependent sentence clauses including
                          sentence structures containing infinitives and gerunds

The following four definitions of question types are reproduced from Wilen's question classification system (1987):

low order convergent: questions requiring students to engage in reproductive
                          thinking. The teacher's intention is to have students
                          recall or recognize information. Because emphasis is on
                          memorization and observation, student responses can
                          easily be anticipated.

high order convergent: questions requiring students to engage in the first levels of productive thinking. The teacher's intention is to have students go beyond recall and demonstrate understanding of information organizing material mentally. Although more thinking is involved at this level, student responses still generally can be anticipated.

low order divergent: questions requiring students to think critically about information. The teacher's intention is to have students analyze information to discover reasons or causes, draw conclusions or generalizations, or to support opinions. Because higher-level productive thinking is involved, student responses may not be anticipated.

high order divergent: higher-order questions requiring students to perform original and evaluative thinking. The teacher's intention is to have students make predictions, solve lifelike problems, produce original communications, and judge ideas, information, actions, and aesthetic expressions based on internal or external criteria. Because this level represents the highest level of productive thinking, student responses generally cannot be anticipated.

Statement of Research Questions

The following questions are posed in this study:

1.   Are there systematic differences in teacher questioning behavior in ESOL and mainstream classes?

    a)   Do teachers of mainstream classes use more higher-cognitive-level questions than teachers of ESOL classes?

    b)   Do teachers of ESOL classes allow more wait-time than teachers of mainstream classes?

c) Do teachers of ESOL classes use more present questions (i.e., comprehension checks, confirmation checks, clarification requests) than teachers of mainstream classes?

2. Are there systematic differences in the way ESOL students and mainstream students respond to different types of teacher questions?

a) Is there a systematic difference in the degree to which cognitive levels of student responses correspond to cognitive levels of teacher questions in ESL and mainstream classes?

b) Does the relative length of response (measured by the number of words) differ between ESOL students and students of mainstream classes depending on the types of questions asked?

c) Does the relative degree of syntactic complexity of response (measured by the number of sentence nodes) differ between ESOL students and students of mainstream classes depending on the type of question asked?

d) Do ESOL students fail to respond to higher-cognitive-level questions more often than students of mainstream classes?

To research question 1:

Previous studies have shown that native speakers modify their questions when speaking to nonnative speakers (Chaudron, 1988). One comparative study of teacher question adjustments shows that certain question types vary depending on whether the

teacher interacts with native or nonnative students (Fink, 1987). The distinction that is often made is between display and referential questions, that is, questions to which the answer is known, and questions to which the answer is unknown. These two question types have been associated with differing levels of cognition; however, there has been little research done on differences in teacher questions using a classification system that more clearly distinguishes cognitive levels of questions. In view of the fact that nonnative students attending university ESOL classes are being prepared to enter mainstream classes, it is worthwhile to ask whether these students in advanced courses are exposed to higher-cognitive-level questions in a fashion similar to students in mainstream classes.

It has been documented in many classroom studies, both of native and nonnative students, that longer wait-times are associated with higher-level-cognitive questions (Rowe, 1987; Tobin, 1987; Stahl, 1994). To the knowledge of this researcher, there has been only one study conducted comparing wait-times in both nonnative and native speaker classes (Fink, 1987). This study reports a slightly longer wait-time in an ESOL class for higher-cognitive-level questions and a much shorter wait-time for lower-cognitive-level questions than in a class of native students. The present study investigates further whether there are deviations in wait-times, in order to build on existing research.

Second language acquisition research has shown that in conversations between native and nonnative speakers, there is more use of comprehension checks,

confirmation checks and clarification requests (Chaudron, 1988; Larsen-Freeman and Long,1991). Studies of the these questions types in the ESOL classroom have shown varying results. These question types are usually examined under the assumption that they increase the amount of interaction that takes place and, as such, are an aid to acquisition. The use of these question types is examined in this study to see how they influence the interactional norms in the two class types.

To Research Question 2:

In contrast to the large body of research on teacher questioning techniques, few studies have examined student responses to questions. Even less research has looked at student responses in the ESOL classroom. Brock (1984) compared length and complexity of ESOL student responses to different question types and found a significant increase in length and complexity of responses to referential questions. Several studies have compared the relationship between the cognitive levels of native student responses and teacher questions (Cole & Williams, 1973; Arnold, Atwood & Rogers, 1974), but, to the knowledge of the researcher, no such studies have been conducted with ESOL students. Neither has any research attempted a comparison of student responses in ESOL and mainstream classes with regard to cognitive level, length of response, and syntactic complexity. In a study of American elementary school classes, Cole and Williams (1973) found that cognitive level as well as length and syntax of student responses were closely related. The present study looks at all three dimensions of student responses as well as the degree to which students fail to

respond. A study of these three dimensions provides evidence of students' ability to

respond appropriately to higher-cognitive-level questions.

CHAPTER II

LITERATURE REVIEW

Introduction

There is a large body of literature available on observational and experimental studies completed in both mainstream and ESOL classes. Whereas a lot of classroom research conducted in mainstream classrooms studies cognitive development and the role of classroom interaction, most ESOL classroom research has been concerned with the linguistic aspects of interaction and second language acquisition. There have been many recent studies on classroom questions. Many of these studies have dealt with teacher wait-time, that is, the time teachers allow students to respond to questions. Very little recent research has looked at types of teacher questions, and then only from the perspective of second language acquisition. There has been little investigation of how critical thinking skills are developed in the ESOL classroom (Tsui, 1995).

The literature reviewed for this study is divided into four groups. First, there is an overview of theories on the role of questions in the classroom, as well as studies of questions in the ESOL classroom. A review of these theories and studies sheds light on the ways in which teacher questions vary depending on the class type and is a necessary step towards ascertaining possible causes for different question and response behaviors in ESOL and mainstream classes. Second, there is a review of the research related to wait-time, as this impacts student responses to teacher questions. Longer

wait-times have been correlated with an increase in higher-cognitive-level responses

and are, for this reason, significant to this study. Third, a survey of studies that

examine the relationship between questions and critical thinking in both native speaker

and nonnative speaker classrooms is presented. A review of this relationship is

relevant, as this study focuses on the development of critical thinking ability through

teacher questioning techniques. Last of all, there is a discussion of U.S. mainstream

classroom culture as it differs from that of international students, who come to the

U.S. from diverse educational backgrounds. This discussion is intended to explore the

cultural challenges nonnative speakers and their teachers face in ESOL and

mainstream classes.

<div align="center">Teacher Questions and Classroom Interaction</div>

As noted by Gall (1970), questions play a pivotal role in teaching. He calls

upon researchers to identify the criteria of effective questions and determine how

questions can help students achieve educational objectives.

Differences in the way in which teachers use both questions, and language in

general, have been documented. Barnes (1990) states that teachers use questions to

channel students into specific modes of participation. He discusses, for example, the

use of closed and open-ended questions. Closed questions are expected to elicit a

closed set of responses (e.g., "Where were you born?," "Did you sell your house

yet?"). In contrast, open-ended questions leave open the nature and length of the

response (e.g., "What did you do on your trip?"). According to Barnes, the use of these

two question types influences students' participation. By being asked closed questions,

the student is normally expected to reproduce information or reasoning. On the other hand, open-ended questions help the student to explore the subject and encourage him/her to think aloud. Whereas closed questions encourage passive participation, open-ended questions cause students to take a more active role in the classroom.

Chaudron (1988) also describes the role of teachers' questions as an important means of gaining learners' attention, promoting verbal responses, and evaluating progress, but states that questions alone may not always promote a great amount of interaction. He reports on many characteristics of ESOL teacher talk. He says, for example, that ESOL teachers ask proportionately more display than referential questions. He also reports that ESOL teachers have a tendency to repeat or rephrase questions more often than teachers in native speaker classes. Further, he mentions that comprehension checks, confirmation checks and clarification requests occur more frequently in ESOL classes. He suggests "... that the adjustments in teacher speech to nonnative-speaking learners serve the temporary purpose of maintaining communi- cation – clarifying information and eliciting learners' responses..." (p. 55). In the current study, the researcher noted many cases of adjustments in teacher speech in both class types.

Brock (1984) notes that teachers in ESOL classrooms pose far fewer referential questions than do native speakers in informal conversation. Her study looks at the effect of higher frequencies of referential questions in the adult ESOL classroom. She claims that referential questions are on a higher cognitive level than display questions. In her study, two teachers were trained in the use of referential questions, and assigned

to teach two ESOL classes for adults. These two teachers increased the number of
referential questions they used significantly as compared to two control group teachers.
This resulted in learner responses that were on average twice as long as and more
syntactically complex than their responses to display questions. In addition, the
students used a far greater number of logical connectors. She suggests that the
increased use of referential questions may give students opportunities for practice and
output that may contribute to their acquisition process. The current study re-examines
the relationship between the cognitive level of questions and response
length/complexity, and compares it to Brock's findings.

In a study of foreigner talk outside the classroom, Kitao (1990) refers to
foreigner register (FR) as a type of speech used with speakers perceived to be deficient
in target language proficiency. This type of speech is simplified but for the most part
conforms to the standard rules of the target language. Kitao claims that yes/no
questions and choice questions are more frequent in FR, lightening the interactional
burden of the nonnative speaker. She also states that FR is characterized by an
increased use of questions in topic-initiating moves, and makes the point that it seems
easier for the nonnative speaker to understand what kind of response is expected to a
question than to a statement. Kitao says there are varying reasons behind native
speakers' use of FR. FR may occur as a result of a native speaker's experience with
nonnative speech, his/her experience in dealing with nonnative speakers, or his/her
assumption that the nonnative speaker can comprehend what he/she can produce. All

of the FR characteristics noted by Kitao were observed in the ESOL classes that took part in this study.

In contrast to Kitao, White and Lightbown (1984) emphasize that ESOL teachers resemble mainstream teachers in many ways. In both class types, teachers tend to dominate the class, control topics and speaking turns of the conversations, and ask most of the questions. In addition, they both ask a lot of display questions and help students respond to them. Another similarity is that both groups repeat or rephrase questions if they do not get an immediate response to the initial question. White and Lightbown argue that the result of these series of repetitions is an extended sequence of interactions during which the teacher and the student together create the student's answer, rather than the student producing the question unaided. White and Lightbown's observations are based to a large extent on high school EFL classes in Canada, a group that is different from the class types that participated in the current study. However, these extended sequences were frequently observed here as well.

The above studies suggest that teachers in general modify their questioning behaviors to meet their instructional goals. There is also evidence that native speakers modify their questioning behavior with nonnative speakers as a result of their perceptions of nonnative speakers' comprehension and general language proficiency. With reference to the research questions posed in this study regarding teacher questioning techniques, the results of these investigations provide valuable background information.

Wait-Time

There have been many studies conducted on wait-time in both ESOL and

native speaker classes in the United States. Most studies distinguish between wait-time

1, or postquestion wait-time, and wait-time 2, postresponse wait-time. Rowe (1987)

began studying the concept of wait-time as an instructional variable in the late 1960s.

In her investigations of wait-time in K-12 classrooms, she found that the average wait-

times were around one second. However, she also found that there were dramatic

differences in interaction between teachers and students when wait-times of three or

more seconds were maintained. The effects of longer wait-times were:

1.   increases between 300 percent and 700 percent in student response length

2.   more support of inferences by evidence and logical argument

3.   greater incidence of speculative thinking

4.   increases in the number of questions students ask

5.   increases in student-student exchanges and decreases in teacher-centered

        behavior

6.   decreases in students' failure to respond

7.   decreases in disciplinary moves

8.   increases in student confidence

She claims that increasing wait-time 2 is even more important than extending

wait-time 1. Increasing wait-time 2 not only has an effect for the student responding to

a question, but also encourages other students to interact with the respondent.

Since her initial studies in the early seventies, a large number of studies have validated her results. Almost all of these studies used a three-second wait-time as the threshold value. For this reason, the three-second value is used as a criterion in this study.

Chewprecha, Gardner, and Sapianchi (1980) studied the effects of teacher-training on wait-time behaviors in Thailand. They comment that in their experience, science teachers in Thailand behave similarly to teachers in western countries in that they also allow an average wait-time of about one second, and also fail to allow students enough time to think before answering questions. This indicates that the one-second wait-time is not limited to American classrooms but may occur independent of culture.

In a review of studies on wait-time in K-12 classes in the United States, Tobin (1987) also found significant changes in teacher and student discourse when the average wait-time was greater than three seconds. The studies he reviewed demonstrate both direct and indirect effects of longer wait-time on higher-cognitive-level learning. Longer wait-times provide both teachers and students with additional time to think. This influences the quality of teacher and student discourse, resulting in higher-cognitive-level achievement. The studies reviewed were of naturalistic classroom data as well as classes in which wait-times were manipulated. One consistent finding in classes in which the teacher consciously extended wait-times was that the number of teacher questions decreased while the amount of student talk increased. Virtually all of these studies reported positive changes in student behavior,

such as longer student responses, increase in complexity and cognitive level of student responses as well as higher achievement.

Stahl (1994) prefers the term think-time instead of wait-time, as the pauses directly after teacher questions and student responses give the student time to 'think,' that is, to process new information, reflect on it, and consider whether and how to respond. Information processing takes time as it involves multiple cognitive tasks.

In a study of high school classes, Honea (1982) reports that when teachers extended wait-times, students had more time to formulate their own queries. He says that "an increase in student inquisitiveness seemed to be a healthy product of the teacher behavior called wait-time" (p.169). He also notes that increased wait-times result in a decrease in the number of teacher questions. He attributes this effect to longer student responses, more unsolicited student responses and longer pauses in speakers' conversations. He recommends that the impact of wait-time be taken into account by administrators when considering tools for facilitating teacher competency.

Another argument in favor of longer wait-times has to do with cognitive processing of information. White and Lightbown (1984) comment on the tendency of teachers in general to ask a lot of display questions at a rapid pace. They state that it may be ineffective to ask questions to which the student need only respond by repeating part of the question because of evidence that these question types are processed in a part of the brain that allows the respondent to disassociate the speech copying function from higher level language processing. Since thinking about question

content slows down performance, it may be more efficient for students to put speech comprehension functions on hold to be able to respond to a question quickly.

A survey of the studies of wait-time indicate that wait-times at all levels of education across the country tend to be shorter than the recommended three-second threshold. However, teachers attempting to implement longer wait-times may face some difficulties. Tobin (1987) reports an increase in teacher anxiety when wait-times are extended. One possible reason given for this anxiety is that extended wait-time quickly causes significant changes in interaction patterns for which teachers are unprepared. If teachers are anxious, they may become discouraged and revert to shorter wait-times and more predictable patterns of classroom interaction. On the other hand, longer wait-times have also been associated with less anxiety on the part of students. Honea (1982) reports that students exhibit more confidence and esprit de corps when wait-times are longer.

In one of the few investigations of wait-time in college courses, Duell, Lynch, Ellsworth and Moore (1992) report that in classes taken by education majors, many students are not provided with the opportunity to respond effectively in class. They found that wait-time 1 averaged about 2.25 seconds and wait-time 2 about .45 seconds, considerably less than the three-second pause recommended by other researchers. Two studies by DeTure (1979) and Swift and Gooding (1983) also found average postresponse wait-times of .68 seconds and .87 seconds respectively.

There have been only a small number of studies done on wait-time in second language settings. In a study of first-year high school Spanish and French classes,

Shrum (1985) found that "wait-time in second language classes is longer than in science classes, but still too short to allow for thoughtful cognitive processing" (p. 311). She found additionally that students thought for longer periods of time after questions posed in English than after target language questions. She concludes that meaningful communication requires that teachers and students spend more time listening and reflecting.

As previously mentioned, a case study by Fink (1987) showed a difference in wait-times when an ESOL class and a native speaker class were compared. However, these wait-times were still under the three-second level and thus did not allow enough time for either group of students to reflect before responding.

Virtually all studies reviewed by this researcher have found a close positive correlation between wait-time and use of higher order questions. Tobin (1987) claims that the added silence in these classes "appears to facilitate higher cognitive level learning by providing teachers and students with additional time to think" (p. 69). On the other hand, he also notes that additional wait-time may not be beneficial if the interaction is intended to facilitate recall or rote learning and should be reserved for questions that are designed to stimulate higher cognitive processes. Whatever the reasoning, the consistent results of these studies make clear the necessity to take wait-time into account in an interactional study of cognitive levels of teacher questions and student responses.

The Role of Questions in Fostering Critical Thinking

The current emphasis placed on critical thinking in education can be understood in light of the perceived role of education in this country. Hunkins (1989) argues that in the American educational arena today, students are expected to participate actively in their own learning. As a means to promote this active role, educators attempt to provide more personalized instruction and more content that is related to students' personal lives. In addition, educators endeavor to build positive attitudes in class that stimulate students' intellect and their quest for knowledge. Implicit in this approach is the need to develop good thinking skills. If students are to shape their own learning, it is necessary that they become critical of the wealth of information they must sift through to achieve their educational goals.

Students need to have critical thinking skills to be able to participate actively in their own instruction. On the other hand, this instruction is crucial in building these thinking skills. It has been demonstrated that a significant amount of growth in this ability occurs at the university level. One fairly consistent finding in is that most of this growth takes place during the students' freshman year at college (Tsui, 1998). Tsui notes in her survey of recent research on critical thinking that in comparison to more traditional courses, those that have as an instructional paradigm an emphasis on problem solving or critical thinking seem to promote the most growth in this area.

In the development of critical thinking at all levels of education, questions are believed to play an important role. As has been previously stated, questions are one of the primary tools teachers use to realize their pedagogical purposes. In a discussion on

how to help adolescents think critically, Unrau (2000) states that teachers should use questioning strategies that encourage students to engage in analysis, problem-solving and inquiry. Further, teachers should use questions to activate metacognitive processes that result in more efficient learning. He emphasizes that teachers need to make a conscious effort to make their questioning strategies effective, by watching and assessing tapes of their own lessons, by getting feedback from others, and by preparing for discussions carefully.

Barnes (1969) claims that through the use of questions, teachers influence students' participation in the formulation of ideas in speech and writing. Thus, a teacher may ask questions that require students to reproduce information, or may ask questions that require responses that compel students to think and explore their belief systems on the basis of the knowledge they possess. Barnes notes that at times teachers will covertly signal to students through their comments how students are to respond to questions. Sometimes, the response that is expected is implied through the teacher's formulation of the question. Barnes calls this a "pseudo-question." Barnes states that these covert signals occurred very infrequently in the data he collected. However, in the current study, the researcher noticed many examples of these and similar signals in the taped interactions.

In an article on the cognitive dimensions of interaction in the ESOL classroom, Tsui (1995) claims that teachers need to pay more attention to the cognitive demands their questions and explanations place on students. She argues that the pseudo-questions noted by Barnes stifle learners' creative thinking and lead them to guess at

the answer the teacher wants instead of reflecting on what they consider to be an appropriate answer. However, in this study, these pseudo-questions were found to help students learn to become creative thinkers.

Norris and Ennis (1989) have defined critical thinking on a general level as "reasonable and reflective thinking that is focused on deciding on what to believe and do" (p. 3). They do not view teacher questions as a means of developing thinking skills, but as a means by which teachers can gather information on students' critical thinking ability. According to them, direct classroom observation is a useful method for determining students' normal critical thinking performance, that is, the level at which students think critically in everyday life. In the current study, the focus is not on assessment of students' ability to think critically, but on the manner in which it is developed. However, implicit in Norris and Ennis' view is the notion that posing higher level questions elicits higher level thinking.

Wilen (1987) notes that in studies of teacher-student interaction, a major assumption has been that there is a direct and positive relationship between the cognitive levels of teacher questions and student thought levels. He points out, however, that research findings on this relationship are mixed. He suggests that the conflicting findings may be the result of researchers using different definitions of higher-cognitive questions and different question classification schemes. His own four-level classification scheme has been widely used (Hunker, 1989) because of its simplicity. To the researcher's knowledge, the only question classification schemes that have been in ESOL classes are two-category schemes such as the referential/

display classification scheme used by Brock (1984). Such schemes only very roughly distinguish cognitive levels of questions.

There may be conflicting results in studies of teacher questions and student thought levels, but, at any rate, Wilen (1993) points out that teachers can be effectively trained to raise the cognitive emphasis of their questions. Wilen's survey of studies shows that teachers in secondary education consistently use lower-cognitive-level questions in the classroom, and that it is worthwhile to examine this phenomenon. He claims that because of the pervasiveness of questions in the classroom as an instructional tool, teachers need to develop a studied interest in their own use of questions and evaluate for themselves the effectiveness of different questioning strategies.

There have been numerous research studies conducted that point to a correlation of higher level thinking and frequency of higher level questions. In a study of elementary classes, Arnold, Atwood and Rogers (1974) found a correlation between the level of teachers' questions and students' responses. They conclude that asking higher-cognitive-level questions is a valid strategy for producing thinking at higher cognitive levels. Cole and Williams (1973) also studied the correspondence between cognitive level of teacher questions and the cognitive level, length, and syntactic complexity of student responses at the elementary school level. Their results showed a strong positive correlation between all three variables. They also conclude that it is likely that asking higher level questions stimulates higher level responses, which require more syntactic complexity.

However, there have also been a number of studies that have demonstrated other results. Mills, Rice, Berliner, and Rosseau (1980) applied three different cognitive classification systems (the Smith and Meux Logic of Teaching system, the Bloom Taxonomy and the Aschner-Gallagher system) to data from a previous study of teacher questioning in elementary and junior high classes. They found no correlation between the cognitive level of the question and the cognitive level of the student's response. They conclude that asking higher-cognitive-level questions is not enough to ensure comparable levels of student cognitive performance. Cotton (1988), in a review of 37 studies of classroom questioning, also reports that higher level questions do not necessarily lead to higher level answers.

Implicit in the idea that questions shape students' thinking is the concept that thought is shaped by language. Vygotsky (1962/1939) believed that language drives cognitive development. He observed that children underwent three stages of speech and thought development. In the first stage, the primary function of communication is social contact. During the second stage, "egocentric speech" emerges, and children begin to internalize vocal speech, that is, speak to themselves silently as they previously did to others. Finally, during the third stage, "inner speech," emerges. At this point, children begin to reflect on what others have said, but also to express aloud what they have been thinking. They begin to use logical memory. Up until this point, words have been mere signs that children attach to objects. Now, however, words are used as a means of concept formation. Thinking ability begins to grow and become

complex. When children then go to school, teachers are in an ideal position to provide opportunities for children to further develop their thinking skills.

In his studies of children, Vygotsky observed that children's developmental stages were assessed on the basis of tasks that were completed without assistance. When children were given assistance, however, their ability to complete tasks increased. This increase in ability varied from child to child, and was described by Vygotsky as "the zone of proximal development." According to him, the learner's understanding of new material is based on the learning that has already occurred, and the zone of proximal development is determined by the learner's potential to learn the new material with external assistance.

Vygotsky also observed that children are relatively comfortable articulating the abstract concepts learned at school, but become confused when called upon to answer questions about concepts that are based in their everyday life. This, he claims, is because these personal concepts are saturated with experience. In contrast, abstract, scientific concepts are introduced to children with a verbal definition, and are not steeped in rich schema. Vygotsky claims that these two types of concepts develop in opposite directions in the minds of children. The abstract concepts learned at school move downward and become applicable to everyday life. The everyday concepts move upward and influence the child's understanding of the abstract. This idea gives new meaning to the efforts teachers today make to relate material studied in classes to students' personal reality.

Vygotsky's ideas are of relevance to the current study for other reasons as well.

First of all, his theories help to explain the role of interaction in shaping students'

thought processes and lend credibility to the claim that teachers are able to impact

students' thinking ability through the questions they ask. Second, the data collected for

the study contain many examples of ways in which the teachers framed their questions

to assist students in their responses, thus evoking Vygotsky's concept of the zone of

proximal development.

The abundance of literature on the relationship between cognitive levels of

questions, and cognitive levels of answers provides evidence of the usefulness of

questioning strategies to drive the cognitive development of students. Implicit in this

evidence is the underlying belief that it is important, at least in the U.S., to develop

students' cognitive levels. In order to facilitate nonnative students' transition into

mainstream classes, an investigation into the effects of questions and responses on

students' thought processes is of value.

<div align="center">Acculturation</div>

There has been a lot of discussion of the differences in teacher expectations in

different cultures and the challenge these pose for nonnative speakers enrolled in U.S.

university classes. These teacher expectations shape the interaction that occurs in the

classroom; if students are unfamiliar with interactional norms, and therefore unable to

apply them appropriately, their ability to meet teacher expectations is severely

compromised. With reference to writing tasks, Spack (1988) argues that even for

native speakers who have trouble with academic writing, the cause of their difficulties

may lie in social and cultural factors that influence their compositions. How much greater is this gap, she argues, for ESOL students. She posits that students' lack of cultural knowledge can stand in the way of academic success, and it is the role of the teacher to help students master the language and culture of the university.

Mehan (1979) claims that an important communicative skill that students learn in order to participate in the teaching-learning process is knowing how to answer questions appropriately. This is especially important given that "a unique aspect of the question-asking process in the classroom is that teachers often ask students questions when they already know the answers" (p. 294). Mehan further states that students' acquisition of such interactional knowledge is closely intertwined with the acquisition of academic knowledge associated with schooling. This is important, as a student's interactional competence affects the way educators view students' competence in an educational environment.

In a case study of the difficulties ESOL students face when enrolling in mainstream classes for the first time, Kelley and Sweet (1991) point to differing cultural understandings of appropriate classroom behavior, and also to interactional norms that are unfamiliar to the students but are influential in the formation of teacher-student relationships. They claim that teachers' expectations of student responses to teacher behaviors sometimes create negative perceptions on the part of the teacher which in turn cause students to withdraw or become defensive. They further claim that studies in this critical area can help to increase participation and retention of nonnative speakers.

Descriptions of educational systems in other countries may give insight into students' unfamiliarity with the American university system, especially with its expectations with regard to interactional norms and the value it places on critical thinking. But prior to any examination of other educational systems, it is of value to ascertain exactly what the expectations are in this country. One such statement of these expectations is given by Unrau (2000) in which he describes the value placed on critical thinking in the school curriculum. The following description shows that the American perception of the role of critical thinking is strongly influenced by and interconnected with the many social and political features found in American culture:

> Integrating critical thinking into school curriculums is important for many reasons. For example, although we're flooded with information, we often have difficulty transforming it into useful knowledge. As we watch TV, go to movies, listen to the radio, connect with the WorldWide Web, and read newspapers, magazines and books, we are often urged to buy all sorts of products. By evaluating our choices as consumers, whether these involve buying a car, purchasing life insurance, or selecting an investment, requires reasoned thinking.
>
> We also need to think reflectively about our government. To function effectively, democracies require informed deliberation on issues that affect individuals, communities and nations. The survival of our society depends on a knowledgeable electorate that has access to a free flow of information in order to test opinions, question convictions and make thoughtful decisions.
>
> The ability to think critically is just as important in school. No matter what the field, the ability to think critically enables students to recognize and construct sound arguments and hypotheses, and evaluate conclusions. As a result, critical thinking needs to pervade every aspect of the curriculum in every subject area (p. 13).

Thus, his arguments in favor of teaching critical thinking are based on aspects of American culture that may only be partially shared by students from different backgrounds. Expressed within the viewpoint above is a clear consideration of

individual decisions and decision-making as a form of survival skill. Unrau claims that

it is of value for students to develop critical thinking as a means of responding to

cultural and political characteristics such as consumerism, free information and

democracy. However, it is questionable whether these characteristics exist as such in

the countries in which ESOL students receive their education or, if they do, whether

there is the perception in those countries that a person needs to develop particular

skills to cope with them. Nonetheless, this is the basis upon which native and

nonnative students at American universities are judged alike.

Vermillion (1997) states that many ESOL students come from educational

systems where critical thinking is not encouraged. She cites an article on the meaning

of reading for East Asian students in which one writer, Song, states that it is

considered a weakness on the part of the student to question a text, an author, or a

professor. This disinclination to challenge a text runs contrary to the notion that

students should learn to evaluate sources with regard to credibility, sound

argumentation, definition of assumptions, etcetera (Norris and Ennis, 1989).

In a description of education in Russia, Richmond (1992) notes that Russians

have a long-standing tradition of communal life in which the individual is subordinate

to the group; individualism has a pejorative meaning. Schools in the former Soviet

Union are seen as more than places to teach reading, writing, and arithmetic, and are

charged with the moral education of students. Richmond states that classes are largely

teacher-fronted, and the teacher is viewed as a dispenser of knowledge. Pupils in

Soviet schools are taught to think and act collectively, and observe the rules of the

classroom. From the first moment, children are instilled with a respectful and somewhat fearful attitude toward adult authority which increases with the age and status of the older person. Discipline is strict and little discussion is tolerated. However, Soviet schools do make some use of oral methods in language instruction. Richmond states that there is a Russian preference for the spoken form of communication, for oral rather than written exams, and a dependence on rote replies. There are, however, no creative oral or written exercises, and there is only one right answer to a question. Zwerev (1983) verifies this depiction of the Soviet school system and also states that, typically, a large part of class time in Soviet schools is spent listening to oral presentations by the teacher.

Davidson and Dunham (1996) report an overall general weakness in the area of critical thinking skills among Japanese EFL students, from which many American university ESOL programs draw their international students. They state that "this is not surprising in view of the fact that the Japanese educational system does not seem to encourage debate or the critical evaluation of reasoning" (p 14). In an effort to show that critical thinking can be incorporated into academic ESOL instruction, they conducted an experimental study in which EFL students were given explicit training in critical thinking and were then tested using the Ennis-Weir Critical Thinking Essay Test, one of the most widely accepted assessments in the critical thinking movement. This test consists of a series of eight paragraphs in support of a prohibition of overnight parking on city streets. A different argument is elaborated in each paragraph. Most of the arguments are weak and contain common reasoning fallacies, and it is the

task of the examinee to evaluate the arguments used in each paragraph on a point-by-point basis. In Davidson and Dunham's study, the students who had received training scored significantly higher on the test, demonstrating that critical thinking skills can indeed be successfully taught in the ESOL classroom.

An additional acculturation issue for ESOL students entering mainstream classes is that they possess schemata that differ from those of their American peers. These differing schemata influence their understanding of reading texts and also of classroom norms. Anderson and Pearson (1988) define schema as an abstract knowledge structure that is based on past experience. A schema is activated when a word is mentioned that brings to a person's mind all prior associations with that word. Thus, the word "telephone" will activate all prior experiences a person has had with telephones. Grabe (1993) argues that schema theory provides a useful means of describing how prior knowledge is used in higher level comprehension processes. He states that activating content information is extremely useful in helping students comprehend and recall information from a text. This has an implication for nonnative speakers participating in a mainstream class that focuses on the development of critical thinking. It must be assured that the students have sufficient prior knowledge before they can engage in a cognitively challenging discussion of a topic; a discussion of a reading text must first be understood at a more basic vocabulary comprehension level.

This literature review shows evidence of links between cognitive types of questions and the development of higher thought processes. It also demonstrates a close relationship between longer wait-times and higher level thinking. Descriptions of

the educational backgrounds of nonnative students point to a disparity between native teacher and nonnative student expectations of appropriate interactional norms associated with classroom culture, and also to differing perceptions of the significance of critical thinking. In view of the current level of knowledge as evidenced in the body of research reviewed here, an investigation of possible differences in teacher questioning techniques and student responses in ESOL and mainstream classes is important.

At a presentation at the 22nd annual TESOL conference, Wyatt-Brown (1988) discussed the areas which were particularly problematic for international students. At the top of his list was critical thinking. He described the ability to think critically as "providing the cornerstone" for the other skills students need. He claimed, however, that American students, as well as international students, seldom know how to analyze material in a sophisticated fashion. The ability to think critically, that is, to comprehend, interpret, and evaluate a variety of materials, is crucial to the success of any university student. This study seeks to provide valuable information as to where nonnative students enrolled in advanced level ESOL classes stand with regard to their level of preparedness for mainstream classes.

CHAPTER III

DESCRIPTION OF RESEARCH METHODOLOGY

Introduction

The communication features under investigation in this study, teacher questioning techniques and student responses, were explored by means of interactional analysis, allowing the researcher to determine differences in interactional patterns. Through indirect participation in the classroom, the researcher was able to observe classes in a natural setting. There were two types of classes, adult level university ESOL classes and mainstream freshman level classes. The mainstream classes and one of the ESOL classes were writing classes, and the second ESOL class was a reading class. Prior to data collection, a pilot study was conducted to find out how well the recording equipment would record the voices of all participants. Data were collected by means of audiotape and notes taken by the researcher during the class sessions. Subsequently, the taped recordings were transcribed and analyzed by the researcher. As it was the purpose of this study to compare interactions between teachers and students as they occur in ESOL and mainstream classes, subjects, thematic content of the classes, and structure of the lessons were chosen to maximize the comparability of the two class types.

Subjects and Setting

The first group of subjects consisted of nonnative speakers attending two advanced level ESOL classes (level 4 of five levels) in the Intensive English Learning

Program (IELP) of a university in preparation for enrollment in mainstream classes.

One of the these classes was a reading class with emphasis placed on textual analysis

of both academic texts and a novel. The second class was a writing class with focus on

the composition of a short resource paper and the development of rhetorical styles of

writing. The second group of subjects consisted of mostly native speakers of English,

enrolled in two freshman level classes in the English Department of a university.

These two classes were both beginning writing classes designed to improve students'

writing, reading, and thinking skills to prepare them for participation in university

courses. These two class types were selected for participation in the study for several

reasons. Advanced level ESOL classes were chosen in line with the underlying

purpose of the study of gaining insight into the degree of preparedness of transitioning

ESOL students to successfully participate in mainstream courses. The freshman level

writing classes selected were typical of the type of classes transitioning ESOL students

might choose to enroll in early in their college studies. In addition, an attempt was

made to locate class types that would typically consist of students with minimal

previous university level instruction involving critical thinking.

Class size and language background were also criteria for selection. Class size

was similar; the number of students present at the sessions taped varied between

twelve and twenty students. The make-up of the two ESOL classes was multi-national,

with the majority of students coming from several different Asian countries and the

Middle East. In the two mainstream classes, there was also a mix of language

backgrounds; however, the majority of the students were native speakers of English.

The researcher made the decision not to differentiate between native and nonnative speakers in the mainstream classes, as the study did not focus on individual differences between students but on the characteristics of interaction as they were to be found in the two class types as a whole. A further criterion for selection of these four classes was teacher experience. All four teachers were considered by their supervisors and peers to be excellent instructors with an average of nine years of teaching experience in their respective fields.

Looking at course content, there were also several reasons for selecting these class types. In all of these classes, discussion of reading assignments made up a large portion of in-class activities, and it was anticipated that these discussions would generate a lot of teacher questions. Further, there is a close relationship between reading and the development of reflective thinking, and Grabe and Stoller (in press) state that reading provides the foundation for synthesis and critical evaluation skills. In addition to the above reasons for the selection, it was discovered that the two departments offering these classes both had the explicitly stated goal to develop critical thinking through writing, reading, and assessment of curricular components in all classes. It was to be expected that the classes would reflect these identical goals.

In order for the reader of this study to be able to judge the method of data collection, the analysis and subsequent discussion with a critical eye, a closer description of the four classes is called for. The following is a description of the roles teachers and students played in the interaction that took place in the four classes.

ESOL Class 1

Early in the quarter, the teacher attempted to hold whole-class discussions but found that the class did not respond well to this format, as students were reluctant to speak. During the first observation, the class spent almost the entire lesson discussing an article on the subject of heroes, as a whole group. Students had been prepared for the discussion during the previous lesson. In that session, they were divided into small groups, assigned one paragraph from the article, and asked to discuss several specific questions related to the paragraph. On the day of the whole-class discussion, the groups were then called upon to summarize their answers to the prepared questions. Thus, not only were the students prepared for the discussion, their role as participants in the discussion was clearly delineated. The teacher's role in the discussion was that of facilitator, questioner, and commentator.

In addition to calling on groups and asking questions based on the students' responses, she often paraphrased students' answers and then added her own comments. She frequently cited previous students' comments. She also read sections of the article out loud, broke complex sentences down into smaller chunks and asked students to analyze and explain them. During this lesson, approximately two-thirds of the class participated in the discussion; for the most part, these students spoke only when called on. The teacher told the researcher after the lesson that she felt frustrated by the unresponsiveness of the class. She subsequently decided to abandon this whole-group format altogether in favor of small group work. During the other two observations, which were not included in the study as data sets, discussion took place solely in small

groups. The class seemed to respond better to this, as the group work generated more discussion. Students also seemed to remain more on task working in small groups.

ESOL Class 2

Sections from the novel *Fried Green Tomatoes at the Whistle Stop Café* (Flagg, 1987) were discussed at all three of the lessons observed. At the beginning of all three observed lessons, the teacher announced the intended lesson plan for the day, writing it on the board as she spoke. The teacher used the blackboard very frequently during the lessons to summarize information discussed, list questions, announce homework, and so on. During the first lesson observed, most of the class time was spent discussing a quiz and practicing a skimming activity, with only the last ten minutes of class devoted to whole-class discussion. During the other two observations, the teacher spent most of the class time available on the reading assignment.

The teacher used a combination of whole-class discussion and small group work to work through the sections of the novel that had been assigned to the students the lesson before. Prior to any discussion, students were always given written questions on the reading assignment. These written questions were either handed out the lesson before for preparation at home, or handed out during the lesson for in-class preparation. In all instances, these questions were discussed in small groups first and then discussed as a whole. Thus, the students were given the opportunity to 'rehearse' the discussion that ensued, which seemed to lighten the task of having to respond spontaneously to questions.

The teacher used a variety of activities to help students focus on the text. During one session, students were asked to take the parts of two of the main characters and read a part of the dialogue out loud. During another session, a film was shown, and students were asked to compare the story to the book. All of the students participated in the discussions; some volunteered their contributions and others were called on by the teacher. The interaction that took place during these discussions was characterized by a large number of teacher questions followed by short student responses. The discussion was fast-paced. During one session, the researcher noted that the teacher asked a total of fifty questions (including repeats) during ten minutes of discussion.

<u>MS Class 1</u>

Two lessons were observed in this class; however, the researcher decided to exclude the second lesson from the study because the discussion did not center around a reading assignment, but was a lecture and discussion of grammar. In preparation for the lesson observed, students had been asked to read an essay by Barbara Mellix on dialects, write about the essay in a journal and come to class with questions. The teacher began the lesson with a five-minute free-write on the reading assignment. Thus students were given a lot of opportunity to formulate their ideas on the reading assignment prior to the whole-class discussion. The discussion, which filled about half of the class time available on that day, was conducted in a fairly 'tight' fashion; that is, almost all of the interaction was between the teacher and individual students, with the teacher asking virtually all of the questions and the students responding. Most of the

students' comments were in response to questions posed by the teacher, and there were few comments in response to other students' utterances. Most of the talk centered directly on the reading assignment, with some discussion of students' own experiences with dialects and other language differences. Almost all students participated, either by volunteering their answers or by being called on by the teacher. The last half of the lesson was spent discussing composition writing techniques.

MS Class 2

Different readings were discussed during the three lessons observed. As a warm-up exercise in all three of the observed lessons, the teacher had the students do a free-write in preparation for discussion of the readings. During the first observation, one third of the class time available was spent on a peer review of a completed writing assignment, one third was spent reading an excerpt from a novel and on free-writing, and the remaining third of the lesson was spent discussing the excerpt as a whole group. During the other two observations, most of the class time was spent on whole-class discussion. Prior to the discussion during the second observation, which centered around a provocative essay on the holocaust, the teacher gave a ten-minute lecture on critical thinking. The whole-class discussions in this class were conducted somewhat 'loosely,' with the teacher asking relatively few questions. In addition to asking questions, the teacher employed several nonquestioning techniques to elicit responses (Wilen, p.11). For example, she lectured on topics related to the reading or told anecdotes that sparked student comments. Students occasionally responded to other students' comments as well as to teacher questions. Virtually all students participated

in class discussions, either by volunteering their comments or by being called on by the teacher.

Data Collection

The data were collected over the course of a ten-week term. In total, eleven class sessions were observed and audiotaped. Three of the classes were observed a total of three times each for one hour. The fourth class was observed twice, each time for two hours. The decision to audiotape rather than videotape was made since the study largely looked at verbal behavior, and sufficient data could be captured through audio recordings. Another reason to forgo videotaping was the concern that it might have created an undue amount of anxiety on the part of the subjects and thus hindered natural interaction. The equipment used for the recording process consisted of a tape deck, a four-channel mixer, and four omnidirectional microphones that were mounted on floor stands positioned in the four corners of the classroom. The researcher was present at all eleven sessions to monitor the recording process and take notes on nonverbal features of the interaction that could not be captured on the tape, such as instances in which students responded to questions by nodding or shaking their heads.

Observing the sessions personally also made it possible for the researcher to informally interview the class instructor after each lesson. In doing so, the researcher was able to gain insight into the instructor's perceptions of the interaction that had just taken place, and also collect additional information on prior class discussions and on students' backgrounds. This additional knowledge aided in the interpretation of students' responses. Through indirect participation by the researcher it was also

possible to gain firsthand knowledge of other factors that influenced the interaction.

For example, it was noted during an observation in one of the mainstream classes that

occurred the morning after Election Day that students seemed poorly prepared and

tired. Several of them admitted that they had not done the reading assignment, and

during the free-write that preceded the discussion, several students rested their heads

on their books or spent the time reading instead of writing.

Data were collected during the portions of the lessons in which readings were

discussed as a whole group. This was done to have comparable sets of data. In the end,

eight of the eleven sessions taped were selected for inclusion in the data set. Three

sessions were rejected, in one case because the discussion that took place was not of a

reading assignment, in the other two cases because the discussion that took place was

in small groups and not as a whole class.

However, for several reasons, the session in MS-C2 that was observed the day

after Election Day was not rejected. First of all, the data met the criteria for inclusion

in the study since it was a whole class discussion of a reading assignment. Second, the

fact that the students were not well prepared did not seem to be a greater anomaly than

the circumstances of any of the other lessons. Finally, the lack of preparation on the

part of the students sheds light on some of the questioning techniques the teacher used,

and more generally on the purposes behind teachers' choice of questioning techniques.

In addition to recording the discussion and taking notes during class

observations, the researcher also conducted informal interviews with the teachers.

These interviews took place immediately after the observations or were conducted via

email. In these interviews, teachers were asked to comment on the proficiency and level of motivation of their students, the class dynamics (e.g., how well students interacted with each other), and how successful they felt the discussions were. In addition, the teachers were given short excerpts of the transcriptions of their own lessons and asked to explain their reasons for particular questioning behaviors. For example, the four teachers were asked to comment on their motives for repeating or rephrasing questions. The information gathered from the interviews was then used to better understand the forces at work in the classes and to analyze the pedagogical purposes underlying the questions asked.

<div align="center">Pilot Study</div>

As a preliminary to data collection for the study, the collection procedure was piloted. The purpose of the pilot study was to test how well data could be captured with the recording equipment. The researcher was interested in determining whether it would be possible to adequately record students' voices during small group discussions of readings as well as during whole-class discussions. The pilot study was also used to determine what should be the focus of the researcher's note-taking during observations. Finally, the pilot study was used to test the question classification scheme to be used in the subsequent analysis.

The class selected for this purpose was a level 4 ESOL writing class with fifteen students. The pilot study demonstrated that the equipment used adequately picked up the speech of both the teacher and all of the students. However, it was discovered that small group discussions could not be recorded in this fashion, as it was

impossible to comprehend and transcribe the speech of students speaking simultaneously in small groups. Because of this, the researcher abandoned the idea of including small-group work in the data set. As the taping equipment was able to sufficiently record all verbal interactions, the researcher decided to focus her note-taking on the non-verbal behavior of students. The pilot study demonstrated to the researcher the necessity of remaining in close contact with the teacher prior to observation so that the researcher could prepare for the reading assignment to be discussed. This was crucial to the subsequent analysis of the data and the coding of teacher questions and student responses. The analysis of the data collected in the pilot revealed the necessity of adding two categories to Wilen's four-point classification scheme, namely a 'present question' category for questions used to aid comprehension, and an 'other' category, for questions that did not fit into any of the other categories.

Data Transcription

The data were transcribed using a modification of Jefferson's transcription system (1984) developed for conversation analysis. This system was chosen because of the detail with which it illustrates pauses, overlapping utterances, and contiguous utterances. These transcription features were particularly useful in the analysis of wait-time. According to Jefferson's system, length of pauses, as well as cases of transcriptionist doubt, are inserted in parentheses. In this transcription, number of words or syllables that were incomprehensible were also inserted in parentheses. Samples of the transcription are include in Appendix A.

Data Analysis

Although each entire lesson was recorded, only the course content portion of the lesson was analyzed. By focusing on course content, the researcher was able to control to a certain extent for variance in questions and responses that could be attributable to differences in teacher purposes. For example, there was no analysis of questions and responses formulated during the class management portions of the lessons.

Research Question 1a: Do teachers of mainstream classes use more higher-cognitive-level questions than teachers of ESOL classes? To determine the answer to this question, questions and responses were coded according to a system based on Wilen's (1987) four-part coding scheme for cognitive levels of questions. Comparisons were made between the four teachers of the total numbers of question types.

Wilen distinguishes between two broad types of questions, convergent and divergent. Convergent questions are intended "to determine basic knowledge, skills, and understandings to prepare students to apply learnings" (p. 13), whereas divergent questions require "students to engage in critical thinking as they process information" (p. 13). These two broad categories are broken down further into low and high convergent, and low and high divergent.

Low convergent questions "require students to recall or recognize information. Emphasis is on memorization and observation. Responses can easily be anticipated. Students define, recognize, quote, identify, and answer yes or no" (p. 30). An example of this type of question, taken from the data collected for this study, is as follows:

Context:	ESOL class, teacher is discussing chapters of a novel with the class for the first time and is interested in checking students' comprehension of the test.
Question:	*Do you remember from the novel how many children Jasper had?*
Reason for classification:	Students are required to recall information stated in the text.

High convergent questions require "students to demonstrate understanding and apply information. Students describe, compare, contrast, rephrase, summarize, explain, translate, interpret, apply, use, provide an example, and solve" (p. 30). An example of this type of question is:

Context:	Mainstream class, teacher initiates discussion of the first section of a novel.
Question:	*What are the main things that move the plot forward in this piece, in this section, okay?*
Reason for classification:	Students are required to do more than recall information in text; they must themselves decide which information from a larger storyline characterizes plot movement. Students must summarize.

Low divergent questions require "student to critically think about information, ideas, and opinions, Students discover motives, reasons or causes, draw conclusions, inferences or generalizations; provide evidence or support for conclusions, inferences, or generalizations" (p. 30). An example of this question type is:

Context:	ESOL class, students have just seen a movie based on the novel they are reading and are now comparing the two. The character Ruth dies in the book before the trial for the murder of her husband, whereas in the film she is still alive.
Question:	*But why was Ruth still alive? What's the effect of that or what's the reason?*

Reason for classification:	Students are called upon to infer the reason for the difference between the storyline in the book and the film. Students must use their own internal criteria to discover answer.

High divergent questions require "students to perform original, creative, and evaluative thinking. Students produce original communications, make predictions, propose solutions, create, solve lifelike problems, speculate, construct, devise, write, design, hypothesize, synthesize, develop/judge ideas and problem solutions, express opinions, and make choices and decisions" (p. 30). An example of this question type is:

Context:	Mainstream class, students are upset by an article they are reading in which the author claims that the family of Anne Frank might have survived the holocaust if they had not acted so passively. The teacher is bringing the discussion to a close.
Question:	*Does the fact that, does the fact that perhaps there are other lessons lessen her impact or her own right to iconhood for us, you know?*
Reason for classification:	Students are required to take the information they have available from the text and apply it to a subject external to the text.

Wilen's coding scheme was devised largely as a teacher training instrument and not as an interaction analysis tool. Because of this, the four categories were interpreted in such a way as to fit a strictly descriptive framework, and two further categories were added for questions that did not fall within the four categories. The fifth category, corresponding roughly to Fanselow's (1987) 'present question' category, that is, comprehension checks, clarification requests and confirmation checks, was added. Fanselow's 'present question' category also includes rhetorical questions. For the purpose of this study, the researcher decided to exclude this

question type from the 'present question' category. A comprehension check demonstrates to the teacher that information has been received correctly, while a confirmation check or clarification request allows the speaker to correctly interpret the listener's reaction. In contrast to these three question types, a rhetorical question, as defined by *The American Heritage Dictionary* (Soukhanov et al., 1992), is "a question to which no answer is expected, often used for rhetorical [persuasive] effect" (p. 1547). This type of question does not have a comprehension-checking function. Rhetorical questions are included in this study in a sixth category, 'other.' This category contains all other question types. The most common type of question in the 'other' category was a classroom management question such as "Or would you like to, would you like to share in small groups and then as a big?"

Contextual information collected from firsthand observation of the classes, knowledge of the texts discussed, and brief interviews with the teachers preceding and following the class sessions were taken into consideration in the classification of questions.

In tabulating the numbers of questions falling into the four categories, it was decided to count as one question all utterances by the teacher that were intended to elicit one answer. In other words, questions which were repeated verbatim or rephrased were counted only once. There was no distinction made between repetitions or rephrasals that immediately followed the initial question, and repetitions or rephrasals which were separated from the initial utterance by wait-time or teacher comments. However, in the entire data set, there were only four instances in which a

rephrasal was categorized at a different level than the initial utterance. In these cases, it was decided to categorize the utterances tabulated as one question at the higher level.

In order to assess the reliability of the researcher's coding, excerpts taken from the data sets were coded by two other coders. One of the coders is an ESOL teacher holding a Master's degree in TESOL, the other is a graduate student in Linguistics who is currently working to develop a transcription system to be used to code ESOL classroom interactions. These two coders received training for one and a half hours in the use of the coding scheme. During this training, the researcher practiced coding samples of the data. Subsequently, the coders were given transcript excerpts from two different classes, one ESOL and one mainstream. These excerpts represented approximately ten percent of the total data collected. The two coders were also given synopses of the reading materials discussed in the classes to assist them in the interpretation of the transcribed interactions. The coders were then required to code for low and high convergent, low and high divergent, present questions and other questions. In order to rule out chance agreement, the coders were also required to state the rationale behind the category selection for each individual question. Following this, the coded transcripts were then compared with the researcher's initial coding, and the rationale behind each coding decision was discussed. Interrater reliability was calculated for each of the coders with the following results: 85% and 90%. Fanselow (1987, p. 30) discusses interrater reliability and states that an average of 80% is considered acceptable. The results in this study are well above this limit.

Research Question 1b: Do teachers of ESOL classes allow more wait-time than teachers of mainstream classes?

This study attempted to determine differences in the amount of wait-time, following both teacher questions and student answers, for ESOL and mainstream teachers. Only wait-times for questions that fell into the categories of convergent and divergent were analyzed. In the analysis of wait-time 1, that is, wait-time following teacher questions, only wait-times that were terminated by the teacher were considered. More specifically, only wait-times that ended when the teacher either repeated or rephrased the question, or began an explanation or lecture were included in the tabulation. Mean wait-times were calculated for both convergent and divergent questions to determine whether longer pauses were allowed following higher order questions.

Wait-time 2, that is, post wait-time following student responses was also tabulated. Only responses to questions that were classified as convergent or divergent were included in this tabulation.

Research Question 1c: Do teachers of ESOL classes use more present questions (i.e., comprehension checks, confirmation checks, clarification requests) than teachers of mainstream classes?

It has been documented that ESOL teachers use an abundance of present questions (i.e., comprehension checks, confirmation checks, clarification requests) with nonnative students. Examples of these three types of questions are:

Comprehension check:	T	*Do you see how that works (Name)? Do you see how they're both forbidden loves?*
	S	Yeah.
Confirmation check:	S	Cleo is missing, Albert. Albert missing.
	T	*Everyone's missing?*
	S	Albert.
Clarification request:	S	I guess that she said she wanted to live with, with her?
	T	*She wanted to?* =
	S	=Live with her.

To find out whether these teachers use more present questions than mainstream teachers, all present questions were coded and included in a fifth category that was aimed to document the degree to which teachers use questions of this type and to differentiate questions used to determine student or teacher comprehension from questions requiring one of the four cognitive levels of response.

Research Question 2a: Is there a systematic difference in the degree to which cognitive levels of student responses correspond to cognitive levels of teacher questions in ESOL and mainstream classes?

Student responses to teacher questions falling into the first four question categories (low convergent, high convergent, low divergent, high divergent) were coded using the same four categories that were applied to teacher questions. The categories, as applied to student responses, were designated as follows:

low convergent:	responses that demonstrated recall or recognition of information
high convergent:	responses that demonstrated understanding of information, such as descriptions, summaries, comparisons, interpretations
low divergent:	responses that demonstrated the first level of critical thinking, such as those stating motives, reasons, or causes

high divergent: responses that indicated a high level of critical thinking, for example, in the form of predictions, hypotheses, expressions of opinion, judgement of ideas

In cases in which there was more than one response to a question, each response was counted separately.

Research Question 2b: Does the relative length of response (measured by the number of words) differ between ESOL students and students of mainstream classes depending on the types of questions asked?

To answer this question, the mean lengths of student responses to convergent and divergent questions were calculated, based on a method of analysis used by Brock (1984). For the purpose of this study, student responses following teacher questions, including those responses that were interrupted by teacher comments, were considered.

The word count did not include words and phrases used as pause fillers, such as 'umm,' or semantically empty phrases such as 'you know,' or 'well.' Nor did the word count include word or phrase repetitions. Contractions such as 'they're' were counted as one word. Responses to yes and no questions in the form of expressions such as 'uh-huh' were counted as one-word answers.

Research Question 2c: Does the relative degree of syntactic complexity of response (measured by the number of sentence nodes) differ between ESOL students and students of mainstream classes depending on the type of question asked?

In order to answer this question, the mean number of sentence nodes per communication unit was measured. Sentence nodes were taken to mean clause structures containing a tensed verb, an infinitive or a gerund. The mean number of

sentence nodes per communication unit in student responses of the convergent type was compared to the mean for divergent responses.

Research Question 2d: Do ESOL students fail to respond to higher-cognitive-level questions more often than students of mainstream classes?

For the purpose of answering this research question, the responses to divergent questions in the ESOL and mainstream classes were compared. Only questions after which the teacher allowed more than one second of wait-time were considered.

Repetitions and Rephrasals

In addition to the methods of analysis described above, a separate investigation of the data was performed to determine the degree to which the two types of teachers repeated or rephrased questions. In order to determine if there were any differences in the two class types with reference to the cognitive levels of the questions, the numbers of repetitions and rephrasals of higher and lower level questions were compared to the total numbers of higher and lower level questions asked.

CHAPTER IV

RESULTS

This chapter summarizes the quantitative data that was collected in the four classes. These data are reported in tables with an accompanying brief explanation. A detailed interpretation of these results is presented in Chapter 5. Results of all statistical tests performed are included in Appendix B.

In order to distinguish between the four classes that comprise the subjects of this study, the classes will be referred to as ESOL class 1 (ESOL-C1), ESOL class 2 (ESOL-C2), mainstream class 1 (MS-C1), and mainstream class 2 (MS-C2). In similar fashion, the four teachers that participated in the study will be referred to as ESOL teacher 1 (ESOL-T1), ESOL teacher 2 (ESOL-T2), mainstream teacher 1 (MS-T1), and mainstream teacher 2 (MS-T2).

As an overview, Tables 1 and 2 on the next page show a breakdown of the total number of questions asked in each of the six categories by the four teachers. The numbers of repeated and rephrased questions are noted in parentheses. These tables will be referred to in Chapter 5.

Table 1
Total Number of ESOL Teacher Questions Including Repeats/Rephrasals

Question Type	ESOL-T1 (35 min.)	ESOL-T2 (66 min.)				ESOL Total (101 min.)
		Observation No:				
		1)	2)	3)	Total	
Low Conv.	0	45	23	62	130 (47)	**130 (47)**
Hi Conv.	13 (2)	1	23	14	38 (2)	**51 (4)**
Total Conv.	**13 (2)**	**46**	**46**	**76**	**168 (49)**	**181 (51)**
Low Div.	2	0	12	33	45 (20)	**47 (20)**
Hi Div.	12 (4)	0	20	8	28 (14)	**40 (18)**
Total Div.	**14 (4)**	**0**	**32**	**41**	**73 (34)**	**87 (38)**
Present	7	1	17	6	24	**31**
Other	8	6	12	6	24	**32**
Total	**42**	**53**	**107**	**129**	**289**	**331**

Table 2
Total Number of MS Teacher Questions Including Repeats/Rephrasals

Question Type	MS-T1 (45 min.)	MS-T2 (118 min.)				MS Total (163 min.)
		Observation No:				
		1	2	3	Tot	
Low Conv.	15	0	4	12	16 (4)	**31 (4)**
Hi Conv.	7	3	8	18	29 (8)	**36 (8)**
Total Conv.	**22**	**3**	**12**	**30**	**45 (12)**	**67 (12)**
Low Div.	33 (7)	2	2	9	13 (4)	**46 (35)**
Hi Div.	12 (3)	3	14	6	23 (8)	**35 (11)**
Total Div.	**45 (10)**	**5**	**16**	**15**	**36 (12)**	**81 (22)**
Present	4	0	0	3	3	**7**
Other	18	7	1	3	11	**29**
Total	**89**	**15**	**29**	**51**	**95**	**184**

Research Question No. 1a: Do teachers of mainstream classes use more higher-cognitive-level questions than teachers of ESOL classes?

As stated in Chapter 3 and for the purpose of answering this research question, it was decided to count as one question all utterances by the teacher that were intended to elicit one answer. Thus, repetitions or rephrasals of questions were excluded from the data set. In order to give the reader an idea of the relative importance of repetitions and rephrasals, the percentages are shown below in Table 3. Note that in the ESOL group, approximately 33% of all questions fell into this category whereas in the mainstream group, 23% of all questions were repeated or rephrased. A Fishers' Exact test performed on the numbers of repetitions and rephrasals showed a significant difference between the two teacher types for divergent questions at the $p<.05$ level. The results of the test were nonsignificant for convergent questions. These results will be discussed in detail in Chapter 5.

Table 3
Percentage of Question Repetitions/Rephrasals by Teacher Type

Question Type	ESOL Total	MS Total
Conv. repetitions/rephrasals	28.2 (n=51/181)[a]	17.9 (n=12/67)[a]
Div. repetitions/rephrasals	43.7 (n=38/87)[a]	27.2 (n=22/81)[a]
Total	**33.2 (n=89/268)[a]**	**23.0 (n=34/148)[a]**

[a] total numbers of repeats/rephrasals/total numbers of questions asked

Table 4 below shows a breakdown by teacher of the total numbers of questions asked in each of the four categories by the four teachers. The ratio of convergent to divergent questions was 11:10 for ESOL-T1, 108:39 for ESOL-T2, 22:35 for MS-T1, and 33:24 for MS-T2. The ESOL teachers asked a total of 119 convergent questions

and 49 divergent questions in 101 minutes of recorded classroom interaction,

compared to a total of 55 convergent questions and 59 divergent questions for the

mainstream teachers in 163 minutes of recorded interaction. Thus, mainstream

teachers used more higher-cognitive-level questions than the ESOL teachers in terms

of raw numbers. A Fisher's Exact test run on the numbers of convergent and divergent

questions showed a significant difference between the two teacher types at the $p<.05$

level (see Appendix B).

Table 4
Number of Teacher Questions According to Levels of Cognitive Difficulty

Question Type	ESOL-T1 (35 min.)	ESOL-T2 (66 min.)	ESOL Total (101 min.)	MS-T1 (45 min.)	MS-T2 (118 min.)	MS Total (163 min.)
Low Conv.	0	83	83	15	12	27
Hi Conv.	11	25	36	7	21	28
Total Conv.	**11**	**108**	**119**	**22**	**33**	**55**
Low Div.	2	25	27	26	9	35
Hi Div.	8	14	22	9	15	24
Total Div.	**10**	**39**	**49**	**35**	**24**	**59**
Total Questions	**21**	**147**	**168**	**57**	**57**	**114**

Table 5 below shows a comparison of the numbers of questions asked

expressed in terms of the percentage of question types related to the whole. As the

total numbers of questions varied greatly from teacher to teacher, the percentages more

clearly demonstrate a difference in the types of questions asked by the two groups. The

percentage of divergent questions asked by the ESOL teachers was 29.2% compared to

53.4% for the mainstream teachers.

Table 5
Percentage of Teacher Questions by Teacher Type
According to Levels of Cognitive Difficulty

Question Type	ESOL Total (n=168)	MS Total (n=114)
Low Conv.	49.4	23.1
Hi Conv.	21.4	23.9
Total Conv.	**70.8**	**47.0**
Low Div.	16.1	29.9
Hi Div.	13.1	20.5
Total Div.	**29.2**	**53.4**

Research Question No. 1b: Do teachers of ESOL classes allow more wait-time than teachers of mainstream classes?

The following two transcript excerpts show examples of wait-time 1:

T   *(Name), what do you think Browne is trying to say there?* (11 sec.) Why don't we look at that word 'obvious' first. Heroes are less obvious. (1 sec.)

S   Sometimes we can't tell who are the heroes.

T   Okay, what is, Ruth here says, - and I repeat, that she couldn't possibly understand what she was saying. *What does she mean by that?* (2 secs) *Can you start us out, (Name)? What does she mean?* (2 secs) *Why does she say that and think that?* (4 secs)

S   I don't know.

Table 6 shows the mean wait-times following teacher questions broken down into convergent and divergent question types. This table shows an overall longer wait-time 1 for ESOL teachers (3 seconds) than for mainstream teachers (1.4 seconds). For convergent questions, the difference between mean wait-time 1 for the two teacher types was nonsignificant. For divergent questions, the difference was significant with a p level $<.05$.

Table 6
Mean Wait-Time 1 in Seconds By Teacher and Question Type

Question Type	ESOL Total	MS Total
Conv.[a]	3.0 (n=83)	1.6 (n=18)
Div.[a]	3.0 (n=39)	1.2 (n=32)
Total	**3.0 (n=122)**	**1.4 (n=50)**

[a] Convergent: z=1.02, Divergent: z=2.00

Table 7 shows a comparison of wait-time 1 for individual ESOL and

mainstream teachers. ESOL-T1 allowed a longer overall wait-time (4.2 seconds) than

ESOL-T2 (1.9 seconds). This difference was statistically significant with p<.05. The

mean wait-times for the mainstream teachers were similar with 1.2 seconds for MS-T1

and 1.5 seconds for MS-T2. It should be noted that the difference between wait-times

for convergent and divergent questions was less than 1 second for all four teachers

observed.

Table 7
Mean Wait-Time 1 in Seconds By Individual Teacher and Question Type

Question Type	ESOL-T1	ESOL-T2	MS-T1	MS-T2
Conv.	3.9 (n=7)	2.1 (n=76)	1.0 (n=1)	1.6 (n=17)
Div.	4.5 (n=6)	1.6 (n=33)	1.2 (n=16)	1.3 (n=16)
Total [a]	**4.2 (n=13)**	**1.9 (n=109)**	**1.2 (n=17)**	**1.5 (n=33)**

[a] ESOL: z=2.61, MS: z=.61

Comparisons of wait-time 2, that is, the times allowed by teachers following

student responses, were also made between ESOL and mainstream classes. Table 8

below shows the total number of responses broken down by teacher and response type.

The differences between mean wait-times were small for both convergent and

divergent responses and were statistically nonsignificant. This table also shows that

both groups of teachers interrupted students giving responses about 32% of the time.

Table 8
Mean Wait-Time 2 in Seconds by Teacher and Response Type

Question Type		ESOL Total	MS Total
Conv.[a]	(% no wait-time allowed)	.7 (n=161) 33.5	.8 (n=52) 34.6
Div.[a]	(% no wait-time allowed)	.8 (n=70) 28.6	.7 (n=58) 31.0
Total	(% no wait-time allowed)	.7 (n=231) 32.0	.8 (n=110) 32.7

[a] Convergent: z=.36, Divergent: z=76

Table 9 shows a breakdown of wait-time 2 by individual teacher. Here the

difference between mean wait-times for convergent questions for the two ESOL

teachers was 1.1 seconds for ESOL-T1 and .6 seconds for ESOL-T2. This difference

was significant at the $p<.05$ level. All other differences were nonsignificant. The

breakdown also shows that all four teachers frequently interrupted students giving

responses. The percentages of interrupted responses were 25.0% for ESOL-T1, 34.1%

for ESOL -T2, 30.4% for MS-T1, and 35.2% for MS-T2.

Table 9
Mean Wait-Time 2 by in Seconds by Individual Teacher and Response Type

Question Type		ESOL-T1	ESOL-T2	MS-T1	MS-T2
Conv.[a]	(% no wait-time allowed)	1.1 (n=21) 14.3	.6 (n=140) 36.4	.9 (n=20) 35.0	.7 (n=32) 34.4
Div.[a]	(% no wait-time allowed)	.8 (n=31) 32.3	.9 (n=39) 25.6	.7 (n=36) 27.8	.6 (n=22) 36.4
Total	(% no wait-time allowed)	.9 (n=52) 25.0	.7 (n=179) 34.1	.8 (n=56) 30.4	.8 (n=54) 35.2

[a] Convergent: ESOL z=2.75, MS z=.64; Divergent: ESOL z=.56, MS z=.54

Research Question 1c: Do teachers of ESOL classes use more present questions (i.e., comprehension checks, confirmation checks, clarification requests) than teachers of mainstream classes?

In Table 10 below, the raw percentages show that ESOL teachers used comprehension checks and clarification requests nearly three times as often as the mainstream teachers. This difference, as calculated using Fisher's Exact, was shown to be significant with $p<.05$ (see Appendix B).

Table 10
Percentage and Numbers of Present Questions asked

Question Type	ESOL Total	MS Total
Present	13.6 (n=30)	4.9 (n=7)
Nonpresent	86.4 (n=191)	95.1 (n=135)
Total	**221**	**142**

Research Question 2a: Is there a systematic difference in the degree to which cognitive levels of student responses correspond to cognitive levels of teacher questions in ESL and mainstream classes?

Comparisons of the cognitive levels of nonnative and native student responses with the levels of teacher questions in the data set indicated very few responses that did not correspond to the questions asked. Specifically, as shown in Table 11, the number of nonmatching responses was 2 in ESOL-C1, 10 in ESOL-C2, 1 in MS-C1, and 2 in MS-C2. In order to be able to measure these results statistically, the small number of student responses that did not fit into any of Wilen's four categories were excluded from these data. For these tests, individual responses were compared to the

questions eliciting them for all four teachers. Various statistical measures were

performed, including Gamma, Kendall's Tau-b, Pearson Correlation, and Spearman

Correlation, and the results confirmed that the degree of correspondence was

extremely high in all four classes (see Appendix B).

Table 11
Correspondence of Student Responses to Teacher Questions

Response Type	ESOL-C1	ESOL-C2	ESOL-Total	MS-C1	MS-C2	MS-Total
corresponding responses	18	173	191	55	52	107
%	100.0	94.5	95.0	98.2	96.3	97.3
noncorresponding responses	0	10	10	1	2	3
%	0.0	5.5	5.0	1.8	3.7	2.7
Total*	18	183	201	56	54	110
%	100.0	100.0	100.0	100.0	100.0	100.0

Research Question 2b: Does the relative length of response (measured by the number

of words) differ between ESOL students and students of mainstream classes depending

on the types of questions asked?

Table 12 shows the mean length of student responses in all four classes for the

two response types. A comparison of the mean lengths of responses shows a marked

difference between the ESOL and mainstream classes. Statistically this difference was

found to be significant for both convergent and divergent responses at the $p < .05$ level.

The mean lengths for convergent questions were 5.5 words in the ESOL classes and

24.9 words in the mainstream classes. The mean lengths for divergent questions were

9.9 words in the ESOL classes and 30.2 in the mainstream classes.

Table 12
Mean Length in Words per Student Response by Response Type

Question Type	ESOL-C1 (n=15)	ESOL-C2 (n=178)	ESOL Total (n=193)	MS-C1 (n=50)	MS-C2 (n=53)	MS Total (n=101)
Conv.[a]	12.25 (n=8)	4.7 (n=141)	**5.5 (n=149)**	11.4 (n=19)	33.5 (n=30)	**24.9 (n=49)**
Div.[a]	10.0 (n=7)	9.5 (n=40)	**9.9 (n=47)**	18.2 (n=30)	45.0 (n=24)	**30.2 (n=54)**
Total	**11.2**	**6.0**	**6.4**	**13.7**	**38.7**	**27.7**

[a] Convergent: z=4.32, Divergent: z=3.18

Research Question 2c: Does the relative degree of syntactic complexity of response (measured by the number of sentence nodes) differ between ESOL students and students of mainstream classes depending on the type of question asked?

As shown in Table 13, the mean number of sentence nodes for convergent questions was .8 in the ESOL classes and 3.0 in the mainstream classes. The mean number of sentence nodes for divergent questions for the ESOL and mainstream classes was 1.8 and 5.1 respectively. The mean number of sentence nodes for both convergent and divergent questions was much higher in the mainstream classes than in the ESOL classes. This difference was confirmed statistically. The following transcript excerpt provides an example of how the sentence nodes were counted:

S   I think no. It's like, sometimes a real hero is trying to do thing for the people and media.
        1   2   3

      show them. And the celebrity just try to promote themselves for themselves.
        4   5

Table 13
Mean No. of Sentence Nodes per Student Response by Response Type

Question Type	ESOL-T1 (n=15)	ESOL-T2 (n=178)	ESOL Total (n=193)	MS-T1 (n=50)	MS-T2 (n=51)	MS Total (n=101)
Conv.[a]	1.9 (n=7)	.8 (n=141)	.8 (n=148)	1.8 (n=19)	3.8 (n=29)	3.0 (n=48)
Div.[a]	1.1 (n=8)	1.8 (n-41)	1.8 (n=49)	3.3 (n=30)	7.1 (n=25)	5.1 (n=55)
Total	1.5	1.0	1.1	2.1	5.4	4.1

[a] Convergent: $z=3.93$, Divergent: $z=3.65$

Research Question 2d: Do ESOL students fail to respond to higher-cognitive-level

questions more often than students of mainstream classes?

In order to answer this question, only divergent questions after which the

teacher allowed more than one second of wait-time were considered. As shown below

in Table 14, the number of questions that fit this criterion were small with only 29

questions in the ESOL group and 17 questions in the mainstream group. However,

51.7% of the questions in the ESOL classes and 17.6% of the questions in the

mainstream classes remained unanswered.

Table 14
Percentage of Divergent Questions Eliciting No Response

	ESOL-T1 (35 min.)	ESOL-T2 (66 min.)	ESOL Total	MS-T1 (45 min.)	MS-T2 (118 min.)	MS Total
No. responses	5	24	29	12	5	17
No. nonresponses	3	12	15	1	2	3
% nonresponses	60.0	50.0	51.7	8.3	40.0	17.6

Summary

The results presented in this chapter are the quantitative analyses of the data

collected during the eight lessons that were observed, taped, and transcribed. These

results show significant differences in many of the ways in which ESOL and mainstream teachers, and students, approach questions and responses. With reference to the two groups of teachers, the main differences were in the numbers of higher level questions and in the number of present questions asked. The mainstream teachers asked more higher level questions and fewer present questions. Looking at student responses, there was a dramatic difference in the length and complexity of student responses in ESOL and mainstream classes. The results of the analysis of students' failure to respond to higher level questions were inconclusive.

One similarity was noted between the two groups of students, however. The cognitive level of students' responses in both groups corresponded very closely to the cognitive level of teacher questions. There were also similarities between the two groups of teachers. First of all, there was no overall systematic difference in the amount of wait-time teachers allowed, both after teacher questions, and following student responses. However, the mean wait-time 1 for one of the ESOL teachers fell within the recommended 3 to 5-second range. The other teachers had shorter wait-times. One further interesting similarity was in the large number of interrupted student responses in both groups, roughly 30% in both groups.

In the following chapter, these data will be used as a basis for examination of the actual interaction samples collected. In particular, quantitative differences in the questioning patterns of the individual teachers will be discussed in light of some of the situational differences that were either revealed in the interviews with the teachers, or observed by the researcher in the classroom.

CHAPTER V

DISCUSSION OF RESULTS

In this chapter, the results of the study, including the quantitative data analysis presented in Chapter 4, are discussed. This discussion draws on the literature reviewed in Chapter 2, the observations the researcher made in the classes, and the interviews with teachers. In addition, there is commentary on aspects of the teachers' questioning behavior that were outside the scope of the research questions.

Research Question 1a: Do teachers of mainstream classes use more higher-cognitive-level questions than teachers of ESOL classes?

As shown in Chapter 4, the distribution of higher-order questions was significant. Mainstream teachers asked a much higher percentage of higher-cognitive-level questions than the ESOL teachers. However, a more careful consideration of the data reveals a number of factors at work in the classroom that the percentages alone cannot adequately convey. These issues may be considered in light of both the development of critical thinking skills as well as in terms of the particular teaching protocols that seemed to be operating in these classes. Examined in context, many of these questions demonstrate how both the pedagogical goals of the teacher as well as the cognitive needs of the students were met. In the discussion below, the use of higher order and lower order questions are treated separately.

Higher-Cognitive-Level Questions:

In terms of raw numbers alone, students were exposed to roughly the same number of divergent questions in all four of the classes. As mentioned in Chapter 3, one of the stated goals in the course descriptions for all of the classes was the development of critical thinking skills. If the teachers' pedagogical purpose was to promote reflective thinking, this choice of divergent questions was a principled method by which this purpose could be achieved. In three of the classes, these questions were mostly high divergent and required students to express opinions or hypothesize.

Only in ESOL-C2 did the teacher ask mostly low divergent questions that required students to articulate reasons and motives. This teacher asked fewer divergent questions in general than the other three. This deviation might be due to the fact that as a course requirement, the students in this class were expected to read a lengthy novel in English. Most of them had never read a novel in a second language before, and the teacher spent a lot of time on text comprehension to help students meet the challenge of reading such a large amount of material. Thus, not much time remained for reflective questions.

Another deviation in the use of divergent questions was observed in MS-C1. Whereas the divergent questions asked were largely text-based in the other three classes, most of the high divergent questions asked in this class were related to the students' personal environment. This deviation seemed to be related to the text discussed (an essay on the acquisition of "standard" English" by a speaker of black

vernacular English) and the teacher's apparent interest in helping students relate the text to their own world. Unrau (2000) suggests that an effective means of fostering thinking is for the teacher to encourage students to make a personal connection with the reading text. The following example of one of the questions asked in the class reflects this teacher's interest in making that connection:

T Having one dialect, learning another dialect, and then having to become comfortable with it. *Umm, - why is that interesting to us in college?*

Vygotsky (1962/1939, p. 80) claims that "the greatest difficulty of all is the application of a concept, finally grasped and formulated on the abstract level, to new concrete situations that must be viewed in these abstract terms...." The above question moves the subject discussed in the article out of the abstract into the world the students live in, enabling them to tap into their schemata and use it to produce original thinking.

The frequency in the use of divergent questions, the particular kinds of divergent questions asked as well as the explicitly stated goals of these classes suggest that all four teachers actively sought to develop critical thinking. Yet what is really meant here by the development of critical thinking is its teaching. In order for students to acquire the ability to be able to think critically, the teachers undertook certain pedagogical protocols to activate cognitive processes in the students. A consideration of the contexts underlying the teacher questions examined in this study shows the relationship between this development and teaching, and reveals the ways in which teachers in both classes sought to facilitate students' acquisition of thinking skills.

In order to shed light on these pedagogical protocols, it is useful to draw a parallel to second language acquisition. It has been shown in second language acquisition research that ESOL teachers modify their speech in the classroom, and that these adjustments help students to improve their language skills by making input comprehensible. (Kitao, 1990). One of these adjustments, as also noted in this study, was the more frequent use of questions. Whereas the mainstream teachers asked 184 questions (including repetitions and rephrasals) in 118 minutes, the ESOL teachers posed 331 questions in 101 minutes. This characteristic of ESOL teachers was also noted by Scarcella and Higa (1982) in a study of child second language learners.

In general, ESOL classes are designed to foster students' emergent language skills, skills the students have not fully mastered. In the classes observed in this study, critical thinking can also be considered an emergent skill, as it is also a skill the students did not yet fully possess. All four teachers in this study, in a fashion similar to ESOL teachers in general, whose purpose it is to improve students' language skills, made adjustments to their speech that reflected their interest in fostering higher level thinking. The following examples illustrate this:

Type of class: typical low-level ESOL
Nonadjusted question: *Well, what are you doing in the United States?*
Adjusted question: *Are you just studying? Or do you have a job?* (Larsen-Freeman and Long, 1991, p. 122)

Type of class: ESOL (example from this study)
Nonadjusted question: *What's going to have more details?*
Adjusted question: *What do you think would have the most details, four hundred pages or two hours?*

Type of class: MS (example from this study)
Nonadjusted question: *What are we learning about Sylvie?*
Adjusted question: *Who's Sylvie? What's she like? What are some, what are some of the things she does in this section?*

These three adjustments facilitated students' responses in similar ways. In the first two examples, the adjusted questions contain answers in the form of options. The students only have to select one of the options and repeat it. In the third example, the teacher takes the original question and decomposes it into several questions with smaller, more focused themes. This reduces the knowledge base the students must explore to be able to respond.

There were several types of adjustments observed. One of the adjustments involved phrasing or rephrasing of higher level questions in such a manner as to limit students' response options. An example of this from ESOL-C2 was:

T   *What do you think Ruth is going to do next?*
T   *...then in the future do you think she's [Ruth's] going to leave and marry Frank?*

Here the difficulty of the question is adjusted downward by rephrasing it as a closed question. The students still had to reflect on their base of knowledge to be able to answer the question. However, the rephrasal allowed them to react with a simple yes or no, rather than compel them to mentally explore all possible outcomes. Similarly, in a discussion on the subject of linguistic dispossession, MS-2 asked:

T   *Do you agree that that [frustration] does occur, does lead to violence, rage, anger, whatever?"*

Again, students were able to respond with a yes or no. An open-ended form of this question might have been:

T   *What does this frustration lead to?*

This open-ended variant would have increased the students' cognitive task by forcing

them to think through the alternatives and evaluate each before responding.

Still another type of adjustment observed was the phrasing of questions in the

negative. This adjustment served to force the teacher's perspective on the student. For

example, in one of the class discussions, MS-T2 might have asked:

T   *What are they trying to make of Sylvie?*

Instead, her question was phrased as follows:

T   *Aren't they in a way trying to make her their mother?*

This adjustment allowed the teacher to give students a cue as to the desired response.

Framing the question negatively tacitly reflected the teacher's opinion on the subject

and in effect elicited students' agreement, since disagreement would have forced the

student to openly reject the teacher's opinion and justify his or her dissension.

A further adjustment observed involved priming the students by first posing a

question, then focusing on the meaning of one of the phrases used in the question

before giving students the opportunity to respond to the original question. For

example, ESOL-T1 asked at one point:

T   *Why do you think it's less clear-cut who's a hero and who's not? Clear-cut.
      When somebody's clear-cut, what does that mean?*

Having the students define *clear-cut* helped them tap into the knowledge they needed

to consider to be able respond to the initial question. As a variation of this adjustment,

sometimes the teacher herself elaborated on one of the terms used in the question and

thus gave students the background knowledge required to be able to produce an appropriate answer. The following example, taken from ESOL-C2, illustrates this technique:

T   *If it's a love story, did that look like love?* (3 secs) *If you think of a love story in a movie, what do you see? You see romance, right? Did you see romance here?*

Here the teacher has equated the term *love story* with the term *romance*. This gives the students a shortcut to the response by focusing their attention on an appropriate interpretation of *love story*.

All four of the techniques described above were used by both the ESOL and mainstream teachers. It did not appear that the teachers made a conscious effort to employ these strategies, but responded with a great amount of automaticity to the particular needs of the class at any given moment by carefully adjusting the formulation of the questions they posed.

In addition to the above adjustments, the teachers also utilized a range of pre-discussion activities that prepared students for the discussions and enabled them to respond to questions in a more sophisticated manner. In both of the mainstream classes, teachers used a combination of free-writing and small group discussion activities prior to discussing the texts as a whole class. In the ESOL classes, teachers initially had students discuss the texts in small groups as well. Providing questions for focus in these discussions was another very fruitful technique. In some contrast to the mainstream classes, the ESOL students were always given questions on a handout to prepare individually or in small groups before whole class discussions of reading

assignments, although in one instance, the mainstream students were also given specific questions to prepare beforehand. These handouts of questions gave students the opportunity to "rehearse" the whole-class discussions, therefore reducing the spontaneity of the class discussions but also the cognitive burden. These pre-discussion activities suited the pedagogical purpose of the teacher because they enabled her to choose the focus of student talk.

The model of learning proposed by Vygotsky (1962/1939) offers a good explanation of the link between pedagogical purpose and the interactional strategies employed in these classes. Vygotsky claimed that choice of language enables people to engage their intellect. In this study, the questioning behavior of the teachers observed suggests that teachers not only selected higher-cognitive-level questions to help students develop thinking skills, but also very carefully formulated these higher level questions in such a way as to give students a means to gradually improve their thinking skills. This corresponds well with Vygotsky's concept of the zone of proximal development. By lessening the cognitive burden on students, all of these teachers helped students to exercise their thinking skills in a way they would have been unable to do independently. The use of these aids to ease cognitive processing reflects the teachers' focus on critical thinking.

Lower-Cognitive-Level Questions

Although higher level questions were the focus of Research Question 1a, a discussion of the use of these questions would not be complete without an examination of the lower level cognitive questions asked by the four teachers. A recognized use of

lower level questions is to bring to students' minds the schemata they already possess to help them reflect critically on an issue. Thus, lower level questions can serve as a springboard for the reflective thinking that goes on in the classroom. For this reason, consideration of this question type is warranted here.

Beyond the use of lower level questions as a means to promote reflection, there are several other reasons teachers ask convergent questions. One reason might be to find out whether students have understood the text, or simply to check whether or not they have completed the reading assignment. Another reason might be to encourage students to participate in a discussion by asking them questions they can readily answer. In this study, the researcher discovered that the four teachers used convergent question types in very different manners. The most salient feature of the teacher-student interaction in ESOL-C2 was the great number of convergent questions asked. The teacher in this class asked 108 questions of this type in 66 minutes, in comparison to 11 for ESOL-T1 in 35 minutes and 59 for the mainstream teachers in 163 minutes. It is possible that the choice of convergent questions and the teacher's fast pace were simply idiosyncratic to that particular instructor. However, there are other possible reasons. Unlike ESOL-C1 or the two mainstream classes, the students in this class were reading a lengthy novel for the first time, and there was a need to ask lower level text comprehension questions to help students move through the text. In addition, the teacher's use of recall questions and the rapid pace seemed to reduce students' anxiety and make it easier for them to participate in the discussion. This was evidenced by the

students enthusiastic and frequently simultaneous responses, their laughter and focused, on-task behavior.

ESOL-T1 also used convergent questions for purposes of text comprehension, but unlike ESOL-T2, all of her lower level questions were high-convergent and required students to explain the meaning of passages from the text. This difference in the use of convergent questions can be explained by the fact that the texts chosen by ESOL-T1 were shorter but of greater difficulty than the novel read in ESOL-C2. Thus, there was not such a need to use recall questions as students had less to read and likely had more time to invest in text comprehension before coming to class. On the other hand, the more challenging material made it necessary for the class to spend time analyzing meaning.

Most of the low-level questions MS-T1 asked were low-convergent recall questions. However, her purpose was not to aid or check text comprehension but to help students think and evaluate. Virtually none of the low-level questions in this class were text-based, but were recall questions related to the students' personal environment. The teacher used these questions to help students see a personal connection to the reading assignment and help them reflect.

MS-T2's use of convergent questions was different from MS-T1's. Two-thirds of the convergent questions used by MS-T2 were asked during the third observation. Prior to that she had asked few convergent questions. She began this third observation by asking mostly high convergent questions requiring students to summarize or explain, but during the last part of the lesson switched to low convergent, recall-type

questions. After this third lesson, MS-T2 expressed to the researcher her frustration with the class during this lesson. It was the day after Election Day, and it appeared that a number of students had stayed up late to watch the conflicting election results. As a result, many had not done the reading assignment. Several students rested their heads on the desks and were visibly tired. It seemed to the researcher that MS-T2 resorted to convergent questions, and, in particular, to recall questions because of the students' lack of responsiveness on this particular day. By asking low-level questions, she could at least elicit some student participation during the discussion. Commenting on observations of such teacher behavior in the classroom, Barnes (1969) noted that teachers faced with a classroom of unwilling students may be forced back upon a "transmission" strategy emphasizing recall of facts.

In general, MS-T2 used a questioning pattern that was not observed in any of the other classes. During all three observations, MS-T2 first began the class discussion by asking convergent questions, and later switched to the use of largely divergent questions. It became apparent to the researcher after the second observation that this questioning pattern reflected MS-T2's principled decision to front any critical discussion of a reading assignment with a summary of the text. This approach was explicitly described in a lecture to the class during the second observation during which the teacher suggested to the class that they summarize a text before writing the critique portion of a assignment.

The four teachers used lower level questions in distinctly different ways but there was one common thread shared by the ESOL teachers that was not present in the

mainstream classes. The mainstream teachers used lower level questions to keep the discussion going or to activate knowledge from students' lives, but did not employ this question type as an aid to text comprehension. In contrast, both ESOL teachers used lower level questions to help students better understand the reading material and facilitate their participation in the discussions.

Research Question 1b: Do teachers of ESOL classes allow more wait-time than teachers of mainstream classes?

Wait-time 1 As discussed in Chapter 2, several researchers have recommended that teachers allow 3 to 5 seconds after asking a question so that students have time to consider how to respond. In spite of this recommendation, many studies show that teachers do not meet the threshold value of 3 seconds. For example, Duell, Lynch, Ellsworth and Moore (1992) report a mean wait-time 1 of 2.25 seconds in a study of college education classes. In this present study, only one of the four teachers, ESOL-T1, sustained a mean wait-time 1 of more than 3 seconds. The other three teachers all had means under 2 seconds. Looking at the two class types overall, the mean-times were 3 seconds for ESOL classes and 1.4 seconds for mainstream classes. This slightly longer wait-time 1 for the ESOL teachers is consistent with the findings in a study conducted by Fink (1987) of two classes of college students. However, a study by Shrum (1985) reported no difference in wait-time 1 between classes held in a foreign language and science classes at the high school level. Perhaps the discrepancy in these findings is related to the small sample sizes in all three studies.

In the current study, the results for this question were found to be nonsignificant. However, the Kruskal-Wallis test performed was not designed to take into account recommended wait-time values, and in view of the recommendation, the mean wait-time 1 of 3 seconds in the ESOL classes can be viewed as considerably longer than the mean of 1.4 seconds in the mainstream classes.

There were specific circumstances that helped explain the disparity between the postquestion wait-times in the ESOL classes. ESOL-T1, whose mean was 4.2 seconds, told the researcher in an interview that she made no conscious effort to allow a three-second minimum wait-time in the class. The relatively long wait-time in her class may have been a result of an intuitive understanding of wait-time, but may also in part have been a reflection of the general unresponsiveness of the class. In contrast to this teacher, the mean for ESOL-T2 at 1.9 seconds fell under the threshold. However, this teacher asked mostly recall questions that did not require much reflection on the part of the students. As mentioned in Chapter 2, Tobin (1987) notes that additional wait-time may not be beneficial after recall questions. In addition, it appeared that the short wait-times allowed by the teacher created a briskly paced and competitive game-like atmosphere that encouraged students to reply and retained their interest.

Several studies (Arnold, Atwood & Rogers, 1974; Tobin, 1987) have reported significantly longer wait-times for higher-cognitive-level questions than for lower level questions. However, the findings in this study showed only slightly longer wait-times for divergent questions in the two groups. For one teacher, MS-T2, the wait-

times for convergent questions were even slightly longer than for divergent questions. This may, however, be attributed to the fact that most of the convergent questions in this class were asked during the third lesson in which students were unusually ill-prepared and unresponsive. As in ESOL-C1, it is possible that the teacher allowed slightly longer wait-times during this difficult lesson to encourage participation. Rowe (1986), Tobin (1987) and Stahl (1992) have claimed that allowing longer wait-times increases cognitive processing and reflective thinking. In this study, neither the ESOL classes nor the mainstream classes utilized longer postquestion wait-times regularly to promote critical thinking. However, in the instances when they did allow more wait-time, students often demonstrated higher level thinking. An example taken from one of the ESOL classes was this:

T   Uh - Yeah. It's kind of - it's an interesting argument, isn't it, that if a hero is created by the media - *does that mean that they're not really a hero? Are they just celebrities?* (3 secs) (Name) says no. (Name) shook your head.

S   I think no. It's like, sometimes a real hero is trying to do thing for the people and the media show them. And the celebrity just try to promote themselves for themselves. (3 secs)

<u>Wait-time 2</u>

Judging by other studies, generally less attention has been given to the amount of wait-time teachers allow after student responses than to wait-time 1. Here, too, however, the recommendation is that teachers wait three or more seconds after student responses to enable other students to reflect on their peers' comments (Rowe, 1987). Duell, Lynch, Ellsworth and Moore (1992) report a mean postresponse wait-time of .45 seconds in college classes. DeTure (1979) and Swift and Gooding (1983) report a

wait-time 2 of .68 seconds .87 seconds respectively. The findings in the current study, with .80 seconds in the ESOL classes and .70 seconds in the mainstream classes, were consistent with these results.

A striking observation in all four of the classes was the large percentage of responses that were interrupted by the teacher. This percentage was similar in all four classes and ranged between 25 and 35 percent. A reason for this large percentage may be that teachers were sometimes unaware that they were frequently interrupting students, or not always aware of the effect of not allowing students ample time to respond. However, at least one teacher was aware of the effect. MS-T2 told the researcher that she intentionally did not allow students lengthy responses because she wanted to "get them to build concepts on top of each other" before they prematurely came to conclusions.

There are also other possible reasons for the short wait-time. In one study, Honea (1982) reports, that waiting causes teacher anxiety. However, the researcher found no direct evidence of this in these data. Another more likely reason for the short wait-time is that the teachers may have felt under pressure to cover an ambitious amount of material within the short class time allotted and for this reason wanted the discussions to transpire at a faster pace. Finally, some of the interruptions may have occurred because teachers found students' answers to be incorrect, unnecessarily long, or simply off task. The researcher noted several instances of this last type of interruption. The following is an example of an apparently rhetorical question to which a student attempted to respond at length. The anticipated response to the question, if

any, would have been "no." However, the student chose to answer in the affirmative

and elaborate at length on a subject that was only tangentially related to the discussion.

T   Yeah, that's the imagery of the, I mean they really find that troubling,
      disturbing, weird, you know, like *would you stay in a house where you have
      water in the first floor?*
S   Cause they did, I know people who do that and I've lived in towns where the
      river floods=
T   (=It happens a lot of time=)
S   =And those at the lower levels move to higher ground, but those who are on
      higher levels, it's just the first floor and not even the whole first floor like this
      was saying something about four feet of the first floor, so they can still use the
      stove and the oven and stuff. They=
T   =Yeah, they did that, it wasn't like they were concerned.

The question above is considered to be rhetorical for two reasons. First of all, an

affirmative answer to the question would be counterintuitive to the common

understanding of the implications of having a flooded house. Second, it was evident

from the primary stress the teacher placed on the word *water* that she felt the

condition described to be undesirable. For these reasons, she interrupted the student's

long and inappropriate response.

     In summary, with the exception of the 4.2-second mean wait-time 1 for one of

the ESOL teachers, there was no difference observed in the amounts of wait-time

teachers allotted students. It does not appear that wait-time allowances contributed

significantly to the promotion of critical thinking in either the ESOL or mainstream

class types.

Research Question 1c: Do teachers of ESOL classes use more present questions (i.e.,

comprehension checks, confirmation checks, clarification requests) than teachers of

mainstream classes?

Larsen-Freeman and Long (1991) report that present questions are among the most frequently used types of conversational adjustments made in discourse with non-native speakers. In Fink's study (1987) of the frequency of present questions in ESOL and mainstream classes at the college level, there were more comprehension checks, a similar number of confirmation checks, and fewer clarification requests in the ESOL class than in the mainstream class. There was no distinction made between these three kinds of present questions in the current study as all have the same purpose, that is, to ensure that speakers and listeners share the same assumptions about what was said.

In this current study, the ESOL teachers used present questions three times as often as the mainstream teachers. These results indicate that lack of comprehension was a greater issue in the ESOL classes.

Research Question 2a: Is there a systematic difference in the degree to which cognitive levels of student responses correspond to cognitive levels of teacher questions in ESL and mainstream classes?

A systematic difference in the cognitive levels of student responses to questions might have been an indication that students in some of the classes had more difficulty responding to higher-cognitive-level questions than students in other classes. Across the board, however, the cognitive levels of student responses correlated strongly with the cognitive levels of teacher questions in both class types. The rate of correspondence was roughly 95% in both class types.

Looking at the few examples of noncorrespondence, virtually all of the responses in the ESOL classes that did not correspond were high convergent responses to low convergent questions. In the following example, the teacher asks students to recall the words of one of the characters in the reading, and the response is an interpretation of that character's words:

T   =Okay. She's sixteen years old and we could debate whether that's immature or not, right. And she's very expressive. And therefore - when Ruth is thinking Idgie doesn't know what she's saying, first of all, *what is Idgie saying?* (3 secs) *What is Idgie saying? What kind of things is Idgie saying to Ruth?* (3 secs)

S   I think she expressed how she loved Ruth is to stay, it's not just physically stay, you know, she expressed she loves Ruth=

Out of context, it would be difficult to say whether the above question was intended as a low-convergent question requiring students to recall information from the text or a high-convergent question asking students to interpret the information stated. The researcher argues that the above question is low-convergent because of the phrase *first of all* that precedes the question. By *first of all*, the teacher seemed to be focusing the students' attention on the information as stated verbatim in the text. Further, with this focus on the text, the teacher wanted to help the students resolve a debate as to whether the character, Idgie, was mature or immature. However, the student who responded to this question was not content to recall information, but sought to interpret it.

In the mainstream classes, there were only three noncorresponding responses, too few to reliably identify any specific pattern. In addition, the categories of the question/response pairs were different in each of the three cases. The three

question/response pairs were low divergent/high divergent, high divergent/ high

convergent, and high convergent/ high divergent. In the following example, the teacher

asked a text comprehension question requiring interpretation, and the student

responded by expressing her opinion on a situation that was related to the discussion

but totally unrelated to the question asked by the teacher:

T   *What's this section say about appearances?* I want to hear from some other
     people. (Name)? (5 secs).
S   I think although, it's just probably - I'd say that - I don't know, I just think if I
     was a town member I'd have pity for that family. Cause what happened to their
     grandfather when their grandma died and their mom committed suicide.

This response showed a high degree of reflection on the part of the student and gave

the impression that she had either misunderstood the teacher's question, or perhaps

wanted to articulate her strong empathy with the characters in the story. Overall, there

were few question/response pairs that did not match, and it was not possible to identify

any particular pattern or reason for the noncorrespondence.

Several older studies have looked at the correlation between teacher questions

and student answers at the elementary and secondary school levels with conflicting

results. Arnold, Atwood, and Rogers (1974) found a high degree of correspondence

between questions and answers at the elementary school level. A study by Mills, Rice,

Berliner, and Rosseau (1978) at the elementary and early secondary levels found no

correspondence between questions and answers. The high degree of correspondence in

this current study suggests that asking higher-cognitive-level questions elicits higher-

cognitive-level responses and is, therefore, a very effective means of generating higher level thinking among students.

Research Questions 2b and 2c: Does the relative length of response (measured by the number of words) differ between ESOL students and students of mainstream classes depending on the types of questions asked? Does the relative degree of syntactic complexity of response (measured by the number of sentence nodes) differ between ESOL students and students of mainstream classes depending on the type of question asked?

The results of this study are consistent with Brock's findings (1984) in that responses to higher-cognitive-level questions were significantly longer and more complex syntactically in both ESOL and mainstream classes. As stated by Cole and Williams (1973), it is likely that higher-cognitive-level questions in general stimulate higher-cognitive-level responses that require greater syntactical complexity and greater length. The consistent pattern here seems to demonstrate that ESOL and mainstream students respond equally well to the cognitive level of questions asked in the classroom, and is a further indication that teachers can use higher level questions to elicit reflective responses and stimulate higher cognitive processes.

The degree of correspondence was similar in the two class types. However, the length and complexity of students' responses were dramatically different, and the researcher questions how ESOL students with the level of proficiency exhibited in the two classes observed in this study would fare if placed in the mainstream writing

classes and required to participate alongside students whose utterances are on average much longer and far more complex than their own. The responses in the mainstream classes were more than four times as long, and nearly four times as complex, indicating an enormous gap in the ability to respond in the two class types. In view of this gap, it seems that the language ability of the ESOL students would greatly hinder them from participating fully, and also limit the degree to which these students could benefit from the teacher questions designed to stimulate higher-cognitive-level thinking. This great discrepancy had a profound impact on the interactional norms in the two class types as teachers in the ESOL classes responded to the language proficiency issues of their students. This response was reflected in the manner and frequency of use of higher and lower level questions and present questions.

Research Question 2d: Do ESOL students fail to respond to higher-cognitive-level questions more often than students of mainstream classes?

The small number of data that met the criteria for inclusion in this question, as well as the individual circumstances surrounding some of these data make it impossible to answer this question conclusively. As reported in Chapter 4, there were 3 instances of nonresponse to higher level questions in the mainstream classes, and 15 in the ESOL classes, suggesting that the ESOL students had more difficulty coping with higher level questions than the mainstream students. However, 7 of the data samples were collected during the discussion that took place during one observation, and there were particular external circumstances that may have led students to remain

silent in these 7 cases. A purpose of this discussion was to prepare students to write a

paper based on the novel they had read. The teacher asked a relatively large number of

divergent questions but told the students repeatedly that they did not need to answer

the questions at that time, but could respond to them in the writing assignment. At the

same time, the teacher waited between 2 and 5 seconds after 14 of these questions,

giving students time to write down her questions, but also suggesting to the students

that she anticipated responses. In many cases, students did respond to the questions,

and the teacher encouraged this behavior by either praising students or responding to

students' responses with new questions. Thus, it is likely that students did not reply to

some of the questions because the teacher had explicitly told them she did not expect

responses.

In most of the 18 instances of nonresponse in the study, teachers waited 3

seconds or less for an answer, and it is possible that the ESOL students failed to

respond because they needed more time than the mainstream students to produce the

longer and more complex responses that higher-cognitive-level questions elicit. In

many of the instances of nonresponse in all four classes, the unanswered questions

were repeated or rephrased, until either the student answered, the teacher answered the

question herself, or the teacher asked a different question.

Repetition and Rephrasals

One marked difference in questioning behavior in the two class types that was

observed incidentally was in the frequency of question repetitions and rephrasals. It

was noted in Chapter 4 (see Table 3) that ESOL teachers repeated or rephrased questions 33% of the time compared to 23% of the time for the mainstream teachers. This high frequency of repetitions in native speaker/nonnative speaker interactions has been noted by researchers in second language acquisition. For example, White and Lightbown (1984) found in a study that 64% of the total questions asked by teachers of high school ESL classes were repetitions. In a discussion of the results of previous studies on input and interaction in native speaker/nonnative speaker conversations, Long (1981) noted that native speakers' repetition of utterances is pervasive. In the current study, interviews with the four teachers on this subject provided a plausible explanation for this difference. Both ESOL teachers stated that they tended to repeat or rephrase questions for the sake of comprehension. Indeed, ESOL-T1 remarked that she had discovered some years before that when students heard a question for the first time, they would initially only be able to identify it as a question, and that repetition was necessary for the content of the question to become comprehensible. In contrast, neither of the mainstream teachers reported comprehension as a motive for repetition or rephrasal of questions. Both of these teachers mentioned repetition and rephrasal as a means to help students broaden their thinking and learn to listen carefully to questions before rushing in to react. This explanation complements the argument of White and Lightbown (1984) that repetitions and rephrasals extend the sequence of teacher-student interactions and allow the teacher and the student to jointly create the student's answer.

The percentages of repetitions and rephrasals of lower level questions in the two groups classes varied between 18 and 28%. In contrast, the range of percentages for higher level questions was much broader with 28.2% repetitions and rephrasals for the mainstream teachers and 43.7% for the ESOL teachers. The significant difference in numbers of repetitions and rephrasals of higher level questions in the ESOL classes suggests that in addition to the issue of oral comprehension, these students needed more time to respond to cognitively challenging questions than the mainstream students.

It is possible that the repetition and rephrasal of questions was beneficial to ESOL students for other reasons as well. For example, it is plausible that teachers tended to repeat and rephrase questions more often because it was a component of the type of classroom discourse these students were accustomed to in ESOL classes, and as such was an interactional feature they readily recognized and knew how to respond to.

Summary and Conclusion

The underlying purpose of this study was to examine how prepared advanced ESOL students are when they enter university-level mainstream classes. This study examined this question from the narrow perspective of teacher questioning techniques, student responses and the development of critical thinking. A goal of the study was to compare the types of teacher questions and teacher wait-time in the two class types. The most salient differences noted were in the types of questions asked. The

mainstream teachers used a greater percentage of higher-cognitive-level questions than the ESOL teachers. However, all four teachers asked similar numbers of higher level questions, reflecting the interest of both groups in promoting higher level thinking among their students. The fact that both teacher types used similar interactional strategies to help students respond to higher level questions also reflects the interest of both groups in developing students' thinking skills.

Whereas mainstream teachers were able to devote most of the class discussions of readings to this goal, the ESOL teachers' purpose, as revealed in the analysis of questioning techniques, was twofold. In addition to instilling thinking stills in their students, these teachers discussed the reading assignments for the purpose of increasing students' text-related and cultural knowledge as an aid to text comprehension. The large number of low-cognitive-level questions used by the ESOL teachers was indicative of this twofold purpose. By asking lower level questions, the teachers supported students' efforts to read and understand the texts. Mainstream teachers also asked a number of lower level questions during whole class discussions. However, their purpose in doing so was not to promote text comprehension but to activate the students' knowledge base. By accessing this base, students were able to analyze, synthesize and evaluate, in other words, to perform critical thinking.

In addition to this dual focus on critical thinking and text comprehension, the ESOL teachers were still faced with the necessity of addressing more basic language proficiency issues. This was reflected in the frequent repetitions and rephrasals of

questions that allowed students more time to process new information and respond in English. Further, the greater use of lower level questions facilitated students' language production in class and thus contributed to their acquisition process.

As noted in chapter 3, in tabulating the numbers of questions falling into the four categories, it was decided to count as one question all utterances by the teacher that were intended to elicit one answer. As shown in table 3 in chapter 4, the ESOL teachers repeated or rephrased mostly lower level questions, whereas the mainstream teachers repeated or rephrased mostly higher level questions. Had the researcher chosen to count all interrogative utterances as separate questions, this would have skewed the results even further in the direction of a focus on comprehension in the ESOL classes.

In contrast to the great dissimilarity in the use of questions, the analysis of wait-time indicated a great similarity in the length of the pauses allowed by the two teacher types. With one exception, both postquestion and postresponse wait-times were under the recommended threshold of 3 seconds in both groups. Thus, it did not appear that ESOL teachers made accommodations for the potentially longer preresponse processing times needed by ESOL students.

A second goal of the study was to provide clarification on the relative ability of beginning native and nonnative university students to respond appropriately to higher-level questions. It was found that the cognitive level of ESOL students' responses as well as those of mainstream students corresponded closely to the cognitive levels of

the questions, indicating that ESOL students are able to cope with higher level

questions on a par with mainstream students. An examination of students' responses

with regard to length and syntactic complexity also revealed that higher level questions

triggered longer and more complex responses in both groups. However, the stark

differences in the length and complexity of responses between the two groups suggest

that responding appropriately to teacher questions in general in a mainstream setting is

more challenging to ESOL students than to students who are native speakers. In

addition, the more frequent repetition of higher level questions in the ESOL classes

also suggests that ESOL students may need more time to process more complex ideas

in English.

A further goal of the study was to examine the ways in which interactional

norms differed between the ESOL and mainstream classes, and how these differences

impact the ability of nonnative speakers to succeed in mainstream classes. The

difference in pedagogical purposes in the two groups, as noted above, resulted in

differing interactional norms in the two classes. One difference was in the more

frequent use of questions to elicit participation in the ESOL classes. The mainstream

teachers asked fewer questions but incorporated other means of promoting students'

participation. It was pointed out that MS-T2 encouraged students' participation

through the use of a number of nonquestioning techniques, such as the elicitation of

students' comments through teacher lectures on topic-related information. ESOL

students are used to being encouraged to participate in class discussions. However,

ESOL students entering mainstream classes for the first time have to learn that their participation in these classes is not necessarily elicited through teacher questions.

Second, ESOL students are accustomed to frequent repetitions and rephrasals of questions and have possibly become used to relying on the extra time the repetitions and rephrasals add to process information and reflect before responding. In mainstream classes, these students have to learn to cope with the faster pace of question/response time.

Third, ESOL students attend reading and writing classes with the expectation that at least part of class time will be spent on text comprehension. However, the mainstream classes observed in this study spent little time on this. It must be quite an adjustment for these students to enroll in a mainstream writing class and discover that they are expected to have understood the text before they attend class, and that the teacher may very well not devote any class time to this area. Lacking previous experience with this type of classroom protocol, it seems unlikely that students would be able to participate successfully in a discussion of reading assignments that begins at the level of analysis and evaluation. Thus, students' prior experiences with the interactional norms that are peculiar to the ESOL classes they have attended, specifically the norms dictating that any class discussion of a reading assignment will begin with an abundance of text-based, lower-cognitive-level teacher questions, may lead to misconceptions of mainstream teachers' expectations.

Finally, as was noted in the commentary on pre-discussion activities, the ESOL students are accustomed to being given focus questions for preparation. With one exception, the mainstream teachers in this study did not prepare written focus questions. Without this type of rehearsal, it is likely that ESOL students will not be able to perform well, at least initially, in class discussions.

The most obvious task ESOL teachers face, even at this advanced level, is improving students' general language proficiency. If the stark differences between class types in overall length and syntactic complexity of responses are any indicator at all, however rough, of oral proficiency, the ESOL students observed in this study have yet to achieve a level of second language proficiency that would allow them to participate in class discussions on an equal par with native speakers.

The short teacher wait-times found in mainstream classes further compound the challenge these students face in participating in a mainstream class discussion. The wait-times in the two class types were similar, and ESOL students enrolling in mainstream classes will already have become accustomed to this norm. However, in light of their emergent second language skills, there is room for concern that they will be placed at more of a disadvantage when it comes to responding to teacher questions than their native speaker peers. The short wait-times may have a more deleterious effect on their capacity to benefit from the instruction.

Within the specific context of these reading and composition classes, the ESOL teachers face the additional task of improving students' text-related and cultural

knowledge so that they can understand, interpret, and evaluate reading texts. Unrau (2000) has stated that "the more they [the learners] know, the more knowledge they will be able to apply as they reason reflectively about claims, both in school and out" (p. 24). Certainly, ESOL students bring to any discussion valuable knowledge from their life experiences and education that can often not be matched by that of their native-speaker peers. However, ESOL teachers scramble in the limited time available to boost students' proficiency and impart knowledge to their students to enable them to succeed in the American university system. By becoming cognizant of the different interactional norms and pedagogical purposes found in these two class types, ESOL teachers can evaluate the ways in which utilize the time available to them to facilitate critical thinking in their own classes.

<div align="center">Limitations</div>

The researcher has attempted to take into consideration the external environmental factors that impacted the interaction that was the subject of study in this thesis. The interactional approach of this research, narrow in its focus on teacher questions and student responses, was effective in shedding some light on the subject matter. However, this same narrowness of approach caused some variables to be ignored that may have influenced the interaction. For example, there was no analysis of other interactional features beyond teacher questions and student responses, such as student questions, or peer-peer interaction, or the effect of nonquestioning techniques on generating reflective thinking. Further, the students were chosen on the basis of

their overall familiarity with university classroom environments, but within the scope of this study, it was not possible to examine the effects of other student characteristics such as gender or nationality on the classroom interaction. However, in confining the research to reading and writing classes of the same size, and also to interaction surrounding course content, the researcher was able to limit to some extent variables that might be attributable to differences in course objectives.

An obvious limitation was the small sample size. The task of observing, interviewing, transcribing and analyzing data from the eight lessons that formed the basis of this study was overwhelming to the researcher, and the selection of a larger sample size would have required the efforts of a team of researchers to be able to be handle the large amount of data this would have generated. In addition, the number of classes available that met the criteria for inclusion in the study was also small in number. It would have been possible to branch out to other institutions in the area, but inclusion of classes from other colleges would have involved incorporating more variables into the project, such as differing course goals and other programmatic variations. There is a tradeoff, however, in that the small size enabled the researcher to collect richer data, that is, to audiotape, comprehensively transcribe, and carefully scrutinize the interactions that took place in these four classrooms.

This was a study of naturalistic data. The researcher did her best to present herself and the study as a nonthreatening entity by observing the classes once or twice prior to data collection, by explaining the purpose of the study carefully to the

participants, and by assuring the participants of the voluntary nature of their participation. In order to alleviate any anxiety participants might have had about being recorded, the researcher gave participants the option of requesting that the tape recorder be turned off at any time. The researcher also placed the taping equipment in the back of the classroom out of sight. Comments of several faculty members who teach lower level undergraduate classes suggested that a lot of classroom research goes on in these lower level classes, and that students tend to be accustomed to such intrusion. However, the presence of the observer in the classroom, even as a nonparticipant observer, as well as the running tape recorder, obviously had an influence on the interaction observed, such that the data cannot be called completely naturalistic.

The very nature of this study of naturalistic data meant that the researcher could not take control, and had no control over the interaction that occurred. Only through her close contact with the four teachers involved in the study and her ability to adjust her schedule on short notice was she able to obtain such a large amount of data that fit the criteria of the study. Even so, data from three additional observations had to be excluded because it did not meet the threshold criteria.

With reference to the design of the question classification scheme to be used, another limitation must be mentioned. As stated by Long (1983), observational instruments are theoretical claims about teaching that are based on hypotheses that have been largely untested. Thus, the division of question types into two, four, or six

categories may or may not reflect the variety of questions that exist. However, there would be no possibility to compare question and response behaviors in different classes without a standard list of question types.

Moreover, the manner in which the classification scheme was applied had an impact on the findings. In this study, the researcher made a conscious decision to count as one question all utterances by the teacher that were intended to elicit one answer. Had the researcher selected other criteria for the tabulation, these may have resulted in different numbers and in a different interpretation. A radical departure from the method of tabulation chosen by the researcher would have been to count each interrogative utterance separately as one question. However, even this means of tabulating question types, as explained earlier in chapter 5, would not have significantly altered the findings. In addition, this method of tabulation affected the categorization of individual utterances in only four instances in the entire data set.

Finally, the researcher would have liked to include small group discussions of readings in the data analysis; however, a transcription of such discussions was not feasible due to the kind of recording equipment that was available to the researcher. The results would have been based on incomplete transcriptions, and this would have led to skewed percentages and interpretive errors.

Implications

A large amount of research has been carried out in both ESOL and in mainstream classes in the area of classroom interactions. Much less research has been

conducted that directly compares interaction in the two class types. The issues raised

by this study have implications both in the areas of classroom research and language

teaching. These implications are discussed here.

<u>Classroom Research</u>

As observed above, this research did not examine interactional features other

than teacher questions and student responses. Further research might examine features

such as nonquestioning techniques and their impact on the development of critical

thinking in the two class types.

As discussed in Chapter 2, the type of questions teachers select has a direct

effect on student responses. High-cognitive-level questions stimulate cognitive

processing and cause students to reflect and produce sophisticated responses. Evidence

from this study points to this effect. However, it was also shown in this study that a

significantly larger percentage of higher-cognitive-level questions were asked in the

mainstream classes. The researcher sees as a possible avenue for research a study of

how well ESOL students who have completed a program preparing them to enter

mainstream classes succeed in responding to these higher-cognitive-level questions

once they enroll in mainstream classes.

Long (1983) and others have discussed a higher frequency of repetitions as one

of the characteristics of foreigner talk discourse. In this study, the researcher noticed

different patterns of repetition based on the type of class and the level of question.

Further research could provide more insight into the need for repetitions and rephrasals

of questions in advanced level ESOL classes. In line with the goal of helping students transition smoothly into mainstream classes, it seems advantageous to adopt mainstream modes of interaction in ESOL classes when appropriate. Another possible type of research might be a controlled study in which ESOL teachers model the patterns of repetition in typical mainstream classes. This could take the form of an experimental study with control and experimental groups using modified repetition behaviors as an independent variable. Pre- and post-tests could be conducted using procedures similar to those applied to answer Research Question No. 2 in this study.

Kelley and Sweet (1991) state that interactional norms that are unfamiliar to ESOL students have an impact on teacher-student relationships. Within the scope of this study, it was not possible for the researcher to examine the classroom interaction that took place from the students' perspective. A qualitative case study of ESOL students enrolling in lower level writing classes for the first time might provide insights into ways in which the ESOL programs can become more responsive to the needs of their students.

The literature the researcher surveyed on questioning techniques discussed many useful classroom strategies designed to make classroom discussions effective, such as free-writing and class discussions of the nature of argumentation (Hunkins,1989; Unrau, 2000). However, the researcher was unable to find any literature that explicitly discussed possible interactional strategies. A closer examination of the interactional strategies teachers use to enable students to cope with

challenging high-cognitive-level questions as well as the way in which students respond to these strategies might be another useful subject for research.

Last of all, it would be of benefit to conduct research on the wait-times that occur in small group discussions. White and Lightbown (1984) state that students in small groups allow longer wait-times than teachers, and that this encourages reflective thinking. With the help of more sophisticated recording equipment, it would be possible to record and transcribe small group interactions and examine the relationship between these longer wait-times and critical thinking.

<u>Language Teaching</u>

A number of differences in interactional norms between the two groups were revealed in this study. A primary implication is that ESOL teachers striving to prepare students for study at an American university might better serve these students by employing the interactional features found in mainstream classes. Thus, they could reduce the amount of time spent on explication of reading texts, repeat questions less frequently, and limit the use of present questions.

A wealth of research shows that longer wait-times are beneficial in many ways. Overall, teachers in this study did not wait the recommended 3 to 5 seconds. However, this discrepancy is not limited to the teachers participating in this research. Short wait-times seem to be a widespread phenomenon at all levels of education in this country. Because of this, there is a tendency for teacher trainers to admonish teachers in training generally to wait longer. However, as pointed out by Tobin (1987) there are

times when shorter wait-times are appropriate, and a more detailed treatment of the issue might be more fruitful in helping teachers to find the right amount of wait-time, instead of a catchall recommendation to wait 3 to 5 seconds.

The practice of giving advanced level ESOL students focus questions in preparation for class discussion was noted. The use of adjustments to teacher questions for the purpose of reducing the students' cognitive burden of response was also noted. An implication of this is that students might benefit if teachers modified questions in their handouts in similar fashion. This would facilitate students' responses and at the same time give them exposure to higher level questions.

A major goal of IELPs is to prepare students to enter mainstream classes. Recently, the program at the university at which this study was based added a fifth level to its four-level program in response to growing concerns that students leaving the program were not ready to participate successfully in mainstream courses. This study suggests that even with the addition of a fifth level, students may still experience a less than smooth transition into regular courses. Adding a sixth level, even if it were feasible, would be problematic and not necessarily beneficial, since students would still be experiencing learning within the context of the ESOL classroom. One way in which to provide students with a some additional support might be through a collaboration of the IELP with the English Department. Students who have completed level 5 in the IELP could enroll in a lower level writing class through the English Department and simultaneously enroll in a newly created IELP support class designed

to give the students additional instruction in the reading materials and assignments, and in the classroom norms as they exist in a mainstream class.

Finally, as mentioned in Chapter 2, many cultures do not pursue the development of critical thinking skills, at least not in the American understanding of this topic. In a study conducted in an intensive academic English program in Japan (Davidson & Dunham, 1996), it was shown that students make significant progress in their ability to use critical thinking skills when they receive a weekly one-hour seminar on this topic. Advanced ESOL students enrolled in an IELP here might also benefit from additional instruction in some basic elements of critical thinking.

Overall, future studies in the area of critical thinking and teacher questioning techniques can be used to raise teachers' awareness of the effects of their instruction. Until such investigations may be pursued, this current study offers several interesting areas for pedagogical focus.

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APPENDIX A

TRANSCRIPTION SAMPLES

Legend   LC: low convergent
                HC: high convergent
                LD: low divergent
                HD: high divergent
                P: present
                O: other

Sample 1 – ESOL

Category:

T	*What happened to Idgie at the end of the novel?*	LC
S	She was still living in Florida.	
T	She was living in Florida. She is still alive living in Florida. Okay. Okay. Think about, think about those characters, those kinds of things and watch the rest of the movie. There'll be some other things, so move to where you're comfortable. You're gonna see about twenty minutes of film........	

Students watch film for 5 minutes.

T	*The trial, it's not the same, but what are the differences?*	HC
Ss	Ruth is alive.	
T	Ruth is alive, okay. *Can you think of another major difference?*	HC
S	The judge.	
S	The judge is=	
T	=The judge. Good. *Who is the judge in the novel?*	LC
Ss	Smoothy.	
T	Right. Good. Umm - there was one another thing. So that was about the same. *Can you think of any reason that they would have that difference?*	LD
	(3 secs) *But why was Ruth still alive? What's the effect of that or what's*	LD
	the reason? (6 secs)	LD
S	So she brought the preacher in.	
T	Okay. So it was her that brought the preacher.	
S	Yeah.	
T	Okay. She got Reverend Scroggins in. *How did that happen in the book?*	HC
	Why did Reverend Scroggins come in the book - to testify? Do you	LC
	remember? (5 secs)	LC
S	Because Idgie saved his son a long time ago. Idgie had a good relationship with his son so that is kind of=	
T	=Reverend Scroggins' son. He got into big	

trouble and Idgie helped him out. - So Reverend Scroggins remembered that and did her a favor. So in the novel it's very different. It wasn't

because of Ruth. - *So can you think of why would they change that?* LD
Why did they change it? (2 secs) You don't have to answer now but LD
if you choose to write about the trial, for example, you would talk
about the differences. That would be No. 2 and then in No. 3 you have
to talk about the effect or the reason why it's done that way. So that's
something you'd have to think about and come up with, *well why do* LD
you think they changed that? (5 secs) *And what effect did it have?* LD
Did it change anybody's relationship? (3 secs) *Or was it just a matter* LD
of four hundred pages in a novel versus two hours of a movie? (2 secs) LD
That's not always the answer though.

Ss   Laugh

T   *That might be the reason but what's the effect? What's the effect?* LD, LD
(2 secs) Okay. Now Ruth is dying and in the novel, *who never left* LC
Ruth's side? LC

S   Onzell.

T   Good. Onzell. Okay. *And who is Onzell? Who's that?* LC, LC

S   Husband, wife of George.

T   Good. Wife of George. Okay. *Now did you happen to notice as you were*
watching this fast-forward, was Onzell there? LC

S   No. Sipsie.

T   No. Sipsie. Okay. *Is Onzell, has Onzell been in the movie yet?* LC

Ss   No.

T   No. So that's a difference. Onzell doesn't exist in the movie. (4 secs)
Okay. Let's go on. Now we're going to look at.....

2:34 pm

T has students work in three small groups again for five minutes.

T   *What happened? What does Evelyn want? (Name), what does she* LC, LC, LC
want?

S   The money?

T   No. (unintelligible)

S   She wants to care. Missus Goody to stay with them.

T   Good. Good comprehension. Okay. So that's different. *Now wouldn't* HD
you think that more things would be left out of the movie? (2 secs) Four
hundred pages, two hours. *What's going to have more details?* (3 secs) LD
What do you think would have the most details, four hundred pages or LD
two hours?

S   400 pages.

T   400 pages, right. But they've actually added a scene.

Ss   Laugh

T   Hmm. Think about, gee they added a scene. Now that's a difference. That could be a No. 2. (3 secs) Okay. So adding a scene. (4 secs) So now we're going to see the end of it.

<div align="center">

Sample 2 – MS

</div>

S   That's why she's starting to get away. She's trying to think. And now she's tied down to two little girls who's all she has left and she doesn't want to give them up.

T   *What do they notice about her finally?* (3 secs)   HC

S   The way, the way she well when she sleeps the way she's transient, the way she keeps a $20 bill rolled up and pinned up into her, in her=

T   =She really lives as a transient even though it's a house. It's one reason why she wanted to move the couch outside. But she sleeps on top of her grandmother's bed under a quilt she doesn't get in the bed, and she sleeps with her shoes under the pillow, right. Umm, she, she's always kind of, she's always kind of on the, hovered above things. She's not really there. She's not really grounded, she's floating, you know.

Ss   Laugh

T   *What about how she buys clothes for the kids?* (3 secs) *She's trying, isn't*   HC
she?   HC

S   The less you get for them=

T   =For school shoes, sequined slippers, yes. And they have to shlog through
- has anybody ever been in like Vermont or something during mud season?   LC

S   Missouri.

T   Boy the snow melts and the mud is about this thick and it's everywhere, umm they're out walking through this foot, two-foot deep mud in sequined ballet slippers, and Lucille minds, Lucille rips the sequins off, you know, she wants shoes like other people have.

S   Plain oxfords or=

T   =Yeah. She's like get that's what she wants, you know she's starting to really care. Umm, nobody else cares so much. But I feel like there's a shift in this section where initially these girls wanted the answers all the way, and they're really happy to have Sylvie because Sylvie was going to be better. They're starting to feel like having Sylvie is, well I wrote down at the end of the section, *are they better off with Sylvie?* (4 secs)   HD

S   Than what?=

T   =It's like that Reagan question. Are you better off now than you were eight years ago. Before Sylvie came.

S   But there wasn't that much of an option of what you could keep the two aunts. The two aunts wanted to leave so they were looking for Sylvie to

come back so, were they better off or not, it's not really an option cause the two aunts wanted to leave. And Sylvie, she was the only option and so it's be alone or Sylvie=

T   =*What though if Sylvie had come, hadn't come, if the aunts would have left them?*   HD

S   She might not have left them but then after a while=

T   =They might have taken them back to their basement or something.

S   Without, without Sylvie coming there, the aunts would not see a future, they might have taken care of themselves, you can't really tell.

T   *Umm, can you see the aunts dealing with the flood?*   DH

S   Uhh-uh.

T   They would have been out of there, umm but let's, while they really did look forward to and want Sylvie, *how do they feel now?*   HC

S   They were looking at her and seeing she may not all be there. Kind of like she had to be their secret now, she wasn't like she was that [(   )

T   [She was going to be their mother. And that's not working out. And in a way she's become, it's almost a role reversal. She almost becomes the burden in a way because they have to be constantly vigilant, it's exhausting, you know *And then what else do they realize in this part?* They realize that   O not only can you be abandoned but you can be taken away. - Children's services can come and remove you if things aren't quite right. And oh boy, are things not quite right. We've got to really worry about that because they can take us away from somebody or Sylvie could abandon us.- Either case would be horrible. They can't, you know, they can hardly function. Umm - there is a comment I thought was interesting about, when they're talking about Sylvie - which I just had a second ago - and now I can't find it. Okay, on page 86, "Sylvie liked to eat supper in the dark, This meant that in summer we were seldom sent to bed before ten or eleven, a freedom to which we never became accustomed." I was thinking of that comment. She says some really interesting things in some really interesting ways. But I was thinking of that comment applied on a larger scale to this if it's a freedom to which we never became accustomed. Sylvie provides them with very little structure, very little rules, very little anything....... They're floating too. Everybody's sort of off their feet here, it seems like....., oh, and my comment in the margin was, *do children really*   DH *want freedom?*

S   No.

T   No. - They want some structure. That's where security comes from. There are some boundaries right. That somebody's watching, somebody cares. You know, if you don't have that, it's kind of an insecure situation. And then, they're really into that insecure situation.

	What about the title? We were mentioning housekeeping. Maybe we	HC
	could start thinking about that in this section. *What do you think?*	HC
	(4 secs) *What's housekeeping?* (4 secs) (Name)	HC
S	I haven't read the whole book I hate to say.	
T	Only up to that page. *What are some of the possible def., what's*	
	housekeeping mean aside from the book, what's housekeeping? (Name)	LC
S	Keeping like your own house in order and in fashion.	
T	Okay. Keeping your house in order and in fashion. (Name)	
S	Their mother was a housekeeper too. I think she had her housekeeping	
	business and (ca. 7 words).	
T	*(Name) Anything else that housekeeping can mean?*	LC
S	Well, I don't know, just keeping your house neat and orderly the way	
	you want it.	
T	Okay. All right.	
S	I think there was a point when they said the house was now Sylvie's,	
	you know so not like Sylvie didn't need it, and it's like she's keeping it.	
	This is hers now, and in her way, her way of housekeeping was you make,	
	just the way most people=	
T	=Grandma says keep the house.	
S	Yes.	
T	And sell off some of the land if you want, you know, make some money	
	on that. You may not, keep the house, because if you've got a house, you	
	know.	
S	That's where I thought that kind of stuff because she was saying that's	
	when the flood happened and Sylvie wouldn't leave, she was keeping the	
	house, she was staying, she was doing everything, and she wasn't leaving	
	it, she was keeping the kids in it, she was keeping herself=	
T	=Their whole world is the house. It's all they really have you know. Now	
	really. *What kind of house is this?* Tell me about this house.	LC
S	It's a hole in the ground.	

APPENDIX B

STATISTICAL TESTS

Percentage of Convergent Question Repetitions/Rephrasals by Teacher Type (Table 3)

repeats

TABLE OF TEACHER BY CONV

TEACHER   CONV

Frequency Percent Row Pct Col Pct	conv	repeats	Total
esol	130	51	181
	52.42	20.56	72.98
	71.82	28.18	
	70.27	80.95	
ms	55	12	67
	22.18	4.84	27.02
	82.09	17.91	
	29.73	19.05	
Total	185	63	248
	74.60	25.40	100.00

STATISTICS FOR TABLE OF TEACHER BY CONV

Statistic	DF	Value	Prob
Chi-Square	1	2.720	0.099
Likelihood Ratio Chi-Square	1	2.859	0.091
Continuity Adj. Chi-Square	1	2.205	0.138
Mantel-Haenszel Chi-Square	1	2.709	0.100
Fisher's Exact Test (Left)			0.066
(Right)			0.968
(2-Tail)			0.104
Phi Coefficient		-0.105	
Contingency Coefficient		0.104	
Cramer's V		-0.105	

Sample Size = 248

Percentage of Divergent Question Repetitions/Rephrasals by Teacher Type (Table 3)

repeats

TABLE OF TEACHER BY DIV

TEACHER   DIV

Frequency Percent Row Pct Col Pct	div	repeats	Total
esol	49 29.17 56.32 45.37	38 22.62 43.68 63.33	87 51.79
ms	59 35.12 72.84 54.63	22 13.10 27.16 36.67	81 48.21
Total	108 64.29	60 35.71	168 100.00

STATISTICS FOR TABLE OF TEACHER BY DIV

Statistic	DF	Value	Prob
Chi-Square	1	4.985	0.026
Likelihood Ratio Chi-Square	1	5.032	0.025
Continuity Adj. Chi-Square	1	4.291	0.038
Mantel-Haenszel Chi-Square	1	4.955	0.026
Fisher's Exact Test (Left)			0.019
(Right)			0.992
(2-Tail)			0.036
Phi Coefficient		-0.172	
Contingency Coefficient		0.170	
Cramer's V		-0.172	

Sample Size = 168

Number of Teacher Questions According to Levels of Cognitive Difficulty and Teacher Type (Table 4)

```
The SAS System

TABLE OF Q_TYPE BY T_TYPE

Q_TYPE      T_TYPE

Frequency
Percent
Row Pct
Col Pct    ESL       MS          Total
LOW_C          83        27         110
            29.43      9.57       39.01
            75.45     24.55
            49.40     23.68

HI_C           36        28          64
            12.77      9.93       22.70
            56.25     43.75
            21.43     24.56

LOW_D          27        35          62
             9.57     12.41       21.99
            43.55     56.45
            16.07     30.70

HI_D           22        24          46
             7.80      8.51       16.31
            47.83     52.17
            13.10     21.05

Total         168       114         282
            59.57     40.43      100.00
```

```
STATISTICS FOR TABLE OF Q_TYPE BY T_TYPE

Statistic                       DF     Value        Prob

Chi-Square                       3     21.060       0.001
Likelihood Ratio Chi-Square      3     21.610       0.001
Mantel-Haenszel Chi-Square       1     17.305       0.001
Fisher's Exact Test (2-Tail)                     8.03E-05
Phi Coefficient                        0.273
Contingency Coefficient                0.264
Cramer's V                             0.273

Sample Size = 282
```

Mean Wait-Time 1 for Convergent Questions in Seconds
By Teacher and Question Type (Table 6)

Kruskal-Wallis Test

```
Kruskal-Wallis Test on Conv-sco

T-Type        N    Median   Ave Rank        Z
ESL          83    1.000       52.4       1.02
MS           18    1.000       44.6      -1.02
Overall     101                51.0

H = 1.03  DF = 1  P = 0.310
H = 1.35  DF = 1  P = 0.246 (adjusted for ties)
```

Mean Wait-Time 1 for Divergent Questions in Seconds
By Teacher and Question Type (Table 6)

Kruskal-Wallis Test

```
Kruskal-Wallis Test on Div-scor

T-Type        N    Median   Ave Rank        Z
ESL          39    1.000       40.4       2.00
MS           32    1.000       30.6      -2.00
Overall      71                36.0

H = 4.00  DF = 1  P = 0.046
H = 6.38  DF = 1  P = 0.012 (adjusted for ties)
```

Mean Wait-Time 1 in Seconds By ESOL Teacher and Question Type (Table 7)

Kruskal-Wallis Test: No. Secs versus ESL-T

```
Kruskal-Wallis Test on No. Secs

ESL-T        N      Median    Ave Rank         Z
1            13     3.000        85.7        2.61
2            109    1.000        58.6       -2.61
Overall      122                 61.5

H = 6.83  DF = 1  P = 0.009
H = 8.63  DF = 1  P = 0.003 (adjusted for ties)
```

Mean Wait-Time 1 in Seconds By MS Teacher and Question Type (Table 7)

Kruskal-Wallis Test: Secs versus MS-T

```
Kruskal-Wallis Test on Secs

MS-T         N      Median    Ave Rank         Z
1            17     1.000        23.7       -0.61
2            33     1.000        26.4        0.61
Overall      50                  25.5

H = 0.38  DF = 1  P = 0.539
H = 0.84  DF = 1  P = 0.359 (adjusted for ties)
```

Mean Wait-Time 2 for Convergent Questions in Seconds
by Teacher and Response Type (Table 8)

Kruskal-Wallis Test

Kruskal-Wallis Test on SEC_CONV

T_TYPE	N	Median	Ave Rank	Z
ESL	161	1.000	106.1	-0.36
MS	52	1.000	109.6	0.36
Overall	213		107.0	

H = 0.13 DF = 1 P = 0.722
H = 0.17 DF = 1 P = 0.677 (adjusted for ties)

Mean Wait-Time 2 for Divergent Questions in Seconds
by Teacher and Response Type (Table 8)

Kruskal-Wallis Test

Kruskal-Wallis Test on DIV_SEC

T_TYPE	N	Median	Ave Rank	Z
ESL	70	1.000	66.8	0.76
MS	58	1.000	61.8	-0.76
Overall	128		64.5	

H = 0.58 DF = 1 P = 0.447
H = 0.88 DF = 1 P = 0.350 (adjusted for ties)

Mean Wait-Time 2 for Convergent Questions in Seconds
by ESOL Teacher and Response Type (Table 9)

Kruskal-Wallis Test

```
Kruskal-Wallis Test on SEC_CONV

ESL-T        N     Median   Ave Rank        Z
1           21     1.000     107.1        2.75
2          140     1.000      77.1       -2.75
Overall    161                81.0

H =  7.57  DF = 1  P = 0.006
H = 10.69  DF = 1  P = 0.001 (adjusted for ties)
```

Mean Wait-Time 2 for Convergent Questions in Seconds by
MS Teacher and Response Type (Table 9)

Kruskal-Wallis Test

```
Kruskal-Wallis Test on SEC_CONV

MS-T         N     Median   Ave Rank        Z
1           20     1.000      28.2        0.64
2           32     1.000      25.4       -0.64
Overall     52                26.5

H = 0.41  DF = 1  P = 0.522
H = 0.52  DF = 1  P = 0.470 (adjusted for ties)
```

Mean Wait-Time 2 for Divergent Questions in Seconds
by ESOL Teacher and Response Type (Table 9)

Kruskal-Wallis Test

Kruskal-Wallis Test on DIV_SEC

```
ESL        N     Median   Ave Rank          Z
1          31    1.000        34.0      -0.56
2          39    1.000        36.7       0.56
Overall    70                 35.5

H = 0.31  DF = 1  P = 0.578
H = 0.46  DF = 1  P = 0.500 (adjusted for ties)
```

Mean Wait-Time 2 for Divergent Questions in Seconds
by MS Teacher and Response Type (Table 9)

Kruskal-Wallis Test

Kruskal-Wallis Test on DIV_SEC

```
MS         N     Median   Ave Rank          Z
1          36    1.000        30.4       0.54
2          22    1.000        28.0      -0.54
Overall    58                 29.5

H = 0.30  DF = 1  P = 0.586
H = 0.46  DF = 1  P = 0.497 (adjusted for ties)
```

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Percentage and Number of Present Questions By Teacher Type (Table 10)

```
The SAS System

TABLE OF Q_TYPE BY T_TYPE

Q_TYPE          T_TYPE

Frequency
Percent
Row Pct
Col Pct        ESL_TOTA MS_TOTAL    Total
               L

PRESENT_Q           30        7         37
                  8.26     1.93      10.19
                 81.08    18.92
                 13.57     4.93

NONE-PRESENT_Q     191      135        326
                 52.62    37.19      89.81
                 58.59    41.41
                 86.43    95.07

Total              221      142        363
                 60.88    39.12     100.00


STATISTICS FOR TABLE OF Q_TYPE BY T_TYPE

Statistic                    DF    Value       Prob

Chi-Square                    1    7.058       0.008
Likelihood Ratio Chi-Square   1    7.736       0.005
Continuity Adj. Chi-Square    1    6.146       0.013
Mantel-Haenszel Chi-Square    1    7.039       0.008
Fisher's Exact Test (Left)                     0.998
                    (Right)                 5.13E-03
                    (2-Tail)                7.55E-03
Phi Coefficient                    0.139
Contingency Coefficient            0.138
Cramer's V                         0.139

Sample Size = 363
```

Correspondence of Student Responses to Teacher Questions: ESOL-T1 (Table 11)

ESL-T1

TABLE OF STUDENT BY TEACHER

STUDENT   TEACHER

```
Frequency
Percent
Row Pct
Col Pct     CH          DH          DL          Total
```

	CH	DH	DL	Total
CH	8	0	0	8
	44.44	0.00	0.00	44.44
	100.00	0.00	0.00	
	100.00	0.00	0.00	
DH	0	8	0	8
	0.00	44.44	0.00	44.44
	0.00	100.00	0.00	
	0.00	100.00	0.00	
DL	0	0	2	2
	0.00	0.00	11.11	11.11
	0.00	0.00	100.00	
	0.00	0.00	100.00	
Total	8	8	2	18
	44.44	44.44	11.11	100.00

STATISTICS FOR TABLE OF STUDENT BY TEACHER

Statistic	Value	ASE
Gamma	1.000	0.000
Kendall's Tau-b	1.000	0.000
Stuart's Tau-c	0.889	0.074
Somers' D C|R	1.000	0.000
Somers' D R|C	1.000	0.000
Pearson Correlation	1.000	0.000
Spearman Correlation	1.000	0.000
Lambda Asymmetric C|R	1.000	0.000
Lambda Asymmetric R|C	1.000	0.000
Lambda Symmetric	1.000	0.000
Uncertainty Coefficient C|R	1.000	0.000
Uncertainty Coefficient R|C	1.000	0.000
Uncertainty Coefficient Symmetric	1.000	0.000

Sample Size = 18

Correspondence of Student Responses to Teacher Questions: ESOL-T2 (Table 11)

ESL-T2

TABLE OF RESPONSE BY QUESTION

RESPONSE   QUESTION

```
Frequency
Percent
Row Pct
Col Pct    CH         CL         DH         DL          Total

CH             19          6          0          0          25
           10.38       3.28       0.00       0.00      13.66
           76.00      24.00       0.00       0.00
           90.48       5.04       0.00       0.00

CL              2        113          0          1         116
            1.09      61.75       0.00       0.55      63.39
            1.72      97.41       0.00       0.86
            9.52      94.96       0.00       4.55

DH              0          0         20          0          20
            0.00       0.00      10.93       0.00      10.93
            0.00       0.00     100.00       0.00
            0.00       0.00      95.24       0.00

DL              0          0          1         21          22
            0.00       0.00       0.55      11.48      12.02
            0.00       0.00       4.55      95.45
            0.00       0.00       4.76      95.45

Total          21        119         21         22         183
            11.48      65.03      11.48      12.02     100.00
```

STATISTICS FOR TABLE OF RESPONSE BY QUESTION

Statistic	Value	ASE
Gamma	0.992	0.005
Kendall's Tau-b	0.925	0.024
Stuart's Tau-c	0.672	0.051
Somers' D C|R	0.911	0.030
Somers' D R|C	0.940	0.026
Pearson Correlation	0.948	0.020
Spearman Correlation	0.936	0.022
Lambda Asymmetric C|R	0.844	0.050
Lambda Asymmetric R|C	0.851	0.046
Lambda Symmetric	0.847	0.048
Uncertainty Coefficient C|R	0.822	0.044
Uncertainty Coefficient R|C	0.801	0.045
Uncertainty Coefficient Symmetric	0.811	0.043

Sample Size = 183

Correspondence of Student Responses to Teacher Questions: MS-T1 (Table 11)

```
MS-T1

TABLE OF RESPONSE BY QUESTION

RESPONSE      QUESTION
```

Frequency Percent Row Pct Col Pct	CH	CL	DH	DL	Total
CH	6 10.71 100.00 100.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	6 10.71
CL	0 0.00 0.00 0.00	15 26.79 100.00 100.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	15 26.79
DH	0 0.00 0.00 0.00	0 0.00 0.00 0.00	10 17.86 90.91 100.00	1 1.79 9.09 4.00	11 19.64
DL	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	24 42.86 100.00 96.00	24 42.86
Total	6 10.71	15 26.79	10 17.86	25 44.64	56 100.00

```
STATISTICS FOR TABLE OF RESPONSE BY QUESTION
```

Statistic	Value	ASE
Gamma	1.000	0.000
Kendall's Tau-b	0.984	0.015
Stuart's Tau-c	0.906	0.046
Somers' D C|R	0.978	0.022
Somers' D R|C	0.991	0.009
Pearson Correlation	0.992	0.008
Spearman Correlation	0.989	0.012
Lambda Asymmetric C|R	0.968	0.033
Lambda Asymmetric R|C	0.969	0.031
Lambda Symmetric	0.968	0.032
Uncertainty Coefficient C|R	0.953	0.034
Uncertainty Coefficient R|C	0.941	0.044
Uncertainty Coefficient Symmetric	0.947	0.039

```
Sample Size = 56
```

Correspondence of Student Responses to Teacher Questions: MS-T2 (Table 11)

```
MS-T2

TABLE OF RESPONSE BY QUESTION

RESPONSE        QUESTION

Frequency
Percent
Row Pct
Col Pct    CH         CL         DH         DL          Total
CH              18          0          1          0          19
            33.33       0.00       1.85       0.00       35.19
            94.74       0.00       5.26       0.00
            94.74       0.00       7.69       0.00

CL               0         11          0          0          11
             0.00       20.37       0.00       0.00       20.37
             0.00      100.00       0.00       0.00
             0.00      100.00       0.00       0.00

DH               1          0         12          0          13
             1.85       0.00       22.22       0.00       24.07
             7.69       0.00       92.31       0.00
             5.26       0.00       92.31       0.00

DL               0          0          0         11          11
             0.00       0.00       0.00       20.37       20.37
             0.00       0.00       0.00      100.00
             0.00       0.00       0.00      100.00

Total           19         11         13         11          54
            35.19      20.37      24.07      20.37      100.00


STATISTICS FOR TABLE OF RESPONSE BY QUESTION

Statistic                             Value        ASE

Gamma                                 0.956        0.034
Kendall's Tau-b                       0.929        0.050
Stuart's Tau-c                        0.911        0.055

Somers' D C|R                         0.929        0.050
Somers' D R|C                         0.929        0.050

Pearson Correlation                   0.944        0.040
Spearman Correlation                  0.940        0.043

Lambda Asymmetric C|R                 0.943        0.040
Lambda Asymmetric R|C                 0.943        0.040
Lambda Symmetric                      0.943        0.040

Uncertainty Coefficient C|R           0.899        0.052
Uncertainty Coefficient R|C           0.899        0.052
Uncertainty Coefficient Symmetric     0.899        0.052

Sample Size = 54
```

Mean Length in Words by Class Type: Convergent Responses (Table 12)

Kruskal-Wallis Test: No. c-wrds versus T-Type

```
Kruskal-Wallis Test on No. c-wr

T-Type      N     Median    Ave Rank        Z
ESL       149      3.000        89.4    -4.32
MS         49      8.000       130.2     4.32
Overall   198                   99.5

H = 18.66  DF = 1  P = 0.000
H = 19.18  DF = 1  P = 0.000 (adjusted for ties)
```

Mean Length in Words by Class Type: Divergent Responses (Table 12)

Kruskal-Wallis Test: No. d-wrds versus T-Type

```
Kruskal-Wallis Test on No. c-wr

T-Type      N     Median    Ave Rank        Z
ESL        47      3.000        41.1    -3.18
MS         54     15.500        59.7     3.18
Overall   101                   51.0

H = 10.13  DF = 1  P = 0.001
H = 10.32  DF = 1  P = 0.001 (adjusted for ties)
```

Mean No. of Sentence Nodes Class Type: Convergent Responses (Table 13)

Kruskal-Wallis Test: No. cnodes versus T-Type

```
Kruskal-Wallis Test on No. cnod

T-Type      N    Median     Ave Rank         Z
ESL       148  0.00E+00         89.4     -3.93
MS         48  1.00E+00        126.4      3.93
Overall   196                   98.5

H = 15.41  DF = 1  P = 0.000
H = 17.87  DF = 1  P = 0.000 (adjusted for ties)
```

Mean No. of Sentence Nodes Class Type: Divergent Responses (Table 13)

Kruskal-Wallis Test: No. dnodes versus T-Type

```
Kruskal-Wallis Test on No. cnod

T-Type      N    Median     Ave Rank         Z
ESL        49  0.00E+00         41.1     -3.65
MS         55  3.00E+00         62.7      3.65
Overall   104                   52.5

H = 13.35  DF = 1  P = 0.000
H = 14.25  DF = 1  P = 0.000 (adjusted for ties)
```

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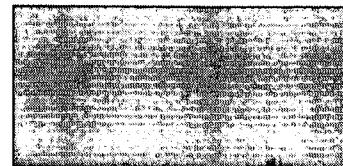
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