CONVERSATIONAL CONTRIBUTION BETWEEN AAC USERS AND TYPICALLY SPEAKING PARTNERS

A Dissertation by

Meng-Ju Tsai

Master of Arts, Washington State University, 2005

Bachelor of Science, Chung Shan Medical University, 1998

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The following faculty members have examined the final copy of this dissertation for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Doctor of Philosophy with a major in Communication Sciences and Disorders.

_____
Julie W. Scherz, Committee Chair

_____
Kathy L. Coufal, Committee Member

_____
Anthony DiLollo, Committee Member

_____
Randy Ellsworth, Committee Member

_____
Kathy H. Strattman, Committee Member

Accepted for the College of Health Professions

_____
Peter A. Cohen, Dean

Accepted for the Graduate School

_____
J. David McDonald, Dean

DEDICATION

To my parents and my wife

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As I look over the past four years, I realize that I have faced a myriad of challenges, all of them teaching me to solve problems and to think critically. I truly believe that many people I have met and/or interacted with in the past few years in the United States have had a significant influence on me and on my future academic career.

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ABSTRACT

The purpose of this study was to investigate the contributions of conversation dyads involving individuals who use augmentative and alternative communication (AAC) devices and their typically speaking conversation partners, which were analyzed by counting conversation turns and by counting attributed speaking roles (i.e., animator, author, and principal) (Goffman, 1981). Another purpose of this study was to compare the conversational contributions made across familiar and unfamiliar of conversation dyads using the same measures.

Three individuals who use AAC and 27 typically speaking conversation partners participated in this study. Each AAC user had conversations with three direct care providers, three professional service providers, and three randomly assigned unfamiliar conversation partners. Twenty-minute conversations were video recorded for each dyad. The findings indicated the asymmetries of conversational contributions of the dyads, as measured by conversation turns and speaking roles. The measurement of speaking roles showed less asymmetrical conversational contributions in the dyads than did the measurement of conversation turns. The familiarity of conversation partners did not show any significant effect on conversational contributions.

This study also provides a novel application of the measurement of speaking roles, which was shown to be particularly suited to the study of conversational contribution of individuals who use AAC in conversation. These results have implications for speech-language pathologists and scholars who evaluate conversations with AAC users and for assisting their conversation partners.

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AAC	Augmentative and Alternative Communication
SGD	Speech-Generating Device
SLP	Speech-Language Pathologist(s)

CHAPTER I

INTRODUCTION

Conversation

Conversation requires at least two participants, one serving as a speaker and the other serving as a listener (Clark, 1996). In a dyadic conversation, both participants take turns acting as speaker and listener, using recognizable communication channels (e.g., spoken language) (McTear & King, 1991). In general, conversation is characterized by conversation turns, communication goals, and collaboration (i.e., coconstruction) among conversation participants.

Conversation turns have been identified as an important feature in every conversation (Schieffelin & Ochs, 1986). Although there are diverse definitions of conversation turns in the literature, conceptually, it is recognized as that sequence of exchanges that constitutes a conversation (Wiemann, 1985). A conversation turn is "shaped by conversation participants as they engineer the selection of the current speaker" (Clark, 1996, p. 331). In other words, each conversation turn is influenced by prior turns produced by other conversation participants (Wiemann & Knapp, 1975).

Contributing to Coconstruction

In recent years, there has been a movement towards investigating conversational coconstruction among participants. Various terminologies (e.g., grounding and cooperation) have been used to represent the concept of coconstruction. The central concept is that "conversation is a collaborative operation by two or more [conversation] participants" (Damico, Oelschlaeger, & Simmons-Mackie, 1999, p. 670) and is used to construct meanings of verbal and nonverbal communication behaviors through turn-taking, which leads to attaining mutual communication goals (Bloch & Beeke, 2008; Clark, 1996; Gan, Davison, & Hamp-Lyons, 2008). Goals may

include the following: (a) expressing needs and wants; (b) exchanging information (e.g., ideas, thoughts, and experience); (c) developing social closeness; and (d) fulfilling social etiquette routines (Light, 1988).

Six factors influencing participants' conversational coconstruction have been described in the literature, including *contexts* (Fetzer & Akman, 2002; Gumperz, 1982; Kovarsky & Maxwell, 1997; Leahy, 2004; Olsson, 2004; Simmons-Mackie, Elman, Holland, & Damico, 2007; Simmons-Mackie, Kingston, & Schultz, 2004), *shared personal experience* (Oelschlaeger & Damico, 1998; Simmons-Mackie, Kingston, & Schultz, 2004), *shared world knowledge* (Milosky, 1990; Oelschlaeger & Damico, 1998; Olsson, 2004; Simmons-Mackie et al., 2004), *attitudes* (Simmons-Mackie et al., 2004), *motivations* (Leahy, 2004; Oelschlaeger & Damico, 1998; Simmons-Mackie et al., 2004), and *communication skills* (Simmons-Mackie et al., 2004). Different conversation partners who are affected by different factors (e.g., shared world knowledge) may react differently in their coconstruction of the conversation. It is generally agreed that coconstruction is critical in conversation between typically speaking conversation participants in order to attain mutual communication goals.

Coconstruction of Conversation toward Conversational Contribution by AAC Users

Although the introduction of augmentative and alternative communication (AAC) devices or systems was to provide individuals with communication disorders a means to participate in conversations, there are many difficulties (e.g., limited skills in operating AAC devices or systems) that may cause these individuals to be unable to fully contribute to dyadic conversations. Several scholars (Buzolich & Wiemann, 1988; Kagan, Black, Duchan, Simmons-Mackie, & Square, 2001; Light, 1988) have concluded that individuals who use AAC need a typically speaking conversation partner to actively coconstruct their dyadic conversations in

order to create meanings and reduce miscommunication, and then attain their mutual communication goals in the conversation.

Like typically speaking conversation participants, in order to attain coconstruction of conversation, individuals who use AAC and their conversation partners must collaboratively create meanings from their nonverbal and verbal communication behaviors through taking turns. However, the introduction of AAC to individuals with communication disorders does not guarantee that they will have successful conversations with others. Several skills must be mastered, including skills in the operation of AAC devices and systems, linguistics, social conversation, and conversation strategies (Light, 1989). A number of potential barriers, such as physical disabilities and limited vocabularies, may cause AAC users to be unable to competently use their AAC devices and/or systems (Beukelman, 1991; Light, Collier, & Parnes, 1985).

Several studies (e.g., Bloch & Wilkinson, 2004; Goodwin, 1995) have concluded that individuals who use AAC, to some degree, may utilize whatever communication modes (e.g., gestures, unintelligible phonemes or words) they have available to reach a certain level of coconstruction of conversation. This is supported by the belief that successful conversation does not fully rely on understanding of communication modes (e.g., spoken speech, messages generated from AAC) but rather on information transmission (McTear & King, 1991).

Individuals who use AAC receive varying levels of support from their typically speaking partners in order to successfully coconstruct conversations (Beck, Fritz, Keller, & Dennis, 2000; Light, 1988; Lilienfeld & Alant, 2005). These typically speaking conversation partners take more responsibility in coconstructing conversations with individuals who use AAC (Beukelman & Yorkston, 1982; Buzolich & Wiemann, 1988; Kagan et al., 2001). However, typically speaking conversation partners must view the individuals who use AAC as capable of engaging

in conversation (Higginbotham & Yoder, 1982; Oelschlaeger & Damico, 1998; Sweidel, 1991). The coconstruction of conversation between a typically speaking partner and an AAC user may result in an asymmetrical conversational contribution on the part of the AAC user (Collins & Markova, 1999; Kent-Walsh & McNaughton, 2005). Typically speaking conversation partners coconstruct the conversation by asking a series of questions, offering conversation topics, and independently choosing a topic and moving forward or closing the conversation (Collins & Markova, 1999).

However, typically speaking conversation partners may bring different types of skills and related factors (e.g., personal styles) to the conversation with individuals who use AAC (Kent-Walsh & McNaughton, 2005). Some may be able to fully coconstruct the conversation with the individuals who use AAC, but some may not (Kent-Walsh & McNaughton, 2005). This could be the result of a series of challenges faced by these typically speaking conversation partners, including limited recognition of meanings of diverse communication modes from the AAC users, and the partners' perceptions of the AAC users as being unable to fully participate in a conversation. In a similar vein, familiarity with those individuals who use AAC, their AAC devices or systems, and/or their communication modes also influences skills in coconstruction of the conversation with AAC users (Hemsley, Balandin, & Togher, 2008; Higginbotham & Yoder, 1982).

More recently, the focus of studies has shifted to analyzing conversations between individuals who use AAC and their typically speaking conversation partners by measuring conversation turns (e.g., Buzolich & Wiemann, 1988), discourse units (e.g., Light et al., 1985; Muller & Soto, 2002), or conversational control (e.g., Farrier, Yorkston, Marriner, & Beukelman, 1985). Essentially, these studies have investigated conversation turns contributed by these dyads

and have concluded that asymmetries exist in their conversations, with typically speaking conversation partners taking more conversation turns than AAC users.

Frame Analysis of Talk - Framework of Speaking Roles

In 1974, Goffman first proposed the approach of frame analysis of talk. When Goffman referred to "talk", he was actually describing dyadic conversation. The concept "frame" was described as a cognitive structure (e.g., premise) that channels the perception and representation of reality (Bateson, 1985; Goffman, 1974), and is used "to select more aspects of a perceived reality and make them more salient in a communicating text" (Entman, 1993, p. 52). Simply speaking, frame is the position that each participant holds during the conversation, whereby participants (i.e., speakers) make the frame noticeable to other participants (i.e., listeners) by showing verbal and/or nonverbal communication behaviors (Schiffrin, 1994), which can be broadly perceived as communication goals (e.g., information sharing or requesting information/needs).

Goffman (1981) also noted that a conversation participant holding a frame in speaking may change the projected frame to another frame (i.e., conversation position). The term "footing" was proposed to illustrate this change. Footing describes "how a person assumes various fundamental roles when speaking" (Leahy, 2004). Change of footing occurs across conversations, thus establishing a new footing, which is characterized as the feature of speaking (Goffman, 1981).

In order to characterize a footing change during conversation, the concept of "speaking roles" was proposed by Goffman (1981). Three roles of speakers have been proposed - animator, author, and principal (Goffman, 1981). Animator is defined as a person who acts as a talking machine to produce a message, and author is defined as a person who selects ideas or thoughts to

be expressively produced (Goffman, 1981). The third role, principal, is defined as a person who generates the idea or thoughts that are spoken. A conversation participant can assume all three speaking roles (i.e., animator, author, and principal) in producing verbal communication behaviors (e.g., spoken speech). In other words, an utterance is spoken by an individual who produces the utterance, and selects the messages that conveys the thoughts and ideas. Nevertheless, the three speaking roles do not necessarily have to be assumed by each conversation participant (Simmons-Mackie et al., 2004). These three speaking roles are attributed to conversation participants in a dyadic conversation while considering contextual cues (e.g., linguistic features) (Goffman, 1974, 1981; Gumperz, 1982; Schieffelin & Ochs, 1986; Simmons-Mackie et al., 2004; Walsh, 2007). Contextual cues help listeners not only minimize miscommunication (Goffman, 1974) but also appropriately change speaking roles in the next conversation turn.

The analysis of speaking roles provides a way to examine dyadic conversation by considering both the speaking roles of the conversation participants and their use of environmentally contextual cues. The changes of speaking roles are considered "important aspects of management of cooperative talk" (Simmons-Mackie et al., 2004, p. 114), and need to be negotiated (Tannen & Wallat, 1993).

Statement of the Problem

A number of studies (e.g., Buzolich & Wiemann, 1988; Farrier et al., 1985; Light et al., 1985; Muller & Soto, 2002) have investigated conversations between individuals who use AAC and their typically speaking conversation partners by analyzing the frequency of conversation turns and signals of conversation turns (e.g., speaker state signal). Generally, these studies have agreed that asymmetries occur in these dyadic conversations, whereby typically speaking

conversation partners contribute more turns to the conversation than the individuals who use AAC. However, the traditional approach of counting conversation turns, fails to account for the role of coconstruction and therefore underestimates the relative conversational contribution of AAC users. Consequently, how individuals who use AAC and their typically speaking conversation partners contribute collaboratively to their dyadic conversations is not clearly understood.

It is known that both conversation participants (e.g., an individual who uses AAC and a conversation partner) contribute different conversation behaviors during their interactions (Kraat, 1985; Light, 1988; Nelson, 1992; O'Keefe & Delia, 1985), and these contributions vary across communication contexts and conversation participants (Light, 1988; Nelson, 1992). Even though the roles of speaking conversation partners have become a primary concern in conversation with individuals who use AAC, there is limited information on the effects of different types of speaking conversation partners (e.g., familiar vs. unfamiliar conversation partners) on the coconstruction of the conversation and their relative contributions. Additional research is needed to investigate the relative conversational contribution of individuals who use AAC and their typically speaking conversation partners, including familiar and unfamiliar conversation partners.

Goffman's framework of assessing speaking roles has been adapted as a method for analyzing conversation in contexts where one of the conversation partners has a communication disorder, including stuttering (e.g., Leahy, 2004, 2008), stroke (e.g., Walsh, 2007), and aphasia (e.g., Damico et al., 1999; Towey & Pettit, 1980). This method allows for the examination of verbal and nonverbal communication behaviors during the conversation as accounted for by the three speaking roles of animator, author, and principal. Participants' coconstruction of each

verbal and nonverbal communication behavior can be explained on the basis of these three roles. To date, there have been no published studies using this method involving speaking roles to analyze conversations between individuals who use AAC and their typically speaking conversation partners.

Purpose of the Study

The purpose of this study was to analyze dyadic conversations between individuals who use AAC and their typically speaking conversation partners in two ways: by counting numbers of conversation turns and by counting numbers of attributed speaking roles. Two research questions were addressed. The first examined the conversational contribution in dyadic conversations as analyzed by the number of speaking roles (i.e., animator, author, and principal) (Goffman, 1981) and by the number of conversation turns for each conversation participant (e.g., Kaye & Charney, 1980; Light et al., 1985; Muller & Soto, 2002). The second research question addressed the conversational contribution attributed to different types of typically speaking conversation partners (i.e., partners who are familiar and unfamiliar with the individual who uses AAC and the AAC device) as they participate in conversations with AAC users.

The anticipated benefit to be gained from this study was an improved understanding of the conversational contributions of individuals who use AAC when engaged in conversation with typically speaking partners. An additional benefit of this study was potentially to highlight the richer information about the conversation capabilities of individuals who use AAC as provided by the analysis of attributed speaking roles.

CHAPTER II

LITERATURE REVIEW

Dyadic Conversation

Conversation can be described as interactive, dynamic, and complex (Brinton & Fujiki, 1989; Gan, Davison, & Hamp-Lyons, 2008; Sacks, Schegloff, & Jefferson, 1974). Face-to-face conversation takes at least two conversation participants with "a transmission channel" (McTear & King, 1991, p. 197), including one serving in a speaking role and the other serving in a listening role (Clark, 1996). Both of them use recognizable communication modes (e.g., spoken language) to send (i.e., speaking role) and receive (i.e., listening role) information (McTear & King, 1991). A single conversation participant cannot complete a conversation (Olsson, 2004). Clark recognized that a conversation constitutes both the speaker's speaking and the listener's listening and that "for each action in speaking, there is a corresponding action in listening" (p. 21). Nevertheless, the sum of these actions by the speaker and the listener do not fully characterize the conversation. Overall, conversation is characterized by collaboration (i.e., coconstruction) with other conversation participants (Clark, 1996).

Coconstruction

The term "coconstruction" which is used throughout this paper in order to maintain consistency, is defined as "a social process by which individuals dynamically alter their actions with respect to the ongoing and anticipated actions of their partner" (Fogel, 1993, p. 12). Coconstruction focuses on "the behavior [that] affects the behavior of another person, is understood by that person, and is responded to in a manner that leads to a desired outcome" (Dunst & Lowe, 1986, p. 11) rather than on the forms of communication behaviors.

A successful conversation requires some coconstruction (McTear & King, 1991). Different terminologies have been used to describe the mutual attainment of communication goals, including coconstruction (e.g., Gan et al., 2008), grounding (e.g., Clark & Brennan, 1991), cooperation (e.g., Gumperz, 1982), co-regulation (e.g., Olsson, 2004), and joint production (e.g., Oelschlaeger & Damico, 1998). Among these diverse terminologies, the core concept is that "conversation is a collaborative operation by two or more [conversation] participants" (Damico et al., 1999, p. 670). In other words, conversation participants cooperatively work together to build mutual awareness of the conversation for each other through taking turns during their conversation (Bloch & Wilkinson, 2004; Goodwin, 1995; Leahy, 2004; McTear & King, 1991). The processes of coconstruction are completed "naturally, without preplanning precisely what will or will not be said" (Leahy, 2004, p. 71).

Purposes of Coconstruction

Coconstruction serves several purposes in conversation (Gumperz, 1982). These purposes include creating meanings (Gan et al., 2008; Leahy, 2004; Olsson, 2004), attaining communication goals (Clark, 1996; Olsson, 2004), and accomplishing communicative competence (Bloch & Beeke, 2008) through turn taking during the conversation (Clark, 1996).

Creating Meanings. Meanings of verbal and nonverbal communication behaviors are not fixed in the conversation but interpreted by the conversation partner (i.e., the listener) (Fogel, 1993). Due to the possibility of not having identical interpretations of meanings, miscommunication is possible among conversation participants, which is "not aberrant; rather it is the norm" (McTear & King, 1991, p. 198). That is, the speaker's intended meanings may not be accurately interpreted by the listener. In this case, the interpretations of the intended meanings

need negotiations between the conversation participants through turns that serve to clarify meanings (Gan et al., 2008; Gumperz, 1982; Leahy, 2004). Simply speaking, both participants must negotiate what they want to talk about (Kretschmer & Kretschmer, 1989). On the other hand, when communication breakdowns occur, communication repair strategies are used in order to reconstruct the conversation with the other conversation participant (Kretschmer & Kretschmer, 1989). Consequently, both participants commit to achieving mutual communication goals within the conversation by using diverse communication modes (e.g., spoken speech, gestures) (Clark, 1996; McTear & King, 1991).

Attaining Communication Goals. Communication is cooperative and goal-directed (Hobbs & Agar, 1985; McTear & King, 1991). While taking turns in a conversation, each participant has communication goals (e.g., asking for route directions) and plans for how he or she intends to achieve these goals on entering a conversation (Clark, 1996; Gumperz, 1982; Wilson, Wiemann, & Zimmerman, 1984). Different communication behaviors directed toward the achievement of each participant's communication goals contribute to the success of the conversation (McTear & King, 1991).

In a broad sense, four communication goals have been proposed (Light, 1988): (a) expressing needs and wants, (b) exchanging information (e.g., ideas, thoughts, and experience), (c) developing social closeness, and (d) fulfilling social etiquette routines. Expressing needs and wants "regulate[s] the behavior of the partner to provide a desired object or to perform a desired action" (p. 76), for example, requesting to watch TV. An example of information sharing occurs when an individual talks about his vacation in Taiwan during the past summer. Light (1988) further indicated that this type of conversation may be lengthy. Both of these communication goals (i.e., expressing needs and wants and exchanging information) stress the success of

transmission of information content. The two remaining communication goals (i.e., developing social closeness and fulfilling social etiquette routines) emphasize the essence of conversation itself rather than its information content (Light, 1988). Developing social closeness has been defined as "to establish, maintain, and/or develop an interpersonal relationship" (Light, 1988, p. 77). For example, individuals might routinely talk to their parents to maintain their relationship. The last goal of communication, fulfilling social etiquette routines, is to conform to social politeness (Light, 1988). For example, an individual might say "How are you?" or "Nice to meet you" to show politeness during the conversation. Communication goals may change as an individual ages or has different communication experiences (Light, 1997a). For example, infants, toddlers, preschoolers, and school-aged children mainly communicate to express needs and wants and to develop social closeness. Adolescents primarily communicate to share information with peers. Adults communicate to fulfill all four communication goals (Light, 1997a).

However, during a dyadic conversation, neither of the conversation participants (i.e., speaker and listener) can know what actually may occur during the conversation, and to some extent, the communication goal is somewhat unclear at the outset. In this regard, both participants must cooperate with each other to achieve their communication goals (Gumperz, 1982). Participants in the conversation "are guided by the overall goals that they hope to achieve. … the participants must attempt to work out their partner's goals and beliefs … their mental states" (McTear & King, 1991, p. 199). Both conversation participants may endeavor to compromise their own communication goals in order to facilitate the other in achieving the goal (McTear & King, 1991). Each participant in the conversation may use different strategies (e.g., taking the perspective of each other) to try to attain mutual communication goals (Savignon, 1983).

Accomplishing Communicative Competence. With the negotiations of meanings and a mutual communication goal, coconstruction during the conversation also enhances the perceptions of communicative competence (Bloch & Beeke, 2008). Wiemann (1977) pointed out that communicative competence is perceived as goal achievement, which is "acquired within the context of reciprocal interactions" (Dunst & Lowe, 1986, p. 17) between the speaker and the conversation partner by using diverse conversational skills (Gerber & Kraat, 1992). In other words, each of them must negotiate "a shared ground" (Light, 1988, p. 79), and thus demonstrate communicative competence during the conversation (Dunst & Lowe, 1986). Competent conversation participants negotiate with each other by "restating, clarifying, and confirming information" (Gan et al., 2008, p. 1) throughout several turns of repeated questions, repeated comments, and/or nonverbal communication behaviors (e.g., head nodding, head shaking) in conversations (Olsson, 2004; Wiemann, 1985). These negotiations are guided by a mutual communication goal that they try to reach during the ongoing conversation (McTear & King, 1991). Consequently, both of them collaborate by coconstructing meanings and searching for information related to the partner's intended communication goals (Duchan, Maxwell, & Kovarsky, 1999; Hymes, 1974; Kraat, 1985; O'Keefe & Delia, 1985; Peck, 1989). A competent speaker tries to "formulate a reasonably informative message and then adjust the message if the listener appears to be confused" (Bryan, 1986, p. 235). Then, the listener must do the following: to: (a) judge whether the message is adequate and ask for more information if the message is unclear, (b) inform the speaker when the message is not clear, or (c) comprehend the message and make a correct response based on the message (Bryan, 1986). The conversation participants mutually affect each other's communication behaviors (Dunst & Lowe, 1986; Peck, 1989). Through these behavioral changes, a mutual communication goal(s) will be coconstructed during

the conversation, and the goal(s) will be cooperatively achieved (Clark, 1996; Clark & Brennan, 1991; Gumperz, 1982; Kretschmer & Kretschmer, 1989).

In summary, achieving coconstruction secures highly possible successful conversation in order to get communication goals across and to achieve communicative competence (McTear & King, 1991). The process of coconstruction requires both conversation participants to see the other as a competent co-participant, who meaningfully uses nonverbal and/or verbal communication behaviors, rather than random and meaningless behaviors (Goodwin, 1995).

Conversation Turns

A conversation turn is one important aspect of conversation (Schieffelin & Ochs, 1986). Definitions of a conversation turn are diverse. For example, a conversation turn has been defined as "all utterances of one speaker until the other speaker speaks" (Cherry & Lewis, 1976, p. 280). A conversation turn is also considered "an initiation when it is the first turn of the conversation, follows a pause and change in topic, or follows a pause with no response by the individual in the speaker-responder's role" (Farrier et al., 1985, p. 67). Although there are a variety of definitions of conversation turn, it is known that, during the conversation, each conversation participant usually takes a number of turns, which sequentially construct the conversation (Wiemann, 1985), and each turn is "controlled jointly…. [and] shaped by conversation participants" (Clark, 1996, p. 331). During a dyadic conversation, a conversation participant attends to what the other conversation participant says and then takes a turn that fits into the conversation according to the previous turn from the other conversation participant or moves in a direction according to how he or she wants to build the relationship with the other conversation participant (Wiemann & Knapp, 1975; Wilson et al., 1984). In summary, taking conversation turns is the result "of the actions of both [conversation] participants" (Buzolich, 1984, p. 35). Through successive turn

taking, the conversation participants are able to create meanings to communication behaviors, attain communication goals, and accomplish communicative competence (Light, 1997b).

Within this broad framework, how conversation participants coconstruct their conversation has become a primary concern. Over time, a body of literature has developed regarding coconstruction between individuals with communication disorders and their typically speaking conversation partners. Specifically, these studies considered two issues: coconstruction of the meanings of verbal and nonverbal communication behaviors (e.g., Oelschlaeger & Damico, 1998; Olsson, 2004), and construction of conversation turns (e.g., Bloch & Beeke, 2008; Oelschlaeger & Damico, 1998).

Oelschlaeger and Damico (1998) investigated the coconstruction of meanings and conversation turns between an individual with aphasia and his wife. The coconstruction of meanings focused on how his wife searched for words, extended the content, and actively completed the incomplete conversation turns of her husband. Results showed that the wife provided a word when the husband indicated that he needed a word he could not think of. By providing words for the man, his wife was trying to coconstruct his conversation turn. Moreover, his wife extended information that the husband initiated with phrases or clauses in their conversation. Oelschlaeger and Damico indicated that with similar shared world knowledge, shared personal experience, and motivation, his wife perceived the individual with aphasia as communicatively competent and therefore provided information that "'contextualizes' and clarifies its meaning" (p. 474). The perception of the individual's disabilities did not fully affect their conversation. Oelschlaeger and Damico further concluded that some conversation participants (e.g., the wife) assume more responsibility to ensure communicative success for a

conversation than others and usually assume that their conversation partner is communicatively competent.

In 2004, Olsson examined how a child with severe multiple disabilities, in the pre-symbolic communication stage, and his caregiver coconstructed meanings in their conversation. Olsson found that both of them reacted or changed their behaviors according to the other's behaviors during the conversation. The caregiver tried to interpret each intended communication behavior from the boy, and elaborated these behaviors further. Olsson made the determination that both of them contributed meanings to their verbal and nonverbal communication behaviors. Simply speaking, this child was able to contribute meanings to their conversation.

In a similar vein, Bloch and Beeke (2008) also investigated coconstruction, but they looked at conversation turns in two dyads: one participant with dysarthric speech and his mother, and the other participant with aphasia and two of his direct care providers. The direct care providers cooperatively completed the conversation turns for the participants with dysarthria and aphasia. In other words, both participants "actively construct [i.e., complete] a single turn" (Bloch & Beeke, 2008, p. 975).

A key factor for these conversation partners was that they did not treat the conversation turns from the participants with communication disorders as problematic; rather they treated these conversation turns as "the opportunity to contribute to the ongoing construction [of conversation turns]" (Bloch & Beeke, 2008, p. 985). Furthermore, the individuals with communication disorders did not clearly express acceptance and rejection to the turns coconstructed by their conversation partners.

In summary, coconstruction of the conversation should consider conversation content (e.g., building mutual meanings) and conversation processes (e.g., completing incomplete

conversation turns) (Clark, 1996). These are influenced by both conversation participants in order to gain coconstruction (Dunst & Lowe, 1986). With coconstruction, effective communication is possible, and miscommunication (i.e., communication breakdown) can be minimized (McTear & King, 1991). Coconstruction of the conversation is "not haphazard, but rather is guided by methods utilized by one or both participants to avoid miscommunications, or if one has occurred, to correct the misunderstanding (Sweidel, 1991, p. 212). This statement infers that coconstruction is "not a matter of unilateral action"(Gumperz, 1982, p. 167) but rather a bilateral action. In other words, coconstruction is perceived as interpersonal instead of intrapersonal (McTear & King, 1991). Both of the conversation participants should coordinate verbal and nonverbal communication behaviors through a sequence of conversation turns while constantly monitoring the course of the conversation and continually maintaining mutual consideration of the other (Duchan et al., 1999; Kretschmer & Kretschmer, 1989).

Factors Influencing Coconstruction

Multiple factors influence how conversation participants are able to coconstruct their dyadic conversation. These factors include the following: *contexts* (Fetzer & Akman, 2002; Gumperz, 1982; Kovarsky & Maxwell, 1997; Leahy, 2004; Olsson, 2004; Simmons-Mackie, Elman, Holland, & Damico, 2007; Simmons-Mackie et al., 2004), *shared personal experience* (Oelschlaeger & Damico, 1998; Simmons-Mackie et al., 2004), *shared world knowledge* (Milosky, 1990; Oelschlaeger & Damico, 1998; Olsson, 2004; Simmons-Mackie et al., 2004), *attitudes* (Simmons-Mackie et al., 2004), *motivations* (Leahy, 2004; Oelschlaeger & Damico, 1998; Simmons-Mackie et al., 2004), and *communication skills* (Simmons-Mackie et al., 2004).

Contexts. Conversation occurs within contexts in which both participants provide meanings to verbal and nonverbal communication behaviors in the conversation (Damico et al., 1999; Kovarsky & Maxwell, 1997; Wilson et al., 1984). These contexts orient the conversation participants in cooperatively constructing their conversation (Wilson et al., 1984). Several contexts that can affect coconstruction of meanings and conversation turns have been recognized, including linguistic context and physical context (Milosky, 1990). Milosky stated that the meanings of verbal and nonverbal communication behaviors could be interpreted in an established topic. In other words, in understanding the established topic, conversation participants are able to accurately embed meanings in the verbal and nonverbal communication behaviors occurring in the conversation. Linguistic context is perceived as "a vital source of information for comprehending further language" (Milosky, 1990, p. 5). Furthermore, the linguistic context can be perceived as both "the principles of sequential organization" (Damico et al., 1999, p. 670) and "a shared linguistic system" (McTear & King, 1991, p. 212). An example of the linguistic context occurs in a prospectus meeting regarding a doctoral student's dissertation. When the dissertation committee members know this meeting is scheduled, they bring up their relevant professional knowledge and experience as related to the submitted proposal. With the topic established, committee members are able to embed meaning in the speech of the other committee members.

On one hand, with sequential ordering of conversation turns, an initial verbal and nonverbal communication behavior determines the possibilities of subsequent verbal and nonverbal communication behaviors during the conversation (Damico et al., 1999; Fetzer & Akman, 2002; Prutting, 1982). These communication behaviors are all related to each other, and therefore make the conversation understandable (Damico et al., 1999). On the other hand, the

shared linguistic system means that conversation participants must have a shared language code in order to encode the information successfully (McTear & King, 1991). If these conversation participants do not share the same or similar linguistic system (i.e., language code), miscommunication may occur.

Meanings of verbal and nonverbal communication behaviors are also affected by physical surroundings, including time, place, and people in which the conversation occurs (Fetzer & Akman, 2002; Milosky, 1990; Prutting, 1982). Conversation participants embed meanings in their verbal and nonverbal communication behaviors during a conversation according to when to talk, where to talk, and with whom to talk. Changes in any one may affect the understanding of meanings of the conversation. Milosky (1990) indicated that two things must be accomplished in order to reduce miscommunication. First, the physical surroundings (i.e., time, place, and person in which a conversation occurs) must be mentioned in the conversation to ensure that both of the conversation participants set up a similar conversation floor (e.g., mutual understanding) (Milosky, 1990). If misunderstanding still exists, then second, each conversation participant should take the other participant's perspective in order to establish accurate meaning (Duchan et al., 1999; Milosky, 1990; Schieffelin & Ochs, 1986). In other words, they become "in tune" (Oelschlaeger & Damico, 1998, p. 475) with each other during the conversation.

Shared Personal Experience. Having shared personal experience allows conversation participants to know what each may want to express, and thus accurately coconstruct their conversation (Oelschlaeger, 1999; Oelschlaeger & Damico, 1998). Each must place himself or herself "in a unique position" with respect to the other participant in the conversation in order to construct meanings and conversation turns (Oelschlaeger & Damico, 1998). However, there are varied degrees and types of shared personal experience (Milosky, 1990). More similar personal

experience results in more accurate coconstruction (Milosky, 1990). With shared personal experience, individuals with a communication disorder are able to use different communication modes (e.g., written words, AAC devices and systems) to make their conversation partners grasp their conversation situations easily (Simmons-Mackie et al., 2004).

Shared World Knowledge. World knowledge is "the knowledge gained from experience, from interacting with others and with the objects, events, and situations in life" (Milosky, 1990, p. 1). Similar to shared personal experience, shared world knowledge allows both participants to do the following: (a) closely monitor what has been said, (b) effectively establish their mutual communication goal by minimal negotiations with each other (Gumperz, 1982; Schieffelin & Ochs, 1986), and (c) be more willing to participate in the coconstruction of the conversation (Oelschlaeger, 1999; Oelschlaeger & Damico, 1998). Conversation participants make use of their shared world knowledge to construct meanings and conversation turns. However, each conversation participant has distinctive and diverse world knowledge different from each other (McTear & King, 1991). Without identical shared background knowledge, participants must process several negotiations before cooperatively building and accomplishing their conversational coconstruction. Milosky (1990) also argued that a conversation partner who is familiar to a speaker is presumed to have more shared knowledge with the speaker than a conversation partner who is not familiar to the speaker.

Attitudes. Simmons-Mackie et al. (2004) indicated that attitudes were an important factor for individuals with communication disorders. Conversation partners with positive attitudes view individuals with communication disorders as communicatively competent and, consequently, assume that they have the ability to make a functional contribution to the coconstruction of

conversation. On the other hand, conversation partners with negative attitudes may view the individuals with communication disorders as communicatively incompetent and therefore do not spend time coconstructing a conversation with them (Simmons-Mackie et al., 2004). In addition, attitudes of the individuals with communication disorders also have certain effects (Simmons-Mackie et al., 2004). An individual with communication disorders who is more active in the conversation, more easily motivates conversation partners to coconstruct their conversation.

Motivations. Motivations were recognized as another factor involved in the coconstruction of conversation (Oelschlaeger & Damico, 1998). On one hand, both conversation participants must provide opportunities to others to coconstruct the conversation together (Simmons-Mackie et al., 2004). In other words, each speaker presents opportunities to listeners and is willing to accept listeners to construct the conversation. On the other hand, listeners should be motivated to provide conversation coconstruction in order to enhance successful conversation and achieve communicative competence (Oelschlaeger & Damico, 1998). In other words, listeners in a conversation should be motivated to assist the speaker in the following situations: (a) when conversation breakdowns occur, and (b) when one of the participants needs help to complete conversation turns and/or to create meanings during the conversation. In summary, motivations are the "desire for such collaborations" (Oelschlaeger & Damico, 1998, p. 474) from both speakers and listeners in conversations.

Communication Skills of Participants. Both conversation participants must have certain communication skills to coconstruct the conversation (Simmons-Mackie et al., 2004). These may include the ability to signal agreement or disagreement to others to make conversational repairs when necessary (Simmons-Mackie et al., 2004). Simmons-Mackie et al. (2004) further

indicated that these skills are difficult for some individuals with communication disorders, which might cause their partners difficulty in coconstructing the conversation.

In summary, coconstruction of conversation occurs with at least two conversation participants in which each one serves as a speaker and a listener alternately. One needs to initiate the conversation, and the other accepts and follows the sequence of the conversation. Both of the conversation participants are affected by various factors (e.g., shared personal experience), which may affect their abilities to cooperatively converse with each other. In addition, the conversation participants must cooperatively negotiate with each other when miscommunications occur due to different shared/relevant personal experience and world knowledge (Gumperz, 1982). In other words, coconstruction is determined "only by deduction from what is contributed by others" (Schiffrin, 1987, p. 4).

Conversational Contribution

Coconstruction is "achieved through a succession of communicative turns" (Higginbotham & Caves, 2002, p. 47- 48). Turn taking during conversation is an important aspect of conversational contribution (Clark & Brennan, 1991; Fetzer & Akman, 2002; Wiemann, 1985). Turns are used to collaboratively create meanings in order to reach coconstruction, and therefore these turns are considered conversational contributions. The success of conversation coconstruction is dependent on the efforts and abilities of both conversation participants (Clark, 1996; Olsson, 2004).

Although there are varying degrees and manners of conversational contribution, it is generally assumed that the number of conversation turns for each typical conversation participant in the dyad is similar, leading to symmetry within the conversation. However, the symmetry does

not exist in conversations between individuals with communication disorders and typical individuals (e.g., Oelschlaeger & Damico, 1998).

Oelschlaeger and Damico (1998) investigated the conversation between an individual with aphasia and his wife. The individual with aphasia was 50 years old and for six years had conduction aphasia, according to *Western Aphasia Battery (WAB)*. Eight naturally occurring conversations in their home were recorded to analyze turn -completion and other related conversation dimensions over a six-week period. They found that the individual's wife collaboratively completed the incomplete turns initiated by her spouse, whereby the individual's wife was in the position to complete her spouse's turns. As a result of his incomplete turns, the wife contributed more turns to the conversation than the individual with aphasia. Asymmetrical conversational contribution was seen in their conversation when the wife assumed greater responsibility in order to reduce her spouse's conversational responsibility. The authors concluded that coconstruction can be achieved through turn-taking between conversation participants, even when one participant has aphasia.

Conversation with Individuals who Use Augmentative and Alternative Communication (AAC)

Conversation has been defined as having a speaker, a listener, and modes of communication (e.g., verbal and nonverbal communication behaviors) between typically speaking conversation participants (McTear & King, 1991). For typically speaking individuals, spoken language is used as their primary communication modes; whereas, for individuals who cannot speak, gestures and/or augmentative and alternative communication (AAC) devices and systems serve as their communication modes. Use of augmentative and alternative communication is a unique mode. AAC consists of a device or system provided to individuals who cannot communicate using typical modalities, temporarily or permanently, in order that

these individuals may have opportunities to communicate with their family, peers, colleagues, and communities (Calculator, 2007).

Augmentative and Alternative Communication

AAC systems and devices integrate four primary components: symbol, aid, strategy, and technique (Beukelman & Mirenda, 2005). A "symbol" includes real objects, pictures, line drawings, or orthography. An "aid" is described as "a device, either electronic or non-electronic, that is used to transmit or receive messages" (Beukelman & Mirenda, 2005, p. 4). "Strategy" is the way to convey the message "most effectively and efficiently" (Beukelman & Mirenda, 2005, p. 4); while, "technique" is referred to as the way to transmit messages, typically in either direct selection or scanning modes (Beukelman & Mirenda, 2005). Using direct selection, the individual who uses AAC "indicates the desired item directly from the selection set" (Beukelman & Mirenda, 2005, p. 93) by pointing or eye gaze; using scanning, the individual waits "while the facilitator or electronic device scans through undesired items before reaching the item of choice" (Beukelman & Mirenda, 2005, p. 97). At that time, the individual acknowledges the correct choice by activating a switch, eye gaze, vocalization, or some other means.

Some high-tech AAC devices are speech-generating devices with which selected choices can be verbally "spoken" through digitized speech and synthesized speech (Quist & Lloyd, 1997). Digital speech is recorded and produced through computer technology, and synthesized speech is recorded and produced through preprogrammed software that converts speech sounds into electrical energy and then synthesizes desired speech (Quist & Lloyd, 1997). This computer generated speech output may be formatted into child's voices or male or female adults' voices (Quist & Lloyd, 1997). With speech generating AAC devices, individuals who use AAC are able to attain their conversation partners' attention before "speaking".

During the conversation, both conversation participants, including the individual who uses AAC, are assumed to have encoding and decoding systems to allow their messages to be transmitted (McTear & King, 1991). In order to have a successful conversation, the conversation partner must have skills not only to speak to the AAC user but also to understand nonverbal communication behaviors and messages generated from the AAC user's AAC device or system. The individual who uses AAC must have skills to produce messages from the AAC device or system, and understand the spoken language from the communication partner.

Light (1989) has attempted to describe communicative competence for individuals who use AAC by proposing four communicative competencies: linguistic, social, operational, and strategic competence. These four competencies, interacting with one another, have been recognized as necessary skills for AAC users to be communicatively competent (Light, 1989).

Linguistic Competence. Linguistic competence requires that individuals who use AAC have certain abilities in two language systems: one is the language spoken in their communities by typically speaking individuals, and the other is the linguistic representations of symbols such as Picture Communication Symbols (PCS) and Blissymbolics used on AAC devices or systems (Light, 1989, 2003). Learning to use these symbols is analogous to learning a second language.

Social Competence. Social competence has been divided into sociolinguistic and sociorelational competence (Light, 1989). Sociolinguistic competence refers to the skills of pragmatics, which include conversation skills (e.g., turn-taking and topic initiation) and communication functions (e.g., requesting needs and wants). Sociorelational competence requires individuals who use AAC to participate in conversations in order to build "a positive rapport with partners" (Light, 2003, p. 12).

Operational Competence. Operational competence is specific to individuals who use AAC, focusing on skills needed to operate AAC devices or systems. These skills include "skills to use the access method(s) or transmission technique(s) as well as skills to operate specific device features (e.g., the on/off switch, volume control, coding systems, output mode selection, etc.,)" (Light, 1989, p. 140). Since the use of AAC devices and systems influences communication behaviors of the individuals who use AAC, it is important that these individuals can independently use AAC devices (Bailey, Stoner, Parette, & Angell, 2006).

Strategic Competence. Strategic competence requires individuals who use AAC to use diverse conversation skills (e.g., asking partner to "guess," providing cues), including verbal and nonverbal communication behaviors (Richards & Schmidt, 1983), to overcome potential conversation constraints (e.g., unable to recognize preprogrammed symbols, unable to maintain the conversation, and unable to access switches) resulting from limited linguistic competence, social competence, and operation competence. AAC users "make use of the best of what we do know, from the contexts we have experienced, to get our message across" (Savignon, 1983, p. 40).

Nevertheless, unclear interrelationships among these four competencies exist. The degree and direction of influence of the individual or combined contributions of the competencies to the success of conversations between AAC users and typically speaking conversation partners is unknown (Light, 1989). In several previous studies investigating conversations with individuals who use AAC, the length of time using AAC prior to the research ranged from six months (e.g., Light et al., 1985) to one year (Buzolich & Wiemann, 1988), and to three years (e.g., Muller & Soto, 2002). Only being operationally skilled in the use of an AAC device does not guarantee a

successful conversation (Beukelman, 1991; Light, 1997a). Clearly, the ultimate purpose of using AAC is to provide communication skills to individuals who cannot communicate verbally (Yoder, 2001) and to meet one or more of these individuals' communication goals within a conversation (Light, 1988, 1997a). The successful integration of these four competencies has been recognized as critical in order to have individuals who use AAC meet communication goals (Light, 1997a) and participate in appropriate social roles in their community (Calculator, 2007).

Coconstruction of Conversation toward Conversational Contribution by AAC Users

Coconstruction of conversation between any two typically speaking conversation participants is affected by many different factors. This is also true when the conversation involves individuals who use AAC. There are several difficulties involved in the coconstruction of conversation between individuals who use AAC and their typically speaking partners.

Challenges for AAC Users

In order to be considered competent communicators, individuals who use AAC must demonstrate linguistic competence, social competence, AAC operational competence, and strategic competence during the conversation (Light, 1989). Nevertheless, there are several barriers that may obstruct AAC users' competency and therefore impede success in their conversations. These may include AAC users' cognitive deficits in encoding messages, cognitive deficits to achieve mutual understanding (e.g., Collins & Markova, 1999; Sweidel, 1991), physical disabilities to access their AAC devices or systems (e.g., Light et al., 1985), limited vocabulary/messages available in their AAC devices or systems (e.g., Gerber & Kraat, 1992), time constraints to access their AAC devices or systems (e.g., Gerber & Kraat, 1992; Sweidel, 1991), complexity of AAC systems or devices (e.g., Beukelman, 1991), changes of conversation

partners (e.g., relationship between partners) (e.g., Farrier et al., 1985; Hemsley et al., 2008; Kraat, 1985), unfamiliar communication contexts and content (e.g., Calculator, 1988; Collins & Markova, 1999; Light et al., 1985), and all of the interacting variables (Buzolich & Lunger, 1995). Individuals who use AAC must overcome these barriers in order to competently converse with their typically speaking partners (Beukelman, 1991). Although it has been recognized that being perceived as having these competencies may be compromised by one or more barriers, their potential effects have not been fully recognized. Any interaction effects of these barriers on the AAC users' conversation are not clear.

Most often, AAC users have conversations with typically speaking individuals. These conversations involve two different modes of communication - spoken speech from typically speaking individuals and messages generated from AAC users' devices and systems. AAC users often do not have access to opportunities to interact with partners who also use AAC. It has been recognized that individuals who use AAC would benefit from interactions with competent AAC users to learn to communicate effectively within a similar system (Hetzroni & Harris, 1996). On the other hand, even if these individuals have opportunities to learn from other skilled AAC users, they may have limited opportunities to practice these learned conversation skills (Kangas, 1990).

Although these factors may mean that AAC users are unable to competently use their AAC devices and/or systems in their conversation (Beukelman, 1991), it has been concluded from clinical experience that competent use of AAC is not the only measure of successful conversation (Farrier et al., 1985). For example, Bloch and Wilkinson (2004) analyzed conversations between two individuals with acquired dysarthria who used AAC and their speaking conversation partners. Results showed that AAC users were able to use AAC to self-repair conversations, and these self-repairing behaviors with the use of AAC were

understandable to their speaking conversation partners. Bloch and Wilkinson concluded that the two individuals with dysarthria who used AAC could successfully make conversational repairs that were understood by their speaking conversation partners. Findings from this study and the one conducted by Oelschlaeger and Damico (1998) supported the notion that successful conversation does not rely solely on understanding communication modes (e.g., spoken speech, messages generated from AAC) but also depends on the transmission of information (McTear & King, 1991). In other words, how AAC users make their messages understood is of concern (McTear & King, 1991). Individuals who use AAC may use multiple communication modes (e.g., gestures, unintelligible phonemes or words) in the coconstruction of conversation.

Coconstruction of Conversation toward Conversational Contribution by Speaking Partners

Responsibilities of Typically Speaking Conversation Partners

During conversation, an individual who uses AAC and a typically speaking conversation partner must express their communicative intents and have these intents understood by each other through conversation coconstruction (Bloch & Beeke, 2008; Bloch & Wilkinson, 2004; Higginbotham & Caves, 2002). However, many limitations (e.g., cognitive deficits) of individuals who use AAC may lead to difficultly in fully coconstructing conversation (e.g., embedding meanings, constructing conversation turns) with their typically speaking conversation partners (Buzolich & Wiemann, 1988; Collins & Markova, 1999).

With the growing emphasis on these dyads, a great deal of study has been directed recently toward the conversational skills of individuals who use AAC in conversation with typically speaking conversation partners (Nelson, 1992). Asymmetrical conversation patterns have been described in conversations between individuals who use AAC and their typically speaking conversation partners (e.g., Buzolich & Wiemann, 1988; Farrier et al., 1985; Light et

al., 1985; Muller & Soto, 2002). The asymmetrical conversation patterns include variations in conversation turns (e.g., Buzolich & Wiemann, 1988), discourse units (e.g., Light et al., 1985; Muller & Soto, 2002), and conversational control (e.g., Farrier et al., 1985). Several studies have investigated the number of communication turns (Buzolich & Wiemann, 1988; e.g., Light et al., 1985), conversational control (Farrier et al., 1985; Muller & Soto, 2002), and co-regulation (Olsson, 2004). These studies have reported that typically speaking conversation partners take more conversation turns than individuals who use AAC in their dyadic conversations. Although these studies investigated different conversation dimensions between individuals who use AAC and their speaking partners, these dimensions are all related to turning taking.

Buzolich and Wiemann (1988) investigated the signals of conversation turns in two dyadic conversations between two individuals with cerebral palsy who use AAC and two typically speaking conversation participants who had no prior experience with individuals with disabilities. One of the AAC users used a Handi-Voice 120, and the other used an alphabet speller. Six signals of conversation turns were investigated, including speaker turn signal, speaker gesticulation signal, speaker state signal, speaker within-turn signal, speaker continuation signal, and between-unit auditor backchannel signals. Two 40-minute conversation sessions were recorded for each dyad, and each dyad received the instruction "to converse with their partner" (p. 7). Videotaping equipment was visible to the dyads, and only the dyads were present in the videotaping room. The main finding of the study showed that the pattern of conversation signals was not fully affected by the type of AAC devices but rather the communication behaviors from each other. In other words, both of the dyads adapted their conversation behaviors to accommodate limitations of the individuals who use AAC. Furthermore, asymmetrical turn exchanges were found, with the typically speaking conversation

partners dominating the conversations as a result of AAC users' difficulty in claiming conversation turns. Buzolich and Wiemann explained that these speaking conversation partners who did not have any prior experience with individuals with disorders might assume more responsibilities to fulfill conversation turns than was obligated by the AAC user. In other words, speaking conversation partners take conversation turns that should be taken by the AAC user.

Asymmetrical conversational contribution was also observed in the work of Farrier et al. (1985). This study examined conversation control of five dyadic conversations between speaking partners and individuals who simulated the use of AAC devices in two tasks (i.e., direction-giving and decision-making) under two conditions (i.e., speaking condition using speech and gestures, and the AAC condition using AAC only. These participants were acquainted with one another before the investigation. Interactions of at least ten minutes with a minimum of 30 turns were recorded. Conversation turn, defined as "one or a series of utterances which contributed to the topic and content of the conversation" (p. 67), was one of the dimensions in the measure of conversation control in the study. The researchers found that the AAC users demonstrated little ability to control the conversation (e.g., fewer initiations of turns).

Light et al. (1985) and Muller and Soto (2002) also investigated conversations with individuals using AAC. Light et al. analyzed the conversations between individuals who use AAC and their primary caregivers (i.e., considered familiar partners). Criteria were that the primary caregivers were adults, had primary responsibilities taking care of the individual in the home environment, had normal speech and language abilities, and were familiar with the individual's AAC device/system. Their interactions were videotaped in a 20-minute, unstructured free-play situation in a clinic room and analyzed in terms of discourse unit. A unit of discourse was defined to include communicative turns, in which AAC users actually take

turns, and turn opportunity units, in which AAC users try unsuccessfully to take turns. Eight nonspeaking children with physical disabilities who use AAC and their primary caregivers were observed. The findings showed asymmetrical conversation patterns in which the caregivers occupied more conversational space, initiated more conversation topics, and showed more conversation turns in order to request specific responses from the children who use AAC.

Muller and Soto (2002) investigated conversations in two situations: (a) AAC users and their preferred day center staff as their speaking conversation partners, and (b) AAC users and other AAC users. Each AAC user indicated a preferred speaking conversation partner and an AAC user. Each dyad was instructed to choose their conversation topics and then engaged in a 47- to -65 - minute unstructured conversation in a quiet place. Muller and Soto found that conversations between the AAC users were more symmetrical than conversations between AAC users and typically speaking conversation partners. Asymmetries were shown by frequent initiations of guesses in the form of yes/no questions by the typically speaking conversation partners. In summary, these two studies have shown that typically speaking conversation participants control the conversation to fill conversational gaps, whereas AAC users do not fulfill conversation turn opportunities. These scholars concluded that asymmetric conversation patterns exist in the conversation between AAC users and typically speaking conversation partners.

Typically speaking conversation partners dominate the conversational space in conversations with AAC users predominantly by asking questions (e.g., yes/no questions). Individuals who use AAC serve a respondent role by providing information (e.g., yes/no responses and other brief, low-information responses) that the typically speaking individuals request (Buzolich & Lunger, 1995; Light et al., 1985). Simply speaking, AAC users serve as roles "fulfilling turns when obligated to do so, and forfeiting their nonobligatory turns" (Light,

1997b, p. 167). Thus, typically speaking individuals significantly contribute more conversation turns, including initiating conversations and initiating conversation topics, than do the individuals who use AAC (Buzolich & Lunger, 1995; Light et al., 1985; Muller & Soto, 2002).

The asymmetrical conversational contributions from AAC users may result from limited vocabulary or messages preprogrammed in AAC systems or devices for use during conversations (e.g., Gerber & Kraat, 1992; McCoy, Bedrosian, Hoag, & Johnson, 2007). Most of the time, the vocabulary or messages are chosen by others (e.g. direct care providers, speech-language pathologists [SLPs], or classroom teachers) instead of the individuals who use AAC (Gerber & Kraat, 1992). It is possible that some vocabulary or messages preprogrammed in AAC devices might not be used appropriately or are pragmatically mismatched for use in actual communication contexts (McCoy et al., 2007). For example, a set of messages pertaining to eating dinner preprogrammed in AAC could not be used in the context of shopping in a mall, or in the context of taking a class; alternately, an appropriate set of messages for participating in a class may not be preprogrammed in a user's device. In these two situations, the individuals who use AAC have no way to communicate successfully using AAC devices or systems. Typically speaking individuals in the same situations, however, have an unlimited range of vocabulary or message options from which to choose for a wide range of conversation purposes.

From these studies, it can be concluded that typically speaking conversation partners take more responsibility in the coconstruction of conversations (Beukelman & Yorkston, 1982; Buzolich & Wiemann, 1988; Kagan et al., 2001; Simmons-Mackie et al., 2004). On the other hand, individuals who use AAC must receive varying levels of support from their typically speaking partners in order to successfully coconstruct conversations (Beck et al., 2000; Light, 1988; Lilienfeld & Alant, 2005). Therefore, conversation partners play a critical role in the

success of conversation with AAC users (Light, 1988). Bloch and Wilkinson (2004) further indicated that without the support from AAC users' speaking partners, the functionality of AAC cannot be determined in everyday life. Light (1997b) further described the following:

> The child [the AAC user] indicates an initial element of the message; the partner takes this element, confirms it, and then leads the child [the AAC user] through a series of questions to expand the element and add more information to the message, confirming at each step that the expanded message is correct. (p. 167)

In other words, the individual who uses AAC needs the speaking conversation partner to actively coconstruct the meanings of the messages in order to reduce miscommunication in conversation (Light, 1988). To meet this responsibility, typically speaking conversation partners must view individuals who use AAC as competent communicators who can engage in the conversation with speaking partners (Higginbotham & Yoder, 1982; Oelschlaeger & Damico, 1998; Sweidel, 1991).

When typically speaking conversation partners take more conversation responsibilities, unconsciously, they lead the conversation and contribute more conversation turns compared to individuals who use AAC in conversation (Collins & Markova, 1999; Oelschlaeger & Damico, 1998; Olsson, 2004). In this regard, coconstruction is characterized by the typically speaking conversation partners asking a series of questions, offering conversation topics, and independently choosing a topic and moving forward or closing the conversation (Clarke & Wilkinson, 2007; Collins & Markova, 1999). A successful conversation between a typically speaking partner and the AAC user primarily relies on the speaking partner and may result in an asymmetrical conversational contribution on the part of the AAC user (Collins & Markova, 1999; Kent-Walsh & McNaughton, 2005).

It has been proposed that typically speaking conversation partners may bring different personal styles (e.g., active vs. passive) and varying levels of skills to coconstruct their conversation with an AAC user (Farrier et al., 1985; Kent-Walsh & McNaughton, 2005; Light, 1997a). Therefore, contributions to the attainment of coconstruction from the dyadic conversation participants may differ (Peck, 1989). Some of them are skilled and competent conversation partners, while others are not (Kent-Walsh & McNaughton, 2005). The competent conversation partners may "adapt their communication repertoire in accordance with their communicative goals, constraints imposed by the environment [e.g., context], and needs of the listener [e.g., AAC user]" (Higginbotham & Yoder, 1982, p. 9). For example, typically speaking conversation partners who are more competent may be "highly sensitive and make efforts to achieve balanced, reciprocal interactions" (Buzolich & Lunger, 1995, p. 38) and therefore are willing to attune themselves "with time-filling activities" (Farrier et al., 1985, p. 71). With active roles and competent skills, conversation partners may guess the meanings of communication behaviors of the individuals who use AAC. However, the relationships between coconstruction and these factors have not been fully recognized.

Less-skilled and less-competent (e.g., inactive) conversation partners make no effort to adapt their behaviors to accommodate the behaviors of individuals who use AAC in constructing conversation (Beukelman, 1991; McCoy et al., 2007; McNaughton & Light, 1989). McCoy et al. (2007) has indicated that these less-skilled and less-competent conversation partners, who may have limited or no experience with individuals who use AAC, "may be only marginally committed to interacting with them [AAC users]" (McCoy et al., 2007, p. 77). These conversation partners may interrupt individuals who use AAC by inserting related or unrelated questions in order to speed up the conversation (Farrier et al., 1985) and may speak "in a

monologic manner" (Buzolich & Lunger, 1995, p. 38). Both of these skilled and unskilled communication behaviors from different typically speaking conversation partners greatly influence the conversational contributions of individuals who use AAC (Farrier et al., 1985).

It has been noted that a conversation partner with familiarity to AAC users and their conversation strategies (e.g., turn-taking signals, nonverbal communication behaviors) may coconstruct their conversation with AAC users. In addition, the familiar partner makes the AAC users' messages understandable during the conversation (Higginbotham & Yoder, 1982). Hemsley et al. (2008) conducted a study to investigate the contribution of conversation turns using a focus group of six adults with complex communication needs, including three using AAC. The group discussed three questions related to the roles and needs of unpaid caregivers in hospitals. These six adults all had shared experiences living in hospitals, and five of them were familiar with each other. Results showed that the verbally speaking adults contributed more conversation turns compared to the adults who used AAC to clarify and repair. These adults were willing to repair their own conversation turns that were not clear to the other adults. The authors concluded that knowing AAC and how individuals who use AAC make repairs to their communication breakdowns affected the partners' contributions to the conversations.

Unlike familiar conversation partners, conversation partners unfamiliar with various conversation strategies may not be able to coconstruct the conversation with AAC users, and therefore, understandable message-exchange may not occur (Higginbotham & Yoder, 1982). Kraat (1985) summarized two unpublished studies conducted in 1983 that investigated conversation between individuals who use AAC and individuals who were familiar and unfamiliar conversation partners. The first study compared the occurrence of communication breakdowns between familiar and unfamiliar conversation dyads. The AAC user was an adult

with cerebral palsy who used a letter board. The familiar conversation partner was a speech-language pathologist, and the unfamiliar conversation partner was a college student who had experience interacting with individuals with disorders but no experience with AAC users. Twenty minutes of conversation were recorded and analyzed. Kraat reported that more communication breakdowns within the conversation occurred with the unfamiliar conversation partner than with the familiar conversation partner. The unfamiliar conversation partner responded to the AAC user less often than the familiar conversation partner and required more conversation turns to repair communication breakdowns. The second study examined several conversation dimensions of an 11-year-6 month-old child who used a Canon Communicator with four familiar conversation partners (three SLPs and one occupational therapist) and four unfamiliar conversation partners (four college students in speech pathology without any experience with this AAC user). Conversations in three picture contexts (ten minutes each) were recorded and analyzed. Analyses revealed that the familiar and unfamiliar conversation partners controlled the conversation by asking many questions, and the AAC user served in the responding role. In addition, the familiar conversation partners had more possibilities for successful conversation than did the unfamiliar conversation partners. These two unpublished studies show that unfamiliar conversation partners may have more communication breakdowns with individuals who use AAC than familiar conversation partners.

Further more, Buzolich and Wiemann's (1988) study recruited unfamiliar conversation partners to investigate the effects of type of communication devices (i.e., Handi-Voice 120 and alphabet speller) and type of conversation modes (i.e., speech and communication devices) on turn-taking. They concluded that the unfamiliar conversation partners dominantly took more

conversation turns than individuals who use AAC. Asymmetrical turn exchanges were also found in these dyads.

Apparently, both familiar and unfamiliar conversation partners have more conversation turns than individuals who use AAC in these studies. However, it is not clear if unfamiliar conversation partners take more conversation turns than familiar conversation partners in conversations with individuals who use AAC. Continued research is required to truly understand the effects of familiarity to individuals who use AAC on the conversation.

Challenges for Typically Speaking Conversation Partners

One primary challenge for typically speaking conversation partners in coconstructing conversation with individuals who use AAC is the difficulty in recognizing AAC users' communication modes. Individuals who employ AAC use multiple modes of nonverbal communication behaviors, (e.g., gestures, eye gazing) in addition to their AAC devices or systems in the conversation. These nonverbal communication behaviors may provide diverse meanings (Higginbotham & Yoder, 1982; Olsson, 2004; Simmons-Mackie & Damico, 1996), and sometimes may be incorrectly interpreted by conversation partners (Olsson, 2004). Typically speaking conversation partners may ignore these behaviors or not allow individuals who use AAC to "speak" in their preferred communication mode (Olsson, 2004). The self-perceptions and overall attitudes of these conversation partners may also impede their ability to coconstruct conversation with AAC users (Beck et al., 2000; Beukelman, 1991; Peck, 1989).

On the basis of these studies (Buzolich & Wiemann, 1988; Farrier et al., 1985; Hemsley et al., 2008; Light et al., 1985; Muller & Soto, 2002), it can be concluded that asymmetrical conversation turns exist in conversations between individuals who use AAC and their typically speaking partners, including familiar and unfamiliar partners. AAC users contributed fewer

conversation turns to the conversation than did their speaking partners. The asymmetry of conversation turns was also observed in conversations between individuals with aphasia and typically speaking individuals (e.g., Oelschlaeger & Damico, 1998).

Nevertheless, investigating the conversational contribution by counting conversation turns does not fully account for the coconstruction of conversation. Counting conversation turns as conversational contributions from each participant ignores the meanings contributed by each participant. In addition, the conversation behaviors of each participant and the environmental contextual cues (e.g., nonverbal communication behaviors) were not measured by counting conversation turns. The framework of speaking roles proposed by Goffman (1974, 1981) broadly considers these.

Frame Analysis of Talk - Framework of Speaking Roles

Frame Analysis of Talk

In an effort to understand the complexities of conversation, the approach of frame analysis of talk was developed by Goffman (1974, 1981), and is used to examine "the organization of experience" (Goffman, 1974 , p. 11). Simply speaking, frame analysis investigates how participants in a conversation use their previous experiences (e.g., previous talking knowledge/experiences with a friend when talking with a new friend) in their conversation. When Goffman (1974) referred to "talk", he was actually describing dyadic conversation. This approach assumed that activities within the conversation have their meanings and these meanings are dependent on closed rules (e.g., environmental contexts), which could be used when analyzing conversation (Entman, 1993; Goffman, 1974). The goal of frame analysis is to provide a systematic and precise interpretation of social communication while maintaining the complexity of human communication (Entman, 1993; Goffman, 1974).

Frame. The concept of "frame" was perceived as a cognitive structure (e.g., premise) that channels the perception and representation of reality (Bateson, 1985; Goffman, 1974) and is used "to select more aspects of a perceived reality and make them more salient in a communicating text" (Entman, 1993, p. 52). Frame is the position that each participant holds during the conversation, in which the participants (i.e., speakers) make the frame noticeable to other participants (i.e., listeners) by showing verbal and/or nonverbal communication behaviors (Schiffrin, 1994), which can be broadly perceived as communication goals (e.g., information sharing or requesting information/needs). For example, "information sharing" relative to a vacation trip is a man's frame (e.g., conversation goal) when he has a conversation with his sister, and his sister might want to request information about this man's vacation trip.

Taking this one step further, Scheff (2005) stated that "frames are a part of this subjective structure" (p. 370). Conversation participants have their own frames (e.g., conversation goals and speaking positions), and must perceive other frames from other participants within the conversation. "Frame" can be reconstructed to the verb "framing" which is a way or a process of creating frames for conversations and applies meaning in order to understand what is going on during the conversation (Goffman, 1974). Framing "lets you [the listeners] know what position [frame] the speaker is assuming in the activity [the conversation], and what position you are being attributed" (Tannen, 1990, p. 33). The method of framing allows the listeners to understand the messages produced within the frame from the speaker (Tannen, 1990). Any conversation behavior can be framed (i.e., embedded meanings) by other conversation participants, and then appropriate responses can be triggered by those participants (Goffman, 1974). The way the conversation is framed is dependent on the relationship of any given conversation participant to the conversation (Goffman, 1974) and any shared/relevant

background knowledge (Gumperz, 1982). Conversation participants have their own way of framing communication behaviors; on the other hand, framing affects participants' perceptions of the communication behaviors (Simmons-Mackie et al., 2004). An interaction can be interpreted differently at the same time due to the relationship and background knowledge (Gumperz, 1982).

Footing Change. Goffman (1981) also noted that a conversation participant holding a frame (e.g., a conversation goal, a speaking position) in speaking may change the projected frame to another frame. In other words, the conversation participant's conversation goal and/or speaking position may change to a different goal and/or position during the progress of the conversation. In order to characterize this change, the term "footing", which considers a participant's position in the conversation (Goffman, 1981), was proposed. Footing describes "how a person assumes various fundamental roles when speaking" (Leahy, 2004).

The term "footing change" is defined as follows:

> A change in the alignment we take up to ourselves and the others present as expressed in the way we manage the production or reception of an utterance. A change in our footing is another way of talking about a change in our frame for events. (Goffman, 1981, p. 128)

"Footing change" occurs across conversations, and this change reestablishes a new footing, which is characterized as the feature of speaking (Goffman, 1981). In order to characterize the footing change during a conversation, the concept of "speaking roles" was proposed by Goffman (1981).

Speaking Roles. The three roles of speakers proposed by Goffman (1981) - animator, author, and principal - look at the relationship among participants within the conversation

(Tannen, 1993). Each verbal and nonverbal communication behavior is viewed as a coconstructed conversation by participants acting as different roles, which is completed naturally and precisely without any planning (Leahy, 2004). *Animator* refers to when a conversation participant functions as "[a] talking machine, a body engaged in acoustic activity, or, … an individual active in the role of utterance production" (Goffman, 1981, p. 144). The animator verbally and nonverbally transmits messages during the conversation. In some situations, someone else's ideas or thoughts might be expressed in these transmitted messages. The animator conveys the messages that are selected by another conversation participant, the *author*, who is referred to as "someone who has selected the sentiments that are being expressed and the words in which they are encoded" (p. 144). The last role "*principal*," refers to "someone whose position is established by the words that are spoken, someone whose beliefs have been told, someone who is committed to what the words say" (p. 144). In summary, the animator is the individual who actually produces talk, while the author is the individual who chooses the ideas or thoughts to be expressed. The principal is the individual whose beliefs are made known.

Example 1 provides an illustration of these three roles.

Example 1

1 A: "Rebecca" "R" (producing from A's AAC device)

2 B: Do I know Rebecca?

3 B: I don't think so.

4 A: "b" "c" "a" "r" (producing from A's AAC device)

5 B: Rebecca Bcar

In line 1, A acts as animator, author, and principal for her message. In line 2, B animates A's messages, but A retains the roles of author and principal with her words that have been

animated. In line 3, B acts as animator, author, and principal. In line 4, A acts as animator, author, and principal by adding new information to the exchange shown in line 1. In line 5, B acts as animator by restating A's message, but again A retains the roles of author and principal for the message.

Goffman (1981) proposed that in certain situations, a conversation participant can assume all three roles (i.e., animator, author, and principal) in generating the message. In other words, an utterance is spoken by an individual who produces the utterance, and selects the messages that conveys the thoughts and ideas. However, it is not required that the conversation participant serve in these three roles at the same time (Simmons-Mackie et al., 2004). The roles of animator, author, and principal can all be applied to the same conversation participant or to different conversation participants, and each conversation participant can quickly switch roles during the conversation (Goffman, 1981). In the example above, B plays all three roles in line 3, but immediately after A's messages in line 4, B plays only the role of animator.

Conversation participants establish and acknowledge mutual understanding by appropriately shifting their different speaking roles (e.g., animator) while considering contextual cues (e.g., linguistic features) (Goffman, 1974, 1981; Gumperz, 1982; Schieffelin & Ochs, 1986; Simmons-Mackie et al., 2004; Walsh, 2007). A contextual cue has been defined as "any feature of linguistic form that contributes to the signaling of contextual presuppositions" (Gumperz, 1982, p. 131). Without contextual cues, conversation participants may misinterpret conversation messages from a speaker (Gumperz, 1982). Within the concept of speaking roles, contextual cues help listeners not only "rule out unintended meanings [from the speaker] and suppress misunderstandings [from the listeners]" (Goffman, 1974, p. 496) but also appropriately change their speaking roles in the next conversation turn.

In summary, the framework of speaking roles is one of diverse features (e.g., frame, framing, footing change) in the frame analysis approach to analyzing the complexity of conversation. This framework allows investigators to examine dyadic conversation considering both the conversation participants and environmental contextual cues. The changes of speaking roles are considered "important aspects of management of cooperative talk" (Simmons-Mackie et al., 2004, p. 114) and need to be negotiated (Tannen & Wallat, 1993).

Application of Framework of Speaking Roles

In the past two decades, several studies have investigated conversation between typically speaking conversation partners and individuals with various communication disorders, including Alzheimer's disease (e.g., Chapman, Ulatowska, King, Johnson, & McIntire, 1995) and stroke (e.g., Walsh, 2007). Application of the framework of speaking roles (i.e., animator, author, and principal) has been used to aid in understanding the coconstruction of conversation of individuals with communication disorders, e.g., stuttering (e.g., Leahy, 2004, 2008) and aphasia (e.g., Simmons-Mackie et al., 2004). Simmons-Mackie et al. (2004) studied the instances of "speaking for another" in the conversation between an individual with severe aphasia and her student speech-language pathologist. "Speaking for another" was defined as "the clinician is the primary animator, or spokesperson, and also authors talk by creating the content and choosing wording to describe the topic" (p. 115). Results showed that the individual with aphasia used the student SLP to animate and author her speech by using existing contextual resources and strategies in order to coconstruct their conversation. In addition, more communicative responsibility was held by the SLP, thus leading to asymmetrical conversation. Although asymmetrical conversation was found, the authors stressed that "shared, increased effort" (p. 122) of conversation may lead to a

more symmetrical conversation. The authors concluded that actively engaging in the conversation by the individual with aphasia is a critical aspect of coconstruction of conversation.

The framework of speaking roles was examined in two studies investigating therapeutic discourses between a speech-language pathologist and an individual with stuttering (Leahy, 2004, 2008). An asymmetrical relationship was shown to exist in traditional therapeutic conversation: SLPs serving as competent communicators and individuals with communication disorders serving as incompetent communicators. These studies showed an asymmetry of the frequency of conversation turns. Conversely, the SLP shifted his speaking role of animator and allowed the individual with stuttering to retain the roles of author and principal throughout the conversation. Leahy concluded that the framework of speaking roles demonstrated that both conversation participants collaboratively construct their therapeutic conversation. In summary, the framework of speaking roles was recognized as an important tool in evaluating aspects of conversation (e.g., position of conversation participants) with individuals who have communication disorders and to show conversation partners' recognition of communication behaviors that emerged from individuals with communication disorders (Leahy, 2004).

Several critical features of the framework of speaking roles allow researchers to explore the complexities of conversational contributions. Using this framework, it could be inferred that conversational contribution could be reported through the frequency and patterns of speaking roles attributed to each conversation participant in coconstructing conversation. To date, no studies have applied the framework of speaking roles to the study of conversations between individuals who use AAC and their typically speaking partners.

Statement of Problems

The past decade has seen a great increase in scholarly efforts (e.g., Buzolich & Wiemann, 1988; Light et al., 1985; Muller & Soto, 2002) directed toward exploring the dyadic conversation between individuals who use AAC and their typically speaking conversation partners. Particular attention has been focused on the conversation turns of the individuals who use AAC and their speaking partners. There is little doubt that an asymmetry of conversation turns exists between them in dyadic conversations (Buzolich & Wiemann, 1988; Light et al., 1985; Muller & Soto, 2002). These asymmetrical conversations might be caused by several factors, including AAC users' internal deficits (e.g., limited linguistic skills) and external limitations (e.g., limited skills using AAC devices) (Beukelman & Mirenda, 2005; Light et al., 1985). These factors may cause the typically speaking conversation partners, including familiar and unfamiliar partners, to take more responsibility for the conversation.

However, although conversations between individuals who use AAC and their typically speaking conversation partners have been extensively investigated by measuring conversation turns, their collaborative speaking roles in constructing the conversation has not been fully considered (Stiegler, 2007). The traditional approach of counting conversation turns fails to account for the role of coconstruction and therefore underestimates the relative conversational contribution of AAC users. In other words, counting conversation turns as a conversational contribution neglects "the process of making sense of what is being said" (Bloch & Wilkinson, 2004, p. 280) by the AAC users. Consequently, understanding how these two groups contribute to their dyadic conversations is left unresolved.

It has been concluded that both groups of conversation participants (i.e., those individuals who use AAC and those who are typically speaking conversation partners) contribute different

conversation behaviors during their conversations (Kraat, 1985; Light, 1988; Nelson, 1992; O'Keefe & Delia, 1985). These behaviors vary, depending on communication contexts and conversation participants (Light, 1988; Nelson, 1992). Therefore, types of speaking conversation partners have become a primary concern in conversation with individuals who use AAC. Although the effect of conversation partners' familiarity to the individuals who use AAC and their AAC device has been investigated (Farrier et al., 1985; Hemsley et al., 2008; Light et al., 1985; Muller & Soto, 2002), the effect of conversation partners' unfamiliarity has not been fully investigated. Also, information on the effects of different types of speaking conversation partners (i.e., familiar vs. unfamiliar) on the coconstruction of the conversation is limited.

Additional research is required to understand the relative conversational contributions from individuals who use AAC and their typically speaking conversation partners in constructing their dyadic conversations. The impact of different typically speaking conversation partners (i.e., familiar and unfamiliar) on the relative conversational contribution to these conversations must also be considered.

To date, some research has investigated conversation through the use of frame analysis of talk, focusing on the speaking roles in diverse populations, for example, the work by Chapman et al. (1995) on Alzheimer's disease. Although the value of the framework has been recognized in these studies, use of the framework of speaking roles (e.g., animator, author, and principal) as a tool to investigate conversations involving individuals who use AAC and typically speaking conversation partners has not been proposed previously within the AAC literature. Furthermore, this framework has not been used to explore the existence of any difference between the types of typically speaking conversation partners (i.e., familiar and unfamiliar) or in comparing the approach of counting conversation turns, as has been traditionally used in these studies.

The intent of this investigation is to present an alternative way of examining the extent of conversational contribution by individuals who use AAC and their typically speaking conversation partners. This investigation will help to refine the manner in which dyadic conversation between individuals who use AAC and their typically speaking conversation partners are viewed.

Purpose and Research Questions

The purpose of this current research was two-fold. First, the current study investigated the conversational contributions of dyadic conversations between individuals who use AAC and their typically speaking conversation partners, as measured by attributing Goffman's (1981) speaking roles (i.e., animator, author, and principal) and by counting conversation turns (e.g., Kaye & Charney, 1980; Light et al., 1985; Muller & Soto, 2002). Second, this study determined the influence of familiar and unfamiliar conversation partners on the conversational contributions.

Two research questions were addressed:

1. Is there a difference in the symmetry of conversational contribution between individuals who use AAC and their typically speaking conversation partners when measured in two ways: counting numbers of conversation turns and counting numbers of attributed speaking roles (i.e., animator, author, and principal)?
2. Does the familiarity of typically speaking conversation partners (i.e., familiar and unfamiliar) affect the symmetry of conversational contribution when measured in the same two ways?

Hypotheses related to these two research questions are as follows:

1. There is a difference in conversational contributions between individuals who use AAC and their typically speaking conversation partners, as measured by the number

of conversation turns and the attribution of speaker roles. AAC users and their typically speaking conversation partners are hypothesized to contribute symmetrical conversations when measured using the framework of speaking roles. However, to the contrary, asymmetrical conversational contributions may be observed when measured with the approach of conversation turns.

2. Conversational contributions between AAC users and their familiar conversation partners (i.e., direct care providers and paid professional service providers) are hypothesized to be more symmetrical than those between AAC users and unfamiliar conversation partners in the same two measures.

CHAPTER III

METHODOLOGY

Participants

Three groups (G1, G2, and G3) participated in this study. Each group contained ten participants, including an individual who used a speech-generating augmentative and alternative communication device and three sets of typically speaking conversation partners.

Participants Using Augmentative and Alternative Communication

Three participants who use speech-generating AAC devices were selected for this study. The principal investigator observed each individual in a natural context (e.g., their home or school) and completed a short screening form (see Appendix A) regarding their eligibility to participate in the study. Each participant using AAC met the following inclusion criteria:

1. Is a minimum age of 16 years.
2. Speaks English as a first language in all communication environments.
3. Has a diagnosis of a developmental disability without a social disorder (i.e., no autism).
4. Uses a speech-generating AAC device as the primary mode of communication for a minimum of six months prior to the research.
5. Is able to see people and hear the speech of others in face-to-face conversations without glasses or amplification.
6. Is able to initiate social conversations with others by using an AAC device.
7. Is able to understand basic social conversations and participate in conversations.

Previous works (e.g., Culp, 1987; Higginbotham & Bedrosian, 1995) have recognized that individuals who use AAC represent a fairly heterogeneous group with varied attributes (e.g.,

communication disabilities and types of AAC systems and devices), and indeed, for this study, it was difficult to recruit a homogeneous group of individuals who use AAC. The three selected AAC users represent different ages and disabilities, and use different types of AAC devices. It is not well understood how diverse barriers (e.g., cognitive deficits, physical disabilities, availability of vocabulary) may impede successful conversation for AAC users, and therefore, these factors were not controlled in this study. Although the current study participants who use AAC may not be a homogenous group, they are representative of the range of AAC users in any community (Buzolich & Wiemann, 1988).

Individuals who use AAC devices were recruited for the study in several ways. Information about the study and the selection criteria was distributed to speech-language pathologists and AAC/assistive technology (AT) specialists in different facilities (e.g., Assistive Technology for Kansas, USD 259) in the geographic area around Wichita. Potential participants who use AAC and/or their legal guardians were contacted about their willingness to participate. Interested potential participants were told that videotaping involved interaction with nine different conversation partners, including three direct care providers, three professional service providers (e.g., SLPs), and three unfamiliar conversation partners. Each individual who used AAC who agreed to participate was asked to identify three direct care providers and three professional service providers with whom he or she wished to converse.

Demographic characteristics of each individual using an AAC device were obtained through screening, self or parental reports, and observation. Detailed descriptions of each individual using an AAC device were documented (see Table 1). Each participant was identified as A1, A2, and A3 to preserve confidentiality.

TABLE 1

DEMOGRAPHIC INFORMATION OF INDIVIDUALS WHO USE AAC

AAC users (A)	Gender	Chronological age	Types of disability	Type of AAC device	Access method	Length of time using AAC
A1	Female	19	Athetoid cerebral palsy	Prentke Romich Vanguard Plus™ equipped with TrackerPro™	Head pointing	12 years
A2	Male	18	Athetoid cerebral palsy	Prentke Romich ECO-14™	Block scanning with switch activation	11 years
A3	Male	16	Down syndrome	DynaVox Palm³™	Direct selection	3 years

Participant 1 Description. Participant 1 (A1) is a 19-year-old female with a diagnosis of athetoid cerebral palsy. She has two typically-developing sisters (one being her twin). A1 is able to see and hear people in face-to-face conversations unaided (without glasses or amplification). She graduated from high school in the year in which she participated in this study. A1 lives with her parents. A variety of paid caregivers assist A1 with her homework and other activities of daily living. A1 uses a power wheelchair for mobility as well as her seating throughout the day. A1 has been successfully using AAC devices for 12 years. Currently, she is using the Prentke Romich Vanguard Plus™, which is a speech-generating device (SGD) (Prentke Romich Company, 2009). SGD systems provide speech output for messages selected by the AAC user. Vanguard Plus™ is equipped with both Unity® 45 and Unity® 84 programs which provide core vocabulary for quick access (Prentke Romich Company, 2009). These vocabularies can be preprogrammed and stored as frequently used messages.

The Vanguard Plus™, used when A1 participated in the current study, was mounted on her power wheelchair with a Daessy Folding Mount™ and fitted with the TrackerPro™ integrated headpointing system, a camera embedded into the case of the Vanguard Plus™. The TrackerPro™ tracks the movement of a small reflective dot placed on A1's forehead with infrared technology, acting as a head activation mouse (Prentke Romich Company, 2009). In addition, A1 can generate novel messages by spelling words letter-by-letter using her AAC device. A1 also uses head nods, head shakes, and/or vocalizations (e.g., /aa/ and /nn/) as a means of communication. According to A1's mother's report, A1 is proficient with her current device.

Participant 2 Description. Participant 2 (A2), an 18-year-old male with a diagnosis of athetoid cerebral palsy, lives with his grandparents. He is able to see and hear people in face-to-face conversations unaided (without glasses or amplification). He was a senior in high school at the time of this study. A2's aunt and a caregiver help him with academic tasks (e.g., homework) and daily living routines (e.g., running errands). A2 uses a power wheelchair for both mobility and seating throughout the day. He has been successfully using AAC devices (i.e., ECO-14™, Pathfinder™, and Liberator™) for 11 years. For this study, A2 used the Prentke Romich ECO-14™, a speech-generating device that provides speech output for messages selected by the AAC user. The ECO-14™ is equipped with both Unity® 45 and Unity® 84 programs, which provide core vocabulary for quick access (Prentke Romich Company, 2009). These vocabularies can be preprogrammed and stored as frequently used messages.

The ECO-14™ was mounted on A2's power wheelchair with a Daessy Folding Mount™. A Jelly Bean™ switch mounted on his wheelchair close to his right knee allows him to select the messages on his device. A2's ECO-14™ device automatically does custom block scanning, in which a block of messages (e.g., one quadrant of the screen) is highlighted at a time, followed

sequentially by another block. When A2 selects one block of messages by pressing the switch with his knee, the device highlights the top entire first row in that block and then automatically moves to the following rows, one row at a time. When A2 presses the switch again, the automatic scanning continues, column-by-column, until the selected message is reached. A2 can also use his AAC device to spell out words and/or initial letters of words to generate novel utterances/messages. A2 also uses head nods, head shakes, and/or vocalizations (e.g., /aa/) during his conversation. From the informational observation, A2 used his AAC device proficiently during the conversations.

Participant 3 Description. Participant 3 (A3), a 16-year-old male with a diagnosis of Down syndrome, lives with his parents, older sister, and younger brother. He graduated from middle school two months before participating in this study and will be entering high school. A3 is independently mobile and is able to see and hear people in face-to-face conversations unaided (without glasses or amplification). A3 uses multiple modes of communication in his conversations, including spoken speech (which is judged to be moderately to severely unintelligible), American Sign Language (ASL), gestures (e.g., head nods and head shakes), and/or an AAC speech generating device (SGD). The only AAC device he has ever used and is currently using is the DynaVox Palm³™, which is a handheld communication device the size of a personal digital assistant (PDA). Palm³™ is a portable device containing words, phrases, and sentences, which are preprogrammed and stored in the device according to the user's needs. A3 directly selects the messages he wishes to express by activating the appropriate icon on the Palm³™ device. A3's mother works as an assistive technology consultant in the public schools and is the primary person who programs his AAC device according to his communication needs.

A3 has used this AAC device for three years, and he is informally judged to be proficient in using it.

Typically Speaking Conversation Partners

For each individual who uses AAC, nine typically speaking individuals were recruited as conversation partners, including six familiar conversation partners (i.e., three direct care providers and three professional service providers) and three unfamiliar conversation partners.

Familiar Conversation Partners Demographics

The familiar conversation partners were selected by each individual who uses AAC from two groups: (a) three direct care providers (e.g., parents, siblings, caregivers) of the AAC user, and (b) three paid professional service providers (e.g., speech-language pathologists, special educators) familiar with the AAC user. All of these individuals interacted regularly with the AAC user. Each familiar conversation partner met the following inclusion criteria:

1. Speaks English as a first language in all communication environments.
2. Has taken care of, provided services to, and/or interacted with the individual who uses an AAC device.
3. Has no self-reported cognitive or speech impairments.
4. Is familiar with the individual's AAC device and communication modes (e.g., messages generated from AAC).
5. Is able to see people and hear people's speech in face-to-face conversations.
6. Has conversations with the target individual on a regular basis.

The inclusion criteria of these two groups of conversation partners were validated before experimental conversations through a short informal interview (see Appendix B). Demographic

characteristics for the direct care providers and paid professional service providers are detailed in Table 2 and Table 3, respectively.

TABLE 2

DEMOGRAPHIC INFORMATION OF DIRECT CARE PROVIDERS AS FAMILIAR CONVERSATION PARTNERS

Direct care provider (D)	**Gender**	**Age**	**Role**	**Length of time with AAC user**	**Specific training with AAC**
D11[a]	Female	26	Caregiver	10 months	Instructions provided by A1's mother
D21[a]	Female	17	Caregiver	Approximately 1 year	None
D31[a]	Female	45	Mother	19 years	Self-taught from Prentke Romich Inc.
D12[b]	Female	41	Aunt	18 years	None
D22[b]	Female	50	Assistant	1 year	Learned from school in-service
D32[b]	Female	20	Caregiver	18 years	Received training with the ECO™
D13[c]	Female	44	Mother	16 years	Primarily self-taught but also attended various AT workshops
D23[c]	Male	40	Father	16 years	None, but knows basic programming and operation
D33[c]	Male	15	Brother	15 years	None

[a]A1's direct care providers.
[b]A2's direct care providers.
[c]A3's direct care providers.

TABLE 3

DEMOGRAPHIC INFORMATION OF PROFESSIONAL SERVICE PROVIDERS AS CONVERSATION PARTNERS

Professional service provider (P)	Gender	Age	Role	Length of time with AAC user	Specific training with AAC
P11[a]	Male	50	Speech-language pathologist	More than four years	Learned from past 13 years caseloads
P21[a]	Female	55	Teacher	5.5 years	Learned from one session with Prentke Romich representative, on-the-job exposure, and brief sessions with parents
P31[a]	Female	57	Speech-language pathologist for oral motor/feeding	12 years	Learned from short courses on Vanguard Plus™
P12[b]	Female	51	Physical therapist	1 year	None, but learned from A2's grandparents' demonstrations
P22[b]	Female	55	Teacher	3 years	Received five years direct support with AAC users and a three-hour training in 1998
P32[b]	Female	46	Occupation therapist	4 years	Learned from courses and experience with others
P13[c]	Female	49	Speech-language pathologist	1 year	Learned from workshops over the past 25 years; self-taught; and some consult with AAC programmer in district
P23[c]	Female	46	Teacher	2 years	Learned from on-the-job training
P33[c]	Female	46	Physical education Teacher	4 years	None

[a]A1's professional service providers.
[b]A2's professional service providers.
[c]A3's professional service providers.

Unfamiliar Conversation Partners Demographics

Nine unfamiliar conversation partners were recruited to converse with the participants who use AAC. Each unfamiliar conversation partner met the following inclusion criteria:

1. Is a minimum age of 18 years.
2. Speaks English as a first language in the communication environment.
3. Has no self-reported cognitive or speech impairments.
4. Has no graduate level education or professional training or professional experiences related to AAC.
5. Has no prior experience conversing with individuals who use AAC.
6. Is able to see people and hear people's speech in face-to-face conversations.

Flyers were placed in various buildings on the Wichita State University campus to recruit participants. The criteria for participating in the study were included on the flyer. Potential participants were screened by the principal investigator. The inclusion criteria of these conversation partners were validated before experimental conversations through a short informal interview (see Appendix B). Demographic characteristics of the qualified participants were reported through a short informal interview and are shown in Table 4. Three unfamiliar conversation partners were attributed to a participant who uses AAC by the principal investigator.

TABLE 4

DEMOGRAPHIC INFORMATION OF UNFAMILIAR CONVERSATION PARTNERS

Unfamiliar partner (U)	Age	Gender	Education level
U11[a]	35	Female	Senior undergraduate student in CSD
U21[a]	32	Male	Two years college and five years technical school
U31[a]	22	Female	Graduate student in electrical engineering
U12[b]	35	Female	Bachelor's degree in psychology
U22[b]	29	Female	Bachelor's degree in French literature
U32[b]	21	Female	Senior undergraduate student in business management
U13[c]	37	Male	Bachelor's degree in CSD and psychology
U23[c]	63	Female	PhD in cultural anthropology
U33[c]	36	Female	Bachelor's degree in CSD

[a]A1's unfamiliar conversation partners.
[b]A2's unfamiliar conversation partners.
[c]A3's unfamiliar conversation partners.

Procedures

All of the participants and/or legal guardians, if necessary, of the three individuals who use AAC signed informed consent forms (see Appendices C, D, and E) prior to participating in the study. If the AAC users were unable to sign the consent form themselves, the principal investigator read the Assent Form (see Appendix C) to them and asked for their assent by head nod, indication on their augmentative and alternative communication device, or other appropriate means (e.g., gesture, written mark). A witness concurred that assent was obtained by co-signing the Assent Form. Consent forms were also signed by the familiar and unfamiliar conversation partners (see Appendices D and E).

Instrumentation

Settings. The dyadic conversation was recorded for repeated review (Elder, 1999) in the Conversation Interaction Laboratory at Wichita State University. This laboratory contains a room for recording dyadic or small group conversations in a naturalistic environment. The room contains three book shelves, a couch, and two chairs. Three color video cameras are mounted on each of the bookshelves. One of the video cameras is situated approximated 82 inches away from the dyad in order to provide a frontal view of both participants during their conversation. The other camera is mounted approximately 56 inches away from the individual who uses AAC and is focused on the display of the AAC device. The video cameras are visible to participants. A diagram representing the set-up of the Conversation Interaction Laboratory is presented in Appendix F.

During the conversation sessions, two participants (i.e., an individual who uses AAC and a conversation partner) were seated next to each other. No one else was present in the room during the videorecording of the conversations (Buzolich & Wiemann, 1988). Each AAC user's AAC device was situated as he or she typically would use it, as confirmed by the caregiver or direct care provider. The principal investigator and the director of the Conversation Interaction Laboratory were in the control room adjoining the conversation room of the laboratory during videorecording.

Conversation Videotaping Instrumentation. The video recordings were made using JVC CCTV color cameras (model TK-C920U) with a 2.8 – 12mm Tamron Aspherical lens. The recording was achieved by routing the video inputs through a Sima SFX-M special effects generator that allows for a split-screen image to be recorded. Video framing was sized so that the

head and mid-torso of each participant are seen on one side of the split screen with the AAC device display on the other side (see Appendix G). The video image was then sent from the mixer to a Dazzle Digital Video Creator (DV-150), which converts the analog signals to digital video format for display and storage on the hard drive of the acquisition computer.

Audiorecording was done using Audio-Technica (model AT831b) lapel microphones. These electret condenser microphones were clipped to both the conversation partner's clothing at approximately the level of the sternum and the AAC device. The audio signals were digitized via the CSpeech software and stored on the hard drive of the acquisition computer. The video signals were monitored and played back on the 21-inch color monitor of the computer. The audio signals were monitored through either a pair of audio headsets or a set of computer speakers.

During videorecording, the principal investigator noted any information that might be relevant to the analysis of the conversation in a contact summary (Miles & Huberman, 1994). The purpose of this summary was to indicate any observed information on the participants' behaviors (e.g., keeps gazing to the door) and any reflective remarks (e.g., conversation partner tries to end the conversation) (Collins, Markova, & Murphy, 1997; Miles & Huberman, 1994) for possible future consideration.

It is possible that awareness of videorecording may affect a dyad's performance in the conversation to some degree initially; however, it has been shown that anxiety (e.g., awareness of videotaping) is usually diminished within the first one to three minutes after entering the laboratory (Wiemann, 1981). Telling each participant that the videorecording mainly focuses on the other participant's conversation is an attempt to allay potential anxiety in the laboratory (Wiemann, 1981).

Conversation Sampling Procedures

Each conversation dyad was videotaped individually. Each dyadic conversation was allowed but not limited to, about 20 minutes (e.g., Light et al., 1985), after which time the principal investigator signaled the dyad to conclude the conversation. During videotaping, the following were eliminated: altering the focus, zooming in and zooming out, and increasing and decreasing the recoding volume.

In order to make the conversation as natural as possible, no structured scripts were used (Gallagher, 1991). Feedback regarding any conversations was not given to the participants. Conversational topics were chosen by the participants. The dyads were encouraged to engage in spontaneous and unstructured conversation (Prutting & Kirchner, 1987).

Conversation with the familiar conversation partners was encouraged to be as typical as possible. Before the conversation, the principal investigator gave the following identical instructions to each dyad:

> Your task today is to have a conversation with each other. Conversational topics will be chosen by both of you. No structured scripts will be used in order to keep the conversation as natural as possible. You may talk about anything you want to for about 20 minutes. I will signal you when 20 minutes have passed, so you may begin to wind up your conversation. If you feel you have finished your conversation before the end of 20 minutes, just let me know, and I will provide you with a list of possible topics to continue.

Instruction to the unfamiliar conversation partners was slightly different from that for the familiar conversation partners:

> Your task today is to have a conversation with each other. [Name of the individual who uses a communication device] will be using a communication device with digitized

speech output during this conversation. Conversational topics will be chosen by both of you. No structured scripts will be used in order to keep the conversation as natural as possible. You may talk about anything you want to for about 20 minutes. I will signal you when 20 minutes have passed, so you may begin to wind up your conversation. If you feel you have finished your conversation before the end of 20 minutes, just let me know, and I will provide you with a list of possible topics to continue.

Typical topics were relate to school, peers/friends, family, sports, leisure activities and events, self-care, and recent self occurrences in their environments recently (Raffaelli & Duckett, 1989; Turkstra, Ciccia, & Seaton, 2003). The list of conversation topics is found in Appendix H.

Questionnaire of Perceptions on Dyadic Conversations

After each conversation, the principal investigator asked each participant the following question: "How typical was the conversation compared to your daily conversation?" A five-point Likert scale (1 = Strongly not typical, 2 = Not typical, 3 = Neutral, 4 = Typical, 5 = Strongly typical) was described in a sheet and presented to the AAC participants. This question assumed that AAC users would respond by using their AAC devices and/or head nods/shakes. Each typically speaking conversation partner was then asked to fill out a questionnaire (see Appendix I) after the videotaped conversation to record their reactions and provide any relevant feedback.

Data Management

The videotaped conversation sessions were digitally stored on CDs for transcription and further analysis. These CDs were labeled with participants' special labels (e.g., A1 and P11), that contained no identifying information. Verbatim transcriptions of each conversation were completed and displayed in a two-column format (see Appendix J). The first column numbered

each utterance in sequential order. The second column included who was speaking and the content of each verbal (e.g., utterances, messages generated from an AAC device) and nonverbal communication behavior (e.g., head nodding, head shaking). In addition, overlapping communication behaviors from the listener while the speaker was speaking were placed with the speaker's communication behaviors on one line. The sequence of the conversation was numbered linearly throughout the whole conversation (Miles & Huberman, 1994). This two-column format allows transcribers and coders to easily follow the sequence of the conversations.

Data Analysis

Using the videotaped conversation sessions, six steps of data analysis were completed: (a) transcribing and notating the dyadic conversation sessions; (b) coding the transcripts to identify the number of conversation turns for each participant in the dyad; (c) coding the transcripts according to Goffman's speaking roles (i.e., animator, author, and principal) for each participant, and identifying the occurrence of each role from each participant; (d) calculating intercoder and intracoder reliability; (e) analyzing the conversational contribution of each participant in dyadic conversations for each coding system; and (f) analyzing the conversational contribution of each type of conversation partners (i.e., familiar and unfamiliar).

Transcribing and Notating

An organizational framework of the transcription notation was adapted from the works of Atkinson and Heritage (1984) and Bloch and Wilkinson (2004), and modified to accommodate nonverbal communication behaviors and the use of AAC devices or systems (see Appendix K for the key to transcription notation). A single page of transcription notation included definitions and examples of the transcription notation (Miles & Huberman, 1994). Each behavior impacting on

dyadic conversations, including verbal communication behaviors (e.g., utterances and messages generated from an AAC device) and nonverbal communication behaviors (e.g., eye gazing, head nodding, head shaking), were displayed on a single line of the transcript and numbered if these occurred separately (Ripich & Panagos, 1985). For example, multiple utterances spoken/generated by a speaker or an AAC device without any audible pauses (greater than two seconds) were displayed in a single line. Multiple utterances spoken/generated with audible pauses (greater than two seconds) were displayed in different lines with their pause times. Each verbal communication behavior or nonverbal communication behavior that occurred alone or along with the verbal communication behaviors was shown in a single line.

Example 2 illustrates the general transcription notations. A is an individual who uses AAC, and B is a speaking conversation partner. In line 1, A produces a message from her AAC device and is enclosed in double quotation marks after an eight-second pause, with both A and B gazing at A's AAC device that is indicated in a line with two dots, one at each end. In line 2, B produces an utterance with B's simultaneous gazing at A and A's overlapping nonverbal communication behaviors (e.g., smiling). The nonverbal communication behaviors are noted in the transcription in double parentheses (Collins & Markova, 1999) The simultaneous utterances and behaviors did not affect the order of the sequence within a conversation line. In line 5, B produces an utterance with both A and B's simultaneous gazing at each other and A's overlapping head nodding in the place where the notation is inserted (i.e., "At Rocko").

Example 2

1 A: (8.0) "Rebecca" (2.0) "R"
.AAC .
B: .AAC .

2 A: .B. ((smiling to B))
B: Is she a friend of yours?
.A .

3 B: Is she somebody at your school?
.A .
A: .B. . AAC .

4 B: I know Ashley.
.A .
A: .B .

5 B: Do you know Ashley Golik? At Rocko?
.A .
A: ((Head nod))
.B .

Transcribing Conversations

Each dyadic conversation was first transcribed by a graduate research assistant (i.e., first transcriber) in the Department of Communication Sciences and Disorders at Wichita State University, who had previous experience in transcribing conversation. All verbal communication behaviors, including utterances and messages generated from an AAC device were transcribed first. Each transcript was checked for accuracy of content (i.e., utterances and messages generated from an AAC device) on each transcription before the step of notating, which was completed by an additional graduate research assistant (i.e., second transcriber) from the same program. The second transcriber watched the transcribed video tape along with the transcript transcribed by the first transcriber. Any discrepancies were discussed to gain consensus. Any potential discrepancies (e.g., utterances heard that were not in the original transcript, utterances

in the original transcript not heard, and/or different utterances heard) found in this process were decided in one of two ways (Higginbotham, Kim, & Scally, 2007; Olsson, 2004): (a) if the first transcriber agreed with the corrected transcriptions from the second transcriber, the final transcript was revised accordingly; (b) if the first transcriber did not agree with the corrected transcriptions, then the two transcribers would meet with the principal investigator and watch the target dyadic conversation session again in order to reach an agreement. All of the discrepancies of the transcriptions were resolved before proceeding to the step of notating transcripts (Higginbotham et al., 2007; Olsson, 2004).

Notating Transcripts. In the stage of notating transcripts, the principal investigator and a graduate research assistant notated the nonverbal communication behaviors (e.g., eye gazing) and added other relevant notations (e.g., time to generate messages from an AAC device). The graduate research assistant was trained to notate the transcriptions. Training consisted of several steps adapted and modified from the works of Guralnick and Paul-Brown (1989) and Olswang, Svensson, Coggins, Beilinson, and Donaldson (2006). First, the assistants viewed a five-minute segment of a videotaped conversation between an individual who uses an AAC device and her speech-language pathologist while following the completed transcript with notations. This videotaped interaction was not included in the present study. Then the reminder of the videotaped conversation was divided into five-minute segments. The assistant was asked to independently code the notations on a segment selected by the principal investigator and compare those notations to the completed transcripts. All nonverbal communication behaviors (e.g., gestures, eye gazing) as well as silences within and between utterances were exactly transcribed (Olswang et al., 2006). Any potential discrepancies were resolved in the same way as those procedures conducted in the stage of transcription. The final training component was a

competency test. This component had the graduate research assistant independently notate transcriptions on randomly selected five-minute segments of conversation transcripts. Competence was demonstrated when a minimum of 80% agreement on the notations was reached by the graduate assistant and the principal investigator for at least three of the segmented transcripts (Guralnick & Paul-Brown, 1989; Kazdin, 1982). Since the duration of the pause time was not the primary focus and did not potentially affect the outcomes, the duration of the pause time was not calculated into the agreement. Only the occurrence of notations (i.e., words, utterances produced from an AAC device, audible beep sounds, nonverbal communication behaviors, unintelligible words, and eye gazing directions) were examined. All discrepancies were discussed and resolved again with the same procedures as those used in the transcribing processes.

Coding Conversation Turns

Conversation turns were independently coded on the transcripts. This coding was done on an utterance-by-utterance basis. A conversation turn occurs in three situations:

Situation One of Coding Conversation Turns. Between conversation participants, a conversation turn occurs when the speaker changes. In other words, when the speaker terminates a communication behavior and another conversation participant inserts another communication behavior immediately following the previous behavior, one conversation turn would be counted for each speaker. Example 3 illustrates three conversation turns, two for A and one for B.

Example 3

1 A: (5.0) “Do” (8.0) “you” (13.0) “know” (10.0) “her”?

2 B: ((head nodding))

3 A: (17.0) “Rebecca”

Situation Two of Coding Conversation Turns. Between conversation participants, a conversation turn also occurs when an overlapping verbal communication behavior (e.g., yes or no) or a nonverbal communication behavior (e.g., head nodding or head shaking) coded with double parentheses occurs in the listener in order to linguistically answer the speaker’s question. Example 4 shows two conversation turns - one for A and one for B.

Example 4

1 A: Do you know her?
B: ((head nodding))

Situation Three of Coding Conversation Turns. Within the same conversation participant, a conversation turn occurs in two situations: first, when a speaker begins a communication behavior in order to yield a conversation floor (e.g., asking a question, giving a greater than two-second pause, gazing at the other partner) to the other participant, but the speaker again begins another communication behavior when there are no responses from the other participant. This would be considered two conversation turns (see Example 5). Second, when a speaker shows no pause(s) between utterances while speaking multiple utterances, this would be considered one conversation turn (see Example 6).

Example 5 contains one conversation turn for participant A, and two conversation turns for participant B (see lines 2 and 3):

Example 5

1 A: (8.0) "Rebecca" (2.0) "R"
. AAC .
B: .AAC A AAC .

2 B: Do I know Rebecca?
.A .

3 B: (3.0) I don't think so.
.A .

Example 6 shows three conversation turns total for B. Line 3 is counted as one conversation turn for B.

Example 6

1 B: Where is the trip gonna go?
. A .

2 B: (5.0) Somewhere far away?
. A .

3 B: Is it to, is it going to go by train? By bus? By airplane?
. A .

Exception One of Coding Conversation Turns. There are two situations when a conversation turn is not be coded. Beep sounds are generated by an AAC device when the user is self-correcting a mishit or is selecting letters or words before they are spoken as an entire message. In a situation where only beep sounds were generated from an AAC device without a message generated, a conversation turn was not coded. Example 7 shows that only B has a conversation turn in line 1, and A has a conversation turn in line 2.

Example 7

1 B: Don't know what you're trying to tell me.
.AAC .
A: *
.AAC .

2 A: (7.0) "s" (5.0) "mission"
.AAC .
B: .AAC .

Exception Two of Coding Conversation Turns. When an overlapping verbal communication behavior (e.g., yes or no) or a nonverbal communication behavior (e.g., head nodding or head shaking) occurred in the listener while the speaker was speaking, a conversation turn was not coded. In this situation, the listener plays a back channel to agree or disagree with the speaker's statements. Example 8 illustrates that A has a conversation turn in line 1, but does not have a conversation turn in line 2. A's head nod serves as a back channel to agree with what B has said in line 2, but is not in response to a direct question.

Example 8

1 A: (61.0)"swimming"
.AAC .
B: .AAC .

2 B: Go swimming.
.A .
A: ((head nod))
.B .

To be counted as a turn, the communication behavior, including a verbal communication behavior (i.e., an utterance and a message(s) generated from an AAC device) and a nonverbal communication behavior (e.g., head nodding), must convey meaning or contribute to the intent of the conversation. The symbol <CT> designated each conversation turn. More specifically, each conversation turn attributed to each participant was identified by adding the identifier to the

symbol <CT>, as shown in Example 9. More detailed coding examples are provided in Appendix L.

Example 9

1 A: Do you know?
<CT-A>

2 B: I don't know, do I know?
<CT-B>

3 A: ((head shaking))
<CT-A>

The number of conversation turns attributed to each conversation participant was tallied.

Coding Speaking Roles

Using Goffman's (1981) framework, three speaking roles (i.e., animator, author, and principal) were coded. The roles of animator, author, and principal are defined as follows: (a) *animator* is the individual who actually produces utterances (i.e., gives "voice" to the words). In other words, the animator is a speaking person. For the purpose of this study, individuals' speech-generating AAC devices may serve as their "voices" because the use of the device is directly under that individual's control. In other words, AAC users are acting as their own animators in the same way that typical speakers would use their laryngeal systems to produce an utterance; (b) *author* is the individual who selects or infers the words or meanings from specific communication behaviors (e.g., head nod or head shake) to be used in the creation of the utterance (Goffman, 1981; Simmons-Mackie et al., 2004); and (c) *principal* is the individual whose beliefs, positions, perspectives, personal information, and sentiments are established by the words spoken (Goffman, 1981; Schiffrin, 1994). The following were used as coding symbols:

"AN" for animator, "AU" for author, and "PR" for principal. Example 10 illustrates these concepts:

Example 10

1 A: (8.0) "Rebecca" (2.0) "R"
.AAC .
B: .AAC .
<AN-A; AU-A; PR-A>

2 A: .B.
B: Do I know Rebecca?
.A .
<AN-B; AU-B; PR-A>

3 A: .B.
B: I don't think so.
. A .
<AN-B; AU-B; PR-B>

4 A: (11.0) "b" (4.0) "c" (7.0) "a" (5.0) "r"
.AAC .
B: .AAC .
<AN-A; AU-A; PR-A>

5 B: Rebecca Bcar
.A .
A: .B .
<AN-B; AU-B; PR-A>

More coding examples are detailed in Appendix M.

Intercoder and Intracoder Reliability

Intercoder Reliability. The principal investigator served as the principal coder for all of the conversation sessions. Two additional coders were trained as reliability judges. These coders were first year graduate students in speech-language pathology in the Department of Communication Sciences and Disorders at Wichita State University. Training was provided to these two coders before the reliability checks were made.

First, the three coders discussed the definitions of transcription notations. Second, they discussed the operational definitions of the two sets of conversational analysis (e.g., conversation turns and speaking roles) as defined in the coding manual (see Appendix N). Third, the two reliability judges independently coded a ten -minute portion of a conversation transcript and compared their coding with that of the principal investigator. Discussions ensued to resolve any discrepancies. Fourth, the reliability judges independently coded a second ten-minute portion of a conversation transcript, and discrepancies of coding were again discussed to obtain consensus.

The final training component involved the two reliability judges independently coding conversation turns and speaking roles on two randomly selected five-minute conversation segments. Agreement was established by dividing the number of agreements for occurrences by the number of agreements plus disagreements of the occurrences and multiplying the quotient by 100 (Kazdin, 1982; Miles & Huberman, 1994; Patten, 2007; Portney & Watkins, 2000). A minimum of 80% reliability was achieved between each of the reliability judges and the principal coder.

After the coding training, the principal investigator/coder coded all 27 transcripts in sets of four. After each set, one transcript was randomly selected and given to the reliability judges for their independent coding. Point-by-point reliability for conversation turns and speaker roles was determined (Portney & Watkins, 2000). Thus, one of every four coded transcripts (22%) was checked for intercoder reliability. No discussions were allowed during the process of coding (Olswang et al., 2006).

In the case that 80% point-by-point reliability was not reached in each reliability check, an additional coding training similar to the initial training was done with the three coders before the next set of four sets of transcripts was coded. Following the training session, the three coders

coded the selected transcript again and intercoder reliability was computed. Intercoder reliability is documented in Table 5, which shows that the mean intercoder reliability between coder 2 and the principal coder in coding conversation turns was 98.72% (range = 97.96% - 100.00%) and in coding speaking roles was 92.83% (range = 89.57% - 95.59%). The mean intercoder reliability between coder 3 and the principal coder in coding conversation turns was 99.42% (range = 98.15% - 100.00%) and in coding speaking roles was 93.89% (range = 92.47% - 98.64%).

TABLE 5

INTERCODER RELIABILITY OF CODING OF CODER 2 AND CODER 3 WITH PRINCIPAL CODER

Transcript	**Coder 2**		**Coder 3**	
	Conversation turns	**Speaking roles**	**Conversation turns**	**Speaking roles**
Transcript 1	98.43%	94.34%	99.21%	92.47%
Transcript 2	99.70%	92.47%	100.00%	94.86%
Transcript 3	97.96%	94.00%	100.00%	98.64%
Transcript 4	98.84%	93.94%	100.00%	95.09%
Transcript 5	96.32%	89.57%	98.15%	92.43%
Transcript 6	100.00%	95.59%	98.99%	91.47%
Mean	98.72%	92.83%	99.42%	93.89%

Note. Intercoder reliability was calculated by dividing the number of agreements for occurrences by the number of agreements plus disagreements of the occurrences and multiplying the quotient by 100 between the principal coder and coder 2 or coder 3.

Intracoder Reliability. Intracoder reliability was established on the six conversation transcripts used in the intercoder reliability check and is reported in Table 6. The principal coder (i.e., the principal investigator) coded the selected conversation transcript again one week after

the initial coding (Olswang et al., 2006). Reliability was calculated and reported. The mean intracoder reliability of coding conversation turns was 99.36% (range = 96.88% -100%). On the other hand, the mean intracoder reliability of coding speaking roles was 98.72% (range = 94.34% - 100%).

TABLE 6

INTRACODER RELIABILITY OF CODING

Transcript	Conversation turns	Speaking roles
Transcript 1	100.00%	100.00%
Transcript 2	100.00%	98.72%
Transcript 3	100.00%	98.81%
Transcript 4	100.00%	100.00%
Transcript 5	96.88%	94.34%
Transcript 6	100.00%	96.83%
Mean	99.36%	98.27%

Analyzing Conversational Contribution

Conversational Contribution Measured by Conversation Turns. The number of conversation turns for each conversation participant was tallied in each dyad. The percentages of conversational contribution for each conversation participant were determined by the number of conversation turns for each participant divided by the total number of conversation turns of the dyad and multiplying the quotient by 100.

Conversational Contribution Measured by Speaking Roles. The conversational contribution was considered the coconstruction of conversation, defined by the three speaking

roles from each conversation participant. The number (*f*) of roles of animator, author, and principal of each conversation participant was summed in each dyad. The percentages of conversational contribution for each conversation participant were derived by dividing the number of roles for each participant by the total number of roles of the dyad and multiplying the quotient by 100. The mean numbers and mean percentages of the conversational contribution were computed in the same way as mentioned above. Furthermore, the number of roles of animator, author, and principal was reported respectively for each type of conversation partner.

Analyzing Conversational Contribution between Familiar and Unfamiliar Dyads

This step in the research analyzed the conversational contribution between the two types of conversation dyads (i.e., familiar and unfamiliar). Using the same procedures described above, numbers and percentages of the conversational contribution between individuals who use AAC and three types of conversation partners were computed for both conversation turns and speaking roles. The number of roles of animator, author, and principal attributed to each type of conversation partner was reported, respectively, to document potential role patterns.

Statistical Analysis

SPSS 15.0 was used for all statistical analyses. A paired-sample *t* test was performed to examine whether asymmetry of conversational contribution between the individuals who use AAC and the typically speaking conversation partners occurs when conversation turns and attributed speaking roles were counted. Another paired-sample *t* test was conducted to examine how asymmetrical conversational contribution is measured between conversation turns and speaking roles. A two-way between-subjects factorial ANOVA was performed to examine the

asymmetrical conversational contribution between familiar conversation dyads and unfamiliar conversation dyads.

CHAPTER IV

RESULTS

The purpose of this investigation was to determine if there are any differences in the symmetry of conversational contributions between individuals who use AAC and their typically speaking conversation partners when measured in two ways: by counting numbers of conversation turns and by counting numbers of attributed speaking roles (Goffman, 1981). Another purpose of this investigation was to determine whether differences exist in conversational contributions among exchanges with two types of typically speaking conversation partners (i.e., familiar and unfamiliar) when measured in the same two ways.

Length of Each Dyadic Conversation

Each conversation was timed to ensure that it met the targeted length of at least 20 minutes. All dyadic conversations were at least 20 minutes in length (range = 20 min 7 s - 23 min 57 s). Two of A3's unfamiliar conversation partners (i.e., U13 and U23) were provided with a list of potential conversation topics in order to sustain their conversations for the required duration of at least 20 minutes. The length of time of each dyadic conversation can be found in Appendix O.

Conversational Contributions Analyzed from Conversation Turns and Speaking Roles

Asymmetry vs. Symmetry of Conversational Contribution of Each Dyad

Frequencies and percentages of conversational contributions from the AAC users and their typically speaking conversation partners were analyzed by counting the number of conversation turns and the number of speaking roles (Goffman, 1981). These data can be found in Appendix P. Table 7 shows the mean percentage (%) and standard deviation (*SD*) of

conversational contributions, measured by conversation turns and speaking roles, that were made by each of the AAC users (A1, A2, and A3) with their typically speaking conversation partners (i.e., direct care providers, professional service providers, and unfamiliar partners).

TABLE 7

MEAN PERCENTAGE AND STANDARD DEVIATION OF CONVERSATIONAL CONTRIBUTION ACROSS AAC DYADS

	Conversational contribution			
	Conversation turns		**Speaking roles**	
	AAC users	**Speaking partners**	**AAC users**	**Speaking partners**
Dyads	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**
	Dyads (n = 9)			
A1	39.48% (5.30)[a]	60.52% (5.30)[a]	41.21% (3.64)[a]	58.79% (3.64)[a]
	Dyads (n = 9)			
A2	43.23% (1.60)[a]	56.77% (1.60)[a]	47.11% (4.57)[a]	52.89% (4.57)[a]
	Dyads (n = 9)			
A3	48.93% (2.54)[a]	51.07% (2.53)[a]	53.03% (3.94)[a]	46.97% (3.94)[a]
	Dyads (N = 27)			
All	43.88%* (5.21)[a]	56.11%* (5.21)[a]	47.12%* (6.28)[a]	52.88%* (6.28)[a]

Note. *Mean* represents mean percentage from each AAC user and nine speaking partners.
[a] Identical standard deviations between AAC users and speaking partners are a result of the mean percentages in the dyads that are complements (sum to 100%).
* $p < .05$.

A paired-sample *t* test was calculated to compare the mean percentage of conversational contributions of the AAC users to that of the typically speaking conversation partners by counting conversation turns and counting attributed speaking roles across all 27 dyadic conversations. When the dyadic conversations were analyzed by counting conversation turns, the mean percentage of conversational contribution of the AAC users was 43.88 % (*SD* = 5.21, range = 30.61% - 52.15%) of the turns, and the mean percentage of conversational contribution of the typically speaking conversation partners was 56.12 % (*SD* = 5.21, range = 47.85% - 69.39%) of the turns (see Table 7). A significant asymmetry of conversational contribution from the AAC users and the typically speaking conversation partners existed ($t(26) = -6.101$, $p < .05$). The Cohen's *d* statistic ($d = 1.73$) indicated a large effect size.

When the dyadic conversations were analyzed by counting attributed speaking roles, the mean percentage of conversational contribution of the AAC users was 47.12 % (*SD* = 6.28, range = 35.33% - 59.17%) of the roles, and the mean percentage of conversational contribution of the typically speaking conversation partners was 52.88% (*SD* = 6.28, range = 40.83% - 64.67%) of the roles (see Table 8). A significant asymmetry of conversational contribution from the AAC users and the typically speaking conversation partners existed ($t(26) = -2.382$, $p < .05$). The Cohen's *d* statistic ($d = 0.46$) indicated a medium effect size. Results of the paired-sample *t* tests indicate that there is a significant asymmetry of conversational contribution measured by both conversation turns and speaking roles.

Asymmetry of Conversational Contribution

Since significant asymmetries were observed in the conversational contributions when measured in each of the two methods, a test was used to determine if the significant asymmetry

of conversational contribution was greater in one method than the other. Modifications to the data sets were made to complete this test. The percentage of conversational contribution for the speaking partners measured by conversation turns was subtracted from the percentage of contribution from AAC users for each dyad. This new set of data represents the symmetry gap (i.e., difference) of conversational contribution of each dyadic conversation measured by conversation turns. A similar modification was done with the asymmetry of conversational contributions measured by speaking roles. These numbers are reported in Table 8.

TABLE 8

ASYMMETRIES OF CONVERSATIONAL CONTRIBUTION MEASURED BETWEEN CONVERSATION TURNS AND SPEAKING ROLE

Dyads	Asymmetry of conversational contribution	
	Conversation turns	**Speaking roles**
	M **(*SD*)**	***M*** **(*SD*)**
	Dyads (n = 9)	
A1	21.04% (10.61)	17.58% (7.29)
	Dyads (n = 9)	
A2	13.54% (3.21)	5.78% (9.13)
	Dyads (n = 9)	
A3	2.12% (5.07)	- 6.07%[a] (7.87)
	Dyads (N = 27)	
All	12.23%* (10.42)	5.76%* (12.56)

Note. Percentages of asymmetry of conversational contributions = percentages of speaking partners – percentages of AAC users.
[a]Negative means that the percentages of the speaking partners were smaller than the percentages of the AAC users.
*$p < .05$.

Another paired-sample *t* test was calculated to compare the mean percentage of asymmetry of conversational contribution by counting conversation turns to that by counting attributed speaking roles across all 27 dyadic conversations. The mean percentage of asymmetry of conversational contribution by counting conversation turns was 12.23% (*SD* = 10.42, range =

- 4.30% - 38.78%), and the mean percentage of asymmetry of conversational contribution by counting speaking roles was 5.76% (*SD* = 12.56, range = - 18.34% - 29.23%) (See Table 8). A significant difference of asymmetry of conversational contribution as measured across 27 dyadic conversations was found ($t(26) = 5.14$, $p < .05$,). The Cohen's *d* statistic (*d* = .99) indicated a large effect size. Results of the paired-sample *t* test show that the asymmetry of conversational contribution measured by conversation turns is significantly different from the asymmetry of conversational contribution measured by speaking roles.

Three Speaking Roles of Each Dyad

In order to report more complete information about the attributed speaking roles, detailed frequencies and percentages of each speaking role (i.e., animator, author, and principal) attributed to each conversation participant can be found in Appendix Q. Table 9 shows mean percentages and standard deviations of each attributed speaking role (i.e., animator, author, and principal) to the AAC users and typically speaking conversation partners across each of the three groups and for all dyads.

TABLE 9

MEAN PERCENTAGE AND STANDARD DEVIATION OF CONVERSATIONAL CONTRIBUTION FROM EACH SPEAKING ROLE ACROSS AAC DYADS

Dyads	**Speaking roles**					
	Animator		**Author**		**Principal**	
	AAC users	**Speaking partners**	**AAC users**	**Speaking partners**	**AAC users**	**Speaking partners**
	M **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**
			Dyads (n = 9)			
A1	6.40% (1.93)	22.69% (1.28)	14.62% (1.70)	20.86% (1.21)	20.19% (2.43)	15.24% (1.90)
			Dyads (n = 9)			
A2	7.23% (1.62)	21.46% (.83)	16.56% (1.28)	19.12% (1.20)	23.32% (3.50)	12.31% (3.77)
			Dyads (n = 9)			
A3	14.79% (1.32)	18.36% (1.20)	16.85% (1.72)	16.52% (1.75)	21.39% (1.68)	12.08% (1.64)
			Dyads (N = 27)			
All	9.47% (4.16)	20.84% (2.15)	16.00% (1.82)	18.38% (2.26)	21.00% (2.86)	13.21% (2.91)

Note. *M* represents the mean percentage.

Conversational Contributions between Familiar and Unfamiliar Conversation Dyads

Asymmetry of Conversational Contributions between Familiar and Unfamiliar Dyads

Dyads that included the AAC users and their direct care providers and their professional service providers were grouped together as familiar conversation dyads. Unfamiliar conversation

partners were a separate group. A 2 (familiarity) x 2 (measurement) between-subjects factorial ANOVA was calculated to compare the effect of familiarity of conversation partners and the method of measurement of conversational contribution on asymmetry of conversational contribution. The main effect for familiarity was not significant ($F(1, 50) = .002$, $p > .05$). A significant main effect for measurement was found ($F(1, 50) = 613.37$, $p < .05$). Eta squared (partial $\eta^2 = .082$) indicated a large effect size. Asymmetry of the conversational contribution measured by conversation turns ($M = 12.23\%$, $SD = 10.42$) had higher asymmetry than asymmetry of conversational contribution measured by speaking roles ($M = 5.76\%$, $SD = 12.56$), as shown in Table 10. Finally, the interaction was not significant ($F(1, 50) = .358$, $p > .05$). The effect of the familiarity of the conversation partners was not influenced by the method of the measurement. Results of the two-way between-subjects factorial ANOVA show a significant effect of the method of the measurement on the asymmetry of conversational contribution, and the effect size being large.

TABLE 10

MEAN PERCENTAGE AND STANDARD DEVIATION OF ASYMMETRY OF CONVERSATIONAL CONTRIBUTION MEASURED BY CONVERSATION TURNS AND SPEAKING ROLES BETWEEN FAMILIAR AND UNFAMILIAR CONVERSATION DYADS

Familiarity of partners	**Method of measurement***		
	Conversation turns	**Speaking roles**	**Total**
	M **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**
	Dyads (n = 18)		
Familiar conversation dyads	11.61% (10.51)	6.49% (12.42)	9.05% (11.63)
	Dyads (n = 9)		
Unfamiliar conversation dyads	13.48% (10.74)	4.30% (13.47)	8.89% (12.73)
Total	12.23% (10.42)	5.76% (12.56)	9.00% (11.89)

Note. M represents the mean percentage. Mean percentages can be negatives. Negatives mean that the speaking partners have less percentage of conversational contribution than AAC users.
*$p < .05$.

Three Speaking Roles between Familiar and Unfamiliar Dyads

Mean percentages and standard deviations of each attributed speaking role (i.e., animator, author, and principal) to the AAC users and the typically speaking conversation partners between familiar and unfamiliar conversation partners are reported in Table 11.

TABLE 11

MEANS PERCENTAGE AND STANDARD DEVIATION OF THREE SPEAKING ROLES BY FAMILIAR AND UNFAMILIAR CONVERSATION DYADS

Dyads	**Speaking roles**					
	Animator		**Author**		**Principal**	
	AAC users	**Speaking partners**	**AAC users**	**Speaking partners**	**AAC users**	**Speaking partners**
	M **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**	***M*** **(*SD*)**
			Dyads (n = 18)			
Familiar	9.23% (4.31)	20.78% (2.22)	16.16% (1.92)	18.84% (2.41)	21.37% (2.02)	13.63% (2.00)
			Dyads (n = 9)			
Unfamiliar	9.97% (4.03)	20.96% (2.12)	15.71% (1.66)	18.82% (2.04)	22.17% (4.18)	12.37% (4.22)

Note. *M* represents the mean percentage of each speaking role among six attributed speaking roles.

Perceptions of Dyadic Conversations from Each Dyad

Each AAC user and each speaking conversation partner were asked to rate their conversation with respect to how well that conversation represented a "typical" conversation for them. A five-point Likert scale (1 = Strongly not typical, 2 = Not typical, 3 = Neutral, 4 = Typical, 5 = Strongly typical) from each conversation participant (i.e., three AAC users and 27 typically speaking conversation partners) is documented in Table 12.

The original question of perception on the conversation "How typical was the conversation compared to your daily conversation?" was asked to A3 several times when his first

conversation was completed. However, A3 did not respond to this question. Two potential causes were observed. First, this question might have been difficult for him to understand, because some of the wording of this question (e.g., "typical" and "strongly") is abstract. Second, the potential responses (e.g., "strongly not typical", or "strongly typical") were not preprogrammed and stored in A3's AAC device. A modified question, "Is this conversation good or bad?", along with demonstration of the thumb up and thumb down gesture was presented to A3. A3 used the thumb up with his verbal speech "good" to respond across all nine dyads, while A3's typically speaking conversation partners were asked to evaluate their perceptions using the five-point Likert scale in the original question.

TABLE 12

PERCEPTIONS OF EACH PARTICIPANT ON THEIR CONVERSATIONS

Dyad	**Perception of dyadic conversations**	
	AAC users	**Speaking partners**[a]
A1 and D11	Strongly typical	Neutral
A1 and D21	Strongly typical	Typical
A1 and D31	Neutral	Typical
A1 and P11	Typical	Typical
A1 and P21	Neutral	Strongly typical
A1 and P31	Not typical	Typical
A1 and U11	Strongly typical	Typical
A1 and U21	Not typical	Typical
A1 and U31	Not typical	Neutral
A2 and D12	Strongly typical	Strongly typical

TABLE 12 (continued)

Dyad	Perceptions of dyadic conversations	
	AAC users	**Speaking partners[a]**
A2 and D22	Neutral	Not typical
A2 and D32	Strongly typical	Strongly typical
A2 and P12	Strongly typical	Not typical
A2 and P22	Strongly typical	Strongly typical
A2 and P32	Strongly typical	Typical
A2 and U12	Strongly not typical	Strongly typical (in content)
A2 and U22	Not typical	Typical
A2 and U32	Neutral	Neutral
A3 and D13	Good[b]	Typical
A3 and D23	Good[b]	Neutral
A3 and D33	Good[b]	Typical
A3 and P13	Good[b]	Typical
A3 and P23	Good[b]	Typical
A3 and P33	Good[b]	Typical
A3 and U13	Good[b]	Not typical
A3 and U23	Good[b]	Strongly not typical
A3 and U33	Good[b]	Strongly typical

Note. Based on a five-point Likert scale (1 = Strongly not typical, 2 = Not typical, 3 = Neutral, 4 = Typical, 5 = Strongly typical).
[a]Speaking partners were one of the following: direct care providers, professional service providers, or unfamiliar partners.
[b]A3 was asked "Is this conversation good or bad?" along with showing gestures of thumb up and down.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the symmetry of conversational contribution in dyadic conversations between individuals who use augmentative and alternative communication (AAC) devices and their typically speaking conversation partners. Three individuals who use AAC devices and 27 typically speaking conversation partners participated in the conversations. Each AAC user had a one-on-one conversation with three of their direct care providers, three of their professional service providers, and three randomly assigned unfamiliar conversation partners. Two specific questions were asked in this study: (a) Is there symmetry of conversational contribution in dyadic conversations between individuals who use AAC devices and their typically speaking conversation partners when measured in either of two ways: counting numbers of conversation turns and counting number of attributed speaking roles (i.e., animator, author, and principal), as proposed by Goffman (1981)? and (b) Does the familiarity of the typically speaking conversation partners influence the symmetry of conversational contribution in these dyadic conversations as measured with the same two analyses?

It was hypothesized that conversational contributions between the individuals who use AAC and their typically speaking conversation partners would be more symmetrical when measured by counting attributed speaking roles than when measured by counting conversation turns. It was also hypothesized that conversational contributions would be more symmetrical in the familiar conversation dyads than those in the unfamiliar conversation dyads when analyzed in the same two measures.

Discussion of the Current Study

This section will include three parts: (a) summary of the findings for research question one, (b) summary of findings for research question two, and (c) a comparison of the current findings to other studies.

Summary of Findings for Research Question One

Across the 27 dyadic conversations between the individuals who use AAC and their typically speaking conversation partners, significant asymmetrical conversational contributions were found in each dyad individually. The typically speaking partners contributed significantly more conversation turns and were attributed more speaking roles than the AAC users. Further analysis showed that counting numbers of attributed speaking roles showed a significantly greater symmetry of conversational contributions than counting numbers of conversation turns.

For A1 and A2, greater symmetry of conversation contribution was found when measured by counting attributed speaking roles than when counting conversation turns. As AAC users, A1 and A2 were more similar to one another than either was to A3. Both A1 and A2 were limited to essentially one mode of communication - the use of their speech-generating AAC device. Even when these devices are used by proficient users (as A1 and A2 were identified to be), conversational interactions are slow and tedious. Example 11 shows that A1 took 22 seconds to produce the word “you”. In Example 12, A2 took 21 seconds to produce the word “how”.

Example 11

1 A1:
(10.0)*(8.0)*(4.0)*(8.0)*“You”(3.0)*(7.0)*“went”(5.0)*(8.0)*(4.0)*(3.0)*(10.0)*(11.0)*(3.0)*(11.0)*(4.0)*“leg”(3.0)*(3.0)*
D21: .AAC .

2 D21: Are you asking about when we went to the leg doctor?
.AAC .
A1: .AAC .

Example 12

1 A2: (21.0)“how”(10.0)“R”(10.0)“here”(11.0)“E”(9.0)“M”(3.0)“Emotion”
.AAC . ((Head turn toward D22))
D22: .AAC A2 .

2 D22: Oh, my emotions?
.A2 .
A2: .D22 .

Many of the conversation partners for A1 and A2 reported that they assumed they should contribute more to their conversations because they were concerned that these users would become fatigued when trying to communicate using their AAC devices. Some conversation partners also reported trying to shorten the delays between turns by contributing more to the conversations. When counting attributed speaking roles, however, A1 and A2 were more like their typically speaking conversation partners. Their viewpoints were made known and discussed, and their ability to co-construct the conversational interactions was acknowledged.

A3, however, had greater symmetry of conversation contribution when measured by counting conversation turns than when counting speaking roles. A3 was able to use multiple means of communication, including his speech-generating AAC device, gestures (e.g., head nods), signing (American Sign Language), and mostly unintelligible vocal speech attempts. With these multiple modes of communication, A3 was able to initiate a conversation topic or respond

to questions more quickly than either A1 or A2. Additionally, at least with his familiar partners, A3's conversation topics seemed to be structured around themes known to be accessible on his speech-generating device (e.g., Boy Scouts, wrestling). He also has had more social experiences with typical peers (e.g., Boy Scouts, school activities) that may have given him greater opportunities to practice conversational skills. It also may be that with the multiple means of communication available to him, A3 was judged to be a more independent communicator than A1 or A2. That is, his conversation partners felt less responsibility to carry a greater load during the conversation. However, greater asymmetry was shown between A3 and his conversation partners when counting attributed speaking roles. From this perspective, his partners carried a greater responsibility for selecting the topics, expressing viewpoints, etc. A3 responded to or asked direct questions but had less responsibility for co-constructing the conversation.

In summary, both methods of measuring conversational contribution showed significant asymmetry between the AAC users and their typically speaking conversation partners. These two analyses demonstrated that the typically speaking partners contributed more to the dyadic conversations than the individuals who use AAC. Furthermore, the measurement of counting numbers of attributed speaking roles illustrated more symmetrical conversational contributions than the measurement of counting numbers of conversation turns.

Patterns of Three Speaking Roles of Animator, Author, and Principal Across Dyads

Before discussing the symmetry of the conversational contributions between the AAC users and their typically speaking conversation partners when measured by counting attributed speaking roles, it will be necessary to discuss some issues related to coding these attributions. Goffman (1981) stated that in most situations, a conversation participant would assume all three roles during the generation of a message. An utterance would be spoken (animator) by an

individual who selected the words (author) to express his thoughts or ideas (principal). In these types of conversations, the attributions of roles to a particular participant would be assumed to be relatively equal. Simmons-Mackie, et al. (2004) asserted that this might not be the case for conversation participants who have a communication difficulty (i.e., aphasia). In this case, individuals with aphasia may not assume all three roles equally but may instead rely on their partners to support their conversational efforts. Most frequently, that would mean that their partners would "speak" for them. In those cases, persons with aphasia would have fewer attributions of "animator" in their conversations. This would appear to be the case for the participants in this study as well.

Feedback from some conversation partners indicated that they felt they were more responsible for keeping the conversation going when conversing with individuals with AAC than they would be in a conversation with typical speakers. They had to try to guess what the AAC users were talking about, and the responsibility for keeping conversation going tended to be more on their shoulders. This can be seen in two ways: first, the speaking partners did more inferring of the meanings and/or words in the messages produced by the AAC users; and second, the typically speaking conversation partners often echoed the messages selected by the AAC users. In some situations, certain typically speaking partners said that they guessed what the AAC users were trying to say before they actually completed their attempts at generating the utterances in order to save time in the conversation. This feedback from the typically speaking partners indicated that they felt they needed to anticipate what the AAC users might be able to talk about (i.e., what messages were available to them in their devices), and then to direct the conversation to those areas. In the following sections, the roles of animator, author, and principal will be discussed sequentially.

Animator. The role of animator is attributed to the individual who actually speaks the message in the conversation. For A1 and A2, their speech-generating devices were the agents to "speak" their messages. For A3, his speech-generating device was one of the means he used to "speak" his message. The role of animator was attributed to the typically speaking conversation partners significantly more frequently than to the AAC users in these dyadic conversations, which indicated that the typically speaking partners verbally spoke more frequently than the AAC users generated messages with their speech-generating AAC devices and/or contributed vocally.

These asymmetries in attributed animator roles were similar to the asymmetries in numbers of conversation turns. In this study, when the AAC users communicated a message non-verbally (e.g., using head nods), the role of animator was not assigned to them. However, a conversation turn was assigned. This is illustrated in the Example 13:

Example 13

1 A2: (21.0)"how"(10.0)"R"(10.0)"here"(11.0)"E"(9.0)"M"(3.0)"Emotion"
.AAC .((head turn toward D22))
D22: .AAC A2 .

2 D22: Oh, my emotions?
.A2 .
A2: .D22 .

3 A2: ((head nod))
.D22 .
D22: .A2 .

In this example, the AAC user (A2) is assigned two conversation turns (line 1 and line 3), and is attributed one animator role (line 1). His conversation partner is assigned one turn and one animator role (line 2). Although A2 participated in the conversation in line 3, the animator role was not attributed because no "spoken" message was generated.

Author. The role of author is attributed to the individual who actually selects and/or infers the content of message. Attributions of the role of author were slightly different between the AAC users and their typically speaking conversation partners. For A3, the numbers of role of author attributed to each was nearly equal. However, A1's typically speaking conversation partners were attributed the role of author much more frequently than A1, and A2's typically speaking conversation partners were attributed the role of author slightly more frequently than A2. This might indicate that A1's and A2's speaking partners directed the conversations with their own messages and/or inferred meanings to A1's and A2's communication behaviors (e.g., messages generated from the AAC device, head nods, and head shakes) frequently during their conversations.

This relates to an increase in the attribution of the number of the role of animator to the speaking partners, when comparing the role of author to the role of animator attributed to the speaking partners. This appears to indicate three potential situations: (a) the speaking partners acted as their own role of author and spoke their intended utterances, (b) the speaking partners acted as the role of author to infer the meanings of the communication behaviors from the AAC users, and (c) the speaking partners verbally echoed (i.e., repeated) the messages selected by the AAC users (i.e., AAC users acted as the author). Example 14 and Example15 provide illustrations of these attributions:

Example 14

1 D12: (6.0) You were having a tough year maybe.
.AAC .
A2: ((one knee touching the switch))
.AAC .

2 A2: (3.0)*"U"(8.0)*"N"
.AAC . ((head turn toward D12))
D12: .AAC .

3 D12: Your junior year
.A2 .
A2: .D12 .

4 A2: **"Junior"
.D12 .
D12: .A2 .

Example 14 shows how the speaking partner (D12) authored her own messages and also inferred the meanings or words to the messages generated by the AAC user (A2). The roles of animator and author were attributed to the speaking partner (D12) in lines 1 and 3, and attributed to the AAC user (A2) in lines 2 and 4. In line 1, the speaking partner (D12) authored and animated her own content. In line 3, the speaking partner (D12) inferred the meanings of the letters "U" and "N" generated from the AAC user's (A2's) AAC device in line 2.

Example 15

1 P12: I think that's a good goal. I do. I think your legs are your strongest point, do you?
.A2 .
A2: .P12 .

2 A2: ((head nod))
.P12 ,
P12: .A2 .

3 P12: Yeah.
((head nod))
.A2 .
A2: .P12 .

Example 15 illustrates how the AAC user (A2) authored his own message and his message was confirmed by his speaking partner (P12). In line 1, the roles of animator and author were attributed to the speaking partner (P12). In line 3, the speaking partner (P12) animated the nonverbal communication behavior (i.e., head nod) produced by the AAC user (A2) the in line 2. The meaning of the head nod (e.g., "yeah", "OK") was validated by the speaking partner (P12). In other words, the speaking partner (P12) animated the message authored by the AAC user (A2).

Principal. The role of principal is attributed to the individual whose perspective/position is spoken in the utterances. The role of principal was attributed to the AAC users significantly more frequently than to the typically speaking conversation partners. Across all three groups of AAC users and their typically speaking conversation partners, the role of principal was attributed more often to the AAC users than to the speaking partners. This relates to an increase in the attribution of the number of the role of animator to the speaking partners, when comparing the role of principal to the role of animator attributed to the speaking partners. This appears to indicate two potential situations: (a) the speaking partners spoke on their own principal; and (b) the speaking partners spoke on the AAC users' roles of principal, whereby the AAC users were able to offer their own ideas and perspectives in these conversations, even though they were not able to "speak" them.

Example 16 demonstrates this comparison of the role of principal attributed to the speaking partner (P33) to the role of animator attributed to the speaking partner (P33). A role of animator and a role of principal were attributed to the speaking partner (P33) in line 1, while only a role of animator was attributed to the speaking partner (P33) and a role of principal was attributed to the AAC user (A3) in line 3. In other words, the speaking partner (P33) spoke (i.e., amplified) the AAC user's (A3's) intended meaning.

Example 16

1 P33: Long, or short races?
((gestures of long and short))
.A3 .
A3: .AAC .

2 A3: (/w rə/)
((gesture of short))
P33: .A3 .

3 P33: Short races.
.A3 .

In summary, the measurement of attributed speaking roles showed that the typically speaking conversation partners were often in the position to speak for the individuals who use AAC, resulting in more roles of animator being attributed to the speaking partners. Furthermore, the speaking partners' utterances were spoken on the AAC users' behalf. In this context, the speaking partners acted as the role of animator and the role of author to speak and select the words for the AAC users' thoughts and ideas.

Summary of Findings for Research Question Two

Research question two addressed the symmetry of conversation contribution between the AAC users and their typically speaking partners when these partners were familiar (e.g., direct care providers or professional service providers) or unfamiliar (e.g., randomly assigned with no previous interactions). The same two methods of measuring conversational contribution were used.

Symmetry of Conversational Contributions between Familiar and Unfamiliar Dyads

The symmetry of conversation contribution was not significantly different between the familiar partners and the AAC users when compared to unfamiliar partners and the AAC users.

For both groups, both methods of measuring conversational contribution indicated similar results that counting attributed speaking roles showed more symmetrical conversational contributions than counting conversation turns. When analyzed by counting conversation turns, conversational contributions of the familiar conversation dyads were slightly more symmetrical than those of the unfamiliar conversation dyads. In contrast to counting conversation turns, counting attributed speaking roles in the unfamiliar conversation dyads was slightly more symmetrical than those in the familiar conversation partners.

These were unexpected findings, and might be explained by a weakness in the inclusion criteria used for selecting the unfamiliar conversation partners. Buzolich and Wiemann (1988) recruited two individuals who used AAC and two unfamiliar conversation partners who had no prior experience with individuals with disorders in their study. In contrast, Kraat (1985) summarized two unpublished studies reporting the following inclusion criteria for unfamiliar conversation partners in both studies: individuals who were not familiar with AAC and individuals who use AAC, but had experience interacting with people with disorders. In a broad sense, the criteria in these two unpublished studies matched the intent of the current study and were adopted. Even though the unfamiliar conversation partners in the current study met these inclusion criteria, three of the unfamiliar conversation partners (i.e., U11, U13, and U33) were currently or had been students in the program of communication sciences and disorders. Data on two of them (U13 and U33) showed that more speaking roles were attributed to the AAC user (A3) than to the speaking partners. This differed from the almost equal attributions of the speaking roles to the other unfamiliar conversation partner (U23). In addition, one of the unfamiliar conversation partners (U22) had previously interacted with a young child with autism spectrum disorder. More speaking roles were attributed to the AAC user (A2) than to her in their

conversation, which again differed from the almost equal attributions of the speaking roles for the other unfamiliar conversation partners (U12 and U32). Because of their familiarity with individuals with communication differences, these four unfamiliar conversation partners may have been more willing to facilitate the AAC users' communication than other unfamiliar conversation partners who participated in this study.

Patterns of Three Speaking Roles across Familiar and Unfamiliar Dyads

Feedback from the unfamiliar conversation partners indicated that they felt that if they had known more about the AAC users (e.g., diagnosed disabilities, potential conversation topics, types of communication means) before the conversations, the conversations might have been better. However, if that information had been given to the unfamiliar conversation partners, that would have made them more "familiar". In contrast, some of the unfamiliar conversation partners did report that their dyadic conversations were similar to conversations between typical people who are unfamiliar with each other, in which they jump around from topic to topic, ask more questions (e.g., yes/no questions), and unintentionally finish each other's utterances.

The attributions of each speaking role (i.e., animator, author, and principal) in the familiar conversation dyads were similar to those in the unfamiliar conversation dyads. Similar attributions of each speaking role observed in these familiar and unfamiliar conversation dyads were also observed across all 27 dyads. It can be inferred that the familiarity of conversation partners did not affect the attributions of speaking roles to either the AAC users or their typically speaking conversation partners.

Comparison of the Current Findings to Other Studies

The first focus of this study was to examine if symmetries of conversational contribution measured by numbers of conversation turns and attributed speaking roles existed in dyadic conversations between individuals who use AAC and their typically speaking conversation partners. Based on the findings of this investigation, asymmetrical conversational contributions were found using both types of measures.

Further analysis showed that counting attributed speaking roles demonstrated more symmetrical conversational contributions than counting conversation turns. The findings of this study are supported by Simmons-Mackie et al. (2004) who stated that the measurement of speaking roles highlighted "shared, increased effort" (p. 122) of the conversation and thus led to more symmetrical conversational contribution.

Conversational Contribution Measured by Conversation Turns

The asymmetrical conversational contributions measured by counting conversation turns found in this study were consistent with the results of previous studies (e.g., Buzolich & Wiemann, 1988; Farrier et al., 1985; Light et al., 1985; Muller & Soto, 2002). There is little doubt that typically speaking conversation partners take more conversation turns than individuals who use AAC in their conversations.

As discussed previously, individuals who use AAC frequently depend on their typically speaking conversation partners to infer the meanings and provide words for their messages over the course of the conversation (Collins & Markova, 1999; Kent-Walsh & McNaughton, 2005). Additionally, when typically speaking conversation partners take more responsibility for the conversation, they also, by necessity, take more conversation turns (Collins & Markova, 1999; Oelschlaeger & Damico, 1998; Olsson, 2004). These turns may be used to avoid

misunderstanding of the messages through requesting more information from the AAC users and to ask more "yes/no" questions to classify their guesses about the meanings of the messages produced by the AAC users (Light et al., 1985; Muller & Soto, 2002). This asymmetry of conversation turns could be expected and, in fact, was seen in this study as well.

Conversational Contribution Measured by Three Speaking Roles

It is not surprising that an asymmetry of conversational contribution also existed in the measurement of attributed speaking roles. There are several possible explanations for this asymmetry.

Animator. The role of animator is attributed to the agent who vocalizes the utterance. Attributions of the roles of animator to the typically speaking conversation partners were more frequent than to the AAC users in this study. The asymmetrical attributions of the roles of animator can be explained by two potential factors. First, the three AAC users in this study communicated primarily thorough their speech-generating AAC devices, although each also communicated with some unintelligible vocalizations and nonverbal communication behaviors (e.g., head nods). They mainly produced key elements (e.g., a letter, a word, a short phrase) through their AAC devices in their utterances, and the meanings of these elements were left to be interpreted by their typically speaking partners by asking for additional information, inferring the meanings to these key elements, or adding pieces of related information together to avoid misunderstanding. This need for clarification necessitates that the typically speaking partners must speak more frequently than the AAC users. Second, the meanings of certain verbal communication behaviors (e.g., unintelligible vocalizations) and nonverbal communication behaviors (e.g., pointing) are not fixed in the conversation, in which the conversation partner

must interpret these meanings over the course of the conversations (Fogel, 1993; Higginbotham & Yoder, 1982; Olsson, 2004; Simmons-Mackie & Damico, 1996).

Additionally, the asymmetry of the attributions of the role of animator found in this study was supported by Simmons-Mackie et al.'s (2004) framework of speaking for another, in which the speaking person (speech-language pathologist) acted as a spokesperson for the individual with aphasia. In order to coconstruct the meanings of the communication behaviors, the typically speaking partners must animate the messages authored by the individual with aphasia. Although their study did not address the number of attributions of the role of animator, the conversation examples shown in their study illustrated the asymmetry of the attributions of the roles of animator between the speaking partner and the individual with aphasia. This asymmetry is no exception for the dyads of the individuals who use AAC and their typically speaking conversation partners in this study.

Author. When analyzing the role of author, asymmetrical attributions occurred across all 27 dyads. The typically speaking conversation partners either authored their own messages or inferred the meanings and/or words (and therefore authored the messages) for the individuals who used AAC. Similar findings have been demonstrated in the work of Simmons-Mackie and her colleagues (2004). They documented how a speech-language pathologist spoke for an individual with aphasia. The speech-language pathologist acted as the animator and authored messages and words (i.e., acting as author) for this individual to coconstruct the conversation. Asymmetry of the role of author could be expected between the individual with aphasia and the speech-language pathologist as previously discussed. This asymmetry is also seen in the work of Olsson (2004), whose findings showed that a caregiver had to try to interpret each intended communication behavior from a child with severe multiple disabilities. Considerable attention

was given to the observation that the child contributed a word, a nonverbal communication behavior, or even a sound to the conversation, and then the caregiver inferred and selected meanings to animate the child's contributions. Similar findings were shown also in the work of Oelschlaeger and Damico (1998). The wife of an individual with aphasia took many conversation turns to search for meanings or words to interpret one or more communication behaviors (e.g., hand pointing) produced by the individual with aphasia based on their immediate context and shared personal experiences. It has been concluded that speaking conversation partners usually infer the meanings and select potential words for the communication behaviors produced by individuals with communication disorders (e.g., Oelschlaeger & Damico, 1998). These findings may explain the asymmetry of attribution of the role of author seen in the current study.

In terms of the almost equal attributions of the role of author in A3's dyadic conversations, two potential facts might explain this. First, A3's speaking partners most often asked yes/no questions, and A3 simply responded to these questions with "yes" or "no" without providing additional related information. Second, since A3 used multiple communication means (e.g., his AAC device, unintelligible speech) in his conversations, his typically speaking conversation partners were not required as frequently to infer his meanings. In other words, A3 might be able to make his messages more understandable to his speaking partners than A1 and A2.

Principal. Asymmetry of attribution of the role of principal in these 27 dyadic conversations was seen as well. The role of principal was attributed more frequently to the AAC users than to their speaking partners, which was in contrast to the attributions of the roles of animator and author. This finding suggests that the individuals who use AAC were able to "hold

their own" in the conversation by having their beliefs, positions, and sentiments discussed. It is tempting to infer that although the speaking conversation partners inferred the meanings and spoke for the AAC users, they retained the AAC users' perspectives in their utterances.

The asymmetry of speaking roles attributed to the dyads found in this study could be explained by an understanding of the concept of coconstruction of conversation. As Light (1988, 1997b) stated, when conversing with individuals with communication disorders (including individuals who use AAC), typically speaking conversation partners take more responsibility to confirm the messages produced by the individuals with communication disorders, and then to lead the conversation with a chain of questions. Then the speaking partners expand the messages from the individuals with communication disorders and confirm these again in order to avoid miscommunication. As demonstrated in this study, the roles of animator and author were more frequently attributed to the speaking conversation partners, but the role of principal was more frequently attributed to the AAC users, acknowledging their participation in the coconstruction of the conversation.

Conversational Contributions between Familiar and Unfamiliar Dyads

Although familiarity of the typically speaking conversation partners showed little influence on the symmetry of conversational contributions in this study, this study also shows that counting conversation turns in the familiar conversation dyads was slightly more symmetrical than in the unfamiliar conversation dyads. This might indicate that the familiar conversation partners took fewer conversation turns in the conversations with the AAC users than the unfamiliar conversation partners. This finding contrasts with the statement, argued by Higginbotham and Yoder (1982) and Milosky (1990), that individuals who are familiar with persons with communication disorders (including those using AAC devices) and/or their

conversation modes (e.g., gestures) might take more conversation turns to classify messages produced from those persons with communication disorders. However, no unfamiliar conversation partners were included in these studies for comparison.

On the other hand, Buzolich and Wiemann (1988) concluded from their work that speaking partners without any prior experience with individuals who use AAC (i.e., unfamiliar partners) might assume more conversation turns to act as the AAC users' "speaking machine". Similarly, speaking partners with limited or no experience with individuals who use AAC might ask diverse related or unrelated questions in order to speed up the conversation (Buzolich & Lunger, 1995; Farrier et al., 1985; McCoy et al., 2007). Another study, summarized by Kraat (1985), showed that unfamiliar conversation partners required more conversation turns than familiar conversation partners to not only clarify messages produced by individuals who use AAC, but then to coconstruct their dyadic conversations. From these studies, asymmetry of turn-taking between individuals who use AAC and unfamiliar conversation partners should be expected. From these perspectives, the findings that the unfamiliar conversation partners took slightly more conversation turns than the familiar conversation partners found in this study are supported.

Another finding of this study is that the attributions of speaking roles in the unfamiliar conversation dyads were slightly more symmetrical than those in the familiar conversation dyads. It can be concluded that the unfamiliar conversation partners might speak slightly more frequently for the AAC users than the familiar conversation partners. Simply speaking, the unfamiliar conversation partners might act more frequently in the roles of animator and author while retaining the AAC users' viewpoints than the familiar conversation partners. This finding is not consistent with the findings of Hemsley et al. (2008), Bloch and Beeke (2008), Buzolich

and Wiemann (1988). These scholars concluded that conversation partners who were familiar with individuals who use AAC and their communication strategies were more willing to speak for them and then attempt to make the unclear messages more understandable in their dyadic conversations. Given the preceding discussion, the effect of familiarity of conversation partners on the conversational contribution went in different directions. The potential effect requires attention in further studies.

Strengths of the Current Study

The current study used a novel method of analyzing the conversational contributions of AAC users and their typically speaking conversation partners by counting the numbers of attributed speaking roles (i.e., animator, author, and principal). Although conversational contributions measured by the attributed speaking roles showed asymmetries between the individuals who use AAC and their typically speaking conversation partners, the numbers of the attributed speaking roles illustrated more symmetrical contributions in the dyads than seen by the numbers of conversation turns.

In contrast to counting conversation turns, the analysis of attributed speaking roles considered not only who the speaking person was (including messages generated from speech generating AAC devices), but also who selected the messages and whose position/perspective was being considered. In other words, an AAC user can be seen to be a more successful conversation participant in spite of being unable to "speak" in traditional ways.

An additional benefit of the analysis of attributed speaking roles in conversations between individuals who use AAC and their conversation partners should be considered in light of the concept of coconstruction of the conversation. Throughout a conversation, meanings of the communication behaviors are negotiated based on environmental contexts (e.g., communication

behaviors produced from the previous speaker) (Goffman, 1974; Simmons-Mackie et al., 2004; Tannen & Wallat, 1993). Both participants in the conversation may take on different speaking roles to accomplish this coconstruction. Furthermore, the analysis of speaking roles highlights the relationship between the conversation participants, and values each conversation participant's verbal and nonverbal communication behaviors when acting as one or more of the speaking roles (Leahy, 2004; Tannen, 1993). Coconstruction of conversation results from communication behaviors understood by each participant and appropriate responses provided which lead to appropriate constructions of meanings (Dunst & Lowe, 1986; Light, 1988). Analyzed from this perspective for the individuals who use AAC, making their meanings of the messages understood is more important than the modes of communication (Dunst & Lowe, 1986; McTear & King, 1991).

In conversations with individuals who use AAC, the analysis of attributed speaking roles allows a richer interpretation of their contributions, including how conversation participants understand each other, how speaking partners infer meanings or words to the communication behaviors produced by the AAC users, and how the AAC users provide related information to the speaking partners.

With these negotiations of meanings and words, the speaking partners confirm and then elaborate the communication behaviors of AAC users (Gan et al., 2008; Gumperz, 1982; Leahy, 2004; Light, 1997b), and the AAC users continually provided related information to the speaking partners. The simple counting of conversation turns underestimates the contribution of the AAC users when compared to counting attributed speaking roles.

Limitations of the Current Study

There are three main limitations to the present study: (a) recruitment of participants, (b) naturalness of videotaped conversations, and (c) and clear understanding of how to code the speaking roles.

Recruitment of Participants

The lack of a homogeneous group of individuals who use AAC is a major limitation of the current study. In the current study, two of the individuals who use AAC were diagnosed with cerebral palsy (A1 and A2), and one was diagnosed with Down syndrome (A3). A1 and A2 had only one primary means of communication (the use of their speech generating devices), while A3 had multiple means. The devices used by A1 and A2 were somewhat more sophisticated in that they allowed their users to generate more unique or novel messages. Cognitive abilities were not considered in the inclusion criteria for participation in this study. By the nature of their diagnoses, A1 and A2 may have had higher levels of cognitive and/or language skills than A3. While A3 had a greater number of conversation turns in all of his dyads than A1 or A2, his conversations were also somewhat limited in terms of content, topic, and vocabulary.

In most studies that include individuals who use AAC, homogeneity of the study population is always an issue. Similarly, the numbers of participants in a given geographical area who use the types of high-tech, speech-generating devices required for participation in this study are limited. The small number of participants and the differences among them in this study will not allow the findings of this research to be easily generalized.

Naturalness of Videotaped Conversations

An additional limitation to this research is the lack of naturalness of the videotaped conversations collected in the current study. Although the conversation participants were asked to converse as naturally as possible, the fact that the conversations took place in a laboratory-type setting and were being videotaped more likely influenced them, at least initially. It has been noted in previous studies that the Hawthorne effect might influence participants' conversation behaviors when they are videotaped (Light, 1988; Wrench, 2008); that is, knowing that they are being videotaped would cause them to act differently in the conversation. Moreover, only recording each dyad one time might also misrepresent conversation behaviors from either the AAC users or their typically speaking conversation partners.

Clear Understanding of Coding Speaking Roles

Although intercoder and intracoder reliability was high, it was difficult to interpret the meanings of the three speaking roles as described by Goffman (1981). Goffman used various analogies to illustrate these roles in his writings but did not provide highly concrete definitions or descriptions of each of the roles. That left the interpretation of how to attribute each of the speaking roles up to the principal investigator in this study.

Role of Author. Goffman (1981) referred to author as "someone who has selected the sentiments that are being expressed and the words in which they are encoded (p. 144)." In Example 17, line 2 illustrates that B (a speaking partner) spoke an utterance based on two parts of the messages produced by A (an AAC user) in line 1. The role of animator was attributed to B, but the roles of author and principal were attributed to A in line 2.

Example 17

1 A: "Rebecca" "R"

2 B: Do I know Rebecca?

3 B: I don't think so.

4 A: "b" "c" "a" "r"

5 B: Rebecca Bcar

It is not clear in Example 17 that the utterance in line 2 ("Do I know Rebecca?") was actually coconstructed by A's "Rebecca" and B's "Do I know". In a broad sense, the words in this utterance were selected by both A and B, not just from A, according to Goffman's (1981) definition. Simmons-Mackie et al. (2004) expanded Goffman's definition of author more broadly. The role of author was defined as "individuals who implicate or infer specific wording or specific messages (Simmons-Mackie et al., 2004, p. 116)." The revised definitions of author solve this double author dilemma. In Example 17, in line 2, B inferred the possible meanings of the two parts of A's message messages (i.e., "Rebecca" and "R") that A provided in line 1 in order to negotiate and then coconstruct the conversation with A. Simply speaking, B acted as the roles of animator and author for A's principal in line 2, and a similar situation is also observed in line 5.

A similar example is illustrated in Example 18. In line 2, A2 (the AAC user) generated two letters "U" and "N" from his AAC device, and D12 (the speaking partner) inferred the meanings to these two letters and then selected her own message "your junior year" in line 3. With this clarification by D12, A2 continually provided further information in line 4 to confirm what D12 inferred in line 3. These negotiations and confirmations of meanings are considered as part of the process of coconstruction.

Example 18

1 D12: (6.0) You were having a tough year maybe.
.AAC .
A2: ((one knee touching the switch))
.AAC .

2 A2: (3.0)*"U"(8.0)*"N"
.AAC . ((head turn toward D12))
D12: .AAC .

3 D12: Your junior year
.A2 .
A2: .D12 .

4 A2: **"Junior"
.D12 .
D12: .A2 .

Role of Principal. Although intercoder reliability was shown to be high, the majority of coding disagreements occurred on the attribution of the role of principal. These coding errors might be caused by unclear operational definitions of role of principal used in the current study. According to Goffman's (1981) statement, the role of principal was attributed to "someone whose position is established by the words that are spoken, someone whose beliefs have been told, someone who is committed to what the words say" (p. 144). In order to code the attribution of the role of principal in the current study, the principal investigator integrated Goffman's (1981) and Schiffrin's (1994) definitions of the role principal, and defined principal as an individual whose beliefs, positions, perspectives, personal information, and sentiments are established by the words spoken. Although this definition provided a somewhat clearer characterization of the role of the principal, in some conversational situations, the role of the principal was still not easy to determine.

In Example 19 line 3, D11 (the speaking partner) is the animator and the author of the first utterance (italicized), inferring the meaning of A1's (the AAC user) word "rested". In this case, it may not be clear who is the principal for the words "Oh, you took a nap".

Example 19

1 D11: So what did you do in the afternoon?
.A1 .
A1: .D11 .

2 A1: (6.0)*(17.0)*"rested"
.AAC .((head toward D11))
D11: .AAC .

3 D11: *Oh, You took a nap.* Did everybody take a nap?
.A1 .
A1: .D11 .

4 A1: ((head nod))
.D11 .
D11: .A1 .

In other conversations, it was difficult to determine whose belief/perspective was being discussed. Example 20 illustrates one of these instances. In line 1, D31 (the speaking partner) spoke multiple utterances to A1 (the AAC user). After an 11-second pause, D31 continued speaking. The role of principal was attributed to D31 in the first utterance in line 1 ("You know what you said when you were little?"). However, it is confusing whether D31 is actually the principal for this utterance or whether she is reflecting A1's thoughts from an earlier time. Simply speaking, it is difficult to determine whose perspective was taken in this utterance. The second utterance ("You said you just thought they talked on the phone.") was attributed to A1 as the role of principal, but the rest of line 1 was attributed to D31 as the role of principal. A similar situation might also be reflected in line 2. It was difficult to determine whether D31 simply was

acting in the roles of author and animator for what she thought A1 might be thinking, or whether D31 was asking A1 to reflect on something else about the conversation.

Example 20

1 D31: You know what you said when you were little? You said you just thought they talked on the phone. That's what lawyers do. And that's what you wanted to do; to be a lawyer and talk on the phone and to talk into that little recorder thing that he used to hold.
.A1 .
A1: .D31 .

2 F31: (11.0) You want to tell me anything more about it?
.A1 .
A1: .F31 .

3 A1: ((head shake))
.F31 .
F31: .A1 .

Implications

The findings from the current study have several implications for the research and clinical assessment of dyadic conversations between individuals who use AAC and their typically speaking conversation partners. This investigation explores a new method to be used in studying conversations between individuals who use AAC and speaking conversation partners different from focusing solely on numbers of conversation turns between the participants. This study illustrates the usefulness of the analysis of speaking roles attributed to the dyadic conversations between AAC users and their typically speaking conversation partners. Who speaks a message, who selects the words in the message, and whose perspective is reflected in the message are all considered in the analysis of speaking roles. The findings reported in this study add a richer level of analysis to the contributions of both participants in the conversation

dyad and provide a greater recognition of the role of the AAC users in coconstructing the conversation.

Inherent in the use of speech-generating devices are multiple factors that may affect the ability of the AAC user to participate in a conversation. These factors include having sufficient vocabulary preprogrammed and stored to enhance the rate of conversation exchange as well as having sufficient language skills to generate novel messages by spelling (e.g., Gerber & Kraat, 1992; McCoy et al., 2007). Because of these factors, individuals who use AAC must often depend on their conversation partners to animate and/or author their messages. Using attribution of speaking roles as a measure of conversational contribution, however, affords greater recognition of the AAC user's role in the conversation.

Directions for Future Research

This study has been concerned with exploring conversational contribution from a traditional analysis approach, i.e., counting numbers of conversation turns, and a more novel analysis approach, i.e., counting numbers of attributed speaking roles, as proposed by Goffman (1981). The analyses presented in this current study have focused on a relatively small number of dyadic conversations between individuals who use AAC and their typically speaking conversation partners to illustrate the benefits of comparing these two methods of analysis. The results of the study suggest several directions for future research in this area.

First, although it is always difficult to recruit a homogenous group of individuals who use AAC, it would be important to have as much information about these individuals as possible in order to compare them with one another. The impact of diagnosis, cognitive/language level, conversational exposure with different types of partners, and etc., need to be considered and accounted for.

Second, each of the individuals who used AAC in this study interacted only once with nine different conversation partners. Different patterns of conversational contributions may have been seen if multiple conversations with the same partners were analyzed or if a greater number of conversation partners were recruited. Additionally, more stringent inclusion criteria for unfamiliar conversation partners may contribute to greater differences between the familiar and unfamiliar conversation dyads. Third, the operational definitions of the speaking roles used in this study did not always afford a clear attribution of those roles, especially the role of principal. A clear definition of the role of principal should be provided with several examples to avoid confusion between personal thoughts/assumptions and speaking from the partners' beliefs. It would be expected that the results might be different with a more clear definition of the role of principal.

Conclusion

We are now in a position to summarize the main points of the current study. Perhaps the most fruitful findings in this study are seen in the benefits of using the attribution of speaking roles to measure conversational contributions between individuals who use AAC and typically speaking conversation partners. Although both measurements of numbers of conversation turns and numbers of attributed speaking roles showed asymmetry in the conversational contributions in the dyads, the measurement of speaking roles showed more symmetrical conversational contributions in the dyads than the measurement of conversation turns. The value of the measurement of speaking roles is shown in highlighting information about who speaks, who selects messages, and whose position is mentioned in the spoken utterance. It can be inferred that the measurement of speaking roles can be considered to be more sensitive and comprehensive

when evaluating conversations with individuals who use AAC than the measurement of numbers of conversation turns.

Two main advantages of using an analysis of the attribution of speaking roles as a measure of conversational contribution have been previously discussed. First, the attribution of speaking roles considers the core concept of conversation, coconstruction (Clark, 1996; Damico et al., 1999; McTear & King, 1991), which is not fully considered by the counting of conversation turns alone (Stiegler, 2007). Second, the conversational contributions from individuals who use AAC and their typically speaking conversation partners can be more thoroughly documented from the analysis of attribution of speaking roles. The analysis of attribution of speaking roles provides a novel way to evaluate conversations with individuals who use AAC, and avoids the potential underestimated contributions of these individuals when measured with conversation turns only.

Along with these advantages, the analysis of speaking roles allows researchers to examine the coconstruction of conversation with individuals who use AAC. This analysis has been investigated with individuals who stutter (e.g., Leahy, 2004, 2008) and individuals with aphasia (Simmons-Mackie et al., 2004), but has not been applied to individuals who use AAC. However, the value of conversation turns cannot be ignored. In the essence of conversation, each conversation participant must take turns to coconstruct meanings from communication behaviors with each other (Clark & Brennan, 1991; Fetzer & Akman, 2002; Light, 1997b; Wiemann, 1985), by acting in the roles of animator, author, and principal appropriately. The finding that the familiarity of the conversation partners had no effect on either measure of conversational contribution was unexpected. It would be important to explore this finding more carefully to determine the factors that contributed to them.

This study represents a first attempt to present the comparisons of conversational contributions measured by numbers of conversation turns and numbers of attributed speaking roles in conversations between individuals who use AAC and their typically speaking partners. These conversations illustrate how the conversation turns were counted and how the three speaking roles (i.e., animator, author, and principal) were attributed to each conversation participant. The current study presents preliminary data and demonstrates the value of analyzing the attribution of speaking roles to the study of conversational contribution with individuals who use AAC. This method of analysis appears to hold promise for providing additional information about the conversation abilities of individuals who use AAC.

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APPENDICES

APPENDIX A

SAMPLE OF INFORMAL AND SHORT SCREENING AND OBSERVATION FOR AAC USERS

Screening for Recruitment of AAC Users

AAC User: _____

Basic Information

- Age:
- Gender:
- Types of disability:
- English as a first language: Yes/No
- Type of AAC device used:
    - Access Method:
    - How the device is mounted?
- Length of time using the AAC device:
- Able to see people in face-to-face conversations: Yes/No
    - Glasses: Yes/No
- Able to hear people's speech in face-to-face conversations: Yes/No
    - Hearing aids: Yes/No

Observation on Conversation Characteristics

- Date and Place (e.g., home):
- Able to initiate social conversations with others: Yes/No
    - To request needs and wants: Yes/No, in what situation:
    - To share information: Yes/No, in what situation:
    - Others:_____, in what situation:
- Able to understand basic social conversations and participate in these conversations: Yes/No
    - To request needs and wants: Yes/No, in what situation:
    - To share information: Yes/No, in what situation:
    - Others:_____, in what situation:

APPENDIX B

SAMPLE OF INFORMAL INTERVIEW FOR CONVERSATION PARTNERS

Informal Interview for Recruitment of Conversation Partners

Conversation Partners: _____

Basic Information

- Age:
- Gender:
- English as a first language: Yes/No
- Have taken care of, provided services to, and/or interacted with the AAC users for at least one year (for paid professional service providers and direct care providers only): Yes/No
    - Length of time with the AAC user:
    - Role:
    - Specific training with AAC:
- Able to see people in face-to-face conversations: Yes/No
    - Glasses: Yes/No
- Able to hear people's speech in face-to-face conversations: Yes/No
    - Hearing aids: Yes/No
- Any reported impairment of cogitation or speech: Yes/No
- Any educational or professional training or professional experiences related to AAC (for unfamiliar conversation partners only): Yes/No
- Any prior experience conversing with individuals who use AAC (for unfamiliar conversation partners only): Yes/No

APPENDIX C

SAMPLE OF CONSENT FORM FOR INDIVIDUALS WHO USE AAC

WICHITA STATE UNIVERSITY
College of Health Professions
Department of Communication Sciences and Disorders

Guardian Consent Form

Your child/guardian is invited to participate in a study of conversation between individuals who use speech-generating communication devices and their typically speaking conversation partners. We will use two ways to analyze conversations (turn-taking and speaking roles) and will look at three types of conversation partners (direct care provider, paid professional service provider, and unfamiliar).

Your child/guardian is invited to be one of three possible participants in this study because s/he meets the following selection criteria: (1) is a minimum age of 16 years; (2) speaks English at home and at school; (3) has diagnosis of a developmental disability without a social disorder (i.e., no autism); (4) has used a speech-generating communication device as his/her primary mode of communication for a minimum of six months; (5) is able to see people and hear people's speech in face-to-face conversations; (6) is able to start social conversations with others by using their AAC device; and (7) is able to understand and participate in conversations. To assure that your child/guardian meets these selection criteria, an informal observation of 20 to 30 minutes will be scheduled in your home and/or his/her classroom and you will be asked to provide information about the use of his/her communication device.

If your child/guardian decides to participate, s/he (and you) will be asked to the following: (1) identify six conversation partners who are familiar to him/her: three direct care providers (e.g., parents, siblings, and a caregivers) and three professional service providers (e.g., speech-language pathologists or special educators), and (2) participate in nine conversations that will be videotaped.

The nine videotaped conversations will take place in the Conversational Interaction Laboratory at Wichita State University (WSU). Each conversation session will last between 15 to 30 minutes. Conversational topics will be chosen by your child/guardian and his/her conversation partners. No structured scripts will be used in order to keep the conversation as natural as possible. After each videotaped conversation, your child/guardian will be asked if they thought that conversation was a good example of their typical conversational abilities.

The videotapes will be used to obtain a written transcript of the conversation as well as an analysis of how the AAC user accesses his/her device during the conversation. These videotapes and related contact information will be kept in a locked file cabinet in the Doctoral Student office in Ahlberg Hall (AH 409) at WSU. Only the principal investigator, co-investigator, and graduate research assistants who are involved in the study will have access to this file cabinet. All research materials will be destroyed after the data are collected and analyses are complete.

We do acknowledge two minor risks or discomforts to be associated with the current research. First, your child/guardian may be anxious when he or she first enters the laboratory for videotaping.

We have found that such anxiety usually goes away within a few minutes after the videotaping begins. Second, although your child/guardian's name may be heard during the conversation, any information obtained in this study in which your child/guardian can be identified will remain confidiential and will be disclosed only with the permission. All forms and transcripts of the conversations will be coded without identifying information.

Participation in this study is entirely voluntary. Your child/guardian's decision whether or not to participate will not affect your future relations with WSU. If your child/guardian agrees to participate in this study, s/he is free to withdraw from the study at any time without penalty.

If your child/guardian has any questions about this research, s/he can contact the investigator, Meng-Ju Tsai, 316-978-3331 or Dr. Julie Scherz at 316-978-5344, at the Department of Communication Sciences and Disorders, 1845 Fairmount, Wichita, KS 67260-0075. If your child/guardian has questions pertaining to the rights as a research subject, or about research-related injury, s/he can contact the Office of Research Administration, telephone 1-316-978-3285, at Wichita State University, Wichita, KS 67260-0007 USA.

Your child/guardian is under no obligation to participate in this study. Your signature indicates that you have read this information and have voluntarily decided to allow your child/guardian to participate.

You will be given a copy of the consent form.

_____ _____

Signature of Parent or Legal Guardian Date

Assent Form

I have been informed that my parent(s), legal guardian, or a legally authorized official has given permission for me to participate, if I agree, in a study about conversation between individuals who use AAC and their typically speaking conversation partners. My participation in the currrent study is voluntary and I have been told that I may stop my participation in this study at any time. If I choose not to participate, it will not affect my relationship with WSU in any way.

_____ _____

Witness Signature Date

Identification of Six Familiar Conversation Partners

	Name	Phone Number	Email Address
Direct care provider 1			
Direct care provider 2			
Direct care provider 3			
Professional service provider 1			
Professional service provider 2			
Professional service provider 3			

APPENDIX D

SAMPLE OF CONSENT FORM FOR FAMILIAR CONVERSATION PARTNERS

WICHITA STATE UNIVERSITY
College of Health Professions
Department of Communication Sciences and Disorders

Familiar Conversation Partners Consent Form

You are invited to participate in a study of conversation between individuals who use speech-generating communication devices and their typically speaking conversation partners. We will use two ways to analyze conversations (turn-taking and speaking roles) and will look at three types of conversation partners (direct care providers, professional service providers, and unfamiliar).

You were identified by one of the research participants who use a communication device as one of nine possible conversation partners in this study. You are either a direct care provider for this participant or you are a paid professional service provider serving this participant, and meet the following selection criteria: (1) speak English at home and at school/work; (2) have taken care of and/or interacted with the participant who uses a communication device for at least one year; (3) have no reported diagnosis of cognitive and speech impairment; (4) are familiar with this participant who uses his/her communication device and his/her conversation abilities (e.g., messages generated from his/her communication device); (5) are able to see people and hear people's speech in face-to-face conversations; and (6) have conversations with this participant on a regular basis.

If you decide to participate, you will be asked to participate in one conversation with the participant using his/her communication device. The conversation will take place in the Conversational Interaction Laboratory at Wichita State University (WSU). The conversation session will be videotaped and will last somewhere between 15 and 30 minutes. Conversational topics will be chosen by the participant who uses his/her communication device and you. No structured scripts will be used in order to keep the conversation as natural as possible. After each videotaped conversation, you will be asked if you thought that conversation was a good example of his/her typical conversational abilities, and you will be asked to answer a questionnaire on your reactions to this conversation with the participant who uses a communication device.

The videotapes will be used to obtain a written transcript of the conversation as well as an analysis of how the AAC user accesses his/her device during the conversation. These videotapes and related contact information will be kept in a locked file cabinet in the doctoral student office in the Ahlberg Hall (AH 409) at WSU. Only the principal investigator, co-investigator, and two graduate research assistants will have access to this file cabinet. All research materials will be destroyed after the data are collected and analyses are complete.

We do acknowledge two minor risks or discomforts to be associated with the current research. First, you may be anxious when you first enter the laboratory for videotaping. We have found that such anxiety usually goes away within a few minutes after the videotaping begins. Second, although your name may be heard during the conversation, any information obtained in this study in which you can be identified will remain confidiential and will be disclosed only with your permission. All forms and transcripts of the conversations will be coded without identifying information.

Participation in this study is entirely voluntary. Your decision about whether or not to participate will not affect your future relations with WSU. If you agree to participate in this study, you are free to withdraw from the study at any time without penalty.

If you have any questions about this research, you can contact the investigator, Meng-Ju Tsai, telephone 316-978-3331 or Dr. Julie Scherz at 316-978-5344, at the Department of Communication Sciences and Disorders, 1845 Fairmount, Wichita, KS 67260-0075,. If you have questions pertaining to your rights as a research subject, or about research-related injury, you can contact the Office of Research Administration, telephone 316-978-3285, at Wichita State University, Wichita, KS 67260-0007.

You are under no obligation to participate in this study. Your signature indicates that you have read this information and have voluntarily decided to participate.

You will be given a copy of the consent form.

_____ _____

Signature of Participant Date

APPENDIX E

SAMPLE OF CONSENT FORM FOR UNFAMILIAR CONVERSATION PARTNERS

WICHITA STATE UNIVERSITY
College of Health Professions
Department of Communication Sciences and Disorders

Unfamiliar Conversation Partners Consent Form

You are invited to participate in a study of conversation between individuals who use speech-generating communication devices and their typically speaking conversation partners. We will use two ways to analyze conversations (turn-taking and speaking roles) and will look at three types of conversation partners (direct care providers, professional service providers, and unfamiliar).

You were selected as one of nine possible participants in this study because you meet the following criteria: (1) are over 18 years old; (2) speak English at home and school/work; (3) have no reported diagnosis of cognitive and speech impairments; (4) have no educational or professional training or professional experiences related to AAC; (5) have no experience conversing with individuals who use a communication device; and (6) are able to see people and hear people's speech in face-to-face conversations.

If you decide to participate, you will be asked to participate in one conversation with the participant using his/her communication device. The conversation will take place in the Conversational Interaction Laboratory at Wichita State University (WSU). The conversation session will be videotaped and will last somewhere between 15 and 30 minutes. Conversational topics will be chosen by the participant who uses his/her communication device and you. No structured scripts will be used in order to keep the conversation as natural as possible. After each videotaped conversation, you will be asked if you thought that conversation was a good example of your typical conversational abilities, and you will be asked to answer a questionnaire on your reactions to this conversation with the participant who uses a communication device.

The videotapes will be used to obtain a written transcript of the conversation as well as an analysis of how the AAC user accesses his/her device during the conversation. These videotapes and related contact information will be kept in a locked file cabinet in the doctoral student office in the Ahlberg Hall (AH 409) at WSU. Only the principal investigator, co-investigator, and two graduate research assistants will have access to this file cabinet. All research materials will be destroyed after the data are collected and analyses are complete.

We do acknowledge two minor risks or discomforts to be associated with the current research. First, you may be anxious when you first enter the laboratory for videotaping. We have found that such anxiety usually goes away within a few minutes after the videotaping begins. Second, although your name may be heard during the conversation, any information obtained in this study in which you can be identified will remain confidiential and will be disclosed only with your permission. All forms and transcripts of the conversations will be coded without identifying information.

Participation in this study is entirely voluntary. Your decision whether or not to participate will not affect your future relations with WSU. If you agree to participate in this study, you are free to withdraw from the study at any time without penalty.

If you have any questions about this research, you can contact the investigator, Meng-Ju Tsai, telephone 316-978-3331 or Dr. Julie Scherz at 316-978-5344, at the Department of Communication Sciences and Disorders, 1845 Fairmount, Wichita, KS 67260-0075,. If you have questions pertaining to your rights as a research subject, or about research-related injury, you can contact the Office of Research Administration, telephone 316-978-3285, at Wichita State University, Wichita, KS 67260-0007.

You are under no obligation to participate in this study. Your signature indicates that you have read this information provided above and have voluntarily decided to participate.

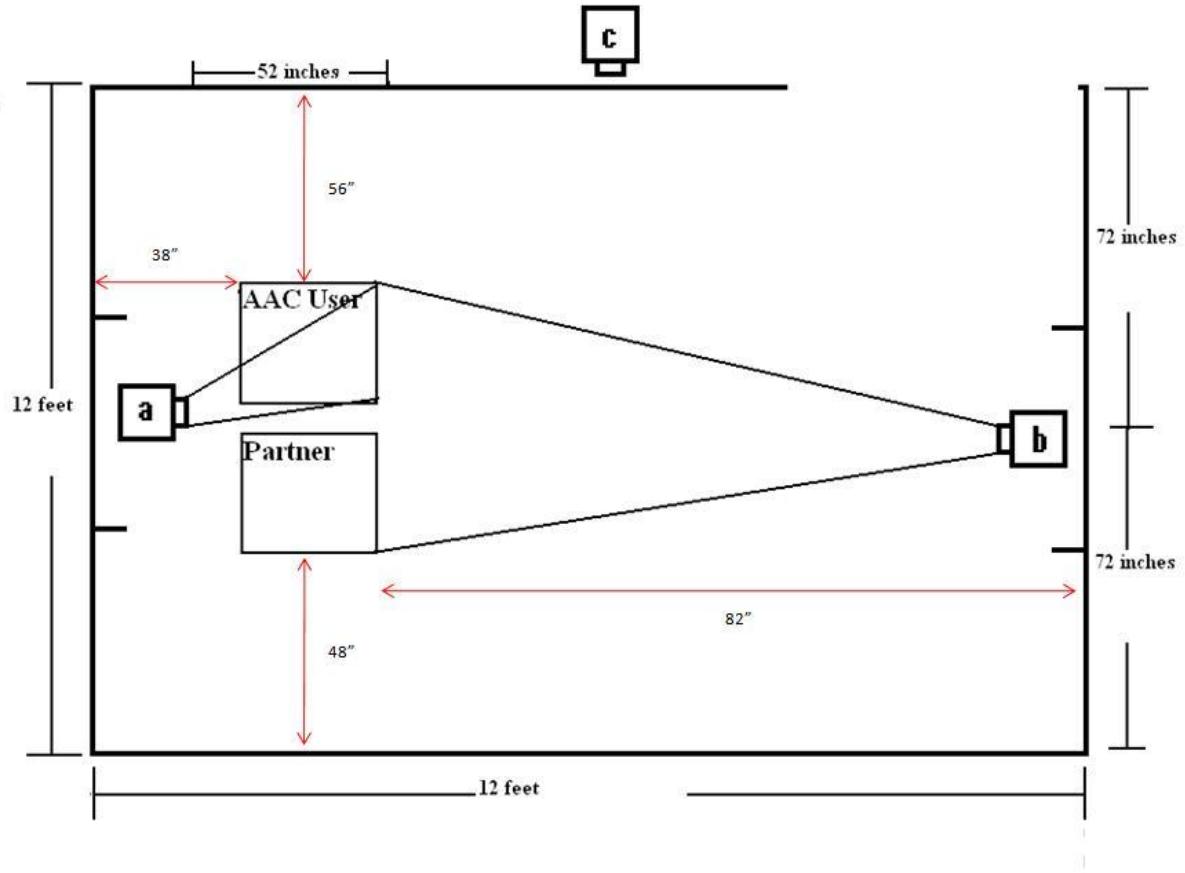
You will be given a copy of the consent form.

_____ _____

Signature of Participant Date

APPENDIX F

FLOORPLAN OF THE CONVERSATION INTERACTION LABORATORY



APPENDIX G

SAMPLE OF SPLIT SCREEN OF VIDEOTAPED CONVERSATION

APPENDIX H

LIST OF CONVERSATION TOPICS

School

Classes you like/dislike
Favorite teachers
Extracurricular activities

Peers/Friends

Best friends
Activities you like with friends

Family

Family members
Family vacations
Family traditions

Sports

Favorite sport(s)/team(s)
Outdoor activities

Leisure Activities

Games
Crafts
Reading
TV
Movies
Music

Self-Care

Favorite foods/restaurants
Clothing styles/places to shop
Chores

Self

Future plans
Best memory
Interesting story about yourself

APPENDIX I

QUESTIONNAIRE FOR SPEAKING CONVERSATION PARTNERS

1. Do you think you were an effective conversation partner in conversation with the individual who uses AAC?

2. Were you aware of any differences in conversation with the individual who uses AAC compared to typically speaking participants?

3. Did you notice any difficulties in conversation with the individual who uses AAC compare to typically speaking participants?

4. Did you do anything differently in conversation with the individual who uses AAC compared with typically speaking participants?

5. If you served as an unfamiliar conversation partner, what do you wish you had known in order to be an effective conversation partner?

    a. If you had known that, what do you think you might have done differently in this conversation?

6. If you served as a familiar conversation partner (i.e., a professional service provider/caregiver or a direct care provider), what strategies have you learned to be a good conversation partner?

APPENDIX J

SAMPLE OF TRANSCRIPTION FORMAT

Line #	Content
1	A: Do you like today's class?
2	B: Not really.
3	B: The instructor did not really prepare the class.
	A: Yes, I have the same thought.
4	B: Yeah!

APPENDIX K

TRANSCRIPTION NOTATIONS

Notation	Description	Example
Word	Utterances are produced from natural speech	A: What do you mean by one, two, three
		B: One, two, three
	Simultaneous utterances and nonverbal behaviors starting simultaneously are linked together in one column	A: Hello, how are you? B: Hi!
	An ongoing utterance or nonverbal behavior which is jointed and stops by another (i.e., overlapping) is marked together.	A: You said one, two, three B: one, two, three
		A: Are you doing counting here?
"word"	Utterances are produced from an AAC device	A: What do you mean by one, two, three
		B: "one" "two" "three"
		A: One, two, three?
		B: "yes" "one" "two" "three"
*	Asterisk indicates audible bleep sounds generated by an AAC device, typically generating messages.	A: What do you mean by one, two, three
		B: *"one" "two" "three"
		A: One, two, three?
		B: "yes" "one" "two" *"three"
(5.0)	Number in parentheses indicates silence presented in seconds within and between utterances (including generating messages from AAC).	A: I don't know.
		A: (3.0) Do I know?
		B: (8.0) "Rebecca" (2.0) "R"

Notation	Description	Example
(( ))	Double parentheses indicate nonverbal communication behaviors (e.g., head nodding; head shaking).	B: (28.0) "Which" (25.0) "Do you know" B: ((head nod)) A: I don't know, do I know?
(word)	Single parentheses enclose the utterances are hard to be transcribed, but represents a likely possibility. The empty single parentheses mean utterance cannot be heard.	A: That was one of my favorite books ((head nod)) B: ((head nod)) B: (/n/) A: I like that story don't you?
.____.	A line with two dots indicates the gaze direction. When the line and two-dot mark are marked with an item/object, it indicates the participant 's gaze is on the item/object.	A: .AAC. (5.0) "one" (8.0) "two" (12.0)"three" B: .AAC_____. A: .B. I don't get this B: .A_____.

Note. Adapted from *Structures of Social Action: Studies in Conversation Analysis*, by J. M. Atkinson and Heritage, 1984, New York: Cambridge University Press, and *The Understandability of AAC: A Conversation Analysis Study of Acquired Dysarthria*, by S. Bloch and R. Wilkinson, 2004, *Augmentative & Alternative Communication*, *20*(4), pp. 272 - 282.

APPENDIX L

EXAMPLES OF CODING USING THE APPROACH OF CONVERSATION TURNS

Line #	Example of coding	Rule
1.	B: Don't know what you're trying to tell me. <CT-B>	1
	.A .	
	A: *	E.1
	.AAC .	
2.	A: (7.0) "s" (5.0) "mission" <CT-A>	1
	B: mission	1
	.AAC . <CT-B>	
3.	B: Oh, are you going on a Mission's trip? <CT-B>	1
	. AAC A .	
	A: .B . (/a a a/) <CT-A>	2
4.	B: (5.0) Where are you going? When are you going: <CT-B>	3.2
	.A .	
	A: .B .	
5.	B: (4.0) First of all, can you tell me where you are going?	3.1
	.A .	
6.	A: (/a/ /f/) <CT-A>	1
	B: .A .	
7.	B: Africa? <CT-B>	1
	.L .	
	A: ((head nod)) <CT-B>	1
8.	B: Great, you are going to Africa. <CT-B>	1
	.A .	
	A: ((head nod))	E.2
	.B .	

Note. This is an example of coding from pilot data.

APPENDIX M

EXAMPLE OF CODING USING THE FRAMEWORK OF ANIMATOR, AUTHOR, AND PRINCIPAL

Line #	Example of coding	Rule
1.	A: (25.0) "Do you know"(8.0) "Rebecca" (2.0) "R" .AAC_____. B: .AAC_____. <AN-A; AU-A; PR-A>	1, 2, 3
2.	B: Do I know Rebecca? I don't think so. Is she a friend of yours? .A_____. A: .B_____. <AN-B; AU-A; PR-A> <AN-B; AU-B; PR-B>	5
3.	B: Don't know what you're trying to tell me. I don't think I know this person. I never heard this name. .A_____. <AN-B; AU-B; PR-B>	4
4.	A: (11.0) "b" (4.0) "c" (7.0) "a" (5.0) "r" .AAC_____. B: .AAC_____. <AN-A; AU-A; PR-A>	1, 2, 3
5.	B: Rebecca Bcar. I don't think I do know her. Is she a friend of yours? .A_____. A: .B_____. <AN-B; AU-A; PR-A> <AN-B; AU-B; PR-B>	5
6.	[a]A: (7.0) "s" (5.0) "mission" B: .AAC_____. <AN-A; AU-A; PR-A>	1, 2, 3

Line #	Example of coding	Rule
7.	B: Oh, are you going on a Mission's trip? <AN-B; AU-B; PR-A> . AAC . .A . A: .B . ((head nod)) <AU-A; PR-A>	1, 2, 3 2, 3, 1.1
8.	B: Yeah. You are going on a Mission's trip. <AN-B; AU-B; PR-B> <AN-B; AU-A; PR-A>	5
9.	B: So what classes next semester? .A . <AN-B; AU-B; PR-B>	1
10.	A: (15.0) "Foods" .AAC . B: .AAC . <AN-A; AU-A; PR-A>	1
11.	B: Foods. Oh like a cooking class? .A . A: .B . <AN-B; AU-A; PR-A> <AN-B; AU-B; PR-B>	5
12.	B: (5.0)That sounds like fun. What else? .A . A: .B . <AN-B; AU-B; PR-B>	4
13.	A: (9.0) "government " <AN-A; AU-A; PR-A> .AAC . B: ((head nod)) . AAC .	1 E.1

Line #	Example of coding	Rule
14.	B: Ah, is it US government? <AN-B; AU-B; PR-A> .A_____. A: ((head nod)) <AU-A; PR-A> .AAC_____.	1, 2, 3 1.1
15.	[a]B: Your mom said you wanted to go to Great Wolf Park. <AN-B; AU-B>	6
16.	B: (2.0) What do you think you would do when you get to Great Wolf Park? .L_____. <AN-B; AU-B; PR-B>	1, 2, 3
17.	A: (61.0) "swimming" . AAC_____. B: . AAC_____. <AN-A; AU-A; PR-A>	1, 2, 3

Note. This is an example of coding from pilot data.
[a]Some portions of the conversation are omitted here.

APPENDIX N

CODING TRAINING MANUAL

Training Steps

1. Discuss transcription notations (see Appendix K).
   a. Provide sample of transcription notations.
2. Discuss operational definitions of conversation turns (see pp. 4-7).
   a. Use examples (see Appendix L).
3. Discuss operational definitions of speaking roles of animator, author, and principal (see pp. 8-14).
   a. Use examples (see Appendix M).
4. Independently code a ten-minute portion of a conversation transcript and compare that coding with coding made by the principal investigator.
   a. Use discussions to resolve any discrepancies.
5. Independently code a second ten-minute portion of a conversation transcript.
   a. Discuss discrepancies of coding to obtain consensus.
6. Independently code conversation turns and speaking roles (i.e., animator, author, and principal) on two randomly selected five-minute conversation segments.
   a. Maintain a minimum of 80% point-by-point reliability.
   b. Keep in mind discussions about coding will continue until this level of agreement is obtained.

Tasks Following Training

Code conversation turns and speaking roles on six transcripts in total (one transcript every 11/2 days, if possible).

- **Keep in mind that if the intercoder reliability between either of you and me does not reach a minimum of 80% in any one of the six transcripts, another training session will be provided. After the training session, this transcript will be coded again.**
- Try to complete coding on one transcript within 1 1/2 hours.
- Sum the following numbers on each page of the transcript
  - Numbers of <CT-A> and <CT-B>
  - Numbers of <AN-A> , <AN-B>, <AU-A>, <AU-B>, <PR-A>), and <PR-B>

Operational Definitions of Conversation Turns (<CT>) (for examples see Appendix L)

Conversation turns are communication behaviors, including verbal communication behavior (i.e., a spoken utterance or a message(s) generated from an AAC device) or nonverbal communication behavior (e.g., head nod, head shake). These behaviors must convey meaning or contribute to the intent of the conversation to be counted as a turn.

Rules to code conversation turns	Rules for when NOT to code conversation turns
Between conversation participants (i.e., the speaker and the listener), a conversation turn occurs when the speaker changes (see **Rule 1**).	If beeping sounds are generated from an AAC device without any meaningful messages generated, a conversation turn will not be coded (see **Rule E.1**).
Between conversation participants, a conversation turn occurs when an overlapping verbal communication behavior (e.g., yes or no) or a nonverbal communication behavior (e.g., head nod or head shake) occurs from the listener in order to answer the speaker's question, while the speaker is still speaking (see **Rule 2**).	When overlapping verbal communication behaviors (e.g., yes or no) or a nonverbal communication behavior (e.g., head nod or head shake) occurs from the listener while the speaker is speaking (and these behaviors are merely used to validate attention to the speaker, but do **NOT** contribute meaning to the conversation), a conversation turn will not be coded (see **Rule E.2**).
A speaker initiates a communication behavior (e.g., asking a question, giving a greater than 2-second pause, gazing at the other partner) in order to yield the conversation floor to the listener. When there are no responses from the listener, the speaker begins another communication behavior. This would be considered two conversation turns for this speaker (see **Rule 3.1**).	
A speaker shows no pause(s) in between utterances while speaking multiple sentences. This would be considered one conversation turn (see **Rule 3.2**).	

Three Main Rules for Coding a Conversation Turn

Rule 1: Between conversation participants (i.e., the speaker and the listener), a conversation turn occurs when the speaker changes. In other words, when the speaker terminates a communication behavior and another conversation participant inserts another communication behavior immediately following the previous behavior, one conversation turn would be counted for each speaker. Example 1 illustrates three conversation turns, two for A and one for B.

Example 1

1. A: (5.0) "Do" (8.0) "you" (13.0) "know" (10.0) "her"? <CT-A>

2. B: ((head nod)) <CT-B>

3. A: (17.0) "Rebecca" <CT-A>

Rule 2: Between conversation participants, a conversation turn also occurs when an overlapping verbal communication behavior (e.g., yes or no) and a nonverbal communication behavior (e.g., head nod or head shake) occurs from the listener in order to answer the speaker's question. Example 2 shows one conversation turn for A and one for B.

Example 2

1 A: Do you know her? <CT-A>
B: ((head nod)) <CT-B>

Rule 3: Within the same conversation participant (i.e., the speaker), a conversation turn occurs in two situations:

Rule 3.1: A speaker begins a communication behavior in order to yield a conversation floor (e.g., asking a question, giving a greater than two-second pause, gazing at the other partner) to the other participant, but the speaker again begins another communication behavior when there are no responses from the other participant. This would be considered two conversation turns.
Example 3 contains one conversation turn for participant A, and two conversation turns for participant B (see lines 2 and 3):

Example 3

1 A: (8.0) "Rebecca" (2.0) "R" <CT-A>
. AAC .
B: .AAC A AAC .

2 B: Do I know Rebecca? <CT-B>
.A .

3 B: (3.0) I don't think so. <CT-B>
.A .

Rule 3.2: A speaker shows no pause(s) between utterances while speaking multiple utterances. This would be considered one conversation turn.
Example 4 contains one conversation turn for B.

Example 4

1. B: Is it to, is it going to go by train? By bus? By airplane? <CT-B>
.A .

Exceptions

Rule E.1: In a situation where only beep sounds are generated from an AAC device without any meaningful messages generated, a conversation turn will not be coded. These beep sounds may be generated by a mishit when the AAC user generates speech that is similar to when speaking partners are trying to think of messages that they want to produce. Example 6 shows that only B has a conversation turn in line 1.

Example 6

1 B: Don't know what you're trying to tell me. <CT-B>
.AAC .
A: *
.AAC .

Rule E.2: In a situation where an overlapping verbal communication behavior (e.g., yes or no) or a nonverbal communication behavior (e.g., head nod or head shake) occurs from the listener while the speaker is speaking, but these behaviors are merely used to validate attention to the speaker and do **NOT** contribute meaning to the conversation, a conversation turn will not be coded. Example 7 illustrates that A does not have a conversation turn in line 2. A's head nod serves only to validate attention to B's utterance, but does not provide new meaning to the conversational exchange.

Example 7

1 A: (61.0)"swimming" <CT-A>
.AAC .
B: .AAC .

2 B: Go swimming. <CT-B>
.A .
A: ((head nod))
.B .

Operational Definitions of Speaking Roles (for examples see Appendix M)

"AN" for animator, "AU" for author, and "PR" for principal

Rules for coding the three speaking roles (i.e., animator, author, and principal)	Rules for when NOT to code speaking roles
Animator - the individual (i.e., spoken person) who actually produces the utterance (i.e., gives "voice" to the words) (see **Rule 1**).	Do NOT code the *animator* to nonverbal communication behaviors (e.g., head nod, head shake) (see **Rule 1.1**)
Author - the individual who selects or infers the words or meanings from specific communication behaviors (see **Rule 2**).	NOT required to code all three speaking roles (animator, author, and principal) for every conversation turn (see **Rule 6**).
Principal - the individual whose beliefs, positions, perspectives, *personal information*, and sentiments are established by the words spoken (see **Rule 3**).	When a conversation turn is NOT coded, do NOT code speaking roles (see **Rule E.1**).
In some situations, the speaker produces multiple utterances that do not specifically relate to previous communication behaviors. In that case, code speaking roles only ONCE for those multiple utterances (see **Rule 4**).	
In some utterances, the speaker animates a previous communication behavior and then goes on to produce additional communication behaviors with new information. In that case, code EACH SEGMENT of the utterance (see **Rule 5**).	

Rule 1: ***Animator*** is defined as the individual who actually produces the utterance (i.e., gives "voice" to the words). In other words, the animator is the spoken person. In this study, an individual's speech-generating AAC device may serve as the animator because the use of the device is directly under that individual's control. In other words, AAC users are acting as their own animators in the same way as typical speakers would use their laryngeal systems to produce an utterance. Example 8 shows that B speaks multiple utterances and serves as the animator.

Example 8

1 B: Don't know what you're trying to tell me. I don't think I know this person. I never heard this name. <AN-B>
.A .

Example 9 shows that A (AAC user) generates several messages spoken by the AAC device which serves as the AAC user's animator in lines 1 and 2. In line 3, B (not the device) serves as the animator for A's spelled letters.

Example 9

1 A: (25.0) "Do you know"(8.0) "Rebecca" (2.0) "R" <AN-A>
. AAC .
B: . AAC .

2 A: (11.0) "b" (4.0) "c" (7.0) "a" (5.0) "r" <AN-A>
. AAC .
B: . AAC .

3 B: Rebecca Bcar. <AN-B>
. A .
A: . B .

Rule 1.1: The animator will NOT be coded to nonverbal communication behaviors (e.g., head nod, head shake), because these nonverbal communication behaviors are not spoken. Example 10 illustrates that the animator is only coded in lines 1 and 3. Because there is no verbal output in line 2, the animator role is not coded.

Example 10

1 B: Is she a friend of yours? <AN-B>
.A .
A: .B .

2 A: ((head nod))
.B .

3 B: Yeah. <AN-B>
.A .
A: .B .

Rule 2: ***Author*** is defined as the individual who selects the words or infers the words or meanings from specific communication behaviors (e.g., head nod or head shake) to be used in the creation of the utterance.

In Example 11, B selects the words for the utterance in line 1. B serves as both the animator and author for this utterance. In line 2, A (i.e., AAC user) selects and "speaks" letters in an attempt to answer the question asked in line 1. A (i.e., AAC user) is coded as the animator and author for this utterance. In line 3, B infers the meaning from those letters and generates a spoken guess. B is coded as both the animator and author for this utterance. A then nods agreement with this guess. When B says "yeah", B is the animator of the response (positive head nod) authored by A.

Example 11

1 B: (5.0)Where are you going? <AN-B; AU-B>
.A .
A: .B .

2 A: (/a/ /f/) <AN-A; AU-A>
B: .A .

3 B: Africa? <AN-B; AU-B>
.A .
A: ((head nod)) <AU-A>

4 B: Yeah. <AN-B; AU-A>
.A .
A: .B .

Rule 3: ***Principal*** is defined as the individual whose beliefs, positions, perspectives, personal information, and sentiments are established by the words spoken.

The coding symbols will be used. Example 12 illustrates these concepts:

Example 12

1 A: (8.0) "Rebecca" (2.0) "R" <AN-A; AU-A; PR-A>
.AAC .
B: .AAC .

2 A: .B.
B: Do I know Rebecca? <AN-B; AU-A; PR-A>
.A .

3 B: I don't think so. <AN-B; AU-B; PR-B>
. A .
A: .B .

4 A: (11.0) "b" (4.0) "c" (7.0) "a" (5.0) "r" <AN-A; AU-A; PR-A>
.AAC .
B: .AAC .

5 B: Rebecca Bcar <AN-B; AU-A; PR-A>
.A .
A: .B .

Rule 4: In some situations, the speaker produces multiple utterances that do not specifically relate to a previous communication behaviors. In that case, only code speaking roles ONCE for those multiple utterances.
Example 13 illustrates that B produces several questions in line 2 with a similar intent (i.e., how to get there). Only code the speaking roles on these utterances once in line 2.

Example 13

1 B: (2.0) Somewhere far away? <AN-B; AU-B; PR-B>
. A .

2 B: (10.0) Is it to, is it going to go by train? By bus? By airplane? <AN-B; AU-B; PR-B>
.A .
A: **
.AAC .

Rule 5: In some situations, the speaker animates a previous communication behavior(s), then goes on to produce additional communication behaviors with new information. In that case, code EACH SEGMENT of the utterance. Example 13 illustrates that in line 2, B first produces an utterance to animate A's messages generated in line 1, and then keeps producing other utterances. The multiple utterances that are produce in line 2 will be coded twice of the speaking roles.

Example 14

1 A: (8.0) "Rebecca" (2.0) "R" <AN-A; AU-A; PR-A>
.AAC .
B: .AAC B AAC .

2 B: Do I know Rebecca? I don't think so. Is she a friend of yours?
<AN-B; AU-A; PR-A> <AN-B; AU-B; PR-B>
.A .
A: .B .

Example 15 demonstrates that in line 3, B first gives a word (i.e., yeah) to A's head nod produced in line 2, and then continues talking. These multiple utterances will be coded twice with the speaking roles.

Example 15

1 B: (2.0) Have you ever been to a Shocker game? <AN-B; AU-B; PR-B>
.A .
A: .B .

2 A: ((head nod)) <AU-A; PR-A>
.B .

3 B: Yeah. You must like Shockers.
.A .
<AN-B; AU-A; PR-A> <AN-B; AU-B; PR-B>

Rule 6: Not all three speaking roles have to be coded in an utterance and one conversation turn. In other words, in certain situations, animator, author, or principal may not all apply to a specific utterance and conversation turn. Example 14 shows that animator cannot apply to the head nod in line 2.
Example 16 illustrates that B related what B heard from A's mom. The animator is attributed to B, but the author and the principal are not attributed to either participant.

Example 16

1 A: (31.0) "I don't know"<AN-A; AU-A; PR-A>
.AAC_____.
B:.AAC_____.

2 B: Your mom said you wanted to talk about it. <AN-B>
.A_____.
A: .AAC_____.

Exceptions

Rule E.1: In a situation where a conversation turn is NOT coded, then coding of the speaking roles (i.e., animator, author, and principal) is NOT required.
Example 17 demonstrates that A nods the head while B is talking, but A's head nod does not contribute meaning to the conversation. Therefore, A is not coded for a conversation turn, so the speaking roles are not coded on A.

Example 17

1 B: They get to do really exciting things huh. <CT-B> <AN-B; AU-B; PR-B>
.A_____.
A: ((head nod))
.B_____.

APPENDIX O

LENGTH OF DYADIC CONVERSATIONS

Conversation dyads	**Length of conversation**
A1 and D11	21 minutes 00 seconds
A1 and D21	20 minutes 27 seconds
A1 and D31	21 minutes 08 seconds
A1 and P11	20 minutes 07 seconds
A1 and P21	23 minutes 57 seconds
A1 and P31	21 minutes 55 seconds
A1 and U11	23 minutes 45 seconds
A1 and U21	20 minutes 18 seconds
A1 and U31	20 minutes 17 seconds
A2 and D12	20 minutes 50 seconds
A2 and D22	20 minutes 35 seconds
A2 and D32	22 minutes 32 seconds
A2 and P12	20 minutes 51 seconds
A2 and P22	20 minutes 25 seconds
A2 and P32	20 minutes 44 seconds
A2 and U12	21 minutes 40 seconds
A2 and U22	22 minutes 17 seconds
A2 and U32	23 minutes 00 seconds
A3 and D13	21 minutes 00 seconds
A3 and D23	20 minutes 20 seconds

Conversation dyads	Length of conversation
A3 and D33	20 minutes 16 seconds
A3 and P13	22 minutes 27 seconds
A3 and P23	20 minutes 23 seconds
A3 and P33	20 minutes 22 seconds
A3 and U13	21 minutes 27 seconds
A3 and U23	20 minutes 24 seconds
A3 and U33	20 minutes 32 seconds

APPENDIX P

CONVERSATIONAL CONTRIBUTIONS ANALYZED BY CONVERSATION TURNS AND SPEAKING ROLES OF EACH DYAD

	Conversation turns				Speaking roles			
	AAC users		Speaking partners		AAC users		Speaking partners	
Dyads	*f* [a]	% [b]	*f* [a]	% [b]	*f* [a]	% [c]	*f* [a]	% [c]
A1 and D11	65	43.33	85	56.67	206	43.46	268	56.54
A1 and D21	45	35.43	82	64.57	146	39.25	226	60.75
A1 and D31	59	41.84	82	58.16	186	42.18	255	57.82
A1 and P11	15	30.61	34	69.39	53	35.33	97	64.67
A1 and P21	77	47.83	84	52.17	243	48.12	262	51.88
A1 and P31	65	44.22	82	55.78	210	43.21	276	56.79
A1 and U11	42	38.89	66	61.11	136	40.60	199	59.40
A1 and U21	61	36.31	107	63.69	195	38.16	316	61.84
A1 and U31	35	36.84	60	63.16	119	40.61	174	59.39
A2 and D12	78	40.41	115	59.59	275	43.65	355	56.35
A2 and D22	77	41.85	107	58.15	243	43.16	320	56.84
A2 and D32	94	44.98	115	55.02	295	45.60	352	54.40
A2 and P12	63	43.45	82	56.55	202	46.87	229	53.13
A2 and P22	71	45.28	87	54.72	216	45.38	260	54.62
A2 and P32	99	44.39	124	55.61	294	43.82	377	56.18
A2 and U12	107	43.32	140	56.68	366	47.41	406	52.59
A2 and U22	37	43.53	48	56.47	154	57.68	113	42.32
A2 and U32	41	41.84	57	58.16	166	50.46	163	49.54

	Conversation turns				Speaking roles			
	AAC users		Speaking partners		AAC users		Speaking partners	
Dyads	***f*** [a]	**%** [b]	***f*** [a]	**%** [b]	***f*** [a]	**%** [c]	***f*** [a]	**%** [c]
A3 and D13	146	43.07	193	56.93	501	46.56	575	53.44
A3 and D23	227	47.79	248	52.21	846	50.96	814	49.04
A3 and D33	218	52.15	200	47.85	784	59.17	541	40.83
A3 and P13	271	50.47	266	49.53	970	57.74	710	42.26
A3 and P23	284	48.97	296	51.03	996	54.70	825	45.30
A3 and P33	245	49.40	251	50.60	816	52.44	740	47.56
A3 and U13	147	50.34	145	49.66	503	54.09	427	45.91
A3 and U23	174	48.47	185	51.53	653	49.43	668	50.57
A3 and U33	264	49.72	267	50.28	908	52.21	831	47.79

[a]Frequency of conversational contributions.
[b]Percentages of conversational contribution from AAC users and speaking partners were analyzed by counting conversation turns.
[c]Percentages of conversational contribution either from AAC users and speaking partners were analyzed by counting speaking roles.

APPENDIX Q

SPEAKING ROLES OF ANIMATOR, AUTHOR, AND PRINCIPAL OF EACH CONVERSATION PARTNER

Dyads	AAC users			Speaking partners		
	Animator	**Author**	**Principal**	**Animator**	**Author**	**Principal**
	% (f[a])	***% (f[a])***	***% (f[a])***	***% (f[a])***	***% (f[a])***	***% (f[a])***
A1 and D11	4.01 (19)	17.51 (83)	21.94 (104)	22.57 (107)	19.20 (91)	14.77 (70)
A1 and D21	4.03 (15)	15.05 (56)	20.16 (75)	24.46 (91)	20.97 (78)	15.32 (57)
A1 and D31	6.80 (30)	14.29 (63)	21.09 (93)	22.00 (97)	21.32 (94)	14.51 (64)
A1 and P11	8.00 (12)	11.33 (17)	16.00 (24)	24.00 (36)	22.67 (34)	18.00 (27)
A1 and P21	8.32 (42)	16.24 (82)	23.56 (119)	20.40 (103)	19.41 (98)	12.08 (61)
A1 and P31	6.58 (32)	14.40 (70)	22.22 (108)	22.22 (108)	21.19 (103)	13.37 (65)
A1 and U11	8.96 (30)	14.63 (49)	17.01 (57)	21.79 (73)	20.00 (67)	17.61 (59)
A1 and U21	4.11 (21)	14.48 (74)	19.57 (100)	23.87 (122)	21.53 (110)	16.44 (84)
A1 and U31	6.83 (20)	13.65 (40)	20.14 (59)	22.87 (67)	21.50 (63)	15.02 (44)

APPENDIX Q (continued)

Dyads	AAC users			Speaking partners		
	Animator	Author	Principal	Animator	Author	Principal
	% (f[a])	*% (f[a])*	*% (f[a])*	*% (f[a])*	*% (f[a])*	*% (f[a])*
A2 and D12	7.78 (49)	15.24 (96)	20.63 (130)	22.38 (141)	19.68 (124)	14.29 (90)
A2 and D22	7.64 (43)	15.28 (86)	20.25 (114)	21.67 (122)	20.07 (113)	15.10 (85)
A2 and D32	4.64 (30)	17.47 (113)	23.49 (152)	22.10 (143)	19.17 (124)	13.14 (85)
A2 and P12	6.03 (26)	17.17 (74)	23.67 (102)	21.11 (91)	19.26 (83)	12.76 (55)
A2 and P22	8.19 (39)	15.97 (76)	21.22 (101)	19.96 (95)	19.96 (95)	14.71 (70)
A2 and P32	5.37 (36)	16.84 (113)	21.61 (145)	21.61 (145)	19.67 (132)	14.90 (100)
A2 and U12	9.07 (70)	15.41 (119)	22.93 (177)	21.24 (164)	19.43 (150)	11.92 (92)
A2 and U22	9.36 (25)	16.48 (44)	31.84 (85)	20.60 (55)	18.73 (50)	3.00 (8)
A2 and U32	6.99 (23)	19.15 (63)	24.32 (80)	22.49 (74)	16.11 (53)	10.94 (36)
A3 and D13	12.92 (139)	14.03 (151)	19.61 (211)	19.80 (213)	19.70 (212)	13.94 (150)

Dyads	AAC users			Speaking partners		
	Animator	Author	Principal	Animator	Author	Principal
	% (f^a)	% (f^a)	% (f^a)	% (f^a)	% (f^a)	% (f^a)
A3 and D23	13.19 (219)	17.11 (284)	20.66 (343)	19.82 (329)	16.39 (272)	12.83 (213)
A3 and D33	15.55 (206)	19.47 (258)	24.15 (320)	16.98 (225)	14.26 (189)	9.58 (127)
A3 and P13	15.83 (266)	18.27 (307)	23.63 (397)	17.38 (292)	15.12 (254)	9.76 (164)
A3 and P23	15.60 (284)	17.52 (319)	21.58 (393)	17.85 (325)	15.49 (282)	11.97 (218)
A3 and P33	15.62 (243)	17.67 (275)	19.15 (298)	17.67 (275)	15.62 (243)	14.27 (222)
A3 and U13	16.13 (150)	16.34 (152)	21.61 (201)	17.53 (163)	16.56 (154)	11.83 (110)
A3 and U23	13.10 (173)	14.53 (192)	21.80 (288)	20.14 (266)	18.85 (249)	11.58 (153)
A3 and U33	15.18 (264)	16.68 (290)	20.36 (354)	18.11 (315)	16.68 (290)	13.00 (226)

Note. Percentage = (frequency of each role / frequency of total six speaking roles) x 100%.
[a]*f* = Frequency of each speaking role.

APPENDIX R

FEEDBACK ON DYADIC CONVERSATIONS FROM 27 TYPICALLY SPEAKING CONVERSATION PARTNERS

Question 1: Do you think you were an effective conversation partner in conversation with the individual who uses AAC?

	Feedback
D11:	Yes.
D21:	Yes, over time I have become familiar with certain head nods and noises. These help me understand what A1 is trying to say. I feel I can have a normal conversation with her in which we both understand.
D31:	Yes.
P11:	Yes, I think we are comfortable with one another.
P21:	Yes.
P31:	Yes.
U11:	I tried to be. It was hard to wait for her to answer a question or ask a question. It was also hard to know what exactly she was asking.
U21:	Yes.
U31:	Yes.
D12:	Yes, I am able to pick up on gestures and sentences and know him so well.
D22:	Yes and no.
D32:	Yes.
P12:	Yes.
P22:	Yes.
P32:	Yes.
U12:	Yes.
U22:	Yes, we seemed to understand each other very well and talked about topics common to conversation between people who are unfamiliar with each other.

Question 1: Do you think you were an effective conversation partner in conversation with the individual who uses AAC?

Feedback

U32: Yes, I may have jumped around from subject to subject but we held a nice conversation.

D13: Yes, he understood what I was saying and responded accordingly.

D23: It actually went better than I expected. He gave me a good tour of his talker.

D33: Yes.

P13: No-not always. I couldn't direct the conversation often.

P23: Yes, but I was a little nervous so that probably showed some

P33: Yes.

U13: No, it took me a little while to understand what A3 was trying to tell me.

U23: Not sure, I assume he understood me, but I could not understand him-except for when he used the gadget/machine (which did not happen until after I had conversed with him for about five minutes).

U33: Some what, it took some getting use to A3's method of communicating. He could answer yes/no questions with ease.

Question 2: Were you aware of any differences in conversation with the individual who uses AAC compared to typically speaking participants?

Feedback

F11: Yes, I had to be a lot more patient for a response. Sometimes A1 would select the wrong button and A1's responses were generally short.

D21: Yes, the conversations are longer in time and less in depth. The typical speaking person does more talking and asking questions than the AAC user.

D31: Yes, slower, more of the burden is on me. I need to be much more attentive than with a typical speaker.

Question 2: Were you aware of any differences in conversation with the individual who uses AAC compared to typically speaking participants?

Feedback

P11: Length of time it takes for partner to generate responses, and time amount of work A1 has to do to generate utterances.

P21: Yes, AAC users require patience for their response, and prompting for more complete information.

P31: Slow rate, some difficulty selection with correct icons but A1 eventually found all items.

U11: Yes, in typical speaking-It is easy to jump in with comments or move the conversation along based on what was said. I felt like we were limited by the time it took to type answers, so the flow was halted.

U21: Yes/slight.

U31: No.

D12: More repeat conversation to simple subjects.

D22: Yes, much slower response time.

D32: No, although he uses a different method to communicate than "normal" people, his conversation was very normal.

P12: Yes, A2's ability to express his thought is slow.

P22: Yes, see Q4.

P32: Yes, due to delay in access, I often "try to guess" what the user will say. Interactions take longer due to the time required to generate a message.

U12: Just that it takes a while to find the words.

U22: Only that physically he has to use his body with a device to communicate. Otherwise, he has the same understanding and communication of people. I typically talk to whom I am unfamiliar with.

U32: Sentence structure was different, but understandable.

D13: Yes, the "wait" time for his response was longer, not as much spontaneous communication/comments.

Question 2: Were you aware of any differences in conversation with the individual who uses AAC compared to typically speaking participants?

Feedback
D23: With a typical speaker, you get more feedback and back and forth talk. With A3, you tend to direct the conversation.
D33: No.
P13: I tried to foresee what possible messages he had on his device, and say/ask things that would allow him to respond.
P23: A3 does not have a lot questions that he can ask others to keep the conversation going-very little reciprocal talking.
P33: No.
U13: Yes, it took me a while to understand what he was trying to tell me.
U23: Yes, A3 was not really using intelligible (to me) words and I don't think I succeeded in interpreting his sounds/discourses (his different sounds had different meanings).
U33: Slower speech, much more articulation on my part so he could understand my questions. There was little more delay in conversation waiting for his reply compared to normal conversation partners.

Question 3: Did you notice any difficulties in conversation with the individual who uses AAC compared to typically speaking participants?

Feedback
D11: More difficulty in understanding what A1 was talking about when telling me where her camp was. She put on the screen "wash bur". I had to guess as to what she was meaning.
D21: Yes, the time between each thing a person says can create a difficulty in understanding. It is also hard to understand when a topic is ending and a new one is starting.
D31: Yes, slower, because I cam so familiar with her, I believe she depends more on me for the sake of efficiency and the amount of labor of involved in conversation.
P11: Oh, yes, A1's ease of access with the device varies. During this session she had difficulty with accessing the bottom row of the device.

Question 3: Did you notice any difficulties in conversation with the individual who uses AAC compared to typically speaking participants?

Feedback

P21: Yes-see Q2.

P31: Need to sit side-by-side to see her AAC written response.

U11: My biggest difficulty was waiting for an answer. It was also clear that she had difficulty in picking letters and symbols and had to work to get her pointer in the right place.

U21: No.

U31: Some.

D12: Takes extra time and patience to wait for A2's answers.

D22: Yes.

D32: He was slower at speaking and got a little distracted at times.

P12: The expressive time involved limits our ability to thoroughly investigate each other's thoughts.

P22: Yes, see Q4.

P32: The delay in message generation.

U12: Just that-he knew what he wanted to say, but it takes a while to find the words.

U22: It takes a little longer and more patience. I wanted to guess at what he was spelling before he finished, but didn't want to be rude and wanted to let him talk. If he spells something wrong, it doesn't find the word for him and takes longer.

U32: Took longer time to the computer so a simple answer was drawn out.

D13: His responses are limited to what is programmed on his device so it is easier to have conversation with someone without an AAC device.

D33: No, he usually makes good conversation.

P13: It is hard for A3 to answer questions.

Question 3: Did you notice any difficulties in conversation with the individual who uses AAC compared to typically speaking participants?

Feedback

D23: It was slower and with A3 you can get hung up on a subject.

P23: Yes, many but A3 does not possess basic sentences in many instances to carry off conversation.

P33: No.

U13: No, once I understand that he was telling me about his favorite things, I was able to understand what types of foods, and wrestles he liked.

U23: Yes, I had the difficulty noted above-not being asking to interpret his "words" (when he did not use the machine).

U33: Difficult to understand his speech. AAC device made it easier and allowed me to know that he understood my questions.

Question 4: Did you do anything differently in conversation with the individual who uses AAC compared with typically speaking participants?

Feedback

D11: Yes, the conversation tends to be more on my shoulders, especially during an environment like this because I am trying to elicit responses from her.

D21: No, at first I did, but now that I am familiar with her. I can have a normal conversation with her.

D31: She provided me less information (words) in her communication, so she needed questions to define intent much more than typical partners.

P11: I have long silences with AAC user while she composes her utterances. How I adjust my communication depends on my partner and partner's system.

P21: I tend to ask questions in a manner to allow an easier response.

P31: Gave more choices and yes/no responses, had to ask for clarifications.

U11: I slowed down drastically. It was also hard to have eye contact. I also felt I tried not to go into too much depth and paused periodically to allow her time to input a comment.

Question 4: Did you do anything differently in conversation with the individual who uses AAC compared with typically speaking participants?

	Feedback
U21:	No.
U31:	No.
D12:	Be more patient for answers.
D22:	Yes.
D32:	I had to guess about certain topics or ideas. I also had to read more into his signals and gestures than most people.
P12:	I asked more frequently if I understood what A2 was telling me.
P22:	I sit beside the AAC user in order to see his face and his device to improve understanding. I allow more time for response.
P32:	It is bad form which I attempt not to do, but I often "guess" his next word.
U12:	I do have a habit of finishing people's sentences for them, and I asked A2 if that was ok. He was ok with it, so I did that more than I usually would just because it was so hard for him to get to the next word. It's a lot of work to do that.
U22:	I asked most of the questions. I was going to ask if he had questions for me because I didn't know if I was giving him enough time between my asking to ask him, but we ran out of time.
U32:	I tried to guess what the answer would be in a yes/no question.
D13:	Allow for more response time.
D23:	You have to have an idea of what is on the talker so you know what to talk about. If what you are discussing is not programmed into the talker, your conversation will be short.
D33:	Yes, he sometimes doesn't get what you are talking about.
P13:	I allowed time for A3's response and I allowed him to direct the topic.

Question 4: Did you do anything differently in conversation with the individual who uses AAC compared with typically speaking participants?

Feedback
P23: I try to help A3 locate things on the device in order to facilitate conversation and give hints of word beginnings. Have to infer the meanings and guess what he is trying to say sometimes. Also had to train him of where to keep device in order for all to hear. He had to learn how to clear things and repeat sentences for those that did not understand.
P33: Yes, it was a longer time with the device.
U13: No, not really, I tried to speak to A3 like I would ask normal persons.
U23: Yes, I did virtually all of the talking.
U33: Rate of speech, delay in response, limited vocabulary and responses programmed in the AAC.

Question 5: If you served as an unfamiliar conversation partner, what do you wish you had known in order to be an effective conversation partner?

Feedback
U11: I wish I knew more of her background information and the nature of her disability.
U21: Nothing.
U31: Nothing in particular.
U12: I think I was an effective conversation partner. I learned that A2 is 18, has one year left of high school, has had the AAC device for one year, like American history, wants to be a lawyer or case manager to solve crimes.
U22: I think I knew enough. He is very intelligent and didn't have any problems understanding me or responding to me. It might have been very helpful to be given information on his disability or something he was interested in, but then if wouldn't have been unfamiliar.
U32: What medical diagnosis A2 had because I could have had more input into his world.
U13: The speaking ability of the person to be a little more aware.
U23: I guess I wished I'd known that that gadget/machine generated sentences/speech for my conversation partner.

Question 5: If you served as an unfamiliar conversation partner, what do you wish you had known in order to be an effective conversation partner?
Feedback
U33: That he uses sign language. Type of disability if applicable.

Question 5a: If you had known that, what do you think you might have done differently in this conversation?
Feedback
U11: If I had known a little more about my conversational partner, conversation would have been easier because I would have known where to start. We could have talked about things that interested her or things that she had done or participated in. Beginning conversations can be very hard for some people. After they have found common ground, things are much easier. Sometimes we get tired of saying the same things as introduction; age, family status, background. . . It is fun to get deeper- what makes you tick, why do you think the way you think. We were limited in those concepts because of time and limitations with her interaction board.
U21: Nothing.
U31: I would have prepared myself to deal with the persons, the sight way to converse with and probably the topic they are interested in.
U12: Perhaps if I had more background information, I could have learned more about A2, but I think we did well.
U22: I might have done research on his disability or learning device or his favorite topic of interest, but that wouldn't have contributed as much to the research and would have made me familiar.
U32: Been able to ask A2 how he was coping with his life and disease.
U13: I don't know, probably the same.
U23: Don't really think I would have been done anything differently.
U33: E.g., would have signed and spoke using total communication making it easier for A3.

Question 6: If you served as a familiar conversation partner (i.e., a professional service provider/caregiver or a direct care provider), what strategies have you learned to be a good conversation partner?

Feedback

D11: I have learned that I need to sit and wait for responses of her. A1 can answer my questions usually, but she just may need longer to come up with what she wants to say. Also, A1 is good about signaling yes or no and also uses gestures. Sometimes, if she doesn't have her device, I can ask yes or no questions to figure out what she wants or is asking.

D21: I have learned to use her expressions and gestures to understand her. I sometimes guess what she is saying before she says it to save on time.

D31: Wait-the best (most complete, and those in which I get the best picture of what A1 thinks). Conversations we have are when I am doing dishes or something like that, and she is just sitting there. Her sentences are much longer. She asks questions and makes statements. Do not assume words I hear are always what she meant. May have been a mishit, and this can take me in the wrong direction. Ask for confirmation of my understanding of what she communicated. The first thing I always do with an AAC user I am unfamiliar with is ask them to demonstrate their non-verbal "yes" and "no". Then I might ask him/her if they would like me to guess as s/he is composing, or if s/he would like me to wait until s/he is completely finished. WAIT. Ask one question at a time. Use my fingers to signify possible answers to my questions. Where appropriate, offer "neither" as a choice. BE patient.

P11: (1) Wait for partner to finish utterances. (2) Wait to follow partner some control in topic. (3) Wait to see which modes partners use to compose a message. (4) Learn to read nonverbal signals (e.g., A1 looks at you when she is finished, or when she wants you to guess the rest of her utterance.).

P21: I sit beside the AAC user so that I can see both the user's face and the device for improved understanding of intended messages.

P31: Give A1 the opportunity to choose topics of conversation utilize all formats (verbal, scanning, number of syllables for choice, her AAC.

D12: Try to ask open ended questions that don't require simple one word answers.

D22: Slow down. Try to avoid only questions that are yes or no. Try to not talk all the time. Allow time for him to respond.

D32: To be attentive, observant, and seemingly comfortable. A lot of speaking with an AAC user is within gestures. I think it is important to act patient and comfortable for the speakers comfort.

Question 6: If you served as a familiar conversation partner (i.e., a professional service provider/caregiver or a direct care provider), what strategies have you learned to be a good conversation partner?

Feedback
P12: Patience. Watch A2's facial expressions carefully.
P22: See Q4. I try to prompt the user to express himself more fully and specifically. Without guessing at his words, I try to encourage word power with time economy.
P32: To wait for the message.
D13: Get/have eye contact, allow for processing/response time, be familiar with different modes of communication, i.e., sign language, typical speech, AAC use.
D23: Know what A3, keep the conversation going, know what is on the talker in order to talk.
D33: Be close to the person and make eye contact.
P13: If I get A3's attentions (touch his arm, get eye contact, say "A3, I want to ask you about something"), I have a better chance of directing the topic and/or setting him up to respond with one of his messages.
P23: Patience, inference, engagement, repeating back, directing the conversation, etc.
P33: Talk about something that he likes.