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ENGLISH LANGUAGE LEARNER ACADEMIC ENGAGEMENT AND INSTRUCTIONAL GROUPING CONFIGURATIONS

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ABSTRACT

This study used an ecobehavioral approach to investigate the conditional probability that English language learning (ELL) students would engage in academic tasks in urban middle school content area classrooms within different instructional grouping configurations. These configurations included whole class, small group, one-to-one, and individual instruction. The participants in the study included 28 native Spanish-speaking students who were all identified as being English language learners (ELL). The findings of this study indicate that participants were most likely to engage in academic tasks during small group and one-to-one instruction. They were least likely to engage in academic tasks during whole class and individual instruction.

Cultural and linguistic diversity in United States public schools has increased substantially over the past decade. Twenty-one percent of children between the ages of 5 and 17 years old speak a language other than English at home: Fourteen percent of the children speak Spanish, 2.7% speak other Indo-European languages, 2.2% speak Asian and Pacific Island languages, and less than 1% speak other languages (U.S. Census Bureau, 2008). The schools that these students attend have identified 11% of these students

as English language learning (ELL) students, students who speak a native language other than English and are in the process of acquiring English language proficiency (Office for Civil Rights, 2007).

As educators in U.S. public schools are experiencing student populations increasingly diverse both culturally and linguistically, they are also encountering intensified federal accountability for student academic achievement. 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. On the National Assessment of Educational Progress, 71% of ELL students in 8th grade scored at a below basic level on both the tests of reading and mathematics (NCES, 2005). High school dropout rates are another problem for ELL students. Twenty-five percent of high school dropouts were born outside of the United States, but they only make up 8% of the U.S. adolescents (Frye, 2005). Teachers who have large numbers of ELL students in their classrooms are experiencing difficulty in supporting these students in closing the achievement gap with native English speaking (NES) students.

Researchers seeking ways to close this achievement gap often 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 context-appropriate language to communicate the ideas of the academic discipline to include understanding the social and cognitive processes involved in problem-solving and interacting 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.

Interpersonal conversational interaction is a critical factor in acquiring a new Discourse. Researchers have found that one way in which conversational interaction facilitates the acquisition of academic Discourse is through 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 (Ellis, 2008, 2009; Iwashita, 2003; Leeman, 2003). Other researchers have found correlations between classroom conversations and vocabulary acquisition (Fuente, 2002; Gass & Alvarez-Torres, 2005). These studies are building a strong research foundation which indicates that ELL student interaction supports second language acquisition.

Another area of research has focused on 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. This process of language feedback and modification helps language learners to acquire more native-like ways to express their thoughts (Egi, 2010; Lyster & Izquierdo, 2009; Swain & Lapkin, 1998). Other researchers have found a correlation between classroom interaction and improved reading comprehension (Almaguer, 2005; Brock, 2007; Kamps, et al., 2007; Saunders & Goldenberg, 1999). This body of research is still emerging, but evidence is accumulating that classroom interaction supports academic language and literacy development.

Although there is a deficit of research on K-12 ELL student academic engagement, the few studies that exist provide some evidence that English language learners do not frequently actively engage in classroom instruction. Goldenberg and Gallimore (1991) 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 a follow up study, Arreaga-Mayer, Utley, Perdomo-Rivera, and Greenwood (2003) found that elementary ELL students who were at risk for being identified as having developmental disabilities were academically engaged in content area instruction only 44% of instructional time. Finally, Gersten and Baker (2000) conducted a qualitative multifocal research synthesis in which they completed a literature review of effective practices for ELL students and interviewed K-12 educators and researchers who specialized in second language acquisition pedagogy about effective instructional practices for supporting the academic achievement of ELL students. They concluded that educators and researchers are concerned that ELL students are not typically cognitively or linguistically engaged in their classes.

Collaborative learning groups have been a research focus in a few stud-

ies of English language learner interaction in academic and/or language classrooms. Collaborative learning seems like a promising practice for promoting student academic language use. However, the few studies in authentic classroom contexts on ELL students in collaborative learning groups appear to have conflicting findings. 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. However, Foster (1993) concluded that students were more likely to interact when the activity in some way required the group participants to exchange information. Finally, one study discussed the probability of one ELL student engaging academically in an elementary classroom during different instructional grouping configurations. Arreaga-Mayer, Utley, Perdomo-Rivera, and Greenwood (2003) found that one ELL student was more likely to engage academically during small group instruction than she was during whole class instruction.

Classroom interaction in culturally and linguistically diverse classrooms is an emerging issue in second language acquisition research. Gersten and Baker (2000) and Arreaga-Mayer, et al. (2003) agreed that more research needs to be done to determine under which instructional circumstances ELL students are likely to engage academically. Furthermore, De Bot (2001) called for more exploration into the classroom interaction of English language learners. After an extensive review of the literature on classroom instruction and ELL students, 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)

Most of the studies that De Bot reviewed were conducted under controlled conditions in which participants were randomly assigned to a control or an experimental group. These studies focused on the acquisition of language structures, not on the circumstances under which ELL students are likely to engage academically. 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.

METHODS

This study addressed these gaps in the research on ELL student academic engagement by describing urban middle school ELL student academic engagement in content area classes during five types of instructional grouping configurations: whole class instruction, small group instruction, one to one instruction, individual instruction, and no instruction. The specific research questions were:

- 1) What percentage of time during whole group instruction, small group instruction, one-to-one instruction, and individual instruction do ELL students engage in academic behaviors?
- 2) What is the conditional probability that ELL students engage in academic behaviors during whole group instruction, small group instruction, one-to-one instruction, and individual instruction?

RESEARCH SITES

This study was conducted in 10 classrooms in 2 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 district population. The chosen middle schools were magnet sites for ELL students. The ELL student population at the two schools was between 15% and 20%. More than 60% of the remaining students were African-American students. In both schools, more than three-fourths of the students qualified for free or reduced lunches under federal poverty guidelines. Students in both schools, as a group, scored significantly below average on the annual state standardized test of English/language arts and mathematics. Both schools were actively involved in a literacy improvement initiative and had instructional coaches who supported content area literacy development. The ELL students spent the majority of their time in content area classrooms with teachers who had content area licenses without ESL or bilingual certification. The ELL students all had one class period of English language development support from a licensed English as a second language teacher.

PARTICIPANTS

Within the two schools chosen for this study, ten teachers were purposively selected for classroom observations. Several factors influenced the choice of teachers: the presence of ELL students in the teachers' classrooms, student schedules, teachers' willingness to have the research conducted in the

classroom, teacher use of a variety of instructional grouping configurations, content area, and grade level.

The student populations in participatory schools included English language learning students who were in the sixth, seventh, and eighth grades. 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. 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).

METHODOLOGY

The researchers in this study examined the impact of instructional grouping configurations on ELL student academic engagement. The independent variable was instructional grouping configuration which 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 academic engagement variables.

The dependent variables were three levels of ELL student academic engagement: academic language production, non-language production academic activity, and other than academic responses, each having multiple sublevels. Academic language production included writing, reading aloud, and academic talk. Non-language production academic activity included reading silently, student attention, and other academic activities such as manipulating objects and drawing for academic purposes. Other than academic responses, there were included non-academic responses such as passing papers and non-compliant responses which included student misbehavior or inattention.

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 momentary time sampling to

record independent classroom and teacher ecological variables and dependent student behaviors in order to understand their conditional relationship to each other (Arreaga-Mayer, Carta, & Tapia, 1994). The Ecobehavioral System for the Contextual Recording of Interactional Bilingual Environments, or ESCRIBE, is a computerized data collection and analysis system 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).

DATA COLLECTION

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. 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.

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. This study only considered one instructional environment variable, instruction grouping configurations. 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.

STUDY DESIGN

The researchers examined the relationship between instructional grouping configurations and ELL student academic engagement. They utilized ecobehavioral analysis, which can look at a number of classroom ecological variables using a computer observational system. The research question was answered by examining the conditional probability of instructional grouping configurations and ELL student language behaviors occurring within temporal proximity of each other (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 instruc-

tion (II), and no instruction (NI). The dependent variables included academic language production, non-language production academic activity, and other than academic responses. 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 within temporal proximity of the independent variable (Keppel & Wickens, 2004).

PROCEDURES

This study included 28 observations in two different middle schools over a three week period. The limited data collection period occurred for logistical reasons. The researchers collected in the spring so that the students and teachers had worked together for several months but they wanted to avoid instruction that focused on preparation for and administration of the state high-stakes standardized test. The developers of the ESCRIBE instrument have used a similar timeframe for data collection (Arreaga-Mayer, Utley, Perdomo-Rivera, & Greenwood, 2003).

These observations took place in content area classrooms during normal instructional time. These classes were purposively chosen because the teachers used a variety of instructional grouping configurations. The researcher observed one student at a time for the duration of a content area class period. During these observations, 1782 lines of data were collected. The mean observation duration was 34 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 procedural business accounted for 1.35% of the time. All five instructional grouping configurations were observed: Whole class instruction accounted for 37.77% of the observational time, small group instruction accounted 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 were not interacting with their peers or teachers.

DATA ANALYSIS

Data analysis used an analysis of conditional probability (Juniper Garden's

Children's Project, N.D.) to determine 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. 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:

$$Z = \frac{P(R_i/A_i) - P(R_i)}{\sqrt{\frac{P(R_i)(1 - P(R_i))}{m_i}}}$$

"Where $P(R_i/A_i)$ =the proportion of the response (R_i) given ecological arrangement (A_i), $P(R_i)$ =the proportion of the response (R_i) given all data (base rate), m_i =the frequency of (A_i), and m_o =the frequency of all data sequences in the file." (Juniper Garden's Children's Project, nd,p.37).

FINDINGS

The results are reported in terms of percentage of time and conditional probabilities that each of the three types of academic 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 and 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).

WHOLE CLASS INSTRUCTION

The researchers coded whole class instruction 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 1, there was not a significant conditional probability of an ELL student engaging in any of the levels of academic language production during whole class instruction. Academic language production showed a significant negative conditional probability of occurring with $p < 0.001$ with a -6.098 z-score. While during whole class instruction, ELL students were not likely to engage in academic language production, they were likely to engage in other, non-language productive behaviors. Non-language production academic activity during whole class instruction occurred with a significant conditional probability of 0.53 , a Z-score of 3.762 , and a P-value of 0.001 . There was not a significant conditional probability of other than academic responses during whole group instruction.

Dependent variables	Frequency	Conditional probability	Z-score	P-value
Academic language production	75	0.11	-6.098	.001
Non-language production academic activity	358	0.53	3.762	.001
Other than academic responses	240	0.36	1.048	Not significant

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 2. Academic language production had a significant 0.44 conditional probability of occurring during small group instruction with a Z-score of 5.712 and a P-value of 0.001 . Non-language production academic activity had no significant conditional probability of occurring during small group instruction. Other than academic responses had a negative significant 0.20 conditional probability of occurring, with a Z-score of -3.336 and a P-value of 0.001 .

Table 2. The Conditional Probabilities of Academic Engagement Occurring during Small Group Instruction

Dependent variables	Frequency	Conditional probability	Z-score	P-value
Academic language production	109	0.44	5.712	0.001
Non-language production academic activity	88	0.36	-1.443	Not significant
Other than academic responses	49	0.20	-3.336	0.001

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 activity during one-to-one instruction was calculated. The results are detailed in Table 3. ELL student academic language production had a significant positive 0.57 conditional probability of occurring with a Z-score of 6.569 and a P-value of 0.001. Non-academic language production academic activity and other than academic responses both showed negative significant conditional probabilities of occurring during one-to-one instruction. Non-academic language production academic activity resulted in a 0.25 conditional probability of not occurring during one-to-one instruction with a negative z-score of 2.665 and a p-value of 0.01 while other than academic responses resulted in a conditional probability of not happening during one-on-one instruction with a z-score of -2.698 and a p-value of 0.01.

Table 3. The Conditional Probabilities of Academic Engagement Occurring during One-to-One Instruction

Dependent variables	Frequency	Conditional probability	Z-score	P-value
Academic language production	62	0.57	6.569	0.001
Non-language production academic activity	27	0.25	-2.665	0.01
Other than academic responses	18	0.18	-2.698	0.01

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 4. The frequency of each level of the dependent

variables was similar enough that none of the variables demonstrated a significant conditional probability of occurring during individual instruction.

Dependent variables	Frequency	Conditional probability	Z-score	P-value
Academic language production	190	0.23	1.327	Not significant
Non-language production academic activity	265	0.39	-1.105	Not significant
Other than academic responses	226	0.33	0.095	Not significant

In examining instructional grouping configurations and ELL student academic engagement, some significant conditional probabilities emerged from the data. During whole class instruction, ELL students were not likely to engage in academic language production, but they were likely to engage in other forms of academic activity such as paying attention or manipulating objects. During small group and one-on-one instruction, ELL students were likely to engage in academic language production and they were significantly not likely to engage in non-academic behaviors. Students were most likely actively to engage academically when interacting with their teachers and/or peers.

DISCUSSION

The results of this study provide evidence to address some of the gaps in the research and disagreements regarding ELL student interaction. First of all, several researchers have identified the dearth of research on ELL student interaction in authentic classroom settings. Other researchers have expressed concern that ELL students do not seem to be extensively engaging academically in content area classes. Finally, in the few studies that exist about ELL students engagement in collaborative grouping configurations, there are conflicting findings. As teachers attempt to increase the level of ELL student academic engagement, they can look to the results of this study to find the instructional grouping configurations that have the highest probability of active ELL student academic engagement.

The findings of this study addressed gaps in research cited by Gersten and Baker (2000), De Bot (2001), and Arreaga-Mayer, et al. (2003). These researchers called for more research in authentic classroom settings under

non-experimental conditions to better understand the connections between instructional methodologies and ELL student academic behaviors. The current study attended to this call for research by focusing on English language learner academic engagement in urban middle school content area classrooms, including mathematics, social studies, science, reading, and language arts classes under normal instructional conditions. In addressing the concerns expressed by Gallimore and Goldenberg (1992), Arreaga-Mayer and Perdomo-Rivera (1996), and Gersten and Baker (2000) about the lack of ELL student academic engagement in content area classes, the researchers of the current study found that 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. Therefore, if teachers want intentionally to increase active academic engagement, they should use more student collaboration and less whole group and individual instruction.

Finally, the research is unclear whether or not ELL students are likely to engage in collaborative activities with other students. As stated in the literature review, 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. However, Foster (1993) and Arreaga-Mayer, et al. (2003) found that ELL students were likely to engage academically in collaborative groups. 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 engagement. The differences in conclusions may be due to sampling differences. The current study used purposive sampling of teachers who were the mostly likely to use small and paired group work. Perhaps these teachers have worked more extensively with their students on how to engage in small group work. Subsequent studies need to be conducted to compare student academic engagement in differing instructional grouping configurations with students who have more and less preparation for engaging in interpersonal conversational collaboration.

This study has several inherent limitations. The primary limitation is the generalizability of the study. Although the students were randomly se-

lected 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. Observations also occurred over a three week period due to logistical considerations. Future studies will be conducted to gain a broader sense of what happens in several different instructional contexts over the course of an academic year.

CONCLUSIONS

In providing professional development for secondary teachers, these researchers have often advocated for increased student interaction in content area classrooms to promote more academic engagement by ELL students. Teachers have sometimes 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 provide evidence that middle school ELL students are more likely to engage actively and 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 engage actively in content area lessons, ELL students need more opportunities to interact small group and one-to-one instructional configurations.

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