

IN SEARCH OF ACADEMIC VOICE: THE IMPACT OF INSTRUCTIONAL  
GROUPING CONFIGURATIONS ON ENGLISH LANGUAGE LEARNER  
ACADEMIC LANGUAGE PRODUCTION

by

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B.S., Indiana University, 1994  
M.S., Indiana University, 2002

AN ABSTRACT OF A DISSERTATION

Submitted in partial fulfillment of the requirements for the degree

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Department of Curriculum and Instruction  
College of Education

KANSAS STATE UNIVERSITY  
Manhattan, Kansas

2006

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This study utilized an ecobehaviorial approach to investigate the relationship between English language learner language use in middle school content area classrooms and instructional grouping configurations. The participants in the study included 28 native Spanish-speaking students who attended urban middle schools. These students were all identified as being English language learners (ELL) in need of English as a second language support services.

This study used the Ecobehavioral System for the Complex Recording of Interactional Bilingual Environments (ESCRIBE) software to record data regarding contextual factors and ELL student behavior using 15 second momentary time sampling in mathematics, social studies, science, reading, and language arts classes. The program analyzed this data to determine conditional probabilities of various student behaviors given each contextual factor. The focus contextual factor of this study was instructional grouping configurations: whole class, small group, one-to-one, and individual instruction. The focus student academic responses included academic language production (writing, reading aloud, and talk academic), academic language reception (reading silently, student attention, and other academic), and other non-academic responses. In this study, the participants were most likely to produce academic language during small group and one-to-one instruction. They were least likely to engage in academic talk during whole class and individual instruction. If teachers want to encourage ELL students to produce

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Approved by:

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## CHAPTER 1 - INTRODUCTION

Cultural and linguistic diversity in U.S. public schools has increased substantially over the past decade. In fact, one out of five school-aged children speaks a language other than English at home (U.S. Census Bureau, 2001). The schools that these students attend have identified half of these students as English language learning (ELL) students<sup>1</sup> (Kindler, 2002). This number is expected to grow, considering that two-thirds of ELL students currently attend elementary school (Kindler, 2002). Over the past decade, the number of ELL students enrolled in public schools in the United States has increased by 105% (Kindler, 2002). In addition, Midwestern states such as Kansas, Indiana, Iowa, and Nebraska have experienced a dramatic increase in ELL student enrollments over the past two decades. Such increases have exceeded 200 percent in many Midwestern states (Kindler, 2002). This increase is expected to continue for the next several decades. U. S. Census Bureau (2000) projections suggest that 40 percent of the school age population will speak a home language other than English by the year 2030.

Hispanic immigrant students have a higher high school dropout rate than any other racial/ethnic group. Thirty-three percent of immigrant Hispanic students dropped out of high school in 2000. This number is three times as much as any other demographic group (Fry, 2003). Low levels of English language proficiency contribute to ELL student high school dropout rates. Fifty-nine percent of Hispanic students who have dropped out of high school have low levels of English language proficiency (Fry, 2003).

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<sup>1</sup> The number of ELL students who need support in learning English may, in fact, be larger, because in 2002 the United States did not have a consistent definition of LEP or FEP status among states, or even in many instances, a standardized assessment tool that would allow states or local school districts within a state to describe English proficiency levels consistently (August & Lara, 1996). Currently, the No Child Left Behind Act requires schools within a state to have a common definition, but there is not a common definition among states (NCLB, 2002).

As educators in U.S. public schools are encountering increasingly culturally and linguistically diverse student populations, they are also facing intensified accountability as a result of the standards-based movement. Under the recent reauthorization of the Elementary and Secondary Education Act of 1965, the No Child Left Behind Act, educators are now being held accountable for the academic achievement of ELL students. A significant achievement gap exists between Hispanic students and White students (Donahue, Daane, & Grigg, 2003). For example, on the 2005 National Assessment of Educational Progress Reading Test, only 46% of Hispanic students in the eighth grade scored at or above the basic level of proficiency. On the same test, 76% of White students scored at or above the basic level of proficiency (Perie, Grigg, & Donahue, 2005). While not all ELL students are Hispanic, Hispanic students form the majority of this student population in the United States (Kindler, 2002). Teachers who have large numbers of ELL students in their classrooms are experiencing difficulty in supporting these students to close the achievement gap between White and Hispanic students.

Several researchers seeking ways to close this achievement gap base their research on the work of three theorists: Cummins, Gee, and Vygotsky. One explanation for this achievement gap is that ELL students acquire social language but struggle with developing academic language, especially in their content area classes (Cummins, 1996, 2001). Gee (1997, 2004) explained that students must become proficient in the Discourse of a particular content area such as biology or economics to be able to perform well in those disciplines. Gee's (1997, 2004) definition of Discourse goes beyond being able to use discipline-appropriate language to communicate the ideas of the academic discipline to include understanding the cognitive processes involved in problem-solving within the discipline. He contended that in order to learn the Discourse of an academic discipline, a person must have extensive guidance and mentoring

through interaction with people who are proficient in the Discourse of the discipline-specific academic community. Vygotsky (1978) also stressed the importance of interaction for cognitive and academic language development. His theories and research showed that novices learn language and acquire thought processes through their interactions with a more knowledgeable peer or expert. He believed that social interaction is the foundation of all learning.

Current research suggests that academic language production in the classroom is a critical factor in second language acquisition and cognitive-academic development. One area of study focuses on conversational recasts, an indirect correction of a grammatical or syntactical error. Several researchers have found a correlation between recasts and second language learner subsequent use of the correct grammatical structure (Doughty & Varela, 1998; Iwashita, 2003; Leeman, 2003). Other researchers have found correlations between classroom conversations and vocabulary acquisition (Ellis, 1994; Fuente, 2002; Gass & Alvarez-Torres, 2005). These studies are building a strong research foundation that indicates that ELL student interaction facilitates second language acquisition.

Another area of research has explored how student interaction promotes language learner ability to construct meaning in the second language. Many researchers have investigated the role of student interaction in oral language development. These researchers found that when language learners converse in the second language, they modify what they say when the listener does not understand them. The misunderstanding by the listener gives them feedback on grammar, vocabulary, and usage errors and the speakers make corrections in order to be better understood. This process of language feedback and modification helps language learners to acquire more native-like ways to express their thoughts (Gass & Varonis, 1994; Nabei, 1996; Polio & Gass, 1998; Swain & Lapkin, 1998). Other researchers have found a correlation

between classroom interaction and improved reading comprehension (Echevarria, 1996; Saunders & Goldenberg, 1999). This body of research is still emerging, but evidence is accumulating that supports the argument that conversational interaction supports second language acquisition.

Not only does classroom interaction support second language acquisition, but it also supports cognitive and academic development. In a longitudinal study of more than 700,000 ELL students for 14 years, Thomas and Collier (1997) examined program effectiveness for ELL students. One of their findings indicated that ELL students who participated in educational programs which emphasized cooperative learning and literacy development in all content areas outperformed ELL students in more traditional grammar-instruction and lecture-based classrooms on standardized tests of reading in English. This study was replicated with similar results and published in 2002 (Thomas & Collier, 2002).

Other researchers have established a strong link between classroom academic language use and language and academic development. Villar (1999) explored the role of instructional conversations. He found that instructional conversations supported students in making critical schematic connections and promoted English language acquisition. Additionally, Saunders, Patthey-Chavez, and Goldenberg (1997) compared ELL students who participated in an instructional conversation-based reading comprehension lesson and a traditional basal text reading comprehension. They found that the instructional conversation lesson prompted more ELL student engagement in higher order thinking than the traditional reading comprehension lesson. Cognitive-academic language production in the classroom appears to be a key that could help to close the achievement gap between White and Hispanic or ELL students (Cummins,



1996, 2001). A more in-depth discussion of these studies and other related studies appears in Chapter 2.

### Statement of the Problem

Unfortunately, English language learners typically have few opportunities to produce academic language in content area classrooms. Gallimore and Goldenberg (1992) found that classrooms tend to be dominated by teacher talk with few opportunities for student language production. Arreaga-Mayer and Perdomo-Rivera (1996) found similar results. They found that elementary ELL students spend most of their time listening to their teachers and little time actually using language for authentic purposes. In studies of mainstream academic language production by ELL students, these researchers found that ELL students in elementary schools typically spent less than 4% of classroom time using academic language and most of this language production occurred during language arts or reading times. ELL students rarely produced language during other content area subjects such as math, science, and social studies. While research suggests that ELL student language production promotes second language acquisition, there seems to be a difference between what the research indicates is effective and what actually happens in classrooms.

Classroom interaction in culturally and linguistically diverse classrooms is an emerging issue in second language acquisition research. This topic fits in well with the last major research agenda concerning ELL students set forth by the National Research Council (August & Hakuta, 1997). In this synthesis and analysis, August and Hakuta proposed the following question related to classroom interaction:

What methods work best to give English-language learners access to the academic and social opportunities that native English speakers have while they are learning English?

Such methods include both school-wide adaptations, such as the way sequences of classes are organized to give English-language learners optimal access to subject matter knowledge and English proficiency, and classroom adaptations, such as the use of particular teaching strategies and classroom composition (p. 193).

August and Hakuta (1997) followed up the outline of research needs with a section on principles for choosing specific research topics. These principles described the need for research to extend current theories and methodologies, ensure that various age groups are represented, address what happens in content area classes that have ELL students, and provide concrete strategies to support educators in implementing research-based professional practices.

A more recent international research agenda calls for a specific focus on classroom interaction. In a research agenda published by Teachers of English to Speakers of Other Languages (TESOL), the international professional organization for English as a second or foreign language teachers, De Bot (2001) called for more exploration into the classroom interaction of English language learners. He posed the following questions for consideration:

What is known about interaction in normal classes?... If there is no high-quality interaction, what can we offer teachers in terms of tasks and activities that take into account the limitations of normal classrooms and quite often not-too-motivated adolescents? The conclusion seems to be that research needs to be done on what, if any, interaction takes place in real L2 classrooms and what effect that interaction has on the ongoing process of language acquisition (p. 603).

These questions developed out of De Bot's criticism of research on classroom interaction conducted with second language learners. He stated that most research has been conducted under experimental conditions and that little is known about ELL student interaction in non-

experimental, authentic classroom contexts. Most of the studies that he reviewed were conducted under controlled conditions in which participants were randomly assigned to a control or an experimental group. In general, the participants in the experimental group were given a treatment designed to enhance interaction while the control group did not receive the treatment designed to increase interaction. Then the groups were compared, often using a pre-test/post-test format measuring some aspect of second language acquisition. These aspects most frequently included vocabulary development or the acquisition of a specific grammatical structure. These studies did not consider how ELL students interact under non-experimental conditions in authentic classroom settings. Because most of the research on classroom interaction and ELL students has occurred under experimental conditions, researchers still have an unclear understanding of how these findings relate to authentic classroom contexts. Several of these studies are discussed in Chapter 2. This lack of research in naturalistic settings has lead De Bot (2001) to emphasize the need for ELL student interactions to be studied as they naturally occur in the classroom.

### Purpose of the Study

An unanswered question in research on classroom interaction is “What can content teachers do to promote ELL student academic language production?” The underlying assumption is that language interaction in academic classrooms is necessary for ELL students to develop cognitive academic language proficiency. The research foundation for this assumption appears in Chapter 2. To begin to answer this question, this study will look at one aspect of classroom instruction, instructional grouping. This study will answer the following questions:

- 1) During which instructional grouping configurations are ELL students in middle school content area classrooms most likely to engage in academic language production, defined as the product of writing, read aloud, and talk academic?
  - a) What percentage of time during whole group instruction, small group instruction, one-to-one instruction, and individual instruction do ELL students engage in academic language production?
  - b) What is the conditional probability that ELL students will engage in academic language production during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?
- 2) During which instructional grouping configurations are ELL students in middle school content area classrooms most likely to engage in academic language reception, defined as the product of reading silently, other academic, or student attention?
  - a) What percentage of time during whole group instruction, small group instruction, one-to-one instruction, and individual instruction do ELL students engage in academic language reception?
  - b) What is the conditional probability that ELL students will engage in academic language reception during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?
- 3) During which instructional grouping configurations are ELL students in middle school content area classrooms most likely engaged in responses other than academic language responses, defined as the product of non-academic response, non-compliance response, exercise/sports/games response, and no response.

- a) What percentage of time during whole group instruction, small group instruction, one-to-one instruction, and individual instruction do ELL students engage in responses other than academic language responses?
- b) What is the conditional probability that ELL students will engage in responses other than academic language responses during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?

### Significance of the Study

The current study will address the gaps in the research on content area instruction and classroom interaction as these concepts relate to middle school ELL students. August and Hakuta (1997) emphasized the need for building upon existing theories, addressing a range of age levels, and identifying effective content area teaching practices for supporting ELL students. This study will address all these needs: interaction and academic language production relate to two foundational theories in second language acquisition-comprehensible output and cognitive academic language proficiency, the participants in this study will be middle school students-an underrepresented group in research of ELL student interaction, and instructional group configuration is a strategy embedded within all content area lessons. Middle school ELL students will be the focus of the study not only because they are underrepresented in the research on classroom interaction, but also because early adolescence is the age period during which English language learners in English dominant instructional programs tend to stop making progress toward closing the achievement gap between themselves and native English-speaking students on standardized tests of reading in English (Thomas & Collier, 1997; 2002). An analysis of classroom interaction and academic language use will support teachers in designing content area lessons that will maximize ELL student academic language production. The results

of this study will help teachers understand which kinds of grouping configurations tend to promote the development of cognitive academic language proficiency.

In addition to answering some essential questions regarding content area instruction for ELL students, this study will also address some of the concerns about the lack of research on ELL student interaction in authentic classroom contexts raised by De Bot (2001) in the TESOL research agenda. This study will take place in real classrooms under non-experimental conditions, thereby describing how adolescent ELL students interact in their classes. The classes observed will be grade level content area classes that have both ELL students and native English speaking students, because ELL students spend the majority of their time in these kinds of classes (Kindler, 2002). The results of this study will support teachers in being more intentional in how and when they use specific instructional grouping configurations with their ELL students.

#### Definitions of Terms

The following terms will be use throughout the description of the current study:

Academic language production: Language production occurs when a person generates language through speaking, writing, or signing. Language production is sometimes referred to as language expression. Academic language production is a specialized Discourse of language production. When a person speaks, writes, or signs, about an academic topic, then he or she is engaging in academic language production.

Academic language reception: Language reception occurs when a person processes the written or oral language of another person. This processing often takes the form of reading or listening. Academic language reception is part of a specialized Discourse of language reception. When a person reads or listens to someone speak about an academic topic, the she or she is engaging in language reception.

Basic interpersonal communication skills (BICS): Cummins (1984) defined language use in terms of basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP), two distinct categories of second language use that have a profound impact on the academic achievement of language minority students. Second language learners who have achieved a BICS level of language proficiency have the ability to communicate interactively in familiar situations in which prior knowledge, visual support, and other environmental factors support their understanding. ELL students who have acquired BICS appear to be fluent in English because they can communicate well in every day interactions. Most ELL students acquire BICS over a period of 1-3 years.

Cognitive academic language proficiency (CALP): CALP is the ability to construct meaning in a language without much experiential or environmental support. CALP is the language of academic instruction. It involves deep linguistic as well as conceptual understanding. CALP begins to develop as soon as ELL students start to learn English. However, CALP takes 5-7 years or more to develop (Cummins, 1984).

Contextual factors: For the purposes of this study, contextual factors are classroom environmental variables that influence student language behavior. These variables are listed in Chapter 3 as stationary and instructional environment variables.

Ecobehavioral analysis: Ecobehavioral analysis calculates the conditional probability that a particular student response (dependent variable) occurs at the same time that a specific contextual factor (independent variable) is present. An unconditional probability is the likelihood that the dependent variable would occur during any of the observed contextual factors. The conditional probability was calculated using the following formula:

$$Z = \frac{[p(Ri / Ai) - p(Ri)]}{\sqrt{p(Ri)(1/mi + 1/mo)}}$$

“Where P(Ri/Ai)=the proportion of the response (Ri) given ecological arrangement (Ai), P(Ri)=the proportion of the response (Ri) given all data (base rate), mi=the frequency of (Ai), and mo=the frequency of all data sequences in the file.” (Juniper Garden’s Children’s Project, p. 37, N.D.).

Ecobehavioral observation: Ecobehavioral observations occur when a researcher or educator observes a student to determine which contextual factors influence student behavior. Traditionally, ecobehavioral observation has been used to understand which classroom structures and interactions influence the academic and social behavior of students who have been labeled as learning disabled or emotionally challenged (Greenwood, Carta, & Atwater, 1991). More recently, ecobehavioral observation has been used to identify classroom contextual factors that influence the academic and language engagement of English language learners (Arreaga-Mayer, Carta, & Tapia, 1994).

English language learner (ELL): An English language learner is a person whose first, home, or dominant language is a language other than English and who is in the process of learning English. ELL can also be used as an adjective to describe a student, e.g. ELL student. ELL students are also sometimes referred to as limited English proficient (LEP), English as a second language (ESL), or culturally and linguistically diverse (CLD). This study uses the term English language learner because it is the term used by the U.S. Department of Education, so readers are likely to be most familiar with this label.



Independent instruction: Independent instruction is recorded when the target student is engaged in an activity and task that is self-managed (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Language production: Language production occurs when a person generates language through speaking, writing, or signing. Language production is sometimes referred to as language expression.

Language reception: Language reception occurs when a person processes the written or oral language of another person.

Non-compliance: Non-compliance behaviors are those which may be incompatible with academic responding, appropriate classroom conduct or classroom rules. N-C also include those instances when the student is observed engaged in inappropriate behaviors, refuses to respond to a direct and/or is away from the teacher's specified location (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992)

One-to-one instruction: One-to-one instruction is scored when the target student is interacting alone with the person coded in the teacher definition section of the code (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Other academic: [Other academic] is an active academic response that occurs when the target student makes a motor or manipulative response. It does not include writing responses (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Reading aloud: Reading aloud is defined by those instances in which the student is observed looking at materials like a book, worksheet, workbook, overhead chart or blackboard and reading aloud what is written (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Reading silently: Reading silently is defined by those instances in which the student is observed looking at materials including a book, workbook, worksheet, computer screen or blackboard for at least 2 seconds and has eye movements indicating the student is scanning words, numbers, or letters (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Second language learner: A second language learner is a person who is learning a language other than his/her native language. The term is included in this study because some of the research presented in the literature review was conducted with language learners who were acquiring languages other than English. English language learners are a subset of second language learners.

Small group instruction: Small group instruction is recorded when the target student is involved with the same activity and material with at least one other student, but not all the students, and the interaction with the teacher is occurring (Arreaga-Mayer, Carta, & Tapia, 1992).

Student attention: Student attention is defined by those instances when the student is observed looking directly at a teacher or at a peer. It is the passive response of the student looking at a teacher or peer who is engaged in an academic task (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Talk academic: Talk is defined by those instances in which the student is observed verbalizing, singing, or signing in response to the academic activity or material (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Teacher factors: For the purposes of this study, teacher factors are teacher behaviors that influence ELL student language behavior. A list of these factors appears in Chapter 3.

Whole class instruction: Whole class instruction is recorded when the target student is receiving the same activity and task as all the other students and interaction with the teacher is occurring (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992).

Writing: Writing defined by those instances in which the target student is observed marking academic task materials (Arreaga-Mayer, Carta, & Tapia, p. 44, 1992)

### Conclusion

This study will also address the need for more quantitative studies to address the classroom interaction and academic language use in naturalistic instructional settings. Teacher educators, language teachers, content area teachers, and school administrators will be able to use the results of this study to plan lessons for ELL students and professional development for teachers that will increase the amount of academic language use by ELL students in content area classes. Ideally, this increased amount of academic language production will result in ELL student academic language development, a prerequisite for academic success in English dominant school settings. The results of this study will contribute to the conversation about ways in which teachers can support ELL students in closing the achievement gap between them and their native English speaking peers.

## CHAPTER 2 - A REVIEW OF THE LITERATURE

In considering what contextual and teacher factors increase ELL student academic language production in middle school content area classrooms, this review of the literature begins with an overview of the broader theoretical issue of sociocultural learning theory. This overview develops into a discussion of the role of socially mediated learning in facilitating second language acquisition. Then, the review presents a survey of the related theories as well as the research that has been conducted to date on classroom interaction and ELL student academic language development. Finally, this chapter concludes with the major premise of this study by identifying underdeveloped areas of research concerning ELL student academic language use in classrooms and raises questions for examining the contextual and teacher factors that increase ELL student academic use in middle school content area classrooms.

### Sociocultural Theory

The underlying theory to describe the ways in which a language learner acquires academic language is sociocultural theory. Lev Vygotsky is a seminal researcher and theorist of sociocultural theory. He contended that all learning develops through social interaction. He believed that

Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological), and then inside the child (intrapsychological). This applies equally to voluntary attention, to

logical memory, and to the formation of concepts. All higher functions originate as actual relations between human individuals (Vygotsky, 1978<sup>2</sup>, p. 57)

Learners experience the conceptual understanding and thought processes through the language and actions of others. Through social interaction, the learner learns to approximate the behavior of a knowledgeable other and eventually internalizes related thought patterns. Eventually, the learner uses internalized language to direct his/her own behavior. This process is referred to as internalization. The difference between what a learner can do independently and what he/she can accomplish with support of a more knowledgeable other is called the zone of proximal development. According to Vygotsky, social interaction drives both language and cognitive development, especially when the learner is interacting with a more knowledgeable peer or adult.

Another language theorist, Noam Chomsky, discussed the role of social interaction in language development. Chomsky believed that social interaction was not the primary force in language development. A prevailing theory proposed by Chomsky (1957) in the 1950s and prevalent in linguistic research for the next several decades was that all humans are born with a specific brain structure that serves as the primary facilitator of language acquisition. Chomsky (1979) contended that

In the case of language, one must explain how an individual, presented with quite limited data, develops an extremely rich system of knowledge. The child, placed in a linguistic community, is presented with a set of sentences that is limited and often imperfect, fragmented and so on. In spite of this, in a very short time he succeeds in "constructing", in internalising the grammar of his language, developing knowledge that is very complex,

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<sup>2</sup> This work was originally published in Russian in the Soviet Union as a series of papers in the 1930s and in the United States in English in 1962 as a monograph entitled *Thought and Language*. For this reason, Bruner's work that extended Vygotsky's discussion predates the citation of the book version of *Thought and Language*.

that cannot be derived by induction or abstraction from what is given in experience. We conclude that the internalised knowledge must be limited very narrowly by some biological property (p. 63)

Chomsky called this biological property, the Language Acquisition Device (LAD). According to Chomsky, the LAD only needed exposure to language patterns in order for a child to develop the structures and vocabulary necessary to become proficient in a first language. Social interaction served as a source for the linguistic data necessary for the child to form an understanding of the linguistic patterns of his/her native language.

Jerome Bruner emerged as a critic of Chomsky's theories. Bruner (1975; 1983) extended Vygotsky's discussion of this cognitive internalization process to include language development. Bruner (1975; 1983) contended that while humans may indeed have a LAD, they must also have a Language Acquisition Support System (LASS), people with whom they interact. He frequently joked that "Every LAD needs his LASS." For a child acquiring a first language, the LASS is comprised of the child's caretakers and other people with whom he/she has regular interaction. Bruner proposed that the actions of the caretakers support language development. He believed that as caretakers verbally interact with children and manipulate objects in familiar situations, the resulting contextualized language-use helps children to associate meaning with language. Over time, children internalize the language of their caretakers and community and use this socially acquired language/meaning as a basis for their own language production. Bruner contended that the negotiation for meaning between the child and the caretakers causes the child to formulate, test, and revise hypotheses about language structures and language use patterns in his/her native language. This theory is in direct opposition to Chomsky (1979) who viewed the exposure to the patterns of language as the primary sculptor of language acquisition and believed that while the

actions of the caretakers of the child provide for the welfare of the child, these actions have little impact on in language acquisition.

### Second Language Acquisition

As Chomsky and Bruner were debating the nature of first language acquisition, researchers in second language acquisition were using the Chomsky and Bruner theoretical frameworks as a basis for discussion and analysis of second language acquisition research. In the late 1970s and early 1980s, Krashen (1981), a theorist and researcher in second language acquisition, conducted a comprehensive review of research in second language acquisition. He condensed these studies into the following five overarching hypotheses regarding the nature of the second language acquisition process: the Acquisition-Learning Hypothesis, Natural Order of Acquisition Hypothesis, Monitor Hypothesis, Input Hypothesis, and Affective Filter Hypothesis. These five hypotheses reflect the theories of Vygotsky, Chomsky, and Bruner, and have formed the foundation of much of the research about and pedagogy for ELL students for the past three decades.

The Acquisition-Learning Hypothesis is one of the best known and foundational hypotheses describing the process of second language acquisition. This hypothesis suggests that there are two systems of language acquisition and performance: an acquired system and a learned system. In the acquired system, second language learners acquire the language in a highly contextualized, natural setting, much like a person acquires her/his first language.

Conversely, the learned system of second language development and performance is explicitly taught. The emphasis of the learned system is on learning about the second language, rather than on using the language to communicate. Second language learners study the rules and structures of the second language such as word order and grammar. Krashen (1981) suggested

that second language learners who focus on acquiring the second language in authentic use of the language learn to communicate much better in the second language than second language learners who focus on learning the grammar and structure of the language. However, he acknowledged that learning some basic grammatical and syntactical (word order) rules can improve written communication (Krashen, 1981). The implication of the Acquisition-Learning Hypothesis for teachers is that ELL students will learn to use English much more effectively if they have numerous opportunities to interact in the classrooms in small groups with native English speakers. This hypothesis echoes Vygotsky's Sociocultural Learning Theory and Bruner's LASS Theory in that a person acquires a second language through interpersonal interaction.

The Acquisition-Learning Hypothesis was based on several studies. Some examples of these studies will be discussed in this paragraph. Upshur (1968) compared English language learning law students who were enrolled in three different kinds of classes: summer law courses only, summer law courses and English development classes, and English development courses only. Student language proficiency levels were pre-tested and post-tested. All three groups made similar gains in language acquisition. Upshur concluded that explicit language instruction had no significant effect on language acquisition. Additionally, Carroll (1967) found that university students majoring in a foreign language who spent time immersed in a country in which the target language was the dominant language outperformed their peers who did not participate in the language immersion experiences.

The second hypothesis, the Natural Order Hypothesis, proposes that second language learners acquire grammatical structures in essentially the same order regardless of language background, the age of the learner, or method of language instruction (Krashen 1981). This



hypothesis lends support to the Acquisition-Learning Hypothesis. Second language acquisition is a developmental process. Second language learners will not use learned grammatical and syntactical structures in authentic communication until they are developmentally ready to use them. In other words, they may learn about a language rule, but may not be able to apply it in their conversations or writing. This is not to say, however, that classroom instruction should focus on a strict sequencing of grammatical instruction. On the contrary, ELL students acquire language best when they are exposed to a rich variety of language structures (Krashen & Terrill, 1983). This hypothesis reflects Chomsky's theory of the LAD.

Krashen based this Natural Order Hypothesis on several studies. Two studies will serve as examples to be discussed here. The foundation of the Natural Order Hypothesis can be traced from Brown's (1973) studies on child acquisition of the first language. Brown found that children who acquired English as their first language tended to acquire the same grammatical morphemes in relatively the same order. Dulay and Burt (1973, 1974) found similar results for child second language acquisition, regardless of a child's native language background.

The third hypothesis, the Monitor Hypothesis, is also closely related to the Acquisition-Learning Hypothesis. This hypothesis describes the relationship between acquisition and learning in speaking and writing in the second language. Krashen (1981) suggested that the acquisition system produces language for communication and the learning system serves as an editor, or monitor, of language production. In other words, as second language learners speak and write, they use their knowledge of the structures of the second language to plan how they are going to put the language together and to self-correct some of their errors.

In using the second language in real life situations, the role of the learned language is small in comparison to the role of the acquired language. Acquired language facilitates

communication while learned language can, in some cases, improve some surface features of languages use such as grammar and syntax. Krashen (1981) discussed the implications of the balance of use between second language learner reliance on acquired and learned language systems. When second language learners overuse their learned language rules, they are often more concerned about the correctness of what they are saying or writing than being able to convey their ideas. On the contrary, under-users of learned language rules have little concern about the correctness of language-use and focus on conveying their ideas. They may know some language rules well that they do not apply. From Krashen's (1981) perspective, the optimal balance between learned language and acquired language use is when second language learners focus on communicating their ideas, but use their learned language knowledge to make their communications more comprehensible to others. This hypothesis demonstrates how both Chomsky's LAD Theory and Bruner's LASS Theory can coexist in that it shows how both processes can interact to support second language acquisition.

Krashen developed the monitor hypothesis from a meta-analysis of several studies. Two will be discussed here for illustration. In Krashen and Pon (1975), the researchers found that an ELL student learned to self-correct her language errors when presented with immediate feedback from a proficient speaker of English. Stafford and Covitt (1978) found that when an ELL student over monitored her language production for grammatical and syntactical errors, she became hesitant to speak in English. From these and several other studies, Krashen (1981) concluded that student self-monitoring of language production is use to a point, but overuse will delay second language acquisition and hinder second language production.

Krashen's (1981) Input Hypothesis, also called comprehensible input, explains how learners acquire a second language. A learner's second language develops when he or she is

exposed to language that is a little more complex than his or her current level of language proficiency. This concept is similar to Vygotsky's Zone of Proximal Development Theory. Teachers can provide comprehensible input to ELL students by supporting what they say and do in the classroom with non-verbal clues for meaning. Over time, this comprehensible input will support the ELL students in acquiring the vocabulary and language structures that are being used in classroom discussions and activities. According to Krashen, a visually, experientially, and linguistically rich classroom environment mimics the language rich environment that caretakers provide children in the process of acquiring the first language. Bruner would describe this kind of environment as providing second language learners with a Language Acquisition Support System (LASS) that scaffolds their understanding of new vocabulary and language structures.

The Input Hypothesis developed out of numerous studies. Two of those studies will be discussed here. The most influential studies were conducted by Hatch (1971) and Wagner-Gough and Hatch (1975). These studies involved a 5 year old ELL student. The researchers found that the student learned English very successfully because use language use occurred in a highly contextualized situation. Butterworth (1972) found similar results with a different case study.

The fifth hypothesis, the Affective Filter Hypothesis, suggests that learners acquire a second language best in nurturing environments (Krashen, 1981). Affective variables such as motivation, self-confidence, and anxiety influence second language acquisition. When students are not motivated, lack self-confidence, and/or have high levels of anxiety, their minds raise an affective filter that interferes with language learning. Rather than actively using comprehensible input to make meaning, learners with high affective filters will instead focus on the negative affective variables. Teachers can help lower ELL students' affective filters by creating learning

environments that are more cooperative rather than competitive, providing culturally familiar learning materials, establishing routines so that students know what to expect, providing affirmation for student attempts to use English, and encouraging ELL students to practice using English in small groups or pairs rather than in front of the whole class.

Several studies support the Affective Filter Hypothesis. Examples include Naimon, Frohlich, Stern, and Todesco (1978) and Gardner, Smyth, Clement, and Glikzman (1976). Naimon, et al. (1978) found for secondary French students, there was a strong correlation between classroom anxiety and academic failure in French class. Gardner, et al. (1976) found similar results for French students. Students who stated that they felt anxiety about learning French performed poorly in speaking French.

Krashen's (1981) five hypotheses about second language acquisition provide a vivid illustration of how learners acquire a second language. They need a nurturing, language rich environment in which they actively engage in instruction that involves relevant activities, demonstrations, copious visual support, and a focus on student-student and student-teacher interactions. Language develops most effectively and at a greater depth in authentic situations when it is the means, rather than the focus of instruction.

In addition to examining the factors influencing second language acquisition, researchers in the 1970s and 1980s were also investigating the concept of second language proficiency. Krashen and Terrell (1983) described language proficiency in terms of levels of language acquisition: preproduction, early production, speech emergent, and intermediate fluency. In the initial stage of second language acquisition, the preproduction stage, ELL students do not understand or speak English. They communicate primarily through body language and environmental clues. During this time, they are listening and acquiring high frequency words

and phrases. Once ELL students begin to speak using high frequency words and phrases, they have reached the early production stage of language acquisition. ELL students in the early production stage can communicate using common words to convey basic ideas. The next stage of language acquisition is the speech emergent stage. In this stage, ELL students use a more extensive vocabulary, longer phrases, and sentences. In general, students at this stage are more willing to take risks to communicate their ideas, so they often make more errors. At this stage, ELL students can communicate most of their ideas and understand much of what other people communicate, but they struggle in expressing and understanding complex ideas. In the next stage of second language acquisition, the intermediate fluency stage, ELL students often appear to be fluent. They can communicate in social situations and they function adequately in many classroom situations. However, they still need contextual cues (prior knowledge, experiential, visual and visual support) to construct a deep understanding of complex content area concepts. Once ELL students have passed through the intermediate fluency stage, Krashen and Terrell (1982) would consider them fluent.

While Krashen and Terrell (1983) were describing language proficiency in terms of distinct levels, another researcher, Jim Cummins, began to question the adequacy of these descriptions. Cummins became concerned because second language learning students, who tested as proficient on second language assessments and who appeared to be fluent in the second language, were overrepresented in special education programs. Consequently, he conducted a series of studies on second language learning students who were referred for special education testing (Cummins, 1977; Cummins, 1980; Cummins, 1983; Cummins, 1986). He found that these students were overrepresented in special education classes and that the assessment instruments used for special education placement decisions were testing the second language

acquisition rather than cognitive development of many second language learning students (Cummins, 1984). He argued that second language acquisition had not only a foundation of social communication, but also a cognitive and academic function. Consequently, he developed a description of language use based on the ways and purposes in which ELL students use the second language. He defined language use in terms of basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP), two distinct categories of second language use that have a profound impact on the academic achievement of language minority students. Second language learners who have achieved a BICS level of language proficiency have the ability to communicate interactively in familiar situations in which prior knowledge, visual support, and other environmental factors support their understanding. Second language learning students who have acquired BICS appear to be fluent in English because they can communicate well in every day interactions. Most of these students acquire BICS over a period of 1-3 years (Cummins, 1984; Thomas & Collier, 2002).

CALP requires a much different use of the second language. CALP is the ability to construct meaning in a language without much experiential or environmental support. CALP is the language of academic instruction. It involves deep linguistic as well as conceptual understanding. CALP begins to develop as soon as second language learning students start to learn English. However, CALP takes 5-7 years or more to develop. Many times when ELL students who speak English well struggle with academic tasks, they have acquired enough BICS to appear fluent in English, but not enough CALP to perform well in an English-only academic environment. When educators do not understand the process of second language acquisition, they may make assumptions about these students' academic abilities or motivation to learn because these students sound as if they are fluent in the second language (Cummins, 1996).

In consideration of the dichotomy between BICS and CALP, researchers (Cummins 1996, 2001; Swain, 1995) expanded Krashen's five hypotheses about second language acquisition to include a focus on comprehensible output. Krashen (1982; 1993) has argued that the use of the second language is not necessary for second language acquisition. He believes that speaking and writing support second language acquisition in that they generate more comprehensible input from more proficient speakers of the second language. In his view, comprehensible input is sufficient to support second language acquisition. Swain (1995; 1997) and Cummins (1996; 2001) disagree with this perspective. Studies conducted in Canada on bilingual immersion (French-English) programs, show that when students have a language program that focuses predominantly on comprehensible input without a focus on how language works and the use of the language, students tend not to develop native-like proficiency in the second language (Swain, 1997). Accordingly, Swain (1995; 1997) and Cummins (1996; 2001) have expanded Krashen's hypotheses to include a focus on language and a focus on use.

Swain (1995) asserted that comprehensible input is insufficient to explain second language acquisition. Rather, she contended that second language acquisition requires both comprehensible input and comprehensible output. Comprehensible output describes a situation in which second language learners interact with other people in the target language and have to revise what they say or write in order to help their conversation partner(s) or reader(s) to understand what they are saying or writing. She claimed that comprehensible output is necessary because it promotes language fluency, helps the learner to become aware of what he/she knows and does not know about the target language, allows learners to formulate, test, and revise their hypotheses about the syntax and pragmatics of the target language, and invites either direct or indirect corrective feedback from more proficient speakers/writers of the target language.

Based on this expanded understanding of second language acquisition, Cummins (1996; 2001) created an instructional framework that is derived from the research on effective second language instruction. This instructional framework suggests that educators focus on three areas of language development: meaning, language, and use. The focus on meaning includes comprehensible input and critical literacy. The focus on language encompasses language structure and function from both an awareness and critical perspective. The focus on use integrates the creation of new understanding, literary and artistic expression, and acting on personal beliefs about social issues through both oral and written interaction.

Content area teachers are often in a unique position to support second language learning students' CALP development. Learning English through the content areas allows these students to acquire CALP naturally in a cognitively, academically, and linguistically rich environment (Chamot & O'Malley, 1996). Research on content area instruction supports this conclusion. When language minority student use English as a medium of instruction, they attain a higher level of language proficiency faster than if they study English as the focus of instruction (Dulay, Burt, & Krashen 1982).

### Academic Discourse

Sociocultural researchers who focus on instruction in content area classrooms call this language use and ways of understanding academic Discourse<sup>3</sup>. Gee (1996) defines *Discourse* as

...a socially accepted association among ways of using language, other symbolic expressions, and artifacts, of thinking, feeling, believing, valuing and acting that can be used to identify oneself as a member of a socially meaningful group or

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<sup>3</sup> Gee (1996) uses discourse with a capital *D* to differentiate his definition of *discourse* that is more commonly used by sociolinguists to describe verbal interactions between speakers. Gee's definition of *Discourse* expands the traditional view of discourse to include social relationships, individual/group identity, and context/content specific conceptualizations.



“social network” (p. 131).

Many Discourse communities coexist within schools. Gee (1996) suggests that academic disciplines such as mathematics, science, art, etc. have their own Discourses that students must learn in order to succeed academically in those disciplines. For example, in order to become a proficient mathematician, a student must learn to understand, speak, listen, read, write, and think like a mathematician as well as form a strong identity as a person who is part of the mathematics community. From this perspective, language is always situated within particular ways of communicating and understanding information.

Gee (1997) conceptualizes two different levels of Discourse: a primary Discourse and a secondary Discourse. The primary Discourse is the language and the ways of knowing that people acquire through socialization within a person’s home and community that develops through a process of enculturation. Secondary Discourses are the ways of knowing and communicating within contexts in the broader community. These Discourses develop through a person’s extended contact with institutions such as schools, religious organizations, social groups, etc. Secondary Discourses are specific to the institution or group. It is important to note that the knowledge basis of a particular Discourse community is distributed among the members of that community. The members of the Discourse community do not always conceptualize or communicate about their knowledge bases in the same ways. In fact, Discourse communities encompass diverse viewpoints and levels of expertise (Gee, 1997; Shore, 1996). Examples of secondary Discourse communities include the ways in which people within a religious community think about and discuss religion, avid fantasy game players think about and discuss their games, and chemists think about and discuss chemistry. Although members of a Discourse community may not have the same levels of understanding or points of view, they still have

communication and identity that is distinct from people who are not a part of the specific Discourse community.

Because within a particular Discourse community, there are specific ways of knowing and communicating, people within the particular Discourse community identify with that community (Gee 1997). For example, some people might say, “I’m a language person,” or “I’m not a math person.” Statements such as these illustrate this sense of being either an “insider” or an “outsider” of a particular Discourse community. Gee (1989) contends that a person is either a part of a Discourse community or he or she is not a part of the community. Either a person is fluent in the Discourse or he or she is not fluent. Partial development of fluency within a particular Discourse represents an “outsider” position. Gee (2004) argues that

What’s hard about school is not learning to read, which has received the lion’s share of attention from educators and policy-makers, but learning to read and learn in academic content areas like mathematics, social studies, and science (students can’t get out of a good high school, let alone out of any decent college, if they can’t handle their content-area textbooks in biology or algebra). Unfortunately, a good many students, at all levels of schooling, hate the types of language associated with academic content areas. Indeed, many people in the public don’t very much like us academics and our “ways with words.” (p. 3).

In this quote, Gee suggests that language and literacy development at a basic level is not the issue for students who are not performing well in school. Rather, the real problem is that these students are not acquiring academic Discourse in particular academic disciplines and the academic Discourse of school makes the students feel like “outsiders” of the academic community. Gee then presents an argument that schools are not doing enough to support

students in acquiring academic language within the school content and that students need extensive authentic interactive experiences with proficient member of the academic Discourse community

A person acquires a particular Discourse through interaction with members of the Discourse community (Gee, 1992, 2004; Vygotsky, 1978). When a person, or novice, first encounters a particular Discourse, the Discourse is often difficult to understand. Through oral or written interaction with people proficient in the Discourse, the novice starts to recognize meaningful patterns of language and thinking that are a part of the Discourse. In other words, the novice becomes socialized into the ways of thinking and communicating of the Discourse community. For this process of socialization to occur, the novice must have a willingness to adapt to the ways of thinking and communicating of the Discourse community. Additionally, highly proficient people within the Discourse community should interact with and mentor the novice in the ways of knowing and communicating of the community. Finally, the novice needs opportunities to engage actively in applying and revising his or her developing understanding of the kinds of thinking and the language of the Discourse community (Gee 2001, 2004; Vygotsky, 1978). This kind of conceptual development and language acquisition is also called situated language learning by some sociocultural theorists and researchers (Gee, 2004). This concept of Discourse applies not only to native speakers of a language, but also to second language learners. Second language learning students in school must not only learn social language to interact with their peers, but they must also learn the Discourse of the academic disciplines that they are studying (Gee, 2001). As outlined in the previous section, second language acquisition researchers and theorists refer this acquisition of academic Discourse, cognitive academic language proficiency, or CALP.

Table 1

***Sociocultural Theory and Theories of Language Acquisition***

Theories	Key theorists and researchers	Hypotheses
Sociocultural Theory	Vygotsky	People learn through social interaction.
Language Acquisition Device (LAD)	Chomsky	All humans are born with a specific brain structure that serves as a primary facilitator of language acquisition.
Language Acquisition Support System (LASS)	Bruner	Social environment is the primary catalyst for language acquisition.
Acquisition-Learning Hypothesis	Krashen	Second language learners who focus on acquiring the second language in an authentic context learn to communicate much better in the second language than language learners who focus on learning the grammar and the structure of the language.
Natural Order Hypothesis	Krashen	Second language learners acquire grammatical structure in approximately the same order regardless of language background, the age of the learner, or the method of language instruction.

Theories	Key theorists and researchers	Hypotheses
Monitor Hypothesis	Krashen	As second language learners speak and write, they use their knowledge of the structures of the second language to plan how they are going to put the language together. This language planning sometimes leads to learner self-correction of errors.
Input Hypothesis (Also referred to as Comprehensible Input)	Krashen	A learner's language develops when she/he is exposed to language that is a little more complex than her/his current level of language proficiency and contextual factors support language learner understanding of the language.
Affective Filter Hypothesis	Krashen	Second language learners acquire a new language more effectively in nurturing environments. Affective variables such as motivation, self-confidence, and anxiety influence second language acquisition.
Cummins' Second Language Acquisition Theory	Cummins	Basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP) are two distinct categories of second language use and

Theories	Key theorists and researchers	Hypotheses
		acquisition.
Comprehensible Output	Swain  Cummins	Second language learners interact with other people in the target language and have to revise what they say or write in order to help their conversation partner(s) or reader(s) to understand what they are saying or writing.
Discourse Theory	Gee	Gee (1996) uses discourse with a capital D to differentiate his definition of discourse that is more commonly used by sociolinguists to describe verbal interactions between speakers. Gee's definition of Discourse expands the traditional view of discourse to include social relationships, individual/group identity, and context/content specific conceptualizations.

### Research on Second Language Acquisition and Classroom Interaction

Many researchers who study second language acquisition have focused on the development of academic discourse (verbal interaction), academic Discourse (verbal interaction and sociocultural realities), or cognitive academic language proficiency. Most of the studies on the development of these academic language proficiencies have been conducted on adult second

language learners, most of whom were attending a university or intensive language program at the time of the studies. Some of these studies have in been conducted in foreign language classrooms while other studies have been conducted in second language classrooms. Only a few studies have used public school children who are learning English as a second language as participants. Many of these studies show a strong correlation between classroom interaction and second language acquisition. Several studies have shown that classroom interaction facilitates the development of native-like syntax in a second language. In general, these studies indicate a significant correlation between classroom interaction and the subsequent acquisition of language structures that were a focus of these interactions. The following sections describe 5 areas of research pertaining to classroom interaction: recasts, meaning negotiation, vocabulary acquisition, native language support, and contextual factors influencing classroom interaction.

### *Recasts*

A few studies have examined the role of recasts in second language acquisition. A recast in when a learner makes an error and a more proficient speaker of the language repeats the phrase correctly. This response is an indirect correction of the error. For example, if a language learner says, “I goed to the store yesterday,” a teacher might respond, “So, you went to the store yesterday. What did you buy?” In this example, the teacher provides the correct verb form to the student without directly telling the learner that he or she has make a grammatical error.

Most studies that have investigated whether or not recasts support second language acquisition have found that recasts support the development of native-like syntax. Most of the research on recasts has been conducted in foreign language environments. In a study of university-level foreign language classroom instruction, Leeman (2003) found that beginning Spanish as a foreign language students who were exposed to recasts in which the speaker

verbally emphasized a target grammatical correction concerning noun-adjective agreement and recasts without the additional verbal emphasis on the correct form performed much better on tests of the target grammatical structures than students who were in a control group that received no corrective recasts. In another study, Iwashita (2003) explored the effectiveness of various kinds of native speaker and university level beginning Japanese as a foreign language learner interactional moves on the acquisition of language structures by the language learner. The interactional moves studied included recasts, negotiation or clarification of a non-target language-like expression, a completion of an unfinished statement, a translation of a word for the learner, and a continuation of a correct expression. Iwashita found that the recasts had the greatest impact on the acquisition of the target verb form than any of the other interactional moves. A third study investigated the role of recasts for adult intermediate English as a second language learners. Doughty and Varela (1998) studied the effect of recasts focusing on past tense verbs with adult English language learners during a content-based lesson. They found that students who participated in these lessons showed a significant positive change in the correct use of past tense verbs on a post test while the control group showed no significant change from the pre test to the post test. Only one study found that recasts had no influence on the acquisition of grammatical structures. This study was conducted with adult Japanese as a second language learners (Loschky, 1994).

### *Meaning Negotiation*

A richer vein of research encompasses recasts as well as other forms of comprehensible input/output. Several researchers have investigated the ways in which classroom interaction and the negotiation of meaning support second language acquisition. Swain and Lapkin (1998) examined eighth grade French immersion students in Canada. They found that dialogue between



language learners contained several instances where the language learners provided corrective feedback for each other or for themselves. Other studies show similar conclusions with interactions between language learners and native speakers of a language. These studies found that language learners react to native speaker difficulty in understanding utterances by modifying the language to be more comprehensible (Gass & Varonis, 1994; Polio & Gass, 1998). Swain (1995) suggested that interaction supports the development of native-like syntax because developing language learners have to hypothesize and modify their understanding of syntactical structures in order to make themselves understood more clearly.

A study by Nabei (1996) affirms Swain's suggestion. Nabei studied incidences in which adult English language learners who participated in an interactive activity, called a dictogloss, negotiated their understanding or language production as they worked in pairs to reconstruct a passage that was read by their teachers. About half of their interactions involved discussing grammar-related issues and about a third of the interactions involved discussions of meaning. Nabei proposed that the interactive activity was successful because it provided numerous opportunities for corrective feedback, comprehensible input, and comprehensible output.

In addition to supporting the modification of language structures, interaction provides students the opportunity to negotiate for meaning and develop academic Discourse. Saunders and Goldenberg (1999) investigated the impact of instructional conversations on the reading comprehension of fifth grade English language learners. They found that students who engaged in regular instructional conversations and literature log writing over the course of a year scored significantly higher on post tests of reading comprehension than students who were in a control group in which they did not engage in instructional conversations. Students who engaged in only instructional conversations or only literature log writing also outscored the control group, but did

not perform as well as the group that participated in both instructional conversations and literature log writing. Speaking and writing about content area topics appears to increase reading comprehension.

Another study found a relationship between instructional conversations and writing development. Patthey-Chavez and Clare (1996) examined transcripts of instructional conversations between a teacher and bilingual students in the fourth grade. They compared these conversations to students' work in their writing portfolios. They found that the writings in the students' portfolios reflected the ideas of their teacher and peers that developed during the instructional conversations. The researchers concluded that instructional conversations support bilingual students in developing their writing.

A third study shows that instructional conversations support academic language development. Echevarria (1996) compared the impact on academic language development and conceptual understanding of instructional conversations and a more traditional approach to reading found in a basal text with Latino elementary students who had been identified as having a learning disability. She found that the instructional conversation approach resulted in greater development of academic language and a deeper understanding of critical content concepts than the more traditional basal approach.

Finally, Gibbons (2003) explored the ways in which secondary language learners in science classrooms developed scientific academic Discourse. She found that "in interactions that are effective in terms of L2 [second language] development, both teachers and learners are active participants in the co-construction of language and curriculum knowledge" (p. 247). The students in this study interacted frequently with the teacher and with each other. As they

interacted, they developed both the content understanding and the language to express this understanding.

### *Vocabulary Acquisition*

Several researchers have studied the influence of classroom interaction on one particular aspect of second language acquisition, vocabulary development. Most of these studies have been conducted with adult language learners. Two studies investigated the effects of modified interaction on comprehension and vocabulary acquisition among Japanese high school students learning English as a Second Language. The studies found that interactionally modified input resulted in better comprehension and the acquisition of more new words than premodified input (Ellis, 1994). Gass and Alvarez-Torres (2005) found similar results in a study that compared the relationship between comprehensible input, interaction, and second language acquisition. Both interaction and comprehensible input had an individual positive correlation to the development of vocabulary. However, language learners in the study who participated in the combined input-interaction treatment group acquired more vocabulary than either of the individual variable treatment groups or the control group. Finally, in a study that compared non-negotiated premodified input, negotiated input, and negotiated input which required the learner to use the target vocabulary (pushed output), Fuente (2002) found that both negotiated input and negotiated input with pushed output facilitated the acquisition of vocabulary. Both forms of negotiated input increased participant receptive vocabulary acquisition while only negotiated input with pushed output resulted in a significant development of productive vocabulary acquisition.

### *Native Language Support*

An extensive body of research supports the hypothesis that bilingual education/native language support promotes second language acquisition (Greene, 1998; Ramirez, Yen, &

Ramey, 1991; Thomas & Collier, 1997, 2002; Willig, 1985). Because language, literacy and conceptual development transfers between languages and these forms of development most readily occur in one's dominant language, native language literacy and language development support second language acquisition (Cummins, 1996). Several studies look specifically at native language interaction and second language acquisition in children learning English as a second language. Jimenez, Garcia, and Pearson (1996) found that strong bilingual readers of English made extensive use of discussing text written in English in their native languages and Jimenez (1997) found that struggling bilingual readers of English who did not initially make use of native language discussions of text in English improved their reading comprehension of text in English by discussing the text in their native language. A more recent study of Spanish speaking school aged English language learners by Schoenbrodt, Kerins, and Gesell (2003) found that English language learners who received a narrative intervention in their native language acquired greater communicative competence than a group of learners that received an intervention in English. The influence of native language support is not limited to school aged learners. Several studies (Anton & DiCamilla, 1999; DiCamilla & Anton, 1997; Storch & Wigglesworth, 2003) have found similar results for adult language learners.

Although research on the influence of classroom interaction is a relatively new area of exploration, second language acquisition researchers have built a fairly convincing case over the last decade that classroom interaction has a positive influence over the acquisition of both social language and academic Discourse. This developing area of research points to the need to explore the contextual factors that promote language learner interaction in academic settings. This understanding will help both language and content area teachers to plan instruction to maximize

the opportunities for language learners to interact with each other, native speakers of the target language, and the teacher.

### Contextual Factors Influencing Classroom Interaction

While second language researchers in the last decade and a half have really begun to explore the ways in which interaction supports second language acquisition, considerably less research has been conducted on ways to encourage inter-student and teacher-student interaction in either language or content area classrooms. This kind of research is important because English language learners tend to interact very little in academic settings.

In a study by Arreaga-Mayer and Perdomo-Rivera (1996), third, fourth, and fifth grade urban English language learners spent less than 8% of classroom time in bilingual classrooms and less than 5% of their time in grade level content area classrooms producing either written or oral language. These classrooms were characterized by teacher-centered instruction in which students spend the majority of their time listening to the teacher lecture. Of the limited time spent producing language, these English language learners predominantly engaged in reading aloud rather than producing language for personal or academic expression. Even when students were producing their own language, these expressions focused on labeling, naming, modeling, and repeating. Students rarely produced language for personal expression. Arreaga-Mayer and Perdomo-Rivera (1996) found that students were most likely to communicate during language arts/reading lessons and had few opportunities to produce language during math, science, or social studies lessons.

This lack of opportunity for academic language production is unfortunate considering that through conducting a series of studies that has encompassed more than two million English language learners in kindergarten through twelfth grades, Thomas and Collier (1995, 1997,

2002) have reached the conclusion that the instructional programs in which English language learners reach the highest levels of academic language proficiency

are highly interactive, emphasizing student problem-solving and discovery learning through thematic experiences across the curriculum. [These programs] are likely to provide the kind of social setting for natural language acquisition to take place, simultaneously with academic and cognitive development. Collaborative interaction in which meaning is negotiated with peers is central to the language acquisition process, both for oral and written language development (Collier, p. 4, 1995)

While Thomas and Collier have not researched the individual components of second language acquisition such as grammar and syntax, they have measured the attainment of high levels of second language proficiency as the English language learner's ability to perform well on standardized tests of reading in English.

One area of research that has been explored in relation to patterns of English language learner interaction in academic and/or language classrooms has been the implementation of collaborative learning groups. Collaborative learning seems like a promising practice for promoting student academic language use. However, research in authentic classroom contexts on collaborative learning groups comprised at least partially of language learners shows that English language learners do not necessarily produce language when working in these groups. In a study of classroom interaction of sixth grade English language learners in a social studies class, Jacob, Rottenberg, Patrick, and Wheeler (1996) found that ELL students participating in collaborative groups did not interact much in collaborative groups. Another study of adult English as a foreign language students came to the same conclusions. However, Foster (1993)

concluded that students were more likely to interact when the activity in some way required the group participants to exchange information.

Another research perspective has compared language learner interaction to learner-teacher interaction. These studies have found that learners are more likely to produce language and acquire language in interaction between learners than in interaction between learners and teachers. In a university level Dutch as a second language class, Deen (1991) found that learners produced more of the target language in collaborative learning groups than in teacher-lead groups. Anton (1999) and Ellis, Basturkman, and Loewen (2001) found similar results in studies of groups of adult ESL learners. They found that the adult ESL learners were more likely to uptake grammatical structures that were addressed through corrective feedback in peer interactions than in teacher-student interactions. The researchers hypothesize that this may be due to peers addressing language gaps within the students' zone of proximal development while teachers may address language structures that are too developmentally advanced for the learner. Finally, Oliver's (2002) study of the conversational interactions of English language learners between the ages of 8 and 13 years old shows that English language learners engage in more negotiation when interacting with each other than they do in interacting with native English speakers.

### Conclusion

The emerging body of literature concerning ELL students and classroom interactions suggests that classroom interaction supports second language acquisition and ELL student success in content area classes. After an exhaustive search of the literature, the researcher for this current study could find no other studies that specifically examined the patterns of English language learner language production in authentic classroom contexts. More research is needed

in this area, specifically concerning which kinds of group configurations support language learner academic language use in content area classrooms.



## CHAPTER 3 - METHODOLOGY

This study used ecobehavioral observation and analysis as a means for studying English language learner (ELL) academic language use in content area classrooms. Students were observed in various instructional grouping configurations to find in which instructional grouping configurations ELL students were most likely to use academic language. The focus for this study developed out of a need in the research literature on classroom interaction. Middle school students were the participants in the study because previous ecobehavioral research with bilingual students has been conducted with students in elementary schools (Arreaga-Mayer, Carta, & Tapia, 1994; Arreaga-Mayer & Perdomo-Rivera, 1996) and most other research on classroom interaction and ELL students has been conducted with adults (see Chapter 2). Furthermore, as discussed in Chapter 2, the research on classroom interaction conducted with adult ELL students has primarily focused on the acquisition of language structures and the few studies that have focused on ELL student language production in various grouping configuration has been contradictory. Finally, as described in Chapter 2, since the 1970s, the focus of research and theory development in second language acquisition has been on comprehensible input. The theory of comprehensible output is relatively new, emerging in the 1990s. This study will contribute to the understanding of the circumstances under which language production occurs in authentic classroom contexts. This chapter describes the study's setting, participants, sampling plan for selecting the subjects for observations, data collection instrument, and data collection procedures. This chapter also includes a description of the ecobehavioral coding system and the ways in which these categories of behavior answer the research questions.

## Research Questions

This study sought to describe ELL student language use during five types of instructional grouping configurations: whole class instruction, small group instruction, one to one instruction, individual instruction, and no instruction. The primary questions of this study were

- 1) During which instructional grouping configurations are ELL students in middle school content area classrooms most likely to engage in academic language production, defined as the product of writing, read aloud, and talk academic?
  - a) What percentage of time during whole group instruction, small group instruction, one-to-one instruction, and individual instruction do ELL students engage in academic language production?
  - b) What is the conditional probability that ELL students will engage in academic language production during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?

The null hypothesis for question one was that there was no significant difference between ELL student academic language production during whole group instruction, small group instruction, one-to-one instruction, and individual instruction.

- 2) During which instructional grouping configurations are ELL students in middle school content area classrooms most likely to engage in academic language reception, defined as the product of reading silently, other academic, or student attention?
  - a) What percentage of time during whole group instruction, small group instruction, one-to-one instruction, and individual instruction do ELL students engage in academic language reception?

- b) What is the conditional probability that ELL students will engage in academic language reception during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?

The null hypothesis for question two was that there was no significant difference between ELL student academic language reception during whole group instruction, small group instruction, one-to-one instruction, and individual instruction.

- 3) During which instructional grouping configurations are ELL students in middle school content area classrooms most likely engaged in responses other than academic language responses, defined as the product of non-academic response, non-compliance response, exercise/sports/games response, and no response.

- a) What percentage of time during whole group instruction, small group instruction, one-to-one instruction, and individual instruction do ELL students engage in responses other than academic language responses?
- b) What is the conditional probability that ELL students will engage in responses other than academic language responses during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?

The null hypothesis for question three was that there was no significant difference between ELL student other than academic response during whole group instruction, small group instruction, one-to-one instruction, and individual instruction. All of these research questions were answered using an ecobehavioral data collection and analysis system that will be described in detail later in this chapter.

## Method

### *Setting*

This study was conducted in 10 classrooms in 2 urban middle schools in a large Midwestern urban school district. This school district's ELL student population has increased more than 1000% in the past 10 years. ELL students accounted for approximately 8% of the total school population as of the 2004-2005 academic year. The chosen middle schools are magnet sites for ELL students. The ELL student population at the two schools is between 15% and 20%. More than 60% of the remaining students are African-American students. In both schools, more than three-fourths of the students qualify for free or reduced lunches under federal poverty guidelines. Students in both schools, as a group, are scoring significantly below average on the annual state standardized test of English/language arts and mathematics. Both schools have been actively involved in a literacy improvement initiative and have instructional coaches who support content area literacy development<sup>4</sup>.

In these schools, ELL students receive a class period every day of self-contained English as a second language (ESL) instruction from licensed ESL teachers. The licensed ESL teachers also team-teach with a content area teacher in at least one of the students' content area classrooms each day. Students interact with bilingual paraprofessionals in at least one core academic class per day. The ELL students spend the majority of their time in content area classrooms with teachers who have content area licenses without ESL or bilingual certification. All of the teachers have received about six hours of in-service training in sheltering instruction for ELL students over the past two years. Under the program definitions as outlined by the data

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<sup>4</sup> The principals of the two middle schools requested that the schools not be identified in the study. More descriptive details of the schools might reveal the schools' identities.

collection instrument, the observations occurred in an English immersion context (Arreaga-Mayer, Carta, & Tapia, 1992).

### *Participants*

Within the two schools chosen for this study, ten teachers were selected for classroom observations. Several factors influenced the choice of teachers: the presence of ELL students in the teachers' classrooms, student schedules, teacher willingness to have the research conducted in the classroom, teacher use of a variety of instructional grouping configurations, content area (to ensure inclusion of mathematics, science, social studies, and language arts), and grade level (to ensure that sixth, seventh, and eighth grades were all included).

The student populations in participatory schools included English language learning students who were in the sixth, seventh, or eighth grades. These middle grades were chosen for the study because, as seen in Chapter 2, few studies on ELL student classroom interaction have been conducted with young adolescent learners. All students were native Spanish speakers because the data collection instrument, the Ecobehavioral System for the Complex Recording of Interactional Bilingual Environments (ESCRIBE), requires that the observer be proficient in the native language of the target students. Spanish is the only available second language for observation in the target school district which the researcher speaks. Other languages spoken by ELL students in the participating schools include Yoruba, Ibo, French, Urdu, Farsi, and Chinese. Students in these language groups were not a part of the study because the researcher does not speak those languages. The researcher would not have been able to determine the nature of verbal interaction used by these students if they were speaking their native languages. Additionally, the target students were at least intermediate or advanced in their English language acquisition as measured by the Language Assessment Scales, Levels 2-4 in oral proficiency

(DeAvila & Duncan, 1990). These language assessments are conducted yearly by the students' ESL teachers.

### *Variables*

This study examined the impact of instructional grouping configurations on ELL student language use. The independent variable was instructional grouping configurations. This variable had four different levels: whole group instruction, small group instruction, one-to-one instruction, and independent instruction. No instruction was initially a level of the instructional grouping configurations, but there were not enough occurrences of this variable to establish any conditional probabilities with any of the ELL student language use variables. The dependent variable was ELL student language use. The dependent variable had several levels: reading aloud, academic talk, writing, reading silently, student attention, other academic, non-academic response, and non-compliant response.

### *Instrument*

Ecobehavioral analysis is a way to describe, quantifiably, qualitative ecological factors and related student behavior. This means of data collection comes from three academic disciplines: ecological psychology, applied behavior analysis, and product/process educational research (Arreaga-Mayer, Carta, & Tapia, 1994). Ecobehavioral analysis uses time sampling to record independent ecological variables and dependent student behaviors in order to understand their conditional relationship to each other (Arreaga-Mayer, Carta, & Tapia, 1994).

In the past, this form of data collection involved using paper and pencil to record codes and barcodes in which researchers made barcodes for each behavior and scanned the barcode when the related factors or response were observed (Arreaga-Mayer, Carta, & Tapia, 1994). In

the past decade, ecobehavioral researchers have started to use computer programs to collect and analyze ecobehavioral data (Arreaga-Mayer, Carta, & Tapia, 1994).

The Ecobehavioral System for the Contextual Recording of Interactional Bilingual Environments, or ESCRIBE, is one of these newer computerized data collection and analysis systems for recording ecobehavioral data. ESCRIBE was developed in the early 1990s by Carmen Arreaga-Mayer, Judith Carta, and Yolanda Tapia as a part of the Juniper Gardens Children's Project at the University of Kansas Schiefelbusch Institute for Life Span Studies (Arreaga-Mayer, Carta, & Tapia, 1992). Arreaga-Mayer, Carta, & Tapia (1992) describe ESCRIBE as "an observational coding system for the evaluation of instructional programs serving special education and mainstream culturally and linguistically diverse learners" (p. 2).

In establishing the validity of ESCRIBE, researchers developed the instrument after an extensive literature review of effective instruction for ELL students. From this literature review, the researchers identified the key ecological variables that seemed to influence ELL student academic achievement. Additionally, the researchers observed dozens of classrooms which included bilingual students. They used the findings from the literature review and their observations to develop codes and corresponding behavioral definitions for these codes. The researchers pilot-tested their codes, using pencil and paper to record data. They established inter-rater reliability. After this round of data collection, they shared their results with other researchers and classroom teachers who provided feedback on their coding system. They revised their coding system and ran a second pilot study. From this study, the variable themes emerged: stationary elements, instructional environment features, teacher language use/behavior, and student language use/behavior. These themes became their variable categories (Arreaga-Mayer

& Greenwood, 1986; Arreaga-Mayer, Carta, & Tapia, 1994). The peer review, revision, and second pilot study established both the validity and reliability of the coding system.

The researchers used the coding system as a basis for creating the electronic data collection system. Like other forms of electronic ecobehavioral data collection, ESCRIBE uses a laptop computer to record data through momentary time sampling, a data collection technique in which the researcher records what happens at points in time over a specified duration of time. Momentary time sampling is explained in detail in the data collection section. This study used a HP Pavilion zt3000 laptop computer with a Windows-based platform. The program allows for intervals to be between 10 and 30 seconds. This study used 15 second intervals because this interval is the shortest interval that the observer can record with reliability.

### *Stationary variables*

The observer begins the coding process by recording the stationary variables. These variables include the setting, instructional model, number of adults, and number of students. This study used the same setting, regular classroom, and instructional model, English immersion, for all observations. The number of adults and students vary, depending on the context (Arreaga-Mayer, Carta, & Tapia, 1992). Arreaga-Mayer, Carta, and Tapia (1992) defined the regular classroom as “a classroom in which the majority of students have not been diagnosed as having learning disabilities and are in the regular program. The regular program could be Native Language Immersion, English Immersion, Developmental Bilingual, Partial Immersion, or any other program as long as all the students participate in the regular classroom” (p. 21). They described English immersion as an instructional program in which “students receive all



instruction in English with no native language support or structured ESL instruction” (Arreaga-Mayer, Carta, & Tapia, p. 22, 1992).

Table 2

***ESCRIBE Stationary Variables***

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
Stationary variables	Setting	1. (RC) regular classroom 2. (SP) special education classroom; self- contained 3. (RR) resource room 4. (IL) instructional lab 5. (LY) library 6. (PA) performing arts room 7. (THR) therapy room 8. (HA) hall 9. (AUD) auditorium 10. (GYM) gymnasium 11. (OTH) other
	Instructional model	1. (NL) native language/immersion

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
		2. (FB) full bilingualism 3. (TB) transitional bilingualism with English as a second language 4. (SI) structured immersion 5. (ESL) English as a second language 6. (EI) English immersion 7. (OTH) other
	Number of adults	1. the actual number of adults interacting with or monitoring students
	Number of students	1. the actual number of students present in the instructional context

*Variable cycles*

Once the stationary variables are recorded, then the observer starts the timed sampling. The ESCRIBE program provides an auditory cue at the beginning of every interval. At the

moment the cue sounds, the observer notes what is occurring in connection to the coding category that ESCRIBE indicates is the focus for that moment's data collection. The observer then enters the codes related to what happened at the moment that the auditory cue was provided (Arreaga-Mayer, Carta, & Tapia, 1992).

*Instructional environment variables*

ESCRIBE provides prompts for each set of data collected. The prompts run in variable cycles. Each cycle begins with the coding of instructional environment variables. Then the cycle runs through 6 sets of teacher and student behavioral variable coding. The entire cycle of variables lasts for 3.25 minutes at 15 second intervals. Once a cycle is completed, a new cycle begins. The cycles continue until the observer stops the program.

Table 3  
*Mapping of the ESCRIBE Variable Cycle*

Cycle I 3.25 minutes	IE	TB	SB	TB	SB	TB	SB	TB	SB	TB	SB	TB	SB
Cycle I 3.25 minutes	IE	TB	SB	TB	SB	TB	SB	TB	SB	TB	SB	TB	SB
Cycle III 3.25	IE	TB	SB	TB	SB	TB	SB	TB	SB	TB	SB	TB	SB

minutes														
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IE=instructional environment code; TB=teacher behavior code;

SB=student behavior code

The instructional environment variables include activity, materials, language of materials, and instructional grouping configurations. Codes for all four levels of variables are recorded during this 15 second interval (Arreaga-Mayer, Carta, & Tapia, 1992).

Arreaga-Mayer, Carta, and Tapia (1992) provided the following definition for the activity variables:

1. Reading is defined as an activity whose primary goals are the translation of written letter combinations into words and the comprehension of words, phrases, sentences, and paragraphs. Reading activities include the use of readers or any reading material... for oral and/or silent reading, discussion of words and sounds, learning the alphabet and the answering of who what, where, when, how, and/or why questions about passages they have read (p. 25)...
2. Math is defined as an activity whose goal is the teaching of numerical concepts and operations (p. 26)...
3. Spelling is defined as an activity whose goal is teaching the spelling of words (p. 26)...
4. Handwriting is defined as an activity whose goal is learning to write either printed manuscript, cursive script or to practice pre-writing skills (p. 26)...
5. Language is defined as an activity whose goals are to teach speech, communication skills, language acquisition, foreign language, vocabulary, grammar, language

- structure, creative writing, literature, poetry, public speaking and/or theater. It includes both oral and written activities (p. 27)...
6. Science is defined as an activity whose goal is the teaching of physical, geological, or biological events (p. 27)...
  7. Social studies are defined as activities whose goal is the teaching of history, geography, economics, psychology, anthropology, and/or community events (p. 27)...
  8. Class business is defined by activities focusing on the routine business of the school day (p. 28)...
  9. Transition is defined by a change of activity within the setting (p. 28)...
  10. Music is defined as instruction whose goals are appreciation for music or the mastery of musical skills (p. 28)...
  11. Arts/crafts activities are defined by instruction whose goals include artistic techniques, exploration of creative ideas, artistic expression, or artistic appreciation (p. 28)...
  12. Physical education is defined as those activities used for the purpose of training or developing the body... PE includes instruction in the exercise, care, and hygiene of the human body (p. 29)...
  13. Free time is an activity whose goal is to allow students to select activities on their own. These activities may be academic or non-academic (p. 29)...
  14. Discipline/time out is defined as the removal of the target student from the activity and/or the environment due to his/her inappropriate behavior (p. 29)...

15. [No activity is coded] when the target student has not selected a task either because the target chooses not to or because the teacher has not indicated an activity (p. 29)...
16. Can't tell means [the observer] can't see or hear (p. 29)...
17. [Other is coded] when the activity cannot be placed in any of the previous categories (p. 29).

Only some of these activity variables were coded for the current study. In personal conversations with Tapia during ESCRIBE training, she indicated that in secondary classrooms, the content area course name would be the activity coded unless the teacher is conducting class business or the student has free time, is being disciplined, or there is no activity. Since this study limited observations to core content area classrooms, handwriting, physical education, and arts/crafts were not coded.

Arreaga-Mayer, Carta, and Tapia (1992) described the materials variables using the following definitions:

1. Books are defined as reading material in any subject area (fiction and non-fiction reading material). Books are coded when the target student is observed using any text or reading book.... This also includes teacher-held or peer-held reading texts if the target student is attending to them (p. 30)...
2. Workbooks are defined as paperback booklets which provide problems or tasks which can be solved directly on their pages... and include student magazines such as Weekly Reader, El Globo, etc. (p. 30)...
3. Worksheets are defined as teacher or commercially prepared sheets in which the students are expected to read and then respond orally or in written form” (p. 30)...

4. Paper and pencil tasks are defined as those that involve the copying of letters and numbers on lined or unlined paper with a pencil, pen, crayon, or marker. Paper and pencil is coded when students copy lessons from a reader or workbook, correct papers, or copy problems or words from the board and then complete those problems on a separate sheet of paper or piece of paper within a notebook” (p. 30)...
5. Computer is coded when the student is observed viewing software programs on the computer and/or providing manipulative responses using a keyboard, mouse or any adaptive equipment (p. 30)...
6. Exercise equipment includes those materials used for physical education classes, athletic games, and sports (p. 31)...
7. Other media is defined as a task that involves a material other than books, workbooks, worksheets, and paper and pencil. Other media is coded when the student is observed viewing a film, filmstrip, overhead projection, teacher’s flip chart, flash cards, blackboard, or listening to music. It should also be coded when the student is using a dictionary, arts and crafts materials, pegboards, beads, assembly items, nuts and bolts, or playing an academic or social game.... Writing on the blackboard is also coded OM (p. 31)...
8. [No materials is coded when] the target student does not have or is not engaged with any of the above materials (p. 31).

Since the setting of the study was limited to core content area classrooms, exercise equipment was not coded.

The language of the materials being used by the target student can be coded as English, non-English, mixed languages, no language, and can't tell. Arreaga-Mayer, Carta, and Tapia (1992) defined these variables in the following manner:

1. [English is coded] when the language of the material is English (p. 31)...
2. [Non-English is coded] when the language of the material is not English (p. 31)...
3. [Mixed language is coded] when the instructional materials are written or presented in audio-visual form in a combination of English and another language (p. 31)...
4. [No language is coded] when no language is explicit in the materials or when no materials are being used by the target student (p. 32)...
5. [Can't tell is coded] when the other codes do not apply or seem to fit the situation.

Can't tell also means [that the observer] can't see or hear (p. 32).

The final variable subcategory in the instructional environment variable category includes five possible instructional grouping configurations: whole class instruction, small group instruction, one-to-one instruction, independent instruction, and no instruction. Arreaga-Mayer, Carta, and Tapia (1992) used the following descriptions to define these variables:

1. Whole class instruction is recorded when the target student is receiving the same activity and task as all the other students and interaction with the teacher is occurring (p. 32)...
2. Small group instruction is recorded when the target student is involved with the same activity and material with at least one other student, but not all the students, and the interaction with the teacher is occurring (p. 33)...
3. One-to-one instruction is scored when the target student is interacting alone with the person coded in the teacher definition section of the code (p. 33)...



4. Independent instruction is recorded when the target student is engaged in an activity and task that is self-managed (p. 33)...
5. No instruction is coded if there is no task and the student is receiving no direct questions, commands, or talk from the teacher (p. 33)...

These variables were the independent variables for this study because they best answer the research question.

**Table 4**

*ESCRIBE Instructional Environment Variables*

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
Instructional environment variables	Activity	1. (R) reading 2. (M) math 3. (S) spelling 4. (H) handwriting 5. (L) language 6. (SC) science 7. (SS) social studies 8. (BM) class business/management 9. (TN) transition 10. (MU) music 11. (AC) arts/crafts

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
		12. (PE) physical education 13. (FT) free time 14. (DIS) discipline/timeout 15. (NO) no activity 16. (CT) can't tell 17. (OTH) other
	Materials	1. (B) books 2. (WB) workbooks 3. (WS) worksheets 4. (PP) pencil and paper 5. (CP) computer 6. (OM) other media/manipulables 7. (EQ) exercise equipment 8. (NM) no material
	Language-materials	1. (E) English 2. (NE) non English 3. (MX) mixed languages 4. (NL) no language 5. (CT) can't tell

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
	Instructional grouping	<ol style="list-style-type: none"> <li>1. (WCI) whole class instruction</li> <li>2. (SGI) small group instruction</li> <li>3. (1:1) one-to-one instruction</li> <li>4. (II) independent instruction</li> <li>5. (NI) no instruction</li> </ol>

*Teacher and student variables*

Once the 15 seconds for the recording of the instructional environment codes are completed, then ESCRIBE cycles through 6 alternating intervals of teacher and student variable coding. Teacher variable categories include teacher definition, teacher focus, language of instruction, corrections-affirmations, and teacher behavior and the student variable categories include student language initiating/responding behaviors, oral responses, student language, and student activity-related responses (Arreaga-Mayer, Carta, & Tapia, 1992). Codes for all 5 teacher variable subcategories are recorded during each teacher variable interval and codes for all 4 student variable subcategories are recorded during each student variable interval.

Arreaga-Mayer, Carta, & Tapia (1992) described the teacher definition variables in the following manner:

1. A regular education teacher is defined as the person officially in charge of the regular classroom (p. 34)...
2. A special education teacher is defined as the person officially in charge of the special education classroom or collaborating in a regular class (p. 34)...
3. The language education teacher is defined as the person officially in charge of the bilingual education component or classroom for limited English proficient students (p. 35)...
4. An aide/paraprofessional is defined as the paid or volunteer staff member who assists the head teacher in a classroom or who works with a small group of children on special skills in the classroom (p. 35)...
5. A related services personnel is defined as a person who provides support services to the classroom such as a speech, physical or occupational therapist, physical education (P.E.) specialist, nurse, social worker, psychologist, Chapter 1 teacher, computer lab teacher, music teacher, art teacher, librarian, building principal or administrator (p. 35)...
6. A substitute teacher is the person that is temporarily (usually a day) in charge of the classroom in the absence of the regularly designated teacher for that class (p. 35)...
7. A peer is defined as a student who is engaged in sustained academic instruction with the target student (p. 35)...
8. No staff is defined as the absence of a staff member in the same room or within approximately 25 feet of the target student (p. 35).

Teacher focus is another category of teacher variables. Teacher focus variables include target student only, target student and others, other than target student, and no focus. Arreaga-Mayer, Carta, and Tapia (1992) define these variables as

1. Target student only is coded when the teacher directs behaviors exclusively toward the target student (p. 35)...
2. Target student and others is coded when the teacher directs behaviors toward the target student plus other students (p. 35)...
3. Other than target student is coded when the teacher is not directing behaviors toward the target student, but is directing behaviors toward another student (p. 36)...
4. No focus is coded when the defined teacher is not directing behaviors toward any student in the classroom (p. 36)...

Language-instruction variables describe the language that the teacher uses to teach students. This subcategory includes 5 variable codes: English, non-English, mixed languages, no language, and can't tell. Arreaga-Mayer, Carta, and Tapia (1992) provide the following definitions for each of these codes:

1. [English is] when the language of instruction is English (p. 36)...
2. [Non-English is] when the language of instruction is not English (p. 36)...
3. [Mixed languages is] when the language messages within a phrase or sentence are in combination of English and another language (p. 36)...
4. [No language is] when no oral or written language is being used in conjunction with the instructional activity [by the teacher] (p. 36)...

5. [Can't tell is] when the other codes do not apply or seem to fit the situation. Can't tell also means [that the observer] can't see or can't hear [the] teacher behavior (p. 36)...

Teacher correction/affirmation variables refer to whether the teacher's language behavior either corrects or affirms the target student's language production or academic responses. The coded variables for this subcategory include correction, affirmation, and neither correction nor affirmation. Arreaga-Mayer, Carta, and Tapia (1992) defined these codes as

1. Teacher correction is defined as a verb or written response directed at clarifying, providing the appropriate response, or corrective feedback to the target student about a particular language or academic response (p. 37)...
2. Affirmation is coded when the teacher verbally or in writing repeats the same answer the student provided with approval or acknowledges the student response (p. 37)...
3. Neither correction nor affirmation is coded when the teacher's verbal or written behaviors are not clearly providing corrective feedback or affirmation to the student (p. 37).

The ESCRIBE training manual emphasizes that these corrections/affirmations are not related to discipline/student conduct.

Teacher behavior variables are related to teacher language use. These variables include question academic, command academic, talk academic, talk non-academic, non-verbal prompt, teacher attention, praise/approval, disapproval, read aloud, sing, no response, and other.

Arreaga-Mayer, Carta, and Tapia (1992) provided the following definitions for these variable codes:

1. Question academic is defined by those instances in which the teacher is observed: (a) asking a clearly stated, definite, distinctly expressed question and leaving nothing implied (direct academic question) or (b) asking a question with an indirect or intended meaning, such as those that include metaphors, idioms and/or euphemisms (indirect academic question). The intent of QA is for the purpose of academic instruction and academic prompting of response by the student (p. 38)...
2. Command academic is defined by those instances in which the teacher is observed making a verbal statement that is not a question and is intended to cue an academic response (p. 38)...
3. The purpose of TA [talk academic] is to present or discuss academic materials to/with students. TA does not require a student response, as opposed to questions and commands (p. 38)...
4. Talk non-academic is defined by those instances in which the teacher is observed engaging in any verbal behavior (questions, command, or talk) that does not apply to academic but refers to management or social behaviors (p. 39)...
5. Non-verbal prompt is defined by those instances when a teacher uses gestures, physical signals or physical guidance to cue a student's response. NVP is coded in the absence of any verbal response by the teacher. It includes non verbal academic, management and discipline prompts (p. 39)...
6. Attention is defined by those instances in which the teacher is looking at a student or engaging in related behaviors that indicate that he/she is paying attention to the student (p. 40)...

7. Teacher use of praise/approval is defined as the verbal or nonverbal expression of praise, appreciation or satisfaction with the students' or class' work, conduct or performance (p. 40)...
8. Disapproval is coded when the teacher expressed dislike, dismay, dissatisfaction, or disgust with a student or his/her appearance, work or conduct or with the class as a whole. Disapproval could be verbal or nonverbal. Disapproval also refers to discipline events (p. 40)...
9. Reading aloud is defined by those instances in which the teacher is reading aloud to or in concert with, one or more student(s). This reading may be from the blackboard, a chart, a book or a worksheet (p. 40)...
10. Singing is defined by those instances in which the teacher is observed singing aloud. This may occur when the teacher teaches a song to the class or when the teacher and class sing together (p. 41)...
11. No response is defined by those instances in which the teacher is making no observable response directed toward the class or target student. In this case, the teacher is engaging in other behaviors (p. 40)...
12. Code other when the teacher behavior cannot be placed in any of the previous categories (p. 41).

Table 5

*ESCRIBE Teacher Variables*

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
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Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
Teacher variables	Teacher definition	1. (RT) regular education teacher
		2. (ST) special education teacher
		3. (LT) language education teacher
		4. (SUB) substitute teacher
		5. (A) aide/para-professional
		6. (RSP) related service personnel
		7. (P) peer
		8. (NS) no staff
	Teacher focus	9. (TG) target student only
		10. (TGO) target student and others
		11. (OTH) other than target student
		12. (NF) no focus
Language-instruction	1. (E) English	
	2. (NE) non English	

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
		3. (MX) mixed languages 4. (NL) no language 5. (CT) can't tell
	Corrections-affirmations	1. (C) corrections 2. (A) affirmations 3. (NCA) neither correcting nor affirming
	Teacher-behavior	1. (QA) question academic 2. (CA) command academic 3. (TA) talk academic 4. (TNA) talk nonacademic 5. (NVP) non-verbal prompt 6. (TAT) teacher attention 7. (PR) praise/approval 8. (D) disapproval 9. (RD) read aloud 10. (SG) sing 11. (NR) no response

Ecobehavioral variable	Ecobehavioral variable	Ecobehavioral variables &
category	subcategory	corresponding codes
		12. (OTH) other

Student variables are the final category of variables recorded and analyzed by the ESCRIBE program. ESCRIBE classifies student variables under four different themes: language initiating/responding behavior, oral responses, language-student, and student activity related responses (Arreaga-Mayer, Carta, & Tapia, 1992).

Language initiating/responding behaviors encompass three variables: initiating language, responding language, and neither initiating or responding language. Arreaga-Mayer, Carta, and Tapia (1992) provide these descriptions for each of these variables:

1. [Initiating language occurs] when the verbal or written interaction of the student is self-initiated. This interaction could be about academics or social topics (p. 41)...
2. [Responding language occurs] when the student's verbal or written interaction is in direct response to a teacher's or peer's behavior. The interaction could be about academic or social topics (p. 42)...
3. [Neither initiating nor responding language should be recorded] when the target student is not engaged, verbally or in writing, in initiating or responding to an academic or social task (p. 42).

Oral responses include 5 variable codes: talk academic, talk management, talk other, no talk, and can't tell. Arreaga-Mayer, Carta, and Tapia (1992) described these variables using the following definitions:

1. Talk academic is defined by those instances in which the student is observed verbalizing, singing, or signing about their academic subject/materials, teacher instruction or other appropriate topics (p. 42)...
2. Talk management is defined by those instances in which the student is observed verbalizing, singing, or signing and the substance of the conversation is not about the academic activity or material but is about issues related to an academic task (p. 43)...
3. Talk other is defined by those instances in which the student is observed talking, singing or signing to a peer or teacher about non-academic or non-management matters (p. 43)...
4. [No talk should be coded] when the student is not engaged in verbal interaction (p. 43)...
5. [Can't tell should be coded] when the other codes do not apply or seem to fit the situation (p. 43).

The language being used by the target student can be coded as English, non-English, mixed languages, no language, and can't tell. Arreaga-Mayer, Carta, and Tapia (1992) defined these variables in the following manner:

1. [English is coded] when the language used by the student is English (p. 43)...
2. [Non-English is coded] when the language used by the student is not English (p. 43)...
3. [Mixed language is coded] when the student's messages are in a combination of English and another language within a phrase or sentence (p. 31)...
4. [No language is coded] when no language is being used in conjunction with the student's academic and activity related responses (p. 32)...

5. [Can't tell is coded] when the other codes do not apply or seem to fit the situation.

Can't tell also means [that the observer] can't see (p. 32).

The final codes for the student behavior category involve student activity related responses. There are 11 variable codes in this subcategory. These codes include writing, reading aloud, reading silently, talk, other academic, exercise/sports/games, non-academic response, non-compliance, student attention, none, and can't tell. Arreaga-Mayer, Carta, & Tapia (1992) describe these variable codes using the following definitions:

1. Writing defined by those instances in which the target student is observed marking academic task materials (p. 44)...
2. Reading aloud is defined by those instances in which the student is observed looking at materials like a book, worksheet, workbook, overhead chart or blackboard and reading aloud what is written (p. 44)...
3. Reading silently is defined by those instances in which the student is observed looking at materials including a book, workbook, worksheet, computer screen or blackboard for at least 2 seconds and has eye movements indicating the student is scanning words, numbers, or letters (p. 44)...
4. Talk is defined by those instances in which the student is observed verbalizing, singing, or signing in response to the academic activity or material (p. 44)...
5. [Other academic] is an active academic response that occurs when the target student makes a motor or manipulative response. It does not include writing responses (p. 44)...

6. [Exercise/sports/games] is defined by those instances in which the student is observed engaging in any athletic sport, physical education game, [etc.] for the purpose of training, health or development of the body (p. 46)...
7. This category contains those behaviors that are not a direct response to the instructional curriculum. It includes playing and/or interacting appropriately in non-academic activities approved by the teacher (p. 44)...
8. Non-compliance behaviors are those which may be incompatible with academic responding, appropriate classroom conduct or classroom rules. N-C also include those instances when the student is observed engaged in inappropriate behaviors, refuses to respond to a direct and/or is away from the teacher's specified location (p. 44)...
9. Student attention is defined by those instances when the student is observed looking directly at a teacher or at a peer. It is the passive response of the student looking at a teacher or peer who is engaged in an academic task (p. 44)...
10. None is defined by those instances when the student is observed not engaging in any responses covered by response codes (p. 44)...
11. [Can't tell is coded] when the other codes do not apply or seem to fit the situation. Can't tell also means can't see or hear (p. 44).

Table 6

*ESCRIBE Student Variables*

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
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Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
Student variables	Student language initiating-responding behaviors	<ol style="list-style-type: none"> <li>1. (IL) initiating language</li> <li>2. (RL) responding language</li> <li>3. (NIR) neither initiating nor responding language behavior</li> </ol>
	Oral responses	<ol style="list-style-type: none"> <li>1. (TA) talk academic</li> <li>2. (TM) talk management</li> <li>3. (TO) talk other</li> <li>4. (NT) no talk</li> <li>5. (CT) can't tell</li> </ol>
	Language-student	<ol style="list-style-type: none"> <li>1. (E) English</li> <li>2. (NE) non English</li> <li>3. (MX) mixed languages</li> <li>4. (NL) no language</li> <li>5. (CT) can't tell</li> </ol>
	Student activity related responses	<ol style="list-style-type: none"> <li>1. (W) writing</li> <li>2. (RA) read aloud</li> <li>3. (RS) reading silently</li> <li>4. (TA) talk</li> <li>5. (OA) other academic</li> </ol>

Ecobehavioral variable category	Ecobehavioral variable subcategory	Ecobehavioral variables & corresponding codes
		6. (EX) exercise/sports/ games
		7. (N-A) non-academic response
		8. (N-C) non-compliance response
		9. (SAT) student attention
		10. (N) none

### *Training*

The researcher for this study participated in a three day training session in collecting data using ESCRIBE, a month before data collection for this study began. This training included learning the definitions for all 110 codes, practicing using the instrument with one of the developers of the instrument, and establishing inter-rater reliability with one of the developers of the instrument. On the first day of the training sessions, the researcher and developer read and analyzed a variety of written scenarios to practice coding the contextual factors and student responses. On the second day of training, the instrument developer observed the coding of the researcher during 3 classroom observations and discussed any miscodings. On the third day, during the inter-rater reliability check, the researcher and the instrument developer coded the



same student at the same time for three different observations with a different focus student for each observation.

### *Reliability*

The ESCRIBE reliability program compared the coding of the researcher and the instrument developer. The first inter-rater reliability check yielded 94.9% reliability. The second inter-rater reliability check yielded 97.6% reliability. The third inter-rater reliability check yielded 98.98% reliability. The average inter-rater reliability score was 97.16%. The developers of ESCRIBE consider 85% inter-rater reliability as acceptable. The researcher for this study has extremely high inter-rater reliability with a developer of the research instrument.

During the study, reliability checks were conducted throughout the data collection process. Three observations were conducted with another researcher who had been trained in data collection using ESCRIBE. The developers of ESCRIBE state that the observers must have at least 85% of the variables coded the same in order to be considered reliable (Arreaga-Mayer, Carta, & Tapia, 1992). The reliability checks showed that the researcher and the other observer coded the same codes for both the contextual factors and the student responses 90.3%, 93.1%, and 92.6% of the time, for a mean inter-rater reliability of 92.0%.

### *Research Design*

This study examined the relationship between classroom environment and ELL student academic language production. This study utilized ecobehavioral analysis, which can look at a number of classroom ecological variables using a computer observational system. The research questions were answered by examining the covariation between instructional grouping configurations and ELL student language behavior in terms of percentage of time and conditional probability (Arreaga-Mayer, Carta, & Tapia, 1994). As cited in the previous chapter,

ELL student academic language development and use has a strong correlation to academic achievement (Cummins, 1996, 2002; Thomas & Collier, 2002). Using an ecobehavioral behavioral analysis as a means to understand the relationship of diverse classroom ecological variables to ELL student academic language use has the potential to help educators to create classroom environments which have a high likelihood of promoting ELL student academic language development and achievement (Arreaga-Mayer & Perdomo-Rivera, 1996). The underlying assumption of this approach to understanding instructional contexts is that comprehensible output “is an important variable in academic and language achievement.... An ecobehavioral approach to instruction enables analysis of the components of effective instruction” (Arreaga-Mayer, Carta, & Tapia, 1994).

This study used a single-factor within-subject design (Keppel & Wickens, 2004). The study is a single-factor study because different levels of the same variable, instructional grouping configurations, were examined. There were five levels of instructional grouping: whole class instruction (WCI), small group instruction (SGI), one-to-one instruction (1:1), independent instruction (II), and no instruction (NI). A definition of what each one of these variable levels means appears in the description of the research instrument later in this chapter. The dependent variable, student behavior, included several levels: writing, read aloud, reading silently, talk, other academic, non-academic response, non-compliance response, student attention, and no response. A single factor was examined because of the complexity of having 5 independent variable levels and to ensure a minimum of 5 occurrences of each variable level. Fewer than 5 occurrences would not add enough statistical power to support a conclusion about the conditional probability of the dependent variable occurring during the independent variable (Keppel & Wickens, 2004). The sample size of this study was 28 participants. A much larger sample size

would be needed to ensure a minimum of 5 occurrences of all levels of all independent variables if more than one independent variable were examined.

This study was a within-subject design because all of the participants had the opportunity to experience all of the levels of the independent variable. The study examined which language behaviors each participant exhibited under each level of the independent variable. The within-subject design provided more statistical power because each participant could experience each level of the variable rather than only having 5-6 participants engage in each level of the independent variable. Increasing the number of occurrences of each level of the factor increases statistical power (Keppel & Wickens, 2004). Finally, since the purpose of this study was to examine the language behavior of the participants in a naturalistic classroom setting, assigning participants to treatment groups in a between-subjects design would have undermined the study's purpose.

### Procedures

The procedure for conducting this study involved several steps. First, the school district was chosen. Then the specific schools were chosen and the principals at the schools gave permission to conduct research within the school pending approval by the school district research and evaluation department. Study approval was sought and granted from Kansas State University's Institutional Review Board. Then permission was sought and approved from the school district research office to conduct research within the school district. Principals of the participatory schools were notified of the school district research office approval of the study and they gave the researcher consent to conduct research in their schools. Next, permission forms were sent to all the students who fit the profile for study participation. Once students returned the permission forms, the researcher acquired the class schedules of the students who returned

the permission forms. Then she made a preliminary list of teachers and class periods to observe. She spoke with the teachers who were on the preliminary list to secure permission to observe during their classes. Once she had permission from the teachers, she made a preliminary schedule for classroom observations. Finally, she conducted the observations and analyzed the data. The following sections describe in detail what happened during these steps and the rationale behind the decisions made.

Preliminary observations of 30 middle school teachers in six middle schools were conducted by the researcher as part of a needs assessment for a teacher professional development program commissioned by the participating school district. This needs assessment was not a part of the current study. However, insights gained from the needs assessment informed the researcher about classroom interaction in the eight middle schools in the school district that had ELL students.

The needs assessment observations were between 40-55 minutes in duration. The classes observed comprised the four core content area classes: English, mathematics, science, and social studies. During these observations, the researcher used the Sheltered Instruction Observational Protocol (SIOP) as a basis for recommending a professional development program for the schools in which the observations occurred. The eight areas measured by the SIOP included preparation, building background, comprehensible input, strategies, interaction, practice/application, review/assessment, and lesson delivery.

This needs assessment served as an initial investigation into classroom interaction involving ELL students. The two schools chosen for this study had the most interaction occurring as measured by the SIOP (Echevarria, Vogt, & Short, 2004), the data collection instrument used in the needs assessment. The two schools were chosen for the study because

they appeared to be the schools in which classroom interaction was most likely to occur. This study examined under which kinds of classroom interaction, instructional grouping configurations, ELL students were most likely to engage in academic language use, so it was important to choose setting in which students were participating in all five instructional grouping configurations. In some of the schools observed during the needs assessment, there was little or no small group and one-to-one instruction observed. Consequently, these classrooms/schools were not appropriate candidates for the study. The school district was chosen because of the researcher's long-standing relationship with the middle school principals and teachers and its urban setting. Access to classrooms was given fairly easily. Furthermore, since the researcher had observed the classrooms several times before the study occurred, the teachers and students were accustomed to her presence in the classrooms.

Because the participants in the study were all minors, parent permission forms that were written in both English and Spanish were sent home for parents to sign. Bilingual consent forms increased the likelihood that parents who were not fluent in English would understand the nature of the study and exactly what they were giving the researcher permission to do. A translator who has experience translating research consent forms was used to translate the forms. He told the researcher that he translated the form into a version of Spanish that most native Spanish speakers would understand. The researcher asked two native Spanish speakers who were employed as bilingual paraprofessionals in the target schools to review the forms for readability. Both native speakers said that they believed that the permission forms would be understood by the parents of the Spanish-speaking ELL students in the schools. Students were also asked to give their permission, even though student signatures were not necessary, because the researcher believed

that students should also be a part of the decision making process regarding their participation in the study.

The researcher sent 175 students permission forms home with students and received 30 forms signed by parents or guardians giving permission to include the students in the study. ESL teachers believed that the low return of permission forms was due to parent fears about signing the forms because of recent Immigration and Naturalization Service raids on local places of employment and the current state and national controversies over immigration. Some students and parents indicated to the teacher that they were afraid that the permission forms were a ploy by the government to identify potential targets for deportation. Twenty-eight of the 30 students who returned forms were observed during this study. Student absences and scheduling conflicts prevented the researcher from observing the other two students.

The 28 students who participated in the study represented a range of demographic groups. Thirteen students were observed at one middle school while 15 students were observed at the other middle school. Sixteen participants were female and 12 students were male. Twelve participants were in the sixth grade, while eight students were in the seventh grade and eight students were in the eighth grade. Student language proficiency levels are unknown to the researcher because of student confidentiality issues. One of the principals expressed concern about sharing student language assessment scores with the researcher. To address her concerns, the researcher decided not to collect ELL student language assessment test scores. However, the principal suggested that the ESL teacher, who conducted the language assessments with the students and knew their test scores, give permission forms out to ELL students who scored at a level two to five on the Language Assessment Scales.

Participating students and their parents were assured on the permission form that their individual data and participation in the study would be kept completely confidential. The computer files for individual students contain no personally identifiable information. Even the researcher could not identify which data file belongs to which student. All signed permission forms are being kept in a locked filing cabinet. Only the researcher will have access to this locked file cabinet. After three years, these permission forms will be destroyed. Study participants were given the option of withdrawing from the study until after the data were collected. Since there was no way to identify which file belonged to which participant once the data were collected, participants could not withdraw from the study after data collection. In discussions with Dr. Rick Scheidt, Chair of the Kansas State University Committee on Research Involving Human Subjects, Dr. Scheidt suggested that not including personally identifiable information in the data files would be preferable to ensuring the ability of a subject to withdraw from the study after the data had been collected.

### *Observations*

This study included 28 observations in two different middle schools over a three week period. These observations took place in content area classrooms during normal instructional time. The researcher observed one student at a time for the duration of a content area class period. The researcher only observed students and did not implement any instructional interventions. The researcher did not interact with students or with teachers. During these observations, 1782 lines of data were collected. The mean observation duration was 34 minutes. The class periods were 40 minutes long. Computer set up, ESCRIBE data entry for stationary variables, class interruptions, and student clean-up accounted for the non-observational class time. The range of observation length was from 5 to 74 minutes. The observations occurred in

several different content area subjects in sixth, seventh, and eighth grade classes: Reading classes accounted for 20.15% of the time, mathematics classes accounted for 26.71% of the time, language arts classes accounted for 23.63% of the time, science classes accounted for 5.22% of the time, social studies classes accounted for 22.62% of the time, and class business accounted for 1.35% of the time.

Five different instructional grouping configurations were recorded: whole class instruction, small group instruction, one-to-one instruction, independent instruction, and no instruction. Whole class instruction accounted for 37.77% of the observational time, while students participated in small group instruction for 13.80% of instructional time. One-to-one instruction occupied 6.06% of class time. Independent instruction consumed 38.22% of the time, while 4.15% there was no apparent instruction. The majority of the time spent in class, 76% of instructional time, students had few opportunities to interact with their peers or teachers.

The teachers and students were told that the researcher was going to conduct a study about classroom interaction and that their identities were going to be kept confidential. They were told that they were not going to have to do anything out of the ordinary and that the researcher was going to be observing what they naturally do every day in the classroom. They were not told more information because the researcher was concerned that more information might cause them to change their behavior because they would know what the researcher was studying. Neither the teacher nor the students knew who was being observed during an observation. The classroom teachers did not even know which students were in the study because the ESL teachers distributed and collected the permission forms during ESL classes.



### *Data Analysis*

Data from ESCRIBE can be analyzed in 3 ways: molar descriptions, molecular descriptions, and product-process analysis. Molar descriptions show the percentage of time during the observations in which each of the coded variables occurred (Arreaga-Mayer & Perdomo-Rivera, 1996). For example, a molar description could show the percentage of time during reading instruction that a first grade student spent engaged in reading aloud. The molecular descriptions are used to calculate the conditional probability of one or more independent variables and one or more dependent variables occurring concurrently or within a short period of time of each other (Arreaga-Mayer & Perdomo-Rivera, 1996). For example, a molecular analysis could describe the likelihood that a tenth grade student would attend to the task at hand during small group instruction or that a third grade student would engage in non-compliant behavior during music classes. The final kind of analysis involves a product-process analysis in which ESCRIBE calculates the probability that specified student behaviors result in academic or language development gains (Arreaga-Mayer & Perdomo-Rivera, 1996). For example, a process-product analysis could be used to show the relationship between the amount of time a student reads silently in class and reading comprehension scores on standardized tests. This study used a molecular analysis to determine the conditional probability that ELL students would engage in academic language use during various instructional group configurations.

### *Data Analysis in the Current Study*

Data analysis used a combination of an analysis of conditional probability and an analysis of covariance (Juniper Garden's Children's Project, N.D.). The ESCRIBE program calculated the probability that each language behavior (dependent variable) would occur given a particular instructional grouping configuration (independent variable). For example, one such relationship

was the probability that participants would engage in academic talk during small group instruction. The analysis of covariance (ANCOVA) then compared the likelihood that the dependent variable would occur given a particular instructional grouping configuration, to its simple percentage occurrence. Using the same example as above, ESCRIBE then compared the conditional probability that participants would engage in academic talk during small group instruction to the overall likelihood that participants would engage in academic talk across all instructional grouping configurations. The results of this analysis were reported in terms of conditional probabilities or unconditional probabilities. Conditional probabilities are statistically significant relationships between the dependent and independent variables while the unconditional probabilities were probability that the dependent variable would happen during any of the levels of the independent variable (Juniper Garden’s Children’s Project, N.D.). The conditional probability was calculated using the following formula:

$$Z = \frac{[p(Ri / Ai) - p(Ri)]}{\sqrt{p(Ri)(1/mi + 1/mo)}}$$

“Where P(Ri/Ai)=the proportion of the response (Ri) given ecological arrangement (Ai), P(Ri)=the proportion of the response (Ri) given all data (base rate), mi=the frequency of (Ai), and mo=the frequency of all data sequences in the file.” (Juniper Garden’s Children’s Project, p. 37, N.D.).

### Conclusion

This study used the ESCRIBE instrument to examine which instructional grouping configurations were most likely to result in ELL student academic language use. These

instructional grouping configurations included whole class instruction, small group instruction, one-to-one instruction, individual instruction, and no instruction. The study took place in ten content area classrooms in two urban middle schools with 28 ELL students. The following chapter presents the findings of this study.

## CHAPTER 4 – FINDINGS

This study was conducted to discover under which instructional grouping configurations ELL students were most likely to engage in academic language production, academic language reception, and non-academic responses. This study used the ESCRIBE research instrument to measure ELL student language responses, the dependent variable, during four types of instructional grouping configurations, the independent variable. These instructional grouping configurations included whole class instruction, small group instruction, one-to-one instruction, and individual instruction.

The results are reported in terms of percentage of time and conditional probabilities that each of the three types of language behaviors occurred under each instructional grouping configuration. With the conditional probabilities, a result with an error value (p-value) of 0.05 or less was considered statistically significant. According to Keppel & Wickens (2004), setting the maximum permissible error at 5% is standard for most studies. The statistical analysis also yielded a z-score. The z-score indicates the amount that the conditional probability for a specific student activity related response deviates from the mean of all the student activity related response. The z-score also shows a directional relationship. A negative z-score indicates that the mean for a specific dependent variable is less than the mean for an aggregate of all the dependent variables (Keppel & Wickens, 2004).

### Research Question 1: Instructional Grouping and Academic Language Production

The first research question asked, “During which instructional grouping configurations are ELL students most likely to engage in academic language production?” Student academic language related responses, or language production, included three levels of the dependent

variable: writing, reading aloud, and talk academic. Across all types of grouping configurations, ELL students spent 14.87% of time in class writing, 1.01% reading aloud, and 8.98% of their time producing language about academic topics.

*Whole class instruction*

Whole class instruction was coded when the teacher was addressing all the students in the class. This coding occurred during lectures and whole class discussions. The conditional probability of academic language production was calculated for each level of the independent variable. As stated in Table 7, there was not a significant conditional probability of a student engaging in any of the levels of academic language production during whole class instruction. Reading aloud was at 0.00 conditional probability of occurring with a z-score of -1.241. This level of conditional probability was not statistically significant. The other forms of academic language production showed conditional probabilities of not occurring during whole group instruction. Writing showed a 0.08 conditional probability at  $p < .001$  with a z-score of -3.754, while talk academic showed a 0.02 conditional probability at  $p < .001$  with a z-score of -4.895. Overall, academic language production had a 0.11 conditional probability of occurring during whole group instruction at  $p < .001$  with a z-score of -6.098. Participants were likely not to engage in academic writing and talk during whole group instruction.

Table 7

*Conditional Probabilities of Academic Language Production Occurring During Whole Class Instruction*

Frequency	Conditional probability	Z-score	P-value
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Writing	56	0.08	-3.754	.001
Reading Aloud	3	0.00	-1.241	Not significant
Talk Academic	16	0.02	-4.895	.001
Composite	75	0.11	-6.098	.001

*Small group instruction*

Small group instruction was coded when ELL students were working with small groups of students. The groups could either be working with or independent of a teacher or instructional aide. The conditional probability of academic language production was calculated for each level of the dependent variable given the small group instructional configuration. The results appear in Table 8. Reading aloud and writing showed no significant conditional probability of occurring during small group instruction with z-scores of -0.245 and 1.496, while talk academic showed a 0.28 conditional probability of occurring where  $p < .001$  with a z-score of 9.300. Overall, small group instruction showed a conditional probability for academic language production at a 0.44 level with  $p < .001$  with a z-score of 5.712. Participants were likely to engage in academic talk during small group instruction.

Table 8

*Conditional Probabilities of Academic Language Production Occurring During Small Group Instruction*

	Frequency	Conditional probability	Z-score	P-value
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Writing	35	.14	-0.245	Not significant
Reading Aloud	5	0.02	1.496	Not significant
Talk Academic	69	0.28	9.300	.001
Composite	109	0.44	5.712	.001

### *One-to-one instruction*

One-to-one instruction was coded when ELL students were working individually with another person. This level was coded whether the other person was a native language speaking peer, native English speaking peer, teacher, or teacher's aide. The conditional probability of ELL students engaging in academic language production during one-to-one instruction was calculated. The results are detailed in Table 9. Reading aloud and talk academic both showed a conditional probability of occurring during one-to-one instruction. Reading aloud exhibited a 0.09 conditional probability of occurring during one-to-one instruction where  $p < .001$  with a z-score of 8.283, while talk academic demonstrated a 0.33 conditional probability of happening during one-to-one instruction where  $p < .001$  with a z-score of 8.157. Writing had no significant conditional probability of occurring during one-to-one instruction. Overall, academic language production showed a composite 0.57 conditional probability of occurring during one-to-one instruction where  $p < .001$  with a z-score of 6.569. Participants were likely to engage in reading aloud and academic talk during one-to-one instruction.

Table 9

### *Conditional Probabilities of Academic Language Production Occurring During One-to-One Instruction*

	Frequency	Conditional probability	Z-score	P-value
Writing	16	0.15	-0.015	Not significant
Reading Aloud	10	0.09	8.283	.001
Talk Academic	36	0.33	8.157	.001
Composite	62	0.57	6.569	.001

### *Individual instruction*

Individualized instruction was coded when ELL students were working by themselves. The conditional probability of ELL student engaging in academic language production during individualized instruction was calculated. The results are listed in Table 10. Writing was the only academic language production level to show a positive conditional probability (0.23) of occurring during individualized instruction where  $p < .001$  with a z-score of 4.795. Reading aloud had an insignificant conditional probability of occurring during individualized instruction, while talk academic had a .05 conditional probability where  $p < .001$  with a z-score of -3.202. Overall, there was no significant conditional probability of academic language production occurring during individual instruction. Students were likely to engage in writing during individual instruction, but they were not likely to engage in reading aloud and academic talk.

Table 10

### *Conditional Probabilities of Academic Language Production Occurring During Individual Instruction*



	Frequency	Conditional probability	Z-score	P-value
Writing	158	0.23	4.795	.001
Reading Aloud	0	0.00	-2.231	.05
Talk Academic	32	0.05	-3.202	.001
Composite	190	0.28	1.327	No significance

The null hypothesis of the first question stated, “There is no significant difference between ELL student academic language production during whole group instruction, small group instruction, one-to-one instruction, and individual instruction.” This null hypothesis must be rejected because there was a significant difference between the instructional grouping configurations in terms of academic language production. Overall, there was a significant negative conditional probability that ELL students would engage in academic language production during whole class instruction and positive conditional probabilities that they would engage in academic language production during small group and one-to-one instruction.

Disaggregating the three forms of academic language production provides additional insight into ELL student academic language production. Under some instructional grouping configurations, participants were likely to engage in one form of academic language production but not in another form. For example, during individual instruction, participants demonstrated a significant conditional probability of engaging in writing, while they showed negative conditional probabilities of engaging in reading aloud and academic talk. Students were most likely to write during individualized instruction, read aloud during one-to-one instruction, and talk academically during small group instruction, and one-to-one instruction. A summary of

these differences in academic language use appear in Table 11. The results are reported in terms of z-scores rather than p-values because z-scores show whether the relationship between the instructional grouping configuration and the mode of academic language production is negative or positive. A p-value does not show this form of directionality-it only shows whether or not the relationship is statistically significant.

Table 11

*Significant Z-scores for Academic Language Production during Different Levels of Instructional Grouping Configurations*

	Writing	Reading aloud	Talk Academic	Composite
Whole class instruction	-3.754	Not significant	-4.895	-6.098
Small group instruction	Not significant	Not significant	9.300	5.712
One-to-one instruction	Not significant	8.283	8.157	6.569
Individual instruction	4.795	-2.231	-3.202	Not significant

Research Question 2: Instructional Grouping and Academic Language Reception

The second research question asked, “During which instructional grouping configurations are ELL students engaged in academic language reception, defined as the product of reading silently, other academic, or student attention?” ELL student read silently for 15.49% of instructional

time, appeared to pay attention for 21.77% of the time, and engaged in other academic responses such as manipulating objects as commanded by a teacher, aide, or peer for 4.88% of the time. Overall, ELL students in this study engaged in academic language reception for 42.14% of instructional time.

The conditional probabilities of each of these three levels of the dependent variable occurring during each of the levels of the academic language reception variables were calculated to answer the question, what is the conditional probability that ELL students will engage in academic language reception during whole group instruction, small group instruction, one-to-one instruction, and individual instruction.

#### *Whole class instruction*

During whole class instruction, reading silently had no significant conditional probability of occurring and student attention had a significant conditional probability of occurring. Reading silently had a 0.17 conditional probability of occurring where  $p < .01$  with a z-score of 0.815 and student attention had a 0.34 conditional probability of occurring where  $p < .001$  with a z-score of 6.015. Other academic responses had a significant 0.02 conditional probability of occurring during whole group instruction where  $p < .001$  with a z-score of -3.100. Overall, during whole class instruction ELL student academic reception behavioral responses had a 0.53 conditional probability of occurring where  $p < .001$  with a z-score of 3.762. Participants were likely to pay attention during whole class instruction, but they were not likely to engage in other forms of language reception. A summary of these results appears in Table 12.

Table 12

*Conditional Probabilities of Academic Language Reception Occurring during Whole Class**Instruction*

	Frequency	Conditional probability	Z-score	P-value
Reading silently	114	0.17	0.815	Not significant
Other academic	12	0.02	-3.100	.001
Student attention	232	0.34	6.015	.001
Composite	358	0.53	3.762	.001

*Small group*

During small group instruction, student attention and other academic responses showed no significant conditional probability of happening. There was a 0.04 conditional probability where  $p < .001$  with a z-score of -4.116 that ELL students would read silently. Student attention and other academic responses showed no significant results. Overall, there was no significant conditional probability that student academic reception would occur during small group work in comparison to other instructional configurations. However, participants were not likely to read silently during small group instruction. A summary of these results appears in Table 13.

Table 13

*Conditional Probabilities of Academic Language Reception Occurring during Small Group**Instruction*

	Frequency	Conditional probability	Z-score	P-value
Reading silently	11	0.04	-4.116	.001
Other academic	18	0.07	1.620	Not significant
Student attention	59	0.24	0.696	Not significant
Composite	88	0.36	-1.443	Not significant

*One-to-one*

During one-to-one instruction, reading silently and other academic responses had no significant conditional probability of occurring. Student attention, however, had a negative conditional probability of happening where  $p < .05$  with a z-score -2.506. Overall, there was a negative conditional probability where  $p < .01$  with a z-score of -2.665 of academic language reception during one-to-one instruction. Participants were likely not to only pay attention during one-to-one instruction. A summary of the statistical analyses appears in Table 14.

Table 14

*Conditional Probabilities of Academic Language Reception Occurring during One-to-One Instruction*

	Frequency	Conditional probability	Z-score	P-value
Reading silently	9	0.08	-1.835	Not significant
Other academic	7	0.06	0.730	Not significant
Student attention	11	0.10	-2.506	.05
Composite	27	0.25	-2.665	.01

### *Individual instruction*

During independent instruction, reading silently and other academic responses demonstrated positive conditional probabilities of happening. Reading silently showed a 0.21 conditional probability where  $p < .01$  with a z-score of 3.025 and other academic responses demonstrated a 0.07 conditional probability of occurring where  $p < .01$  with a z-score of 2.471. Student attention showed a 0.11 conditional probability of occurring during individual instruction where  $p < .001$  with a z-score of -5.258. Overall, the academic language reception variable levels showed no conditional probability of occurring during individual instruction because the individual forms of academic language reception balance each other. However, participants were like to read silently and engage in other academic non-verbal responses while they were not likely to just pay attention to someone else. The results of the statistical analyses appear in Table 15.

Table 15

### *Conditional Probabilities of Academic Language Reception Occurring during Individual Instruction*

	Frequency	Conditional probability	Z-score	P-value
Reading silently	142	0.21	3.025	.01
Other academic	50	0.07	2.471	.05
Student attention	73	0.11	-5.258	.001
Composite	265	0.39	-1.105	Not significant

The null hypothesis of the second question stated, “There is no significant difference between ELL student academic language reception during whole group instruction, small group instruction, one-to-one instruction, and individual instruction.” This null hypothesis must be rejected because there was a significant difference between the instructional grouping configurations in terms of the aggregated data for all the forms of academic language reception. Participants were likely to engage in academic reception during whole class instruction but were not likely to do so during one to one instruction.

Additionally, there were significant differences between different forms of academic language reception. Disaggregating the three forms of academic language reception provides additional insight into ELL student academic language reception. Participants were likely to read silently during individual instruction, but not during small group instruction. They were not likely to engage in other academic activities during whole class instruction, but they were likely to do so during individual instruction. Finally, they were likely to attend to what other people were saying during whole class instruction, but not during one-to-one and individual instruction. See Table 16 for a synthesis of these data.

Table 16

*Significant Z-scores for Academic Language Reception during Different Levels of Instructional Grouping Configurations*

	Reading silently	Other academic	Student attention	Composite
Whole class instruction	Not significant	-3.110	6.015	3.762
Small group instruction	-4.116	Not significant	Not significant	Not significant
One-to-one instruction	Not significant	Not significant	-2.056	-2.665
Individual instruction	3.025	2.471	-5.258	Not significant

Research Question 3: Instructional Grouping Configurations and Other than Academic Responses

Question 3 asked, “During which instructional grouping configurations are ELL students engaged responses other than academic responses, defined as the product of non-academic response, non-compliance response, and no response?” Non-academic responses accounted for 11.56% of instructional time. Examples of non-academic responses included putting papers in folders and getting out supplies for accomplishing a task. Non-compliance responses were coded 21.32%. Non-compliance responses included behaviors such as student inattention and talking to peers about nonacademic topics. No response was only coded 0.06% of the time, so it will be excluded from the data reporting. The following section will describe the other than academic



responses that ELL students made during the different levels of the instructional grouping variable. What is the conditional probability that ELL students will engage in responses other than academic language responses during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?

*Whole class*

During whole class instruction, there were not significant conditional probabilities of participants engaging in non-compliant responses or non-academic responses. The following table, Table 17, shows the results of the data analyses. Participants were not any more likely to engage in other than academic responses during whole class instruction than they were overall in all grouping configurations.

Table 17

*Conditional Probabilities of Other than Academic Responses Occurring during Whole Group Instruction*

	Frequency	Conditional probability	Z-score	P-value
Non-academic	71	0.11	-0.657	Not significant
Non-compliance	169	0.25	1.813	Not significant
Composite	240	0.36	1.048	Not significant

*Small group*

During small group instruction, there was a 0.11 conditional probability where  $p < .001$  with a z-score of -3.295 that participants would engage in non-compliant responses. However, there was no significant conditional probability for non-academic responses. Overall, there was a 0.20 conditional probability where  $p < .001$  with a z-score of -3.336 that an ELL student would engage in an other than academic response in a small group instructional configuration. In other words, participants were not likely to engage in non-compliance responses during small group instruction. Table 18 lists the frequencies, conditional probabilities, z-scores, and p-values for the non-academic and non-compliance responses.

Table 18

*Conditional Probabilities of Other than Academic Responses Occurring during Small Group Instruction*

	Frequency	Conditional probability	Z-score	P-value
Non-academic	22	0.09	-1.132	Not significant
Non-compliance	27	0.11	-3.295	.001
Composite	49	0.20	-3.336	.001

*One-to-one*

During one-to-one instruction, there was 0.08 conditional probability where  $p < .01$  with a z-score of -2.839 that participants would engage in non-compliant responses. There was not a significant conditional probability of a non-academic response. Overall, there was a 0.18 conditional probability where  $p < .01$  with a z-score of -2.698 that an ELL student would engage

in an other than academic response during one-to-one instruction. Participants were not likely to engage in a non-compliance response during one-to-one instruction. Table 19 contains a summary of these results.

Table 19

*Conditional Probabilities of Other than Academic Responses Occurring during One-to-One Instruction*

	Frequency	Conditional probability	Z-score	P-value
Non-academic	9	0.08	-0.958	Not significant
Non-compliance	9	0.08	-2.839	.01
Composite	18	0.18	-2.698	.01

*Individual instruction*

During individual instruction, there was a 0.09 conditional probability where  $p < .05$  with a z-score of -1.987 that participants would engage in a non-academic response. Conversely, there was no significant conditional probability of a non-compliance response. Taken as a whole, there was no significant conditional probability that participants would engage in an other than academic response during individual instruction. Participants were likely not to engage in non-academic responses during individual instruction. Table 20 provides a synthesis of the data from the statistical analyses.

Table 20

*Conditional Probabilities of Other than Academic Responses Occurring during Individual Instruction*

	Frequency	Conditional probability	Z-score	P-value
Non-academic	58	0.09	-1.987	.05
Non-compliance	168	0.25	-3.295	Not significant
Composite	226	0.33	0.095	Not significant

The null hypothesis of the third question stated, “There is no significant difference between ELL student other than academic responses during whole group instruction, small group instruction, one-to-one instruction, and individual instruction.” This null hypothesis must be rejected because there was a significant difference between the instructional grouping configurations in terms of the aggregated data for all the forms of other than academic responses. Participants were not likely to engage in other than academic responses during small group and one-to-one instruction.

Disaggregating the three forms of other than academic responses provides additional insight into which instructional grouping configuration are least likely to result in nonacademic and noncompliant responses from participants. Participants were not likely to engage in non-compliant responses during small group and one-to-one instruction. They were not likely to engage in non-academic behavior during individual instruction. See Table 21 for a synthesis of this data.

Table 21

*Significant Z-scores for Other than Academic Responses during Different Levels of Instructional Grouping Configurations*

	Non-compliance	Non-academic	Composite
Whole class instruction	Not significant	Not significant	Not significant
Small group instruction	-3.336	Not significant	-3.336
One-to-one instruction	-2.698	Not significant	-2.698
Individual instruction	Not significant	-1.987	Not significant

### Conclusion

In examining instructional grouping configurations and ELL student responses, some significant conditional probabilities emerged from the data. See Table 22. Whole class instruction demonstrated a negative conditional probability of academic language production and a positive conditional probability of academic language reception. Small group instruction showed a positive conditional probability of academic language production. One-to-one instruction leads to a positive conditional probability of academic language production and negative conditional probabilities of academic language reception and other than academic responses. The implications of these results as well as the disaggregated levels of each of these dependent variables will be discussed in the following chapter.

Table 22

*Significant Conditional Probabilities of ELL Student Academic Responses to Instructional Grouping Configurations*

Instructional Grouping Configurations	Negative Conditional Probabilities	Positive Conditional Probabilities
Whole class instruction	Writing	Student attention
	Talk academic	
	Other academic	
Small group instruction	Reading silently	Talk academic
	Non-compliance	
One-to-one instruction	Non-compliance	Talk academic
	Student attention	Reading aloud
Individual instruction	Talk academic	Writing
	Reading aloud	Reading silently
	Student attention	Other academic
	Non-academic	

## CHAPTER 5 - DISCUSSION

This study investigated English language learner language use in middle school content area classrooms, including mathematics, social studies, science, reading, and language arts classes. The participants in the study included 28 native Spanish-speaking students who attended urban middle schools. These students were all identified as being English language learners in need of English as a second language support services.

This study used the ESCRIBE software to collect data regarding contextual factors and student behavior every 15 second during observations of ELL middle school students in content area classrooms. The program analyzed these data to determine conditional probabilities of various student behaviors given each contextual factor. The focus contextual factor of this study was instructional grouping configurations: whole class, small group, one-to-one, and individual instruction. The focus student academic responses included academic language production (writing, reading aloud, and talk academic), academic language reception (reading silently, student attention, and other academic), and other non-academic responses. This chapter includes the limitations of the study, the discussion of the results, implications, and suggestions for future research.

### Limitations

This study has several inherent limitations. The primary limitation is the generalizability of the study. Although, the students were randomly selected within the confines of the narrow context of the study, this study did not include a true random sampling. This study included only two different schools that were within the same school district. Both schools were urban middle schools with similar demographic compositions. The students in these schools, because they were from similar demographic groups and in the same school district, may have had some

unknown similar characteristics that they shared that are not prevalent in the general population of Spanish-speaking English language learners. A known unique characteristic is the students' language background. All the students in the study spoke Spanish as their native language. Students from other language and cultural backgrounds may react differently to instructional grouping configurations. The schools may have also had some unknown uncommon characteristics. For example, the schools and students were located in a low income urban area. Students in rural or suburban schools may have responded differently to the instructional grouping configuration due to different prior socialization. Follow-up studies in multiple settings are necessary in order to make generalizations about the findings of this study.

Another limitation was the subjectivity of some of the behavioral codes. Although, inter-rater reliability with the developer of the instrument was established before the study began and measured throughout the study with another researcher trained on the same instrument, the coding categories themselves were sometimes the observer's interpretation of student behavior. For example, while language production codes such as reading aloud or talk academic were fairly straightforward in observer interpretation, language reception codes such as student attention were more problematic. Students may appear to be listening to a teacher speaking, but they may actually be thinking about a boyfriend. On the other hand, the same student may be doodling on a piece of paper, but be listening to a teacher speak. A qualitative follow up study in which students were interviewed about their language use during the various grouping configurations on specific days would add more credibility the results of language reception coding.

A third limitation in measuring behavior is that it looks at the type of responses rather than the qualitative aspects of instruction, interaction, and student responses. For example, while



ESCRIBE can measure how much time students spend discussing academic concepts, it does not provide any information as to the quality of the language used or the kinds of feedback that the students receive from the people with whom they are interacting. A discourse analysis of these academic discussions would illuminate the quality and kind of academic language produced during classroom interaction.

The final limitation of the study is that the ESCRIBE instrument was developed more than 15 years ago based on a model from special education research by special education researchers and an applied linguist whose specialization is in adult second language acquisition rather than child second language acquisition. While ESCRIBE is a powerful, well-developed research instrument, it could be updated to reflect more current research that is more focused on child second language acquisition. The codes reflect student responses in content area classrooms, but some of the codes could be disaggregated to provide greater insight into students' responses. For example, *other academic responses* could be disaggregated to reflect Krashen's (1981) descriptions of comprehensible input by creating a *manipulating objects* code and a *drawing* code.

### Discussion of the Results and Implications

The results of this study provide evidence to address some of the gaps in research and controversies regarding ELL student interaction. As detailed in Chapter 2, the research is unclear whether or not ELL students are likely to engage in collaborative activities with other students. Additionally, research agendas set forth by Teachers of English to Speakers of Other Languages (TESOL), the national ESL professional organization and the National Research Council, called for more research about ELL student interaction in authentic classroom situations

and teaching strategies to increase ELL student academic engagement. In this section, each of these research issues will be discussed in terms of the findings of the current study.

In the literature review in Chapter 2, there was a discrepancy between studies about ELL student engagement in collaborative activities. Jacob, Rottenberg, Patrick, and Wheeler (1996) found that middle school ELL students did not interact much in collaborative groups, while Deen (1991), Anton (1999), and Ellis, Basturkamn, and Loewen (2001) found that university ELL students produced more language in peer collaborative groups than in teacher-lead discussion. The current study shows that ELL students in middle school content area classes were most likely to produce academic language in small grouping and one-to-one instructional grouping configurations. While these findings contradict Jacob, et al. (1996), they align with the other studies that support the instructional practice of student interaction as a means to increase ELL student academic language use.

The findings of this study also provide answers for the gaps in research cited by De Bot (2001). In this TESOL research agenda, De Bot asked,

What is known about interaction in normal classes?... If there is no high-quality interaction, what can we offer teachers in terms of tasks and activities that take into account the limitations of normal classrooms and quite often not-too-motivated adolescents? The conclusion seems to be that research needs to be done on what, if any, interaction takes place in real L2 classrooms and what effect that interaction has on the ongoing process of language acquisition (p. 603).

This study was conducted in content area classrooms under non-experimental conditions. In this authentic educational context, academic language production had a negative probability of occurring during whole group and individual instruction and a positive probability of occurring

during small group and one-to-one instruction. Interestingly, the dominant grouping configurations, whole class and individual instruction, which comprised 75.99% of instructional time, were the instructional grouping configurations that had the negative probability of promoting ELL student academic language production. If teachers want intentionally to increase academic language production, they should use more student collaboration and less whole group and individual instruction.

According to Krashen (1981), second language learners need exposure to comprehensible input in the target language, or language use supported by paralinguistic cues, for second language acquisition to occur. He contended that ELL students acquire language more efficiently and to higher levels of language proficiency through this supported language exposure than if language instruction focuses on explicit instruction in language structures. Reading silently had a positive conditional probability of occurring during both whole class instruction and individual instruction. During whole class instruction, students often read silently the contents of writing on a chalkboard or on an overhead transparency. Individually, students often read books or worksheets silently. Reading has a strong correlation to both vocabulary acquisition and writing development for English language learners (Krashen, 2004). In considering a balanced language acquisition program, the teachers should provide ample opportunities for ELL students to read silently in class. ELL students in this study were most likely to read silently during individual instruction.

ELL students showed a positive conditional probability of student attention only during whole class instruction. Student attention as defined by this study did not equate with student engagement. Rather, paying attention meant that the student appeared to be listening to what the teacher or a peer was saying and was not engaged in other forms of academic response. Students

were not likely to attend during individualized instruction. When ELL students listen to others speaking in the target language in contextualized situations such as when a teacher is talking about a concept and manipulating related objects, they begin to associate language with familiar objects and concepts. This association facilitates second language acquisition (Krashen, 1981; Krashen & Terrell, 1982).

Other academic responses had a significant probability of taking place during individual instruction. They showed a significant negative probability of happening during whole group instruction. Other academic responses included activities such as manipulating objects and drawing in response to teacher or peer requests or other forms of input. Using non-verbal responses is an important way for ELL students to communicate and manipulative and pictures are valuable forms of comprehensible input. These forms of paralinguistic supports form the foundation of second language acquisition (Cummins, 2001; Krashen & Terrell, 1982). Because these other academic responses can be so beneficial for supporting second language acquisition, teachers of ELL students should find ways to integrate more visual and manipulative support into their lessons (Krashen & Terrell, 1982).

Responses other than academic responses were coded when students were not engaged academically. These responses included non-compliant responses, non-academic responses, and no response. No response was left out of the data analysis because it was only coded once during the entire study. ELL students engaged in non-compliance responses 21.32% and non-academic responses 11.56% of the time. Non-compliance included classroom misconduct as well as student inattention and lack of engagement. Non-academic responses encompassed classroom procedural tasks and instructional material management. ELL students were not

academically engaged in content area classroom instruction for an astonishing 32.88% of instructional time.

ELL students showed a significant probability of engaging in non-academic responses only during individual instruction. However, they showed a negative probability for engaging in non-compliance responses during small group instruction and one-to-one instruction. These instructional grouping configurations demonstrated a significant likelihood of ELL student engagement in academic tasks while whole class instruction and individual instruction did not. Since ELL students spend too much of their time engaging in non-academic and non-compliance responses and only about 20% of their instructional time is spent in the instructional grouping configurations in which these responses are not likely to occur, teachers should consider using more instructional time with ELL students working in small groups and in pairs. These instructional grouping configurations appear to maximize ELL student academic engagement.

In conducting professional development with teachers, this researcher has often advocated for increased student interaction in content area classrooms in order to promote more academic language production by ELL students. Teachers have often objected to this suggestion claiming that small group work and pair work result in ELL students being off task. However, the results of this study indicate that students are more likely to engage academically and less likely to be off task when they are placed in small groups and pairs than when the teacher engages student in whole class or individual instruction. If teachers want ELL students to learn and use academic language, they need opportunities to practice using the language small group and one-to-one instructional configurations.

In addition to addressing the questions raised by De Bot (2001), this study provides some possible answers to questions set forth in a literature review by August and Hakuta (1997)

commissioned by the National Research Council. In this review, August and Hakuta identified some of the critical research issues that needed to be investigated concerning K-12 ELL students.

This research agenda included the following question:

What methods work best to give English-language learners access to the academic and social opportunities that native English speakers have while they are learning English? Such methods include both school-wide adaptations, such as the way sequences of classes are organized to give English-language learners optimal access to subject matter knowledge and English proficiency, and classroom adaptations, such the use of particular teaching strategies and classroom composition (p. 193).

The schools chosen for this study were selected because the teachers were more likely to design instruction to include student interaction than teachers in the other schools with ELL students in the school district. As stated in Chapter 4, ELL students in this study spent 14.87% of class time writing, 1.01% reading aloud, and 8.98% talking about academic issues. These activities account for 24.86% of instructional time. In fact, these results show that the schools chosen for the study were more likely than most schools to facilitate academic language production. In Arreaga-Mayer and Perdomo-Rivera (1996), the researchers found that ELL students in elementary schools produced oral language less than 5% of instructional time. The difference between these results is due to the research design and purpose of the two studies. The current study used purposive sampling to increase the likelihood that classrooms chosen would include all forms of instructional grouping configurations that served as the independent variable in the study. The focus was on what ELL students would do during each instructional grouping configuration. Conversely, the Arreaga-Mayer and Perdomo-Rivera (1996) study investigated interaction in content area classrooms with a focus on what kinds of interaction

typically takes place in these settings. Therefore, they did not use purposive sampling to select the participating schools.

Even though the classrooms in this study were more likely than typical classrooms to promote ELL students interaction, in light of the need for student academic language use in content area classrooms, these percentages of time are insufficient if one agrees with Swain (1995), Cummins (2001), and Gee (2004) regarding the importance of comprehensible output as a critical component of second language acquisition as discussed in Chapter 2. All these researchers emphasized the need for students to engage in extensive academic talk as supporting cognitive, academic, and linguistic development. These theorists and researchers point to the necessity for ELL student to develop all four language skills-reading, writing, speaking, and listening-to high academic levels. However, as described in the discussion of the TESOL research agenda questions, small group and one-to-one instruction would increase the amount of ELL student interaction.

As teachers attempt to increase the level of the various modes of academic language production, they can look to the results of this study to find the instructional grouping configurations that have the highest probability of ELL student academic language production. For example, ELL students in general are not faring well on standardized tests of writing (Panofsky, et al., 2005). If teachers want to increase ELL student academic writing, they may decide to decrease the amount of whole class instruction, since this grouping configuration has a strong negative conditional probability of ELL student writing for academic purposes and increase the amount of individual instruction because this instructional grouping configuration has a much higher conditional probability of resulting in ELL student engagement in academic writing.

Reading aloud by ELL students has a high conditional probability of occurring only during one-to-one instruction. If reading aloud is difficult for a particular ELL student, teachers should provide the student more opportunities to read aloud with a partner. There is not a significant conditional probability that any of the other grouping configurations are likely to promote reading aloud.

Finally, Cummins (2001) and Swain (1995) view academic talk as a critical component of effective second language acquisition instruction. However, only two instructional grouping configurations had a significant conditional probability of promoting ELL student academic talk: small group and one-to-one instruction. The other two instructional group configurations, whole class and individual instruction, both had significant conditional probabilities of not resulting in academic discussions. Considering that ELL students engaged in academic talk only 8.98% of instructional time, content area teachers might want to use more small and one-to-one instructional groups in order to promote more academic talk by ELL students.

### Future Research

A natural future research project that could develop out of the findings of this study would be to examine the effective of classroom contextual factors on ELL student academic performance. This kind of research could be performed using the ESCRIBE process-product analysis described in the methods section of Chapter 3. ELL student instructional grouping configurations and classroom academic language use could serve as the independent variables and ELL student standardized test scores on language and content area assessments could serve as the dependent variables. Other research projects could look at the dominant language choice (native language or English) of ELL student interaction and academic achievement.



The additional suggestions for future research address the limitations of this study. First of all, this study should be replicated in multiple contexts such as suburban schools and with subjects of multiple language backgrounds. Furthermore, student focus groups and individual interviews would provide insight into student language reception during various instructional grouping configurations and activity related responses. Additionally, the quality of instruction and interaction could be examined better through discourse analysis. Finally, ESCRIBE should be modernized to reflect current research on child and adolescent second language acquisition and effective instruction. This revision should entail examining the recent research of Cummins' (2001) Relations of Power Framework, Echevarria, Vogt, and Short's (2004) Sheltered Instruction Observational Protocol, and Swain's (1995) Theory of Comprehensible Output. The revision should also include the result of qualitative observations of both content area and English language development classrooms in schools in which ELL students are excelling.

### Conclusions

The focus for this study developed out of a need in the research literature on classroom interaction. Middle school students were the participants in the study because previous ecobehavioral research with bilingual students has been conducted with students in elementary schools (Arreaga-Mayer, Carta, & Tapia, 1994; Arreaga-Mayer & Perdomo-Rivera, 1996) and most other research on classroom interaction and ELL students has been conducted with adults (see Chapter 2). Furthermore, as discussed in Chapter 2, the research on classroom interaction conducted with adult ELL students has primarily focused on the acquisition of language structures and the few studies that have focused on ELL student language production in various grouping configuration has been contradictory. Finally, since the 1970s, the focus of research and theory development in second language acquisition has been on comprehensible input. The

theory of comprehensible output is relatively new, emerging in the 1990s. This study has contributed to the understanding of the circumstances under which language production occurs in authentic classroom contexts. Overall, this study provides strong support for greater use of ELL student collaboration in content area classrooms. This collaboration could take the form of either small group or one-to-one instruction. ELL student academic language use was most likely to occur during these instructional grouping configurations. According to Cummins (1996, 2001), Thomas and Collier (1997, 2002), Swain (1995, 1997), and Gee (1997, 2004), among others, promoting greater academic language use in the classroom leads to higher levels of second language acquisition. High levels of second language acquisition are most likely to result in higher ELL student academic achievement (Collier, 1995; Cummins 1996, 2001). Since small group and one-to-one instructional grouping configurations are likely to result in ELL student academic language use, increasing the use of these instructional grouping configurations could contribute to ELL student academic achievement to close the achievement gap between these students and native English speaking students.

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## APPENDIX 1 – PARTICIPANT CONSENT FORMS

Dear Parents:

Your child is being asked to participate in a research study. This study will examine which kinds of classroom discussion groups will help your child to learn English the best. During this project, a researcher will sit in your child's classroom and watch what the teacher is doing and what your child is doing. This information will be written in a computer program. The computer program will analyze this information to help the researcher to understand how much your child reads, writes, speaks, and listens in different kinds of groups.

This study will be safe for your child. The researcher has given the school a paper from the police department that says that she has no criminal history. The researcher will observe students participating in normal classroom activities. The information collected about just your child will not be shared with the teacher. The results of at least 25 different students will be put together when the information is reported. No one, not even the researcher, will be able to identify which computer file or other information is connected to your child. The information learned from this study will be shared with teachers and researchers so that we can help English language learning students learn English faster and better.

The researcher will not tell anyone who the students in this study are. The English as a second language teacher may know that your child is in the study because he or she is collecting the permission forms. The classroom teacher may know that your child is in the study because he or she may notice that the researcher is looking at your child during the observations. The teachers will be asked not to tell anyone which students are in the study. The researchers will not tell anyone outside of the schools which schools are in the study. Permission forms will be kept in a locked file cabinet for three years. Only the researcher will have access to this locked file cabinet. After three years, this permission form will be destroyed.

This study will last 3-6 weeks. Each child will only be observed one time for about 50 minutes.

If you have questions about why or how this study is being conducted, you can contact either Dr. Linda Thurston, Kansas State University, Bluemont Hall room 018, Manhattan, KS 66506 at (785) 532-6943 or Katie Brooks 214 S. Audubon Rd., Indianapolis, IN 46219 at (317) 351-1879.

If you have questions about the rights of participants in this study or about the way in which the study will be conducted, you may contact Rick Scheidt, Chair, Committee on Research Involving Human Subjects, 1 Fairchild Hall, Kansas State University, Manhattan, KS 66506, (785) 532-3224.

**Parent Permission**

Your child will not be a part of this study unless you give your permission. Participation in this study is voluntary. There will be no penalty or loss of benefits to your child if you choose not to allow him or her to participate in the study. You can choose to withdraw your child from the study until after the data has been collected. After your child is observed, there will be no way to delete the data from the observation, because the researcher will not connect your child's name or any personal information to the computer file that contains the observation data. Please check one of the following boxes:

**I give my permission for my child to participate in this research study. I have read and understand the information provided about the study in this letter. I understand that I can choose at any time until after my child is observed to withdraw my child from this study.**

**I do not give my permission for my child to participate in this research study.**

**Parent or guardian signature** \_\_\_\_\_

**Date** \_\_\_\_\_

**Student Permission**

You will not be a part of this study unless you give your permission. Participation in this study is voluntary. There will be no penalty or loss of benefits to you if you choose not to participate in the study. You can choose to withdraw from the study until after the data has been collected. After you are observed, there will be no way to delete the data from the observation, because the researcher will not connect your name or any personal information to the computer file that contains the observation data. Please check one of the following boxes:

I agree to participate in this research study. I have read and understand the information provided about the study in this letter. I understand that I can choose at any time until after I am observed to withdraw from this study.

I do not agree to participate in this research study.

Student signature \_\_\_\_\_

Date \_\_\_\_\_





0.09  
(unconditional  
probability)

CONDITIONAL PROBABILITY = Probability of the dependent variable(s)  
given the Independent Model  
UNCONDITIONAL PROBABILITY = Probability of the dependent variable(s)  
independent of any Independent Model