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Initiation of communication from users of AAC and preceding communication partner's utterances

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INITIATION OF COMMUNICATION FROM USERS OF AAC AND PRECEDING COMMUNICATION PARTNER'S UTTERANCES

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Abstract

This study examined the effect communication partners' have on the initiations produced by users of augmentative and alternative communication (AAC). The data was reviewed from a larger study; it included transcripts and videos of a set of four students from an elementary school classroom in the Midwest. The students had a wide range of abilities. Both the student and teacher utterances were analyzed for: different types of communication functions, environmental factors and conversational factors. It was hypothesized that the communicative function of the previous utterance and the level of aided input used would affect the number of initiations. The findings support the concept that the preceding utterance and communication partner can increase or decrease the number of student initiations. This suggests that the communication partner could make adaptions to their own speech and language, as well as the environment, to maximize therapy and the student's skills.

Title

Initiation of communication from users of augmentative and alternative communication (AAC) and the preceding communication partner's utterance.

Introduction

Communication is a complex human function that, for some individuals, is not successful in all situations. In order to build social relationships, there has to be some form of communication, whether verbal or nonverbal. That interaction is difficult for some populations; this may be especially true for someone requiring augmentative and alternative communication (AAC). They may not know how to request wants and needs, make choices, or share stories. In these situations, a communication partner has the ability to facilitate or impede the responses from that individual. The communication partner is anyone who is trying to communicate with the student. That person can make the learning process harder, by creating less opportunities or providing less structure. Or the communication partner can scaffold the learning process to make it easier with more opportunities to practice a communication skill. In this study, the preceding utterance from an adult and how the utterance affects the responses of an AAC user will be investigated. Due to the lack of research in this area, therapy procedures could be advanced from these findings; additionally, everyday conversations with a user of AAC could potentially be enhanced.

Literature Review

Augmentative and alternative communication (AAC) refers to any communication systems in place to assist an individual who cannot use speech to

communicate successfully in all circumstances. According to Brandone et al. (n.d.) AAC can be used either to supplement speech or to replace it. It can also be used to assist comprehension of language.

Communication

Language is composed of two components: expressive and receptive. Expressive refers to the language used by a person to express his or her own needs, wants, or feelings. Receptive language is the understanding and comprehension of the communication of others (Brandone et al, n.d.). Language is important because it provides the ability to communicate needs, wants, ideas, emotions, self-advocacy, self-determination and personal accounts. Verbal communication is only one form of expressive language. Language also includes non-verbal communication, according to Brandone at al. (n.d.), such as gestures, facial expressions, and written language. Language is organized through a set of rules that allows a broad understanding (Brandone et al, n.d.).

For people with complex communication needs there are two broad types of augmentative and alternative communication. First, according to "Augmentative and Alternative Communication" (n.d.) on ASHA's website, unaided communication refers to any communication that relies solely on the human body: gestures, sign language and/or body language. There is also aided communication, which requires the use of a device or external equipment ranging from low technology options like pencils and paper, to high technology devices that are electrical ("Augmentative and Alternative Communication" n.d.). A combination of both types is also an option.

Initiation is an important aspect of language, as it is the way someone can start communication on his or her own. Without initiation, a person is unable to gain attention when they want to speak, ask questions, or make important spontaneous comments such as “I am in pain”. As stated by Brandone et al. (n.d.) initiation also occurs when a person changes the subject or says something after a long pause within a conversation.

Responses to communication must be addressed, to be able to identify if it is an initiation or not. There are two types: one is obligatory, and the other is nonobligatory. Obligatory responses mean that socially an answer is required, such as with most questions (Kent-Walsh et al, 2015). Nonobligatory statements do not require any response; it is optional and socially acceptable to respond either way.

A speech disorder occurs when a person struggles with oral speech. Oral speech includes the individual sounds of the language, voice problems, fluency, or anything that restricts the physical sound of speech (Kaneshiro et al, 2014). A language disorder occurs when the receptive or expressive skills are affected, such as the ability to understand others or share thoughts and feelings (Kaneshiro et al, 2014). Speech and language disorders are separate disorders; however, they are not exclusive disorders and can co-occur and range in severity (Speech and Language Disorders and Diseases, n.d.). Speech and/or language disorders can be caused by a wide variety of factors; some of these factors include brain damage, physical impairments, intellectual impairments, hearing loss, or even unknown causes (Speech and Language Impairments, 2011). Individuals with speech and/or language impairments may require the use of augmentative and alternative communication, or

AAC.

Methods of Testing

Since language is deeply complex, it can be hard to identify what a child, who is displaying difficulty, understands and what appropriate therapy goals may be. There are both formal and informal methods to test a child's language. One type of formal measure would be tests with a set of typical development ranges of scores provided to help identify a delay or impairment. Informal methods can include recording and transcription of a language sample. A language sample is a section of spontaneous utterances from a child, usually taken during a language rich activity or play.

There is research on assessing a student with an AAC device, in which traditional language therapy interventions are suggested (Soto and Zangari, 2009). A language sample is an important and sometimes better assessment tool because it shows what the student is capable of in a typical conversation, while formal tests may test the student's ability to take a test if they are more emerging in their AAC use (Beukelman et al., 2005). A student may not be taught to take formal tests, and without learning those skills, a test is assessing their ability to understand a formal question and respond appropriately. The traditional language interventions refer to therapy techniques and using language samples to elicit an assessment (Beukelman et al., 2005). There is, however, insufficient research on multimodal communication, meaning several different modes of communication are used to communicate (e.g., verbal speech, AAC device, sign language) and the appropriate ways for a teacher, para educator, or speech-language pathologist to create the environment most

effective to elicit initiations in particular, in order to capture them in a language sample.

With no set guidelines on how to effectively elicit speech from users of AAC, or what the most effective way to encourage initiation of speech, speech-language pathologists cannot appropriately set language goals for these students. This lack of research on multimodal communication and the appropriate ways for a teacher, para educator, or speech language pathologist to create the environment most effective to elicit initiations, can lead to a risk of an inappropriate therapy goal. Trends in the students' capabilities cannot be fully identified until better methods to elicit initiations are utilized. By having a better method to assess the students on their abilities, the less likely that therapy goals will focus on a skill they have already obtained.

A language sample may not completely display an individual's language capability. It is only a small sample that is used to represent the whole. A person may be distracted, not fully motivated, or be weary from a long day, limiting their performance. In other instances, the communication partners may not provide opportunities for language interactions, which will limit the sample. If a student is not presented the opportunities to display a skill, it was simply not present in that transcript. Without testing each specific skill, it cannot be determined that they are incapable of doing it.

According to Barker et al. (2013), students with complex communication needs (e.g., students who don't use verbal speech as their main mode of communication) who were provided a speech-generating device (SGD), and given

aided modeling and opportunities to practice use of the device, were capable of producing more target words than students who only had speech therapy. This means, the AAC device, with a verbal output of speech to represent their voice, was a more efficient way for the students to communicate and learn target vocabulary words.

In order to teach the function and symbols of an AAC device, aided modeling should occur. In one study by Kent-Walsh et al. (2015), through the use of aided modeling, teachers were able to instruct children who used AAC devices to ask inverted yes/no questions. Students who are able ask questions are able to request more information, and continue their learning. Aided modeling occurs when a communication partner uses a device or aid to visually display their verbal comments, modeling for the student how the device works.

AAC users have to learn how to use their device and how it represents language. In order to learn language, one must understand the relationship between a symbol and its referent, which is the word and meaning connected with it (the object or concept it is representing)(Van Tatenhove n.d.). For instance, if you heard the word “apple” for the first time and were shown an apple, you must decide if the person is referring to the apple itself, the color, the skin, that it is edible, or the fact that it is a fruit (Brandone et al, n.d.). Without practicing using vocabulary, it is hard to generalize the meaning. Then the student must connect an item with an English word (or word in their native language) and to a picture in an AAC device. Meaning that a student has to learn what a dog is, and how it relates to the picture of the dog in their own device.

In order to understand these relationships, a person must hear and experience language. However, people need to do more than just hear a language to understand it. They must practice and test it in a linguistic environment that is meaningful (Ukrainetz, 2005). They should be taught in a sequence that follows natural development. That natural development is how a student can use a word outside of the classroom, and in a way that is meaningful to them. Language should be modeled often to demonstrate events, actions, or thoughts relevant to that person. Strategies such as expansion, parallel talk, and elaboration can assist in the teaching of language (Mercer and Mercer, 1998) and should be modeled as well.

To accurately assess a student's ability, they must have the chance to display those skills. If, during a language sample, the opportunity to display a skill is not given, it cannot be assumed that they are not capable of a skill. Thus, goal setting without providing the opportunities for a student to display a certain skill is likely to be less beneficial to the student, because it may target already acquired abilities.

Method

More research is needed on how a student's language is affected by a communication partner's preceding utterance. That communication partner is anyone who is interacting with the student, however this study is primarily focused on teachers, Para educators, and speech-language pathologists. If the number of utterances from a student using AAC changes, the question "why?" needs to be asked**.** Within that main question, there were several possible reasons analyzed. What was the structure of the conversation; or more specifically, what was the purpose of the preceding utterance? How does what the adult says affect the number of interactions

elicited from the student? For example, do a reduced number of questions from an adult increase the number of initiated responses from the student? What was the environment in which the conversation took place?

Participants

This thesis provides an analysis of what adults working with students who use AAC devices could do to provide the best opportunities for students to initiate communication. In order to investigate this relationship between the adults preceding utterance and the student's response, portions of the transcripts from a larger study were further reviewed (Edmister, Garrett, Staples, Peterson, Kliewer, 2012). These transcripts, containing language samples, were collected; using IRB approved protocols, from videotapes of class interactions. A total of 138 samples were collected from 23 students from the first year of the study. Four students from one elementary school classroom in Midwest were selected for this study. Each of the four students has at least 3 pre- and 3 post- videos.

Procedure

In this study, a language sample was much more effective because it shows a typical speech sample of a student. Therefore, this study used an informal assessment measure or language sampling of spontaneous speech. The language sample varied in time, typically between 3-5 minutes. Each transcript was coded for several communication functions to identify any trends that may be present.

Student Utterances

There were four different types of initiations identified: true initiation, non-obligatory, other non-obligatory and non-obligatory gestures and vocalizations

without clear communication intent. First, all of the students' true initiations were coded; these are all new topics or a significant break in the conversation, in which the original conversation had ended. Next, non-obligatory initiations were coded: which are any utterance by the student that is not pragmatically necessary for the conversation. Then, other non-obligatory remarks, that were imitations of the teacher or other students, were identified. This was included because many times a student would imitate the teacher, without clear intentions as to why. It may be a filler to show they are attending to the conversation; it could help them process the information, or maybe it is a habit from practicing activities like flashcards. Since intentions cannot be identified, imitations were separated from the other non-obligatory remarks. Lastly, the transcripts were coded for non-obligatory gestures and vocalizations with no clear communication intentions. All of these combined were the total initiations for each student. All other utterances were counted as obligatory remarks, or that an answer was expected and required pragmatically.

Each transcript was then coded for the environment: the type of class interaction, level of background noise, and level of teacher distraction. Class interactions were limited to one- on- one, group, or lecture format for the lesson. Environmental changes could influence the number of initiations in many ways; for example, the comfort level of the student, the amount of distractions, and the level of interest for the activity, which affects everyone differently.

Another code utilized in the study identified the type of input such as whether the teacher was modeling the device, which is aided input or not. Modeling how to use an AAC device teaches the student how to use the device as his or her own voice,

as well as help with the auditory input and comprehension. Three levels were used to code the level of input: aided input, environmentally aided input, and no aided input. Aided input occurred when the teacher used the student's AAC device to model language. Environmentally aided input occurs when a teacher does not use that device but instead uses another item surrounding them in the setting to clarify and connect an image or experience with a word. These items may include picture flashcards, pointing to a real dog, or pictures from a storybook.

Preceding Utterances and Teacher Utterance Codes

Next the teachers' interactions were analyzed. For every student initiation, the preceding utterance was identified and coded. There were six codes that identified the function of that utterance. A comment was described as a statement, directions, or teacher opinion that did not require any response. Some of the students interrupted frequently, which was coded by a time the teacher asked a question and the student ignored it and moved on to a new topic or interrupted the teacher. The student did respond with an initiation or non-obligatory, and was coded as such because despite a question requiring a social response, the student was choosing to ignore it. Therefore an interruption is a better choice to explain the students' response, which was not socially acceptable. Any time the teacher provided an explanation to a student's question it was identified, as well as teacher corrections of the student. Lastly, the transcripts were coded for nonverbal cues (e.g. pointing, tapping a worksheet).

The total teacher utterances were counted and compared with the number of preceding utterances that resulted in an initiation. The final coding that was

completed was the number of total questions the teacher asked. The number of questions is important because questions pragmatically require a response, reducing the number of possible initiations.

Reliability

In order to better understand the purpose and intent of communication, along with each transcript (which represented 3-5 minutes of interactions typically) the video was watched in its entirety, ranging from 20-30 minutes. This helped identify trends in the communication patterns. A 3-5 minute sample is a small part representing a whole and the students' skills may fluctuate, so watching the whole video provided insight on the class dynamics and students' skills more clearly.

Reliability was run on 20% of the coding, meaning another student, provided coding for the transcript to check for consistency. The totals for each utterance type were added and then compared. The formula used to run reliability was inter-rater reliability formula: total number agreed divided by the number of agreed and disagreed combined multiplied by 100. The total student utterance reliability was found to be 95.7%. The reliability of each individual category for the student pragmatic functions was also analyzed. Non-obligatory responses and obligatory responses both were found to have 93% reliability. True initiations had 94.1% reliability. The other two categories (non-obligatory imitations and other non-obligatory gestures and vocalizations) were found with a reliability of 100% each. The teacher's reliability was found to be overall 95.9%. The preceding utterances that resulted in an initiation total were 85.7%. The main categories for the preceding utterances: comment, interruption and explanation were found to have above 91%

reliability. However, nonverbal cues, correction and the student responding again from their own last comment's reliability ranged from between 0%-66.6% reliability. This was due to lack of coding and communication with the student running reliability, with a total of less than 5 utterances from each, each utterance had a greater effect on the individual percentage. Next, total teacher utterances and total teacher questions were found to have above 97% reliability. Lastly, the total for preceding utterances had 91.3% reliability.

Results

In order to best express the results, it is important to first review the interactions for each of the students. Please note that their names have been changed to protect their confidentiality. In addition, no teachers will be named.

Andrew had seven videos in total, three pre- and four post- videos. His results are displayed in Table 1, Table 2, and Table 3.

Table 1

Andrew's Utterances and Their Conversational Function

Transcript	Initiation	NO	NO/imitations	NO – UC intent	Obligatory
Fall 1	3	10	26	0	0
Fall 2	7	12	7	0	11
Fall 3	7	16	35	0	9
Spring 1	1	9	14	0	0
Spring 2	2	10	37	0	4
Spring 3	5	14	7	0	6
Spring 4	6	12	5	0	7

Note. Non-obligatory (NO) responses are divided into 3 categories, non-obligatory, non-obligatory imitations, and non-obligatory gestures and vocalizations without clear intent [UC- unclear]

Six out of seven of Andrew's videos were one- on- one with a teacher whose attention was not divided by competing factors. Spring 1 is the only transcript that was in a group setting, and it also had no aided input.

Andrew used a significant number of non-obligatory utterances that are imitations of the teacher. The intention of these imitations is unclear; it is possible he repeats to show he is listening or trying to process the information. He also likes to repeat the teacher's name until she responds. However, when he does this, he was not observed to follow up with a comment once his attempt to gain the teacher's attention was acknowledged.

Table 2 and Table 3 represent the teacher's preceding utterances. The teacher's utterances also included if another student's utterances resulted in an initiation. The last column includes the total number of questions a teacher asked to determine if the number of questions asked affects the number of initiations.

Table 2

The Preceding Utterance for the Teacher and other students that Resulted in an Initiation for Andrew

Transcript	Comment	Interruption	Explanation	Nonverbal Cue[a]	Correction	Student
Fall 1	28	2	0	0	3	0
Fall 2	13	0	0	0	1	0
Fall 3	42	8	0	0	0	0
Spring 1	20	2	0	0	0	0
Spring 2	42	0	0	0	3	0
Spring 3	15	5	0	0	0	0
Spring 4	11	9	0	0	0	0

Note. Student refers to a student initiating after one of their own comments or utterances

[a] Nonverbal cues only were included in this data only if it elicited the initiation without any verbal cues

Spring 1 was a group setting where other students' utterances resulted in an initiation for Andrew and were included in the category of teacher's preceding utterance totals. Three out of the 20 comments that resulted in an initiation belonged

to another student. The teachers' utterances totaled to 38, and the students' to 30 out of the total 68 in Table 3.

Table 3

The Total Utterances in Three Categories of the Teacher and/or Other Students for Andrew

Transcript	Total Preceding	Total Utterances	Total Questions
Fall 1	34	49	5
Fall 2	14	44	11
Fall 3	50	95	23
Spring 1	22	68	8
Spring 2	45	65	6
Spring 3	20	46	14
Spring 4	20	49	18

Note. Total utterances include only verbal teacher responses.

The next student is Claire. She had three pre- and three post- videos for a total of six videos. Table 4 represents Claire's utterances.

Table 4

Claire's Utterances and Their Conversational Function

Transcript	Initiation	NO	NO/imitations	NO – UC intent	Obligatory
Fall 1	2	3	0	0	2
Fall 2	8	14	0	0	8
Fall 3	9	3	0	0	0
Spring 1	5	11	0	0	1
Spring 2	8	11	4	0	16
Spring 3	0	0	0	0	0

Note. Non-obligatory (NO) responses are divided into 3 categories, non-obligatory, non-obligatory imitations, and non-obligatory gestures and vocalizations without clear intent [UC- unclear]

There are several notable things in Claire's language samples. Fall 1 was characteristic of a low number of student initiations, loud classroom environment, and adults who were unfamiliar with the student and the device. Also, it is notable that there is no aided input or any type of modeling during this portion of the transcript. Most of the time is spent by the aide familiarizing herself with the device

and not trying to converse with Claire. Fall 2, Fall 3, and Spring 2 all took place in a one-on-one setting, with a teacher whose attention was not divided from Claire. The last transcript occurred while the teacher was creating a worksheet for Claire and conversing with another teacher and student. Thus, Claire did not have an opportunity to join the conversation.

When wait-time was provided in the one-on-one setting, Claire was observed to respond and follow normal pragmatic conversational rules. When the focus shifted to another teacher, Claire struggled. In the transcript Fall 2 and Fall 3, the teacher also provided aided modeling. In Spring 1 and Spring 2, the teacher did provide environmental-aided stimulus to assist in the student's receptive language. However, the reason Spring 1 had a lower student utterance rate was it also was a group setting, in which a game was played. Claire appeared uninterested in the game as demonstrated by lack of participation, eye contact and attempts to change the subject.

The teacher's preceding utterances for the language samples are as follows:

Table 5

The Preceding Utterance for the Teacher and other students that Resulted in an Initiation for Claire

Transcript	Comment	Interruption	Explanation	Nonverbal Cue[a]	Correction	Student
Fall 1	4	1	0	0	0	0
Fall 2	15	2	0	0	1	0
Fall 3	9	0	0	0	0	0
Spring 1	11	1	0	0	0	0
Spring 2	15	2	0	3	0	0
Spring 3	0	0	0	0	0	0

Note. Student refers to a student initiating after one of their own comments or utterances

[a] Nonverbal cues only were included in this data only if it elicited the initiation without any verbal cues

Spring 1 and Spring 3 are both group setting interactions. In Spring 1, the others students did elicit initiations from Claire. Four out of eleven comments and the one interruption were from other students. In Table 6 (see below), the totals of

student and teacher utterances are outlined. Out of the total utterances in Spring 1, 32 were from the student peers, the rest from teachers. In addition, in Spring 3, 22 total utterances were from the student peers. The other students elicited five out of eleven of the initiations in Spring 1. In both transcripts, Spring 1 and Spring 3, the other students asked one question.

Table 6

The Total Utterances in Three Categories of the Teacher and/or Other Students for Claire

Transcript	Total Preceding	Total Utterances	Total Questions
Fall 1	5	48	13
Fall 2	18	65	9
Fall 3	9	43	2
Spring 1	12	69	9
Spring 2	20	65	20
Spring 3	0	65	11

Note. Total utterances include only verbal teacher responses.

Most of Claire interruptions of the teacher were due to wanting a snack and repetitious. Additionally, other students' utterances that prompted an initiation from a student are included to allow for group therapy to be analyzed for trends.

The next student, Logan, has motor impairments and is nonverbal. He uses a picture communication book (pragmatic organization dynamic display or PODD) and a switch to indicate yes or no. He also uses gestures to communicate.

Table 7

Logan's Utterances and Their Conversational Function

Transcript	Initiation	NO	NO/imitations	NO – UC intent	Obligatory
Fall 1	0	0	0	0	0
Fall 2	1	0	0	0	2
Fall 3	0	0	0	0	3
Spring 1	0	0	0	0	2
Spring 2	1	0	0	0	0
Spring 3	1	0	0	0	2

Note. Non-obligatory (NO) responses are divided into 3 categories, non-obligatory, non-obligatory imitations, and non-obligatory gestures and vocalizations without clear intent [UC- unclear]

Fall 1, Fall 2 and Spring 1 are all individual settings; however, all three have very loud background noise. In Fall 1 and Fall 2, the clinician's focus was divided by competing factors. In each of these portions of the transcript, the teacher uses no aided input. Also, in each of these videos, the task was identifying an object from a field of three.

Fall 3 was a brief, 14-second clip in which Logan was extremely excited for the weekend. He made three vocal approximations when he was asked questions about his weekend plans. There was no aided input. The last two: Spring 2 and Spring 3, both involved some aided modeling. Spring 2 was a loud group setting in which the teacher had to divide her attention. Lastly, Spring 3 did not provide unlimited access to the device for Logan due to a different teacher than normal; once he hit the switch once, it was taken away despite his hand moving toward it again. Also, in both of these scenarios the teacher and environment seemed over stimulating.

Below is the table displaying the teacher's and other students' preceding utterances that resulted in an initiation (Table 8) as well as Table 9, which shows the number of questions asked in comparison to the total utterances. See Table 8.

Table 8

The Preceding Utterance for the Teacher and other students that Resulted in an Initiation for Logan

Transcript	Comment	Interruption	Explanation	Nonverbal Cue[a]	Correction	Student
Fall 1	0	0	0	0	0	0
Fall 2	1	0	0	0	0	0
Fall 3	0	0	0	0	0	0
Spring 1	0	0	0	0	0	0
Spring 2	1	0	0	0	0	0
Spring 3	1	0	0	0	0	0

Note. Student refers to a student initiating after one of their own comments or utterances

[a] Nonverbal cues only were included in this data only if it elicited the initiation without any verbal cues

Table 9

The Total Utterances in Three Categories of the Teacher and/or Other Students for Logan

Transcript	Total Preceding	Total Utterances	Total Questions
Fall 1	0	6	4
Fall 2	1	31	14
Fall 3	0	5	4
Spring 1	0	34	6
Spring 2	1	30	13
Spring 3	1	51	14

Note. Total utterances include only verbal teacher responses.

Overall, the consistency of wait time for Logan was frequently less than 30 seconds, who needed additional time to process the information and create the motor plan. It was noted that Logan required at least 30 seconds for yes/no questions when using a switch.

The last student analyzed was Scott. Table 10 displays the data on the function of his utterances during his language sample.

Table 10

Scott's Utterances and Their Conversational Function

Transcript	Initiation	NO	NO/imitations	NO – UC intent	Obligatory
Fall 1	2	1	0	0	2
Fall 2	14	13	0	1	15
Fall 3	0	1	0	0	0
Spring 1	0	4	2	0	2
Spring 2	1	0	1	0	7
Spring 3	0	9	3	0	5
Spring 4	2	6	2	0	6

Note. Non-obligatory (NO) responses are divided into 3 categories, non-obligatory, non-obligatory imitations, and non-obligatory gestures and vocalizations without clear intent [UC- unclear]

Scott's language samples primarily came from group settings. The only two one-on-one interactions are Fall 2 and Spring 4. Fall 2 was a quiet location, where he

was meeting a new student clinician. Spring 4 was noisier and Scott was distracted, but it was the only time aided input was provided during the transcripts. In addition, environmentally aided conversation occurred in Fall 2.

Table 11

The Preceding Utterance for the Teacher and other students that Resulted in an Initiation for Scott

Transcript	Comment	Interruption	Explanation	Nonverbal Cue[a]	Correction	Student
Fall 1	3	0	0	0	0	0
Fall 2	15	5	0	1	0	0
Fall 3	0	1	0	0	0	0
Spring 1	6	0	0	0	0	0
Spring 2	2	0	0	0	0	0
Spring 3	9	0	0	0	0	1
Spring 4	9	0	0	0	0	0

Note. Student refers to a student initiating after one of their own comments or utterances

[a] Nonverbal cues only were included in this data only if it elicited the initiation without any verbal cues

Three of Scott's transcripts occurred in a group setting where another student spoke: Fall 1, Fall 3, and Spring 1. In Fall 1, the other students made six total utterances out of the 24; none elicited an initiation noted in Table 12. In Fall 3, the same thing occurred, with only five total student utterances. However, in Spring 1, the other student peers made five out of the six comments that resulted in an initiation with 41 out of the 78 total utterances. The other students only asked four questions in the Spring 1 transcript. Table 12 displays the data regarding conversational totals from the teacher and/or other student peers.

Table 12

The Total Utterances in Three Categories of the Teacher and/or Other Students for Scott

Transcript	Total Preceding	Total Utterances	Total Questions
Fall 1	3	24	2
Fall 2	21	66	25
Fall 3	1	46	7
Spring 1	6	78	12
Spring 2	2	81	25
Spring 3	10	43	10
Spring 4	9	52	15

Note. Total utterances include only verbal teacher responses.

Table 13 includes totals for all students' utterances. Obligatory responses only represented 22% of their communication, while the non-obligatory responses represent a higher percentage of the conversation at 28.7%. True initiation was used 17% of the time by the students.

Table 13

Total of All Student's Utterances

Total Utterances	Initiation	NO	NO/imitations	NO – UC intent	Obligatory
498	85	159	143	1	110

Note. Non-obligatory (NO) responses are divided into 3 categories, non-obligatory, non-obligatory imitations, and non-obligatory gestures and vocalizations without clear intent [UC- unclear]

For the teacher's overall totals, see Table 14. In this study, a teacher or another student elicited an initiation 26.8% of the time. It was noted that 19% of the time a teacher asked a question, pragmatically requiring an answer. Questions reduce opportunities for initiations. Whereas 78% of the time the teachers were commenting and the remaining 3% was teacher explanations, nonverbal cues, correcting or a peers' utterance.

Table 14

Total of the Teacher's Preceding and Overall Utterances

Pro. Utterances	Comment	Interruption	Explanation	Nonverbal [a]	Correction	Student
359[a]	282	36	1	4	8	1

[a] 359 preceding utterances elicited an initiation out of 1, 337 total utterances by teachers or other students

Figure 1 is a visual representation of the number of initiations in comparison with the type of input used: aided input, environmentally aided input, and no aided input.

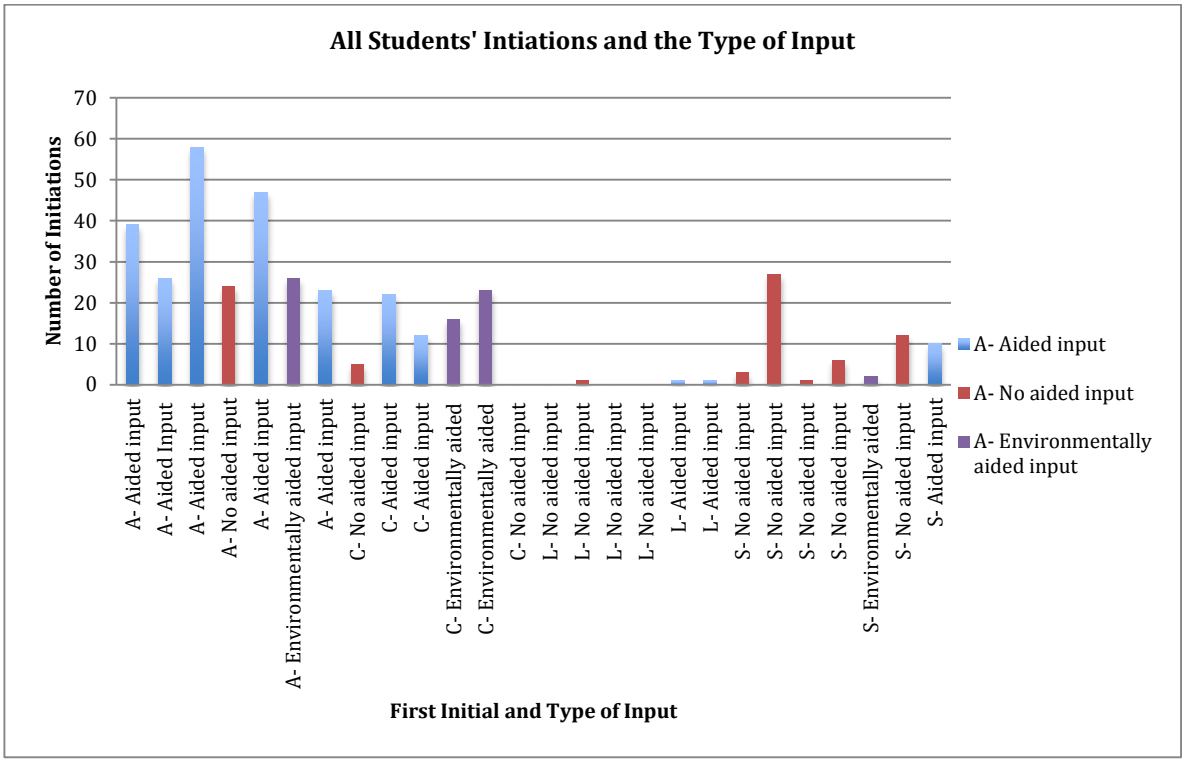

Figure 1. All Students' Initiations and the Type of Input. This figure illustrates the effectiveness of each type of input on the number of initiations

The function of the teacher's preceding utterances that resulted in a student initiation is identified in Figure 2. Commenting is the most successful function of speech that resulted in initiation, with 85% of student initiations following a comment from the teacher. Next, students initiated after a question in which they chose to interrupt. Explanation, non-verbal cuing, corrections, and a student responding to their own selves were successful less than 4% of the time.

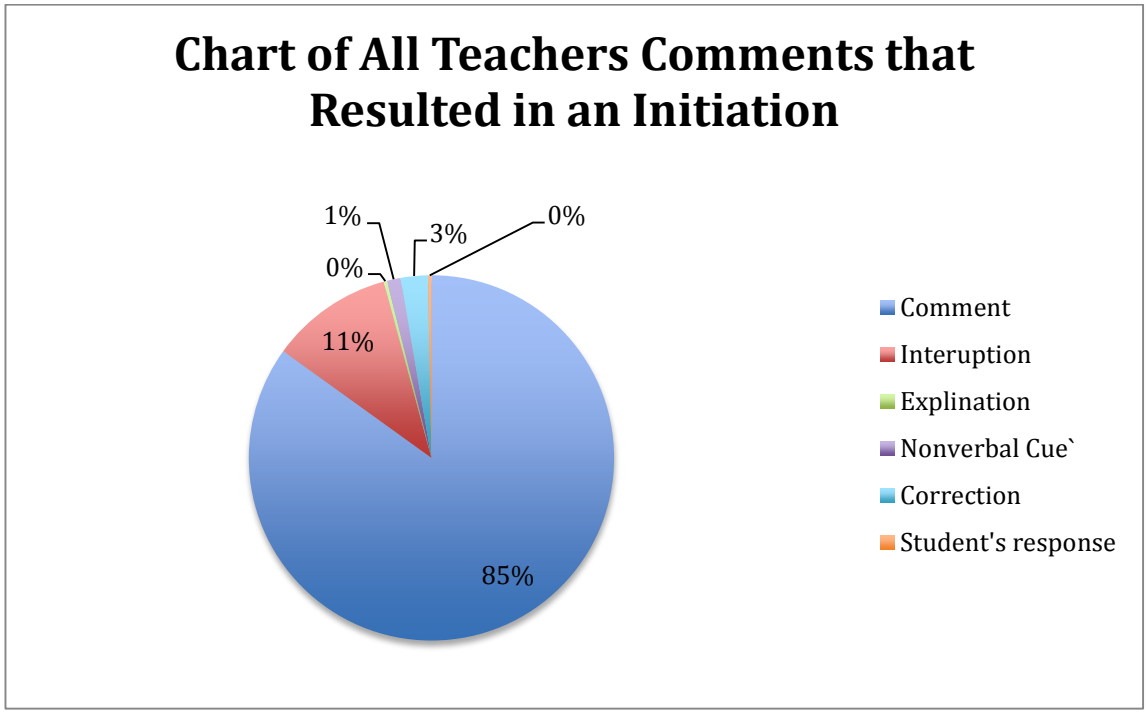

Figure 2. Chart of All Teachers Comments that Resulted in an Initiation. This chart illustrates which teacher utterances were most successful in eliciting initiations.

Figures 3, 4, 5, and 6 are charts of the number of initiations in comparison to the class type: either individual, group or lecture format. The individual format was characterized as at least one teacher and no other students present. A group setting occurred in an activity setting, when the students were expected to participate regularly and interact with other students. Lastly, the lecture format is when the teacher wanted students to primarily listen and answer questions. Claire's transcript, Spring 3, occurred in a group setting but resulted in zero initiations and therefore does not show up on the chart. Similarly, Logan had three interactions in individual settings that resulted in zero initiations.

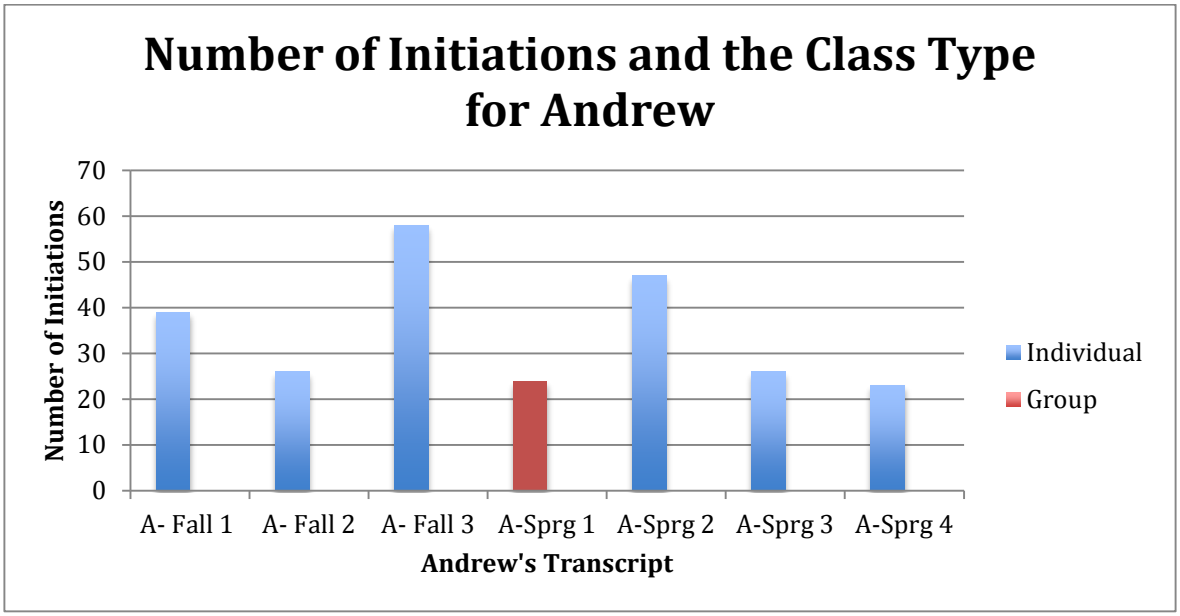

Figure 3. Number of Initiations and the Class Type for Andrew. This figure illustrates the effectiveness of the type of interaction, whether one-on-one, group or lecture.

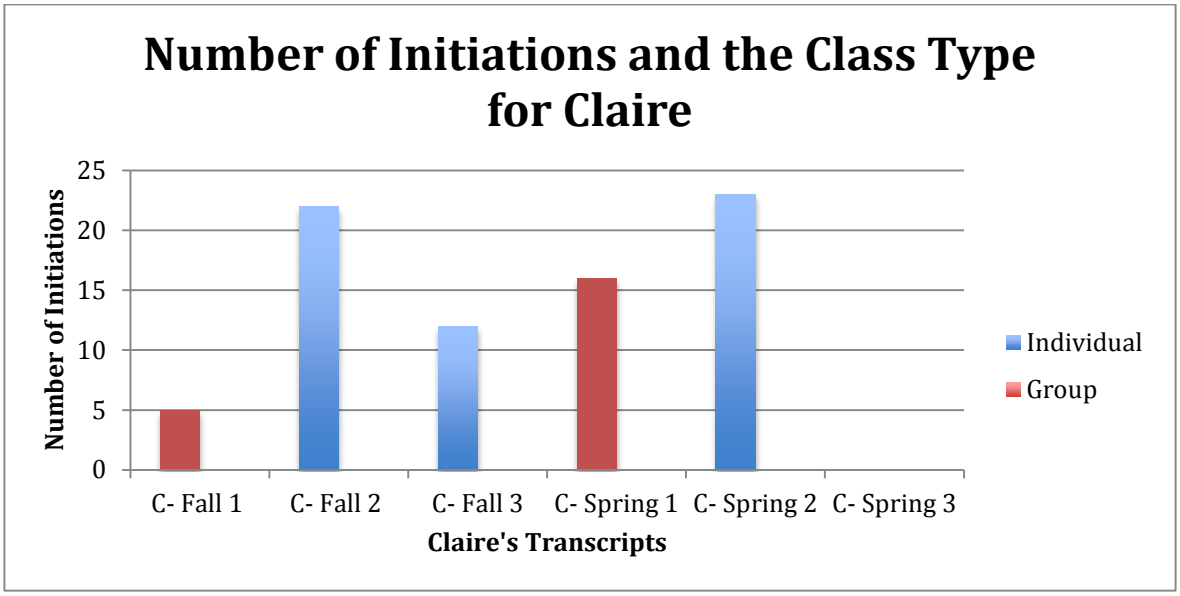

Figure 4. Number of Initiations and the Class Type for Claire. This figure illustrates the effectiveness of the type of interaction, whether one-on-one, group or lecture.

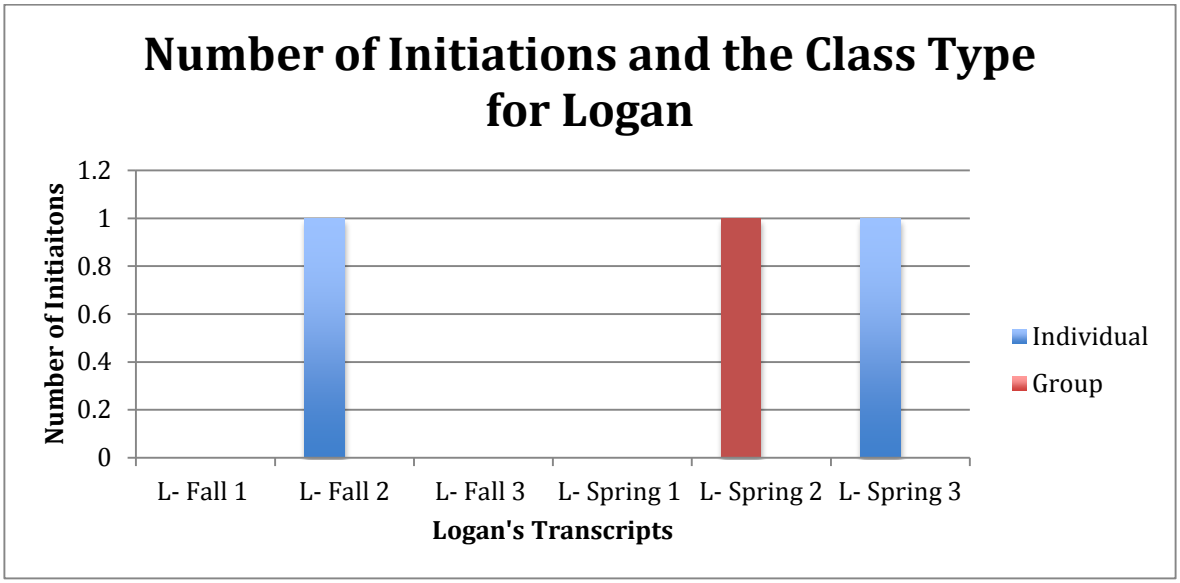

Figure 5. Number of Initiations and the Class Type for Logan. This figure illustrates the effectiveness of the type of interaction, whether one-on-one, group or lecture.

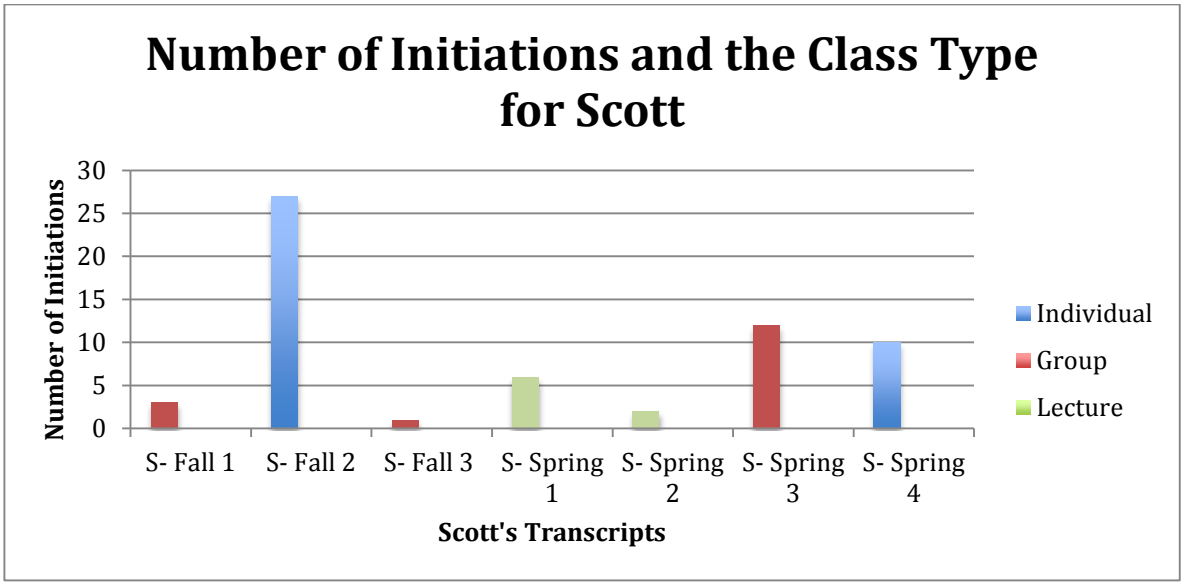

Figure 6. Number of Initiations and the Class Type for Scott. This figure illustrates the effectiveness of the type of interaction, whether one-on-one, group or lecture.

Figures 7 and 8 show the number of student utterances in comparison with environmental factors. Figure 7 displays the level of noise in the environment on a scale of three levels: quiet, moderate and loud. A pattern is seen with a higher number of total student utterances in a quieter environment. This may be due to either an

improved ability to listen, focus, or comfort level. The second graph displays the focus of the teacher. Similarly, this may or may not be the cause of the increase. It seems likely the teacher with divided attention would have an effect on a student, whether providing less feedback, less opportunities or any other change in the conversational format. If another student or teacher often distracts a teacher, it may be evidence as to why the numbers of utterances change.

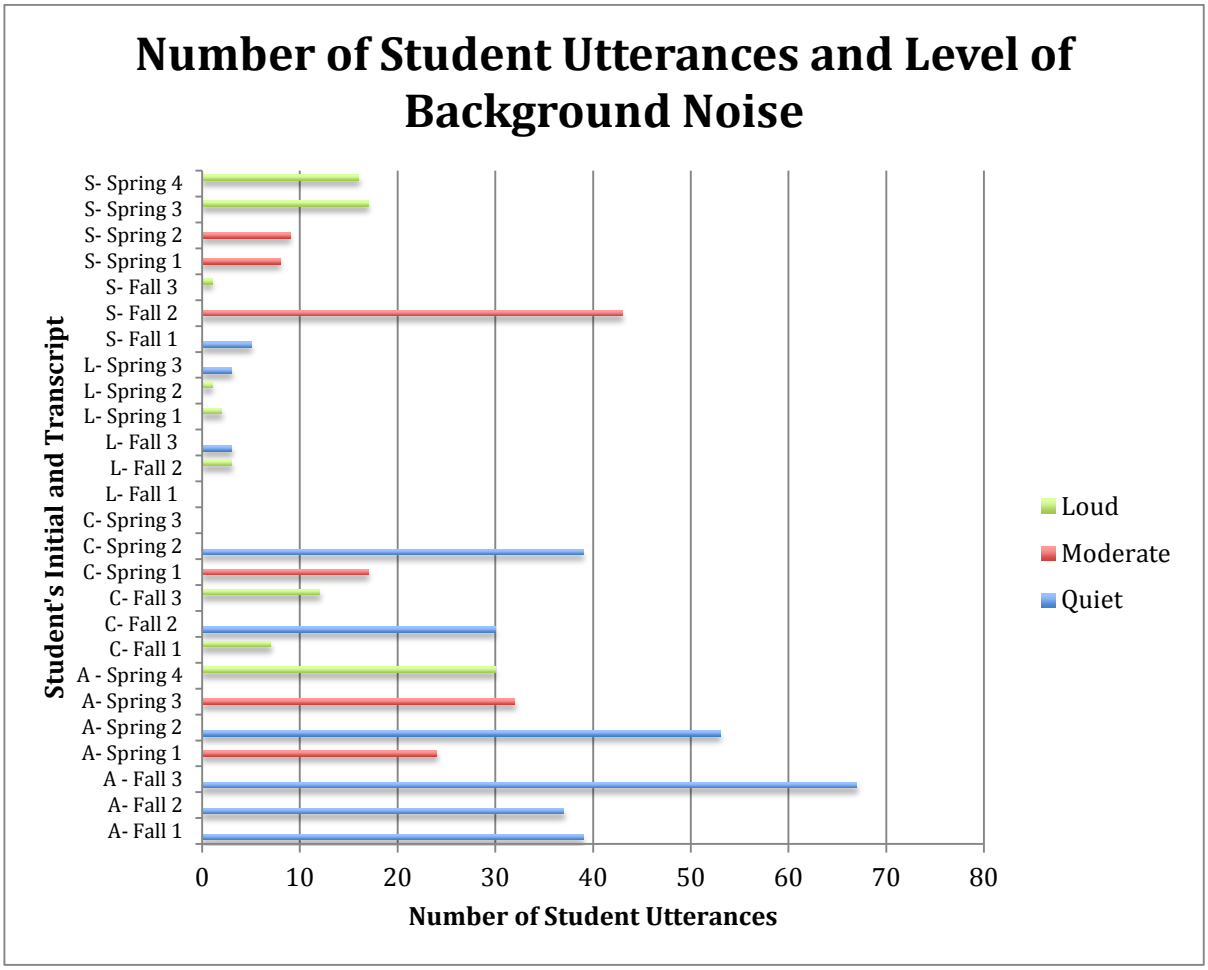

Figure 7. Number of Student Utterances and Level of Background Noise. This figure illustrates the effect of background noise on total student utterances.

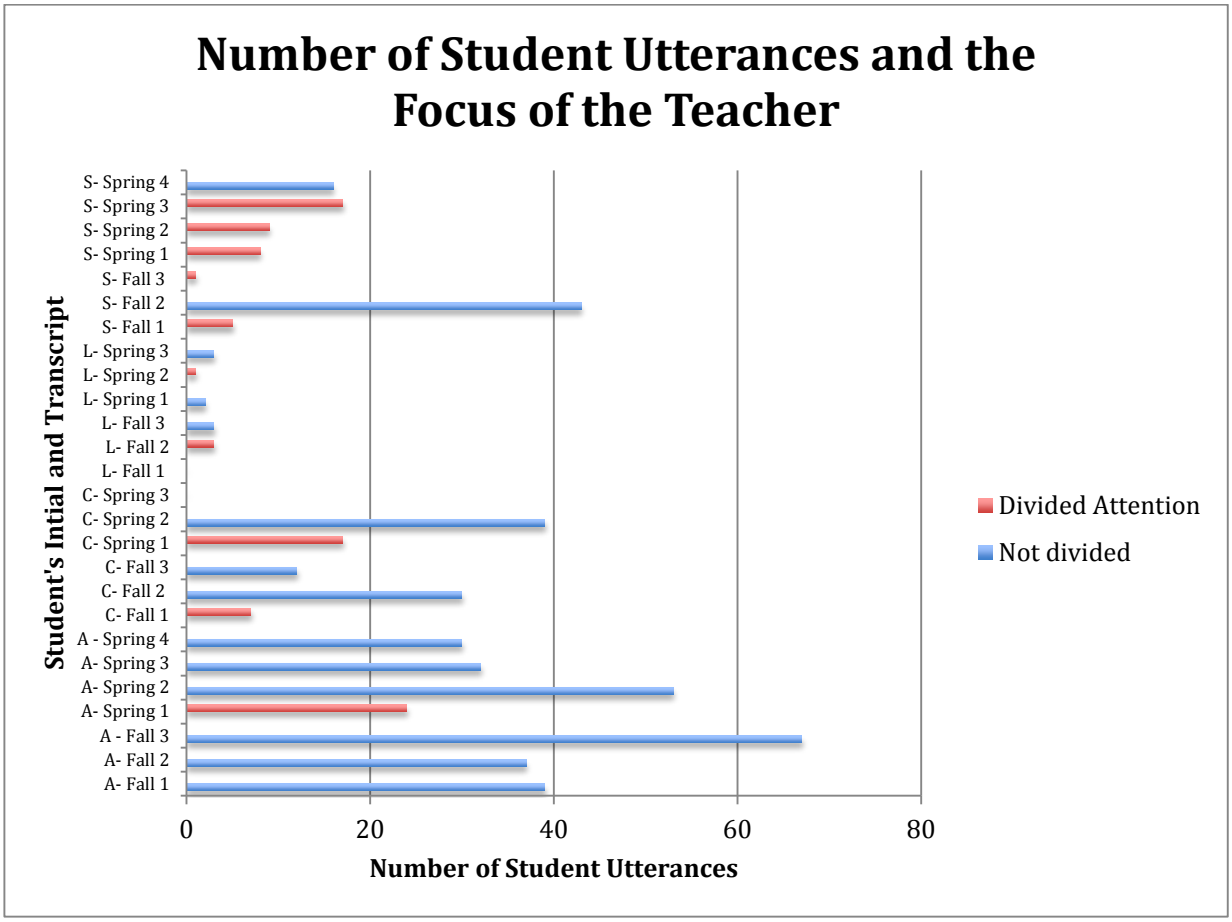

Figure 8. Number of Student Utterances and the Focus of the Teacher. This figure illustrates the overall effect of the teacher's focus, whether it was divided or not.

The more a teacher focuses on a student, the higher the incidence of student utterances. While it is not feasible for a teacher to always be 100% focused, if competing factors are at least reduced, it seems to show improvement and benefit for the student.

Discussion

These findings have implications for therapy and the daily lives of students who use AAC devices, as well as non-users of AAC. By identifying trends, therapists', teachers', and para educators' instruction for students who use AAC to communicate can be improved. This thesis provides suggestions for conversational structure that

could provide more opportunities for students to practice initiation of language, a necessary function to gain attention, switch the topic, or make a comment or request needs or wants. While every person has their own unique style for learning and communicating, a few trends that may have an affect on the number of initiations have been identified.

Individual Trends

Beginning with individual trends, Andrew's number of initiations dropped when the teacher had to divide her attention, due to competing factors and the group setting. See Spring 1 in Table 1. With only one transcript in this type of setting, group, the cause cannot be determined. It may be the teacher's need to divide her attention, the activity (playing "Simon Says"), or even the student's mood that day that could be attributed to the decrease in initiations. It should also be noted that "Spring 1" is the only video in which there was no aided input or environmental aided input, so it may be a contributing factor.

Claire had two transcripts in which she produced fewer initiations. There are several possible reasons. First, in both videos the teachers had competing factors for their attention. In Fall 1, the aide that was communicating with Claire was unfamiliar with the device, and spent most of the time familiarizing herself with the process and device. Spring 3 was a group setting where both of the other students and teachers were competing for the main teacher's attention who was trying to get a worksheet for Claire. This format did not provide opportunities for communication or initiations. The classroom was loud in both of the settings, which may be another factor for reduced initiations. Claire, however, did also benefit from the group setting. In Spring

1, Claire had 11 initiations, in which another students modeled the preceding utterance five out of the eleven times.

Logan, in Fall 3, made three vocalizations in a brief, 14 second clip. This may have been due to excitement in the conversations, despite the fact that no aided input was used. When talking about a student's interest, with a higher level of familiarity, there may be increased motivation or focus on that topic. Otherwise, there is a possibility it was due to additional factors such as time of day, mood, type of task or even level of physical fatigue.

However, Logan had a low number of initiations in his other videos (between zero and one). This may be due to consistency of wait time for Logan. Which often was less than 30 seconds. Logan appeared to need additional time to process the information and/or create the motor plan. It was noted that Logan responded to yes/no questions when using a switch when 30 seconds or more of wait time was provided. Also, often the environment was over stimulating: materials used had many colors (e.g., bright letters, multicolored numbers), loud noises, and the teachers' had competing factors that divided their attention. Even when the teacher's attention was not divided, often she would continue to talk after asking him to make a selection, either rephrasing the question or commenting. This might not have allowed for Logan to process the question and answer before more stimuli were added for him to process.

Another potential reason for the reduced number of initiations could be the lack of consistent access to his switch or PODD (pragmatic organization dynamic display, or a picture book used for communication). Since Logan is nonverbal with

limited mobility, he has limited ways to request a device when he has something to say. Reducing access to their device can affect their communication in many ways. Something that is not consistent is seen as unreliable in most cases and people often will try to reduce their dependence on unreliable things. This may reduce the motivation Logan has for using his PODD communication device. It also allows fewer opportunities to practice, with more time between uses to forget skills. Lastly, it reduces the ability to say what they need or want to say, which is not fair to the child and reduces the ability to provide the best quality of life. Overall, consistent access is recommended, especially during a conversation.

Scott's initiations decreased in Spring 4, despite the use of aided input. A possible reason as to why there is not an increase in initiations for that transcript would be the activity, which was answering multiple-choice questions with an iPad during his turn. So the target interaction for the lesson was responding. The other portion of the transcript was Scott working on a puzzle.

Another possible reason for the reduced initiations in all of the transcripts besides Fall 2, and Spring 4 is the type of activity. Since it was a group, the teacher's focus was split between students, reducing the opportunities per student. The activities included: naming flashcards (on their turn), Simon Says, a group reading activity, and naming family members. Activities, which require the students to wait for their turn and then follow a command (e.g., say the word on the card, touch your nose, or answer the questions), may impede opportunities to initiate.

Group Trends

Aided input is beneficial to both a student's receptive and expressive skills (Barker et al, 2013). It helps individuals to also learn their own device better and how to use it. Aided input appears to be an effective way to increase initiations overall. When the student begins to understand the communication book and how it works, the numbers of initiations increase, as seen with Claire and Andrew (Figure 1). In watching and analyzing the entire videos, it appeared that Claire and Andrew, both frequently receive aided input. Students who received less aided input initiated less, as it seems with Logan and Scott. Environmental aided input (using a visual other than the students' communication book) helped overall, but it did not appear as successful as aided input with their own speech device. Having access to the device and using it to model speech in different ways is important to a student's learning. The teachers that modeled their thoughts and directions also had were the most successful at having the students engaged and participating in the activity. However, there is no way to test for causation in this setting. A student may simply be more focused, awake, or interested in a particular activity explaining the increased number of initiations. Studies have indicated aided input is beneficial and may be a reasonable explanation for the increase in initiations (Barker et al, 2013).

Another possible cause could be attributed to the emergence of a new communication skill for Logan and Scott, meaning they are less familiar with their own device. It was unknown when each of the students' received their device and with a large variability in capability, their utterances were not comparable. It may be that Claire and Andrew received their device previously or have had more experience with AAC, and that is why they are more capable of producing initiations. Emerging

skills are abilities that are introduced but not naturalized yet, which could explain Logan and Scott's skills, depending on when they received their device or their language skill.

Next was the type of function of the speech of the teacher that affected the student's number of initiations. Eighty-five percent of successful preceding utterances were a comment from the teacher. The more a teacher modeled their thoughts and pragmatically did not require a response, the more opportunities the student received to practice initiating within a conversation. While questions did allow for eleven percent of the initiations due to interruptions, interruptions are not a communication function that is not always ideal to reinforce in a student in a classroom setting. A question requires a response, meaning that there is no socially acceptable way to answer as an initiation without interrupting. The more questions a teacher asks, the less opportunities there are for socially acceptable initiations.

The class interaction type also appeared to change the number of student initiations: whether individual time with a teacher, a group activity or lecture. A student given more attention may have more opportunities to talk with the teacher. The group settings provide peer models and allow for fewer teachers to be needed. Those models are necessary to help synthesize a skill. However, one-on-one therapy had increased intentional modeling and opportunities to practice, which benefitted the emerging skill of initiation. When a student is learning a skill, it is important to provide settings, one to teach individually and one to provide additional models in a natural context.

Lastly, being aware of the environment of the student may increase overall utterances and participation in therapy. The students within this study appeared to perform better when the environment was quiet and there were fewer distractions for the teacher. The most effective environments, for when anyone is targeting communication skills, need to be a priority to allow our students maximum focus on the current task and goal. So by reducing the background noise and competing factors for the teacher, the student may have better capability of focusing and learning target words and communication goals. This could create a maximized learning moment with the highest number of opportunities present.

While there is limited research on increasing the number of initiations with students who use AAC, there appears to be trends present that can provide the student with the best possible chance of being successful if that is the goal. However, these skills may not just apply for students with AAC. These are feasible adaptations for verbal students as well to provide an environment conducive for learning to initiate. All students could benefit from being provided opportunities and modeling regularly to practice different speech functions, especially initiations.

Limitations

Due to speech and language's complexity, as well as each individual person's unique abilities and fluctuating focus and skills, potential trends can be identified but not confirmed. The limitations of this study revolve around difficulty identifying correlations between factors in the classroom. However, trends that appeared to increase initiations with the individuals of this study can be identified and researched further in other learning interventions.

Given a longer period to collect data, trends in the classroom and student growth could be observed. Instead of using transcripts from just one academic year, it would be interesting to use language samples spanning a few years, and track the amount of student change between the years. With the broad range of abilities in this study and only a sample size of four unique students: an increased number of students could assist in determining if maybe trends vary depending on the student's disability or motor skills.

Due to the short window of time to complete the study, wait-time between teacher utterances could not be analyzed. Wait time is a teacher's utterance and the time until someone speaks again, whether the teacher or student. Additional teacher utterances could require the student to process the additional utterance and remember what happened previously. For instance for some students, if asked a question and the student is trying to process how to respond to a first question, and a teacher rephrases the question, the student must process the additional utterance and attempt to remember the previous question and figure out how to respond correctly. Wait-time is important to allow the student to process the information, comprehend it, and respond appropriately. Without enough wait-time, a student may become over stimulated or confused on how to respond in the conversation. If a student struggles with creating a motor plan or understanding the conversation, they may also need additional time. For example, Logan did not have consistent access to his device and often seemed to be given too short of wait time. The less time he receives practicing his device, the more unfamiliar he is with it, and with reduced wait time, he may not be able to process his thoughts and find an appropriate

response in the wait time he receives before the teacher speaks again. Consistent access is necessary for the reinforcement of the device and creating that familiarity. Since the information for this thesis comes from the transcripts and videos alone, there is no way to identify his capability with longer wait times and consistent access to his device.

Lastly, with all of the information coming from a larger study, information regarding how each teacher went about introducing the speech device is not clear. For example, how frequent scaffolding was presented and needed for each individual student or the lesson plan for the activity observed. Also, this study did not identify the percentage of aided input used during the day. It was identified in the transcript but only a small portion of the day. A percentage of the time a teacher models the use of a device may help identify new trends. Thus, a pattern emerging from the amount of access a student has to the device, if it is used at home, when they received it, or even how often the teacher models the device is unknown.

Future Research

It is apparent that some trends exist. The type of activity, the number of comments a teacher makes, the amount of wait time, and the type of environment are just a few factors that appear to affect the number of initiations. With additional research and an increased number of students analyzed, these factors and their effects on initiations may be supported with more evidence. Data collected over a longer period of time for an increased number of students could provide insight to more nuances of communication skills, in this case initiation. Future research needs to analyze wait time, percentage of the use of the aided input, and methods of

teaching students AAC devices. Also other functions of communication could be analyzed, such as number of student questions, attempts to regulate the environment, or social interactions. This further research could determine best procedures to elicit all forms of communication.

Conclusion

The communication partner has a significant role in creating and adapting the environment and their own speech to assist others learning to communicate, especially users with AAC. Communication is essential to building social relationships and having a better quality of life through the ability to regulate their environment and have relationships. Any user of AAC needs to be able to initiate for several important reasons such as requesting needs or wants, building relationships, and discussing topics meaningful to them, self-advocacy, and self-determining. Without this, they are dependent on the communication partner to introduce all topics. The recommended adaptions found in this study have implications for providing improved results for initiations with students who use AAC. By providing an environment with maximum opportunities to practice and generalize a skill, a student will be able to efficiently synthesize these skills. The field of speech-language pathology could benefit from improved interactions with the client, which may increase motivation from the student. In order to provide therapy, speech-language pathologists must identify what evidence is available to support their therapy procedures. In order to be able to offer continuous therapy, a speech-language pathologist must be able to show the client benefits with supporting data. This thesis

supports the need for a trained communication partner to create optimal settings for student's using AAC to improve their ability to initiate during interactions.

References

Augmentative and Alternative Communication (AAC). (n.d.). Retrieved October 27, 2015. Retrieved from http://www.asha.org/public/speech/disorders/AAC/

Barker, R. M., Akaba, S., Brady, N. C., & Thiemann-Bourque, K. (2013). Support for AAC use in preschool, and growth in language skills, for young children with developmental disabilities. *AAC: Augmentative & Alternative Communication*, *29*(4), 334-346. doi:10.3109/07434618.2013.848933

Beukelman, D.R., & Mirenda, P. (2005). Augmentative and alternative communication: Supporting children and adults with complex communication needs (3rd ed.). Baltimore: Paul H. Brookes

Brandone, A., Salkind, S., Golinkoff, R., & Hirsh-Pasek, K. (n.d.). Language development. Retrieved October 18, 2015. Retrieved from http://udel.edu/~roberta/pdfs/Bear%20chaptBrandone.pdf

Edmister, E., Garrett, J., Staples, A., Peterson, A., Kliewer, C. (2012). *Results of Year One of the Comprehensive Communication and Literacy Project.* Iowa Department of Education.

Kaneshiro, N., Zieve, D., & Ogilvie, I. (2014, June 25). Language disorder - children: MedlinePlus medical encyclopedia. Retrieved October 28, 2015, from https://www.nlm.nih.gov/medlineplus/ency/article/001545.htm

Kent-Walsh, J., Binger, C., & Buchanan, C. (2015). Teaching children who use augmentative and alternative communication to ask inverted yes/no questions using aided modeling. *American Journal Of Speech-Language Pathology*, *24*(2), 222-236. doi:10.1044/2015_AJSLP-14-0066

Mercer, C. D., & Mercer, A. R. (1998). Teaching students with learning problems (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Soto, G., & Zangari, C. (2009). *Practically speaking: Language, literacy, and academic development for students with AAC needs* (pp. 52-54). Baltimore, Md.: Paul H. Brookes Publishing.

Speech and Language Disorders and Diseases. (n.d.). Retrieved October 28, 2015, Retrieved from http://www.asha.org/public/speech/disorders/

Speech and Language Impairments | Center for Parent Information and Resources. (2011). Retrieved October 28, 2015, Retrieved from http://www.parentcenterhub.org/repository/speechlanguage/

Ukrainetz, T. (2006). *Contextualized language intervention: Scaffolding PreK-12 literacy achievement* (pp. 19-23). Eau Claire, Wis.: Thinking Publications.

Van Tatenhove, G. (n.d.). Resources. Retrieved October 18, 2015. Retrieved from http://www.vantatenhove.com/index.shtml