DEVELOPMENT OF INTERACTION DURING A SOCIAL SKILLS INTERVENTION GROUP FOR EMERGING ADULTS WITH AUTISM SPECTRUM DISORDERS (ASD):

A CASE STUDY

A Dissertation in
Communication Sciences and Disorders

by
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Submitted in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

December 2014
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ABSTRACT

It has been proposed individuals with autism spectrum disorder (ASD) may benefit from social skills support across the lifespan; however little is currently known about how to best structure social skills instruction for adults with ASD. A biweekly social skills group employing a naturalistic instructional discourse approach was conducted with four emerging adults with ASD who attended a college-based inclusion program at a large state university. The intervention focused on developing participants' understanding of a partner’s expectations related to appropriate responding to questions, comments, and short response tokens. Sessions were transcribed verbatim and coded to support detailed analysis. Feedback was solicited from participants, the program teacher, and neurotypical (NT) peers to investigate the social validity of this intervention. A case study approach supported in-depth description of development over time in participant-to-participant interaction, participant involvement in social and instructional discussion, and participant attitude toward group activities. Emerging adults with ASD demonstrated an increased amount of contribution to group conversation and showed improvements in positive participant-to-participant interaction. Over the course of this group, social interaction time increased while instructional interaction time decreased. Implications for designing future group-based social skills interventions for emerging adults with ASD are discussed.
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ACKNOWLEDGEMENTS

I would like to thank the following people for their invaluable support as I have made my way through these adventures in academia:

Kathryn Drager: Thank you for being such a supportive, encouraging, and calming adviser. I so appreciate everything you have done to help me get through this process quickly and in one piece.

Erinn Finke, Carol Miller, and Pamela Wolfe: You are officially the best committee ever. Thank you all for your support, encouragement, ideas, and flexibility as this project morphed and changed into something completely different from what had been expected.

Dakota Fego, Marlee Gilmartin, Chelsea Hilbert, Clare Keating, Leah Kohl, Caroline Swanson, Haley Williams, and Danielle Wittreich: My trusty band of research assistants, you guys were truly amazing. I quite literally could not have completed this project without your help.

Friends, Mom and Dad: Thank you all for your support, for embracing the craziness that ensues when one is trying to get a PhD, and for not panicking when I dropped off the face of the planet for weeks at a time.

Clay: Thank you for all of the above and also for remaining calm while feeding me and bringing me morale cookies and refilling my coffee and finding us a place to live.

Erin Lindsay: Thank you for talking me down off the ledge.

Rancid, the Bouncing Souls, Less Than Jake, the Mighty Mighty Bosstones, and the Vandals: For the fight songs that kept me going when I really didn't want to anymore.
CHAPTER 1

Introduction

Autism spectrum disorders (ASD) are diagnosed based on the presence of restricted and repetitive patterns of behavior, interests, or activities coupled with persistent deficits in social communication and social interaction (American Psychiatric Association, 2013). While the manifestation of symptoms changes with development and may be seen to decrease in severity across the life span, research indicates adults with ASD often continue to display lingering difficulties across core areas including language, communication skills, and social functioning (e.g. Lewis, Woodyatt, & Murdoch, 2008; Magiati, Tay, & Howlin, 2014; Seltzer, Shattuck, Abeduto, & Greenberg, 2004). Deficits in these areas are thought to be significant contributors to low levels of participation in gainful employment, postsecondary education, independent living, and social and community activities (e.g. Farley et al., 2009; Howlin, Goode, Hutton, & Rutter, 2004; Liptak, Kennedy, & Dosa, 2011; Marriage, Wolverton, & Marriage, 2009; Seltzer et al., 2004; Taylor & Seltzer, 2011).

The Centers for Disease Control now estimate the prevalence of ASD at one in 50 (Blumberg et al., 2013). The numbers have been steadily rising over recent years, likely reflecting improvements in diagnosis leading to a more accurate determination of the true prevalence (Elsabbagh et al., 2012). The annual cost associated with caring for individuals with ASD was recently estimated at $137 billion per year (Autism Speaks, 2012), much of which is attributable to costs incurred during adulthood (Autism Speaks, 2012; Knapp, Romeo, & Beecham, 2009). Although the cost of care is lower for individuals who do not have concomitant
intellectual disability (ID) and do not require residential care, the average annual costs associated with supporting individuals with ASD in adulthood remain significant, largely due to the high rate of unemployment and underemployment seen in this population (Knapp et al., 2009).

In addition to the significant financial impact low participation in gainful employment has on individuals with ASD, their families, and society at large, deficits in social and communication skills can also translate to low levels of participation in the various social and recreational activities commonly accessed by NT adults living in the community (e.g. Liptak et al., 2013; Ormond, Krauss & Seltzer, 2004; Ormond, Shattuck, Cooper, Sterzing, & Anderson, 2013). This in turn is a factor in the significantly lower quality of life (QoL) that has been documented in this population across the life span (e.g. Jennes-Coussens, Magill-Evans, & Koning, 2006; Renty & Roeyers, 2006; van Heijst & Geurts, 2014). Low levels of participation may also contribute to loneliness, which has been shown to be related to anxiety, depression, and low self-esteem in adults with ASD (Mazurek, 2014). However, this situation may be malleable as participation in social skills interventions (e.g. Gantman, Kapp, Orenski, & Laugeson, 2012; Hillier, Fish, Siegel, & Beversdorf, 2011), joining support groups (e.g. MacLeod & Johnston, 2007), or establishing social support and friendship networks (Jantz, 2011; Mazurek, 2014) may help reduce anxiety, depression, and loneliness.

**Adolescence and Emerging Adulthood**

In light of the growing awareness of the lifelong impact of an ASD diagnosis, researchers are increasingly emphasizing the importance of developing effective interventions focused on supporting older adolescents and adults with ASD (e.g. Kamio, Inada, & Koyama, 2013;
This may be an especially important time for added support; changes in social and societal expectations that come to bear during this period may result in increased stress and anxiety as individuals with ASD are asked to handle increasingly challenging social situations (Cridland, Caputi, Jones, & Magee, 2013). Successful social functioning in adolescence and adulthood requires flexible interpretation and efficient navigation of various complex situations, but development of the requisite skills in individuals with ASD may not keep pace with the changing expectations of those around them. For example, others in the surrounding environment are likely to expect increasingly competent navigation of the subtle and complex nuances of social interaction, and may be less tolerant of differences and eccentric behavior in older individuals with ASD (Cridland et al., 2013). However, as the likelihood of peer acceptance may be decreasing, the pressure to find acceptance in a peer group is often growing (Cridland et al., 2013). These and other similar pressures continue into late adolescence and emerging adulthood, a time of significant exploration that ultimately culminates in determination of adulthood roles and identity (Arnett, 2000).

Cridland and colleagues (2013) employed personal construct theory to describe the experience of adolescents with ASD, proposing increases in rigid and inflexible behavior may actually be a strategy for coping with the proliferation of new and anxiety-provoking social situations. Personal construct theory takes the view that people build their own constructions of the world around them through trial and error. When ideas or “constructs” prove inaccurate or unhelpful they should be modified or discarded, but inflexible thinking may lead individuals with ASD to retain invalidated constructs. Thus, intervention and support applied at this critical time
may help adolescents and emerging adults with ASD more successfully adopt desired adult
social roles and navigate new social situations, which could ultimately facilitate more fulfilling
community integration for many adults with ASD (Taylor & Seltzer, 2011).

**Conversational Skills and Social Responding in Individuals with ASD**

Individuals who are perceived as socially competent communicators show interest in
others, put them at ease and draw them into interaction, engage actively and responsively in
conversation, and show balance in turn-taking while successfully negotiating topics of shared
interest (Light, 1988). However, in the case of individuals with ASD, these desirable
characteristics may not be readily apparent as social interaction and maintaining balanced
conversations are generally areas of significant challenge (e.g. Carter, Davis, Klin, & Volkmar,
2005; Eigsti, de Marchena, Schuh, & Kelley, 2011). For example, individuals with ASD may
tend to converse at length about topics of highly preferred interest and can have difficulty
responding to and incorporating others' areas of interest in conversation (e.g. Nadig, Lee, Singh,
Bosshart, & Ozonoff, 2010), which may impact a partner's enjoyment of the interaction.
Unfamiliar conversation partners may also erroneously perceive individuals with ASD as having
limited interest in social engagement, although first person accounts which caution against
mistaking a lack of facility with social interaction for a lack of interest (e.g. Robison, 2007) may
be helping to change this perception on a societal level. Researchers are also starting to
acknowledge many individuals with ASD are indeed interested in social interaction and show
motivation to develop social relationships with others (e.g. Cridland et al., 2013; Fletcher-
Fey (1986) proposed a model for classifying children with language disorders that may be useful in describing the different interactional styles of individuals with ASD. Fey described the intersection of two continua: assertiveness, which refers to the “ability or willingness (or both) to take a conversational turn when none has been solicited by a partner” (p. 69), and responsivity, which refers to an individual's "level of responsiveness to the needs of her conversational partner" (p. 69). Individuals with ASD may show insufficient responsivity and assertiveness to successfully maintain conversation (e.g. Eigsti et al., 2011; Nadig et al., 2010; Schall & McDonough, 2010), and partners often provide significant support to keep a conversation going (e.g. Sirota, 2010). In a truly reciprocal conversation, no one speaker bears sole responsibility for maintaining the interaction and there is balance between appropriate responding and relevant, on-topic assertive conversational acts. Even when a speaker takes a longer turn to tell a story or share something of personal interest, this occurs with the implicit consent of the listener, who uses response tokens or short backchannel responses (e.g. “uh-huh,” “yeah”) to subtly negotiate turn length, show interest, confirm impressions, request elaboration, or signal readiness to move on to another topic (e.g. McCarthy, 2003; Norrick 2007; 2008; 2012).

Paul, Orlovski, Marcinko, and Volkmar (2009) recently completed an in-depth investigation of dyadic conversational behavior in adolescents with ASD as compared to neurotypical (NT) peers. Results indicated small yet statistically and clinically significant differences in interpersonal skills, such as provision of the appropriate amount of information, topic management and reciprocation, responding to partner cues, and conversational repair. The authors concluded these findings indicated difficulty in three core areas: topic management,
information management, and reciprocity. Skillful performance in each of these areas requires a speaker to determine what a listener already knows and what new information might be deemed interesting or useful. These presuppositional skills may be closely tied to theory of mind (ToM) deficits in individuals with ASD (Paul et al., 2009). Nadig and colleagues (2010) showed contingent responding and provision of an appropriate amount of information was related to level of language delay and ASD symptom severity, specifically in the area of restricted and repetitive behaviors and interests, suggesting these deficits could also be related to executive dysfunction.

**Consideration of a Partner’s Need for Information**

The ability of individuals with ASD to consider a listener's needs has frequently been discussed within the context of narrative construction, particularly during social conversation. Conversational narratives are a critical component of everyday social interaction and are used for various purposes, including sharing memories and experiences, making and maintaining relationships, furthering conversation, and building rapport (e.g. Bickmore & Cassell, 1999; Fels & Astell, 2011). Indeed, episodes of storytelling may comprise the bulk of many conversations that are maintained beyond a few short turns.

Colle, Baron-Cohen, Wheelwright, and van der Lely (2008) used a story retell activity to investigate narrative discourse in adults with ASD. They found while adults with ASD were able to sustain story structure and showed no evidence of linguistic deficits, they had difficulty using pronominal references, elaborating causal links between events and emotions, and used fewer temporal expressions. The authors proposed these patterns of performance might relate to
difficulty attending to listener needs during storytelling. McCabe, Hillier, and Shapiro (2013) analyzed personal narratives told by adults with ASD and found their narratives were structurally very simple, with fewer causal connections and more ambiguous pronominal references. They also showed participants' narratives tended to contain either too little or too much information, indicating difficulty tailoring a narrative for a listener's needs.

Story telling and retelling tasks have also revealed children with ASD often have difficulty with narrative coherence, organization, and establishing causal connections between story elements, which can result in stories that are "list-like" or “odd” (Diehl, Bennetto, & Young, 2006; Goldman, 2008). These characteristics may stem from a lack of understanding of a listener's needs (Diehl et al., 2006; Goldman, 2008), difficulty integrating information and adjusting language across contexts and partners (Diehl et al., 2006), or a lack of understanding of the social purpose of storytelling (Goldman, 2008). Goldman (2008) observed many children in her study provided insufficient background and evaluative information to facilitate a listener’s comprehension and needed support to help generate their narratives. However, they frequently gave off-topic answers to the prompts and questions that were used to scaffold the storytelling process and elicit more complete stories. Other investigators similarly found children with ASD contributed less novel and relevant information to conversations compared to children with other developmental disabilities (Capps, Losh, & Thurber, 2000), and were more likely to introduce ambiguous, bizarre, or irrelevant information (Losh & Capps, 2003). These patterns may still be apparent to some degree in many adults with ASD.
Responsivity as Intervention Target

Given many individuals with ASD have difficulty thinking about a partner and responding appropriately, responsivity has been frequently and fruitfully targeted in social and communication skills interventions within this population (e.g. Bauminger 2002; Ruble, Willis, & Crabtree, 2008). For example, Howlin and Yates (1999) targeted initiating and maintaining conversations, responding to questions, and avoiding stereotyped responses. At the end of this year-long intervention adults with ASD were able to use more initiating and maintaining utterances, demonstrating increased appropriate responding to requests for information and decreased repetitive statements. Plavnick, Sam, Hume, and Odom (2013) demonstrated successful use of video modeling in a group setting to help adolescents with ASD learn to respond to others in a way that "facilitates ongoing social interaction," including asking after others' interests and maintaining conversations. Dotson, Leaf, Sheldon, and Sherman (2010) successfully implemented a strategy-based approach known as teaching interaction procedure with adolescents with ASD to teach conversation basics (i.e. eye contact, appropriate proximity, initiating and ending an interaction, making on-topic statements), provision of positive feedback to a partner, and asking and answering open-ended questions.

Responsivity has also been used as a generalization measure in studies evaluating the efficacy of package social skills interventions. Bauminger (2002, 2007a, 2007b) implemented a social-emotional intervention that provided instruction in understanding and recognizing emotions and engaging in social problem-solving for school-aged children with ASD. Bauminger measured interaction with peers during recess, finding increased positive responses and initiations after participating in this intervention over the course of a school year. She also
noted growth in overall positive social interaction, especially in terms of increased eye contact and interest in sharing experiences with peers (Bauminger, 2002). McMahon, Vismara, and Solomon (2013) applied Bauminger's coding scheme to describe behavior observed during free time and noted responding significantly increased while other (e.g. self-talk) and initiating vocalizations decreased over time. The authors suggested reduction in initiating vocalizations was due to increased appropriate responding, which resulted in longer conversations.

Clearly, responding appropriately during conversation is a multifaceted and complex skill, but the impact on real-life social functioning and malleability of different aspects of this domain indicate responsivity may be an important intervention target. Indeed, researchers working to gather information useful for optimizing intervention design (Kaat & Lecavalier, 2014; McDonald & Macalicek, 2013; McMahon, Lerner, & Britton, 2013; Tobin, Drager, & Richardson, 2014; Reichow & Volkmar, 2010) may find addressing responsivity is a key ingredient of successful social skills interventions.

**Social Skills Interventions for Adults with ASD**

The existing evidence regarding social skills interventions for adults with ASD, while relatively scant, does provide initial evidence group interventions and support groups may increase social functioning, (Gantman et al., 2012), social cognition (Turner-Brown, Perry, Dichter, Bodfish, & Penn, 2008), conversation skills (Howlin & Yates, 1999), and participation in group discussions (Hillier, Fish, Cloppert, & Beversdorf, 2007). Several of these studies described formal package interventions that provided group instruction in various aspects of social interaction and social functioning. Gantman and colleagues (2012) implemented the
manualized UCLA PEERS program with young adults with ASD and their caregivers. This program addressed a variety of component skills needed to support relationship development, e.g. dating etiquette, conversation skills, and establishing friendship networks. Their instructional approach included role plays, Socratic questioning, and didactic presentation of social rules. The group met 90 minutes per week for 14 weeks, at the end of which participants demonstrated decreased loneliness, increased knowledge of social skills, and more frequent participation in social get-togethers. Furthermore, caregivers reported improvements in social functioning. Turner-Brown and colleagues (2008) adapted Social Cognition and Interaction Training for individuals with ASD (SCIT-A), delivering intervention once a week for 50 minutes over the course of 18 weeks. Sessions were structured to include a review of the agenda, member check-ins, review of the previous session's homework assignment, and activities related to the scheduled topic. The treatment group showed improvement on measures of social cognition but not social functioning.

Other studies have described less structured group interventions that incorporated social skills instruction within an informal discussion or support group format. Hillier and colleagues (2007) investigated the efficacy of the Aspirations program, where young adults met an hour a week over the course of eight weeks to discuss topics such as interpersonal problem-solving and social communication. Participants showed significant increases in contribution to group discussions. Furthermore, anecdotal report suggested many showed increased positive attitude, peer relations, and effort to interact with others. In a subsequent investigation with a larger sample, Hillier and colleagues (2011) found small yet significant reductions in depression and anxiety among Aspirations participants. The investigators proposed these benefits may have
resulted from the opportunity for group members to converse freely about daily challenges with others who had shared similar experiences. Howlin and Yates (1999) conducted a similar type of group that met once a month for 2.5 hours over the course of a full year. The group worked on social problem solving and developing skills in the areas of initiating and maintaining conversation, responding to questions, and avoiding stereotyped responses. Instructional activities included role-play, structured games, and provision of feedback on video recorded during the sessions. At the close of the intervention, participants used more initiating and maintaining utterances and showed improvement in appropriate responding to requests for information. Some decrease in the use of repetitive statements was also noted.

A few recent studies have described interventions for adults with ASD that focused on the acquisition of specific social skills rather than addressing a variety of related topics in turn. Pugliese and White (2014) delivered a nine-session social problem solving program to a group of college students with ASD. They utilized a multi-modal instructional approach, including provision of direct instruction, immediate and specific feedback to help shape skills, intensive modeling of new skills, practice with role-plays, and use of visual supports. Results varied, although some participants did show significant improvement on several subtests of a formal measure of social problem solving. The authors proposed this variability may have been due at least in part to issues with the self-report measure.

Some of the other interventions focused on development of specific component skills were delivered to adults individually rather than in a group setting. For example, Nuernberger, Ringdahl, Vargo, Crumpecker, and Gunnarsson (2013) developed a behavioral skills training package that was effective in teaching three young adults with ASD to initiate and maintain a
short conversation with a peer. Koegel, Ashbaugh, Koegel, Detar, and Regester (2013) taught
time-management strategies to matriculated college students with ASD with the goal of
facilitating their participation in recreational activities on campus. The researchers provided
assistance with identifying desirable activities, and met weekly with each participant to discuss
strategies for sustaining successful social interaction while attending the selected activities.
These strategies included asking partner-focused questions, sharing in others' interests, and
responding appropriately during conversation. Neurotypical peer mentors were also available to
accompany participants to activities if requested. Given this support, the number of activities
attended per week increased, and participants reported increased satisfaction with the college
experience and level of peer interaction.

Although we do not yet know what intervention methods are most effective for adults
with ASD (e.g. McMahon, Lerner, & Britton, 2013; Reichow & Volkmar, 2010), there were
some common features across these studies. One characteristic many interventions shared was
purposeful incorporation of components designed to facilitate generalization (Klin et al., 2007).
Including caregivers or NT peers in the intervention and providing homework were the two most
common methods of encouraging outside practice. Most of these interventions also incorporated
opportunities for structured practice and feedback, used multi-modal instruction and visual
supports, and included some form of instructional activity designed to build social cognition and
knowledge (e.g. didactic instruction, presentation of social rules, group discussion). This last
component is in keeping with the idea of “partial cognitive compensation for social-emotional
deficits” (Bauminger, 2002, p. 294) and the assertion many individuals with ASD may have the
basic skills required, but struggle to identify salient cues that signal when certain responses are
warranted during actual social interaction (Paul et al., 2009). It should be noted, much of this research has focused on high-functioning adults with ASD, and several investigators have observed the need for more research that includes older adolescents and adults with ASD across a broader cross-section of the population (e.g. McDonald & Machalicek, 2013; Reichow & Volkmar, 2010; Tobin et al., 2014) to support firm conclusions about the efficacy of these types of interventions.

**Intervention Approach: A Case for Instructional Discourse**

Many social skills interventions for adults with ASD have utilized naturalistic activities such as discussion and group problem solving (e.g. Hillier et al., 2007, 2011; Howlin & Yates, 1999). For example, Aspirations employed "a counseling support group model rather than a teacher-directed approach” (Hillier et al., 2007, p. 109); it was designed to be led by members with leaders taking a less active role, stepping in mainly to help maintain on-topic discussion. While a naturalistic setting may help bridge the gap between social skills knowledge and actual social functioning (Santhanam & Hewitt, 2012, as cited in Santhanam, 2014), there may be value in considering a blended approach as adults with ASD who had experience with support groups reported wishing for more structure and incorporation of social skills instruction (Jantz, 2011).

Instructional discourse is one approach that may satisfy both of these needs. In instructional discourse, “learners create and shape meaning through talk” (Merritt, Barton, & Culatta, 1998, p. 146). Instructional discourse engages reasoning and critical thinking, using collaborative discussion to make the implicit explicit, co-create knowledge, and contextualize information (Elizabeth, Ross Anderson, Snow, & Selman, 2012; Merritt et al., 1998). Using
discussion and social interaction to build social knowledge may help facilitate generalization (Hume, Loftin, & Lantz, 2009), address the disconnect between social cognition and social functioning (e.g. Klin et al., 2007; Turner-Brown et al., 2008), and help develop conversation skills (Elizabeth et al., 2012).

The group leader facilitates the desired types of discussion by adopting a supportive interaction style. This entails posing different types of open-ended questions that support the creation of personal connections, commenting on idea development, and creating opportunities for members to take the lead in steering discussion. Merritt and colleagues (1998) stressed in order to meet instructional goals, group leaders should establish and convey a clear purpose for each lesson, provide multiple examples using repetition and summarization, and ensure information is presented at an appropriate cognitive and linguistic level. The leader encourages participation by providing positive feedback and using a balance of questioning and commenting (Merritt et al., 1998). Additionally, the group leader must work to create a culture where group members understand they are expected not only to listen attentively while others are talking, but also to play a highly active role in moving the discussion forward by sharing ideas, responding thoughtfully to others’ contributions, making connections between ideas, and asking questions (Elizabeth et al., 2012; Merritt et al., 1998). These may initially be difficult skills for individuals with ASD, but the leader can use modeling and scaffolding to effectively support discussion and concept development (Merritt et al., 1998).
Rationale for a Group Setting

The interventions discussed thus far took place almost exclusively in group settings. Group interventions are practical and efficient. They allow service professionals to simultaneously deliver instruction to multiple individuals (e.g. Dotson et al., 2010) and are thus respectful of existing resource limitations (Plavnick et al., 2013). Group interventions may also provide individuals with ASD meaningful opportunities for observational learning (Plavnick & Hume, 2014). Thus, all members of a group potentially have the opportunity to learn even when another member is taking a turn by observing and internalizing the response and received consequences.

Groups also allow for constructive interaction between group members. Irrespective of the instructional strategies employed, the studies described above often noted benefits that arose based on the opportunities afforded within the group for participants to work together, learn from each other, and practice with peers in a safe and controlled environment (e.g. MacLeod & Johnston, 2007; Pugliese & White, 2014). Researchers have described this as a sense of community, and many reported participants enjoyed interacting with other individuals with ASD (e.g. Hillier et al., 2007; Howlin & Yates, 1999; MacLeod & Johnston, 2007; Turner-Brown et al., 2008). Tobin and colleagues (2014) suggested this may speak to the importance of the informal social support characteristics of intervention groups for adults with ASD.

Group discussion has the potential not only to facilitate development of abstract thought and social perspective taking, which are critical for later language development (Nippold, 1998), but also supports learning through social interaction. The social context is regarded by many theoreticians as a critical ingredient for language learning (e.g. Bruner, 1975; Snow, 1999;
Tomasello, 1992). Joint attention, or triadic interaction between people about an object or event is posited as a mechanism that provides social and pragmatic context, allowing children to attribute meaning to language (Tomasello, 1992; Tomasello & Farrar, 1986). Indeed, Tomasello (1992) proposed the reason individuals with ASD have difficulty acquiring conventional language is they have difficulty understanding “what adults are doing with particular pieces of language” (p. 73). In the case of a group discussion, the leader's use of focused prompts and scaffolding techniques may unite attention and serve to provide a clear shared context that supports social language development.

Interaction within a group of peers is another factor that may also support desired outcomes. The symmetrical nature of peer-to-peer interaction is important for social and pragmatic language development (e.g. Blum-Kulka, 2004). While the presence of a group leader necessarily influences the nature of this dynamic (Breen, 1985), interaction with other group members may support a different kind of learning than interaction with the leader. Thus, it is not only important for group members to actively participate in discussions, but ideally they will exchange questions and ideas with each other without the group leader acting as arbiter of all interactions (Elizabeth et al., 2012; Lindblom-Ylänne, Pihlajamäki, & Kotkas, 2003).

**Case Study Investigations in ASD**

Researchers have argued for “open-ended and ecologically valid techniques” in the investigation of social skills interventions for individuals with ASD (Fletcher-Watson et al., 2013, p. 222). Case study methodology is one such tool, and has been used in this population in recent years for various purposes, including describing response to intervention and explaining
“the presumed causal links in real-life interventions that are too complex for the survey or experimental strategies” (Yin, 2009, p. 19). For example, Sze and Wood (2007) described adaptation of a cognitive behavioral approach to treating anxiety in an 11-year-old girl with ASD, providing detailed description of the intervention and the girl's response to each component. Passerino and Santarosa (2008) used detailed description of learning and social communication in a digital learning environment over the course of three years to propose a theoretical framework describing the development of cognitive and learning processes in individuals with ASD.

Case studies have also been used to describe an "intervention and the real-life context in which it occurred" (Yin, 2009, p. 19). Ruble and colleagues (2008) presented a case study of a social skills group conducted with six boys in an outpatient clinic, focusing on the development of efficient yet informative measurement techniques appropriate to the resource constraints of a clinic-based setting. Thus, case study methodology allows for deep description and detailed analysis of change over time, supporting investigation of the complex and evolving nature of interaction within an ongoing intervention, in-depth discussion of intervention components, and hypothesis development concerning intervention efficacy and design.

The Current Project

This project used an embedded, single-case study design to describe a social skills group implemented with four transition-aged emerging adults with ASD who attended a college-based inclusion program. Nine intervention sessions were coded and analyzed as embedded subunits, then examined collectively to support conclusions relative to the case as a whole. Breen (1985)
argued the validity of treating this type of instructional group as a single-case; “Because the classroom culture is a human enterprise, it provides the researcher with a living subject, an informant, not unlike a single learner” (p. 150). Selection of this case was based on the availability of this unique opportunity to investigate the implementation of a naturalistic social skills intervention within the confines of a college-based inclusion program (Stake, 1995; Yin, 2009). Although there are currently relatively few such programs providing transition training to emerging adults with ASD, program availability is gradually increasing and more information is needed regarding incorporation of social and communication skills instruction (Zager & Alpern, 2010). An ethnographic participant-observer approach to data collection was employed to authentically describe the group's interaction and present an inside perspective on group implementation. Analysis focused mainly on identification of patterns related to:

• Changes in amount and type of participants' contributions to group discussion, including changes in participant-to-Participant interaction

• Changes in appropriate responsivity and assertiveness relative to inappropriate responsivity and assertiveness

• Changes in the success and efficiency of instruction

• Participant comments in response to features of instruction and group interaction
CHAPTER 2

Method

Research Design

Case study analysis seeks to provide deep understanding of a selected case by working to uncover patterns explaining "why" or "how" (Stake, 1995; Yin, 2009) while retaining the "holistic and meaningful characteristics of real-life events" (Yin, 2009, p. 4). Case studies provide an important complement to the intervention literature by describing actual intervention delivery and proposing hypotheses regarding reasons for treatment success (Yin, 2009). In this case, a rich description of the development of group interaction over time adds qualitative information that may help support optimization of intervention design, a much needed direction for future research (e.g. Kaat & Lecavalier, 2014; McDonald & Macalicek, 2013; Reichow & Volkmar, 2010).

Generalization in Case Study

One of the common concerns regarding case study methodology is the lack of generalizability. However, Stake (1995) asserted, “The real business of case study is particularization, not generalization. We take a particular case and come to know it well, not primarily as to how it is different from others but what it is, what it does” (p. 8). Although the information that can be learned from case studies is not generalizable in the same way as other types of research, case study methodologists have described the importance of “analytic generalization” (Yin, 2009) or “naturalistic generalization” (Stake, 1995) to remind readers of the
value of case study in supporting development of connections between theories and ideas while engaging background knowledge and personal experience.

To support naturalistic generalization, Stake (1995) emphasized the importance of providing a “vicarious experience,” including rich description of setting as well as ample provision of raw data. Yin (2009) further proposed case study design and analysis should be guided by “theoretical propositions.” He encouraged researchers to reference existing literature in the development of these propositions, stressing this is not formal theory development on a grand scale, but rather a thoughtful formulation of the study’s “blueprint.” The degree to which the researcher can justify the proposed story behind the case description drives the depth of analytic or naturalistic generalization that is possible from the information presented.

Credibility of Findings

Reliability and validity are considered by many qualitative and case study researchers to be concepts more clearly applicable to quantitative research. Many qualitative researchers espouse the constructivist perspective that knowledge and information emerge from interaction within social contexts, which Golafshani (2003) suggested may be a main reason many feel these terms a poor fit for qualitative research. The purpose of documenting reliability and validity in quantitative research is to demonstrate quality and rigor. In qualitative work, where there is often more than one plausible interpretation, quality and rigor are shown by proving the researcher’s conclusions are supported by the data (Stake, 1995). Thus, many have proposed credibility or trustworthiness are more apt terms (e.g. Golafshani, 2003; Hupcey, 2010; Yin, 2009). Demonstrating credibility in qualitative research can be accomplished through such
strategies as providing rich description, showing raw data, and using visual data products to allow readers to test the researcher's conclusions for themselves. Another common tool is triangulation, or corroboration across multiple sources of evidence, which shows how the researcher’s ideas are supported by different types of information (Golafshani, 2003; Hupcey, 2010; Stake, 1995, Yin, 2009).

Yin (2009) described additional strategies that are particularly relevant to case study research. He suggested construct validity could be supported by establishing a "chain of evidence" so the reader can track data from collection through to analysis and conclusion. Pattern matching, explanation building, and addressing rival explanations can be used to support internal validity, whereas using theory to drive design, conducting multiple-case studies, and providing detailed description of the case support external validity. Finally, Yin asserted researchers can support reliability by establishing a clear and replicable step-by-step procedure for data collection and analysis to ensure someone else following the same procedure with another similar case would arrive at the same findings.

**Specific Strategies for Supporting Credibility in the Current Study**

In the current study, triangulation among “converging lines of inquiry” (Yin, 2009) was established by consulting multiple informants and collecting information using questionnaires and behavioral observation (McMahon, Lerner, & Britton, 2013). Behavioral observation, which is useful for documenting changes in behavior over time (e.g. Barry Klinger, Lee, Palardy, Gilmore, & Bodin, 2003; Lerner & Mikami, 2012; McMahon, Lerner, & Britton, 2013), was the primary form of data collection in this study. Questionnaires soliciting direct report from
stakeholders were used to contextualize and corroborate the information gleaned from behavioral observation. This type of direct report is an important component of case study research (Stake, 1995; Yin, 2009), although as Yin (2009) cautioned there may be limitations due to bias, poor recall, or difficulty with self-expression. In particular, researchers have raised concerns regarding the accuracy of self-report measures for individuals with ASD, largely due to reported difficulties with introspection and understanding mental states (e.g. Baron-Cohen, 2000; Mazefsky, Kao, & Oswald, 2011).

Multiple informants, including professional SLPs, student research assistants, and the existing literature were consulted throughout the lengthy, iterative process of developing, testing, and tweaking the coding scheme that was ultimately used to classify observational data in this study. This was particularly important given the final coding was done exclusively by the principal investigator; her experience running the group as a participant-observer gave critical background knowledge, experience, and a valuable insider perspective that could not be duplicated in an independent coder. This use of an ethnographic participant-observer approach was in keeping with Breen's (1985) recommendation to embark upon the study of the language classroom with an anthropological sensitivity, and allowed examination of the group's culture and day-to-day functioning from an insider's perspective.

An embedded design and use of both quantitative and qualitative measures helped to enhance the strength of this study. Embedded designs support stronger conclusions as they involve more than one unit of analysis (Yin, 2009). Furthermore, Yin (2009) noted case studies need not be purely qualitative, and are strengthened by the use of mixed methods. This allows the researcher to address more complicated questions supported by a “richer and stronger array
of evidence than can be accomplished by any single method alone” (Yin, 2009, p. 63). In embedded designs, Yin recommended quantitative analysis at the subunit level to support qualitative analysis at the holistic level. Thus, the current study analyzed quantitative trends in nine randomly selected subunits (Yin, 2009), establishing a strong basis from which to draw conclusions regarding the overall patterns seen across sessions.

Finally, data were presented in a highly visual manner to allow readers to independently interpret the patterns being discussed (Hupcey, 2010). “Data visualization creates images—images whose content transcends the spoken word,” presenting a more complete picture of the data by making patterns and trends apparent in ways narrative or numerical presentation cannot (Dickinson, 2010, p. 472). Additionally, visually presented data are useful for combining qualitative and quantitative information, and may ultimately support greater recall and deeper comprehension of a study's findings (Dickinson, 2010).

**Ethical Considerations**

Ethical approval for this study was obtained from the relevant institutional review and school boards. Informed consent was obtained from parents of participants with ASD, directly from participants with ASD, and from all individuals who provided questionnaires responses. Written consent to audio record group sessions was obtained from all group members.

The confidentiality of participants' and informants' identities was protected by removing or disguising identifying information. Pseudonyms were used in transcripts and data reporting.
Setting

College-Based Inclusion Program

College-based inclusion programs are designed to provide support for the transition to adulthood in such a way individuals with disabilities who continue receiving special education support after the age of 18 have access to age-appropriate educational and social opportunities alongside same-aged peers, many of whom are participating in postsecondary education (Zager & Alpern, 2010). The current research was conducted in cooperation with one such program, which was designed as an enrichment program for students with intellectual and physical disabilities who had completed 12th grade programming but needed targeted transition support before moving on to independence in adulthood. This program provided support for students to continue developing independence, social, communication, and vocational skills, and also maintained an apartment to provide opportunities to practice independent living in small groups.

This program made extensive use of NT peer mentors. Mentors were undergraduate student volunteers who were involved throughout the day in providing academic and social support. Thus, the students in this program had to demonstrate sufficient verbal communication skills to interact successfully and meaningfully with these mentors. In addition, they needed to display the responsibility and awareness to be semi-independent in navigating campus, and the maturity to participate in university courses with appropriate support. These were individuals who had demonstrated an active role in planning for their own futures, and many maintained independent or supported employment while in the program. See Appendix A for information about the program’s referral and application process.
Personnel and Participants

Support Personnel

Group Leader

The group was led by the principal investigator, an SLP with four years of clinical experience delivering speech and language services in school-based settings to a caseload of school-aged and transition-aged students, many of whom had an ASD diagnosis.

Neurotypical Peers

Group helpers. Group meetings took place during the school day at a time NT peer mentors associated with the inclusion program were already scheduled to work with the participants with ASD. These mentors were invited to join group meetings as desired. An undergraduate student intern gaining teaching experience in the inclusion program as well as two undergraduate research assistants who helped organize materials for group sessions also attended frequently. These NT helpers were not generally significant contributors to group discussions, and assisted by providing examples and helping to manage the flow of discussion as directed by the group leader. They also sometimes engaged with participants with ASD during times of social interaction. All undergraduate helpers who attended regularly were female. Typically, between three and five helpers were present during each group session.

Conversation partners. Participants were also paired with a NT conversation partner, with whom they met twice weekly for 10-15 minutes. Conversation partners were four female undergraduate juniors and seniors majoring in Communication Sciences and Disorders.
Conversation partners had varying levels of experience interacting with individuals with ASD, ranging from no previous contact to growing up with a sibling diagnosed with ASD.

*Program Teacher*

The teacher of the college-based inclusion program was a school district employee who had been running the program for the past two years. She consulted with the principal investigator during the planning phase, providing invaluable feedback. She also provided information about the participants with ASD during the intervention delivery phase.

*Participants with ASD*

Participants with ASD were emerging adults between the ages of 18 and 21 who received special education services under an Autism classification and attended the college-based inclusion program described above. They demonstrated the communication, independence, and motivation required for admittance to this program, but all had some difficulty with conversational responsivity and assertiveness. In many ways they paralleled their NT emerging adult peers in thinking about readiness for adulthood and showing the desire to be treated as adults, but in other ways their independence and maturity differed from what might be expected from most NT college students. Participants were all reported to have normal or corrected normal hearing and vision. Participants did not engage in other formal language or social skills interventions, although they continued to participate in activities within the inclusion program that addressed these areas. See Table 1 for demographic characteristics.
Recruitment

At the time of this study, there were five students in this program who had an ASD diagnosis. Recruitment information was presented to each of them; four elected to participate and gave consent.

Pre-intervention Assessments

Lewis and colleagues (2008) showed adults with ASD often continue to have difficulty with basic language skills. They argued this highlights the importance of assessing language before beginning an intervention to enable individualization of support and ensure the planned intervention is appropriate. Additionally, the need for in-depth description of participant characteristics, especially language characteristics, has been noted by several researchers (e.g. McDonald & Macalicek, 2013; Reichow & Volkmar, 2010). Several types of data were compiled to formulate an accurate clinical impression of each participant's language abilities.

Table 1
Participant Demographics

<table>
<thead>
<tr>
<th>Namea (Gender)</th>
<th>Age (yr-mo)</th>
<th>IEP Classification</th>
<th>Year in program</th>
<th>Past Speech Therapy?</th>
<th>Employment Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alex (M)</td>
<td>21-0</td>
<td>Autism None</td>
<td>Last</td>
<td>No</td>
<td>Community</td>
</tr>
<tr>
<td>Bryce (M)</td>
<td>21-3</td>
<td>Autism None</td>
<td>Last</td>
<td>Yes</td>
<td>Campus</td>
</tr>
<tr>
<td>Cara (F)</td>
<td>20-8</td>
<td>Autism ID</td>
<td>Last</td>
<td>Yes</td>
<td>Campus</td>
</tr>
<tr>
<td>Darcy (F)</td>
<td>19-3</td>
<td>ID Autism</td>
<td>First</td>
<td>Yes</td>
<td>Campus</td>
</tr>
</tbody>
</table>

Note: M = male; F = female; yr = year; mo = month. Information provided by participant and teacher report.
a Names have been changed and are expressed using pseudonyms throughout this report.
Comprehensive Analysis of Spoken Language (CASL). The CASL (Carrow-Woolfolk, 1999) is one of the few formal language assessment batteries normed on individuals through 21 years of age, and was selected based on inclusion of subtests assessing knowledge of language form and vocabulary as well as principles of pragmatic language use. The Synonyms, Grammaticality Judgment, Nonliteral Language, Meaning from Context, and Pragmatic Judgment subtests were administered, allowing derivation of a Core Language standard score.

The Synonyms subtest (Lexical/Semantic category) requires examinees to identify a synonym for a given word from a set of four choices presented aloud. The Grammaticality Judgment subtest (Syntactic category) asks examinees to listen to a sentence, quickly judge its grammatical correctness, and offer corrections in the case the sentence was judged grammatically incorrect. The Nonliteral Language subtest (Supralinguistic category) assesses the examinee’s ability to describe the meaning of a spoken sentence whose literal meaning does not convey the intended message (i.e. idiomatic or figurative language). The Meaning from Context subtest (Supralinguistic category) asks the examinee to infer the meaning of a target word based on hearing it used in a sentence. Unlike the Nonliteral Language subtest, the Meaning from Context subtest does not require application of world knowledge to arrive at the correct interpretation. Finally, the Pragmatic Judgment subtest (Pragmatic category) requires application of pragmatic rules to identify appropriate language or action for a given context.

The principal investigator administered the CASL individually to each participant across two to three 30-45 minute sessions. Subtest administration was discontinued if the participant was unable to complete the practice items. See Table 2 for subtest standard scores, Core Language index scores, and percentile ranks.
**Comprehensive Examination of Language Fundamentals—5th Edition (CELF-5),**

**Observational Rating Scale.** The CELF-5 (Semel, Wiig, & Secord, 2013) Observational Rating Scale is composed of 40 questions regarding an individual’s listening, speaking, reading, and writing abilities. The inclusion program teacher completed this form for each participant, providing information about actual language functioning across settings.

**Study-specific Questionnaires.** Questionnaires developed specifically for this study were administered to participants, teachers, and NT conversation partners. These questionnaires gathered basic demographic information (see Table 1) and probed functioning in regard to social responding, conversation skills, social interaction style, cognitive functioning, and learning. Questionnaires used open-ended questions and a four-point Likert scale as recommended by Jantz (2011), who observed individuals with ASD may over-select the middle point given five-point scales. Questions regarding social interaction style, cognitive functioning, and learning

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**Table 2**

*CASL Scores*

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alex</td>
<td>88 (21)</td>
<td>72 (3)</td>
<td>47 (&lt;0.1)</td>
<td>49 (&lt;0.1)</td>
<td>40 (&lt;0.1)</td>
<td>57 (0.2)</td>
</tr>
<tr>
<td>Bryce</td>
<td>73 (4)</td>
<td>70 (2)</td>
<td>45 (&lt;0.1)</td>
<td>57 (0.2)</td>
<td>67 (1)</td>
<td>60 (0.4)</td>
</tr>
<tr>
<td>Cara</td>
<td>85 (16)</td>
<td>67 (1)</td>
<td>51 (&lt;0.1)</td>
<td>—</td>
<td>59 (0.3)</td>
<td>—</td>
</tr>
<tr>
<td>Darcy</td>
<td>73 (4)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>40 (&lt;0.1)</td>
<td>—</td>
</tr>
</tbody>
</table>

*Note.* Gramm. Judgment = Grammaticality Judgment; STD = standard score; P.R. = percentile rank; Index = index score; — = no score available, participant was unable to complete subtest.
were derived from the International Classification of Functioning, Disability and Health (ICF) framework (WHO, 2002). See Appendix B for full versions of the questionnaires.

All participants received the intervention, so it was not possible to blind raters to treatment status. Questionnaire administration was timed to ensure informants had enough experience with participants to provide reliable information (McMahon, Lerner, & Britton, 2013; Rao, Beidel, & Murray, 2008; Reichow & Volkmar, 2010); the program teacher was already well acquainted with each participant, and questionnaires were not distributed to NT conversation partners until the dyads had met on at least five separate occasions. The program teacher and principal investigator assisted participants with ASD by reading the questions aloud and providing examples to facilitate their completion of self-report measures as needed.

Alex

At the time of this study, Alex was a 21-year-old male in his final year of the inclusion program. He received services as a student with Autism and did not have concomitant ID. He reported particular interests in playing video games, cooking, and playing squash. He was successfully employed at a local restaurant where he worked about three days a week.

Language assessment. While Alex's conversational language abilities were strong, his Core Language Index score on the CASL was three standard deviations below the mean. His performance on the Synonyms subtest was within the low average range, and his performance on the Grammaticality Judgment subtest was approximately two standard deviations below the mean. His performance on the other subtests was more significantly delayed, ranging approximately three to four standard deviations below the mean. Alex was observed to display
some anxiety during testing and was often unwilling to risk an answer if he was not certain. Additionally, it was noted he seemed to have difficulty understanding the nature of the Pragmatic Judgment subtest, which was where he showed his weakest performance.

Teacher report on the CELF-5 Observational Rating Scale indicated Alex had little difficulty with listening and speaking skills in the classroom, although sometimes word-finding and organizing his thoughts for expression posed a challenge. She noted he “constantly repeats a story that he has explained minutes before” and then asks, “Do you understand what I mean?” This may be indicative of difficulty monitoring a partner’s understanding.

**Pre-intervention questionnaires.** Alex’s teacher reported his greatest area of need in conversation skills was understanding when he had been heard and learning how to end conversations. She reported he would also benefit from learning how to have conversations that are a little more interesting to his partners. Alex reported he was interested in working on learning how to keep a conversation going, although his teacher noted she had not observed any particular needs in this area. Alex reported his conversational strengths included asking questions and talking to others about their interests, but he reported difficulty maintaining eye contact. Both Alex and his teacher indicated he was able to give on-topic answers to questions, but Alex’s teacher perceived he had slightly more difficulty responding to comments and nonverbal cues than Alex himself perceived. Alex reported he was moderately interested in talking to others, but teacher perception was that he was very interested in social interaction.

Alex’s conversation partner reported he was generally receptive to engaging in conversation with her, although there were days when he announced he was not feeling very talkative. She reported he was usually fairly responsive, but did sometimes continue unchecked
along a train of thought, ignoring her comments and questions. She observed they were generally able to maintain a conversation for approximately five to eight minutes before Alex got bored or distracted. She reported it was relatively easy and interesting to have a conversation with Alex, but that he was not able to do his share of the work in maintaining the conversation.

In regard to Alex’s social and cognitive functioning, both he and his teacher generally perceived he had little to no difficulty across the areas probed. In general, his teacher observed less difficulty than he reported about himself, particularly as regarded establishing relationships and maintaining social space; however, Alex reported slightly less difficulty responding to social cues than his teacher perceived. Both reported a similar profile of little or no difficulty with higher-level cognitive functions such as abstract thinking, organization, and problem-solving. Alex’s teacher reported no difficulty with applying knowledge, but Alex reported he had mild to moderate difficulty focusing attention and making decisions.

**Clinical impressions.** While Alex sometimes perseverated on preferred topics, relative to the other participants in this group, he had the most typical conversation skills. He was able to maintain a fast pace of conversation and while not always optimally responsive, he could respond appropriately to questions, comments, and response tokens. He also demonstrated some understanding of conversational balance, and asked partner-focused questions when engaged in a conversation. He had a very good sense of humor, which was dry and sarcastic.

**Bryce**

At the time of this study, Bryce was a 21-year-old male in his final year of the inclusion program. He received services as a student with Autism. While he did not have a secondary
classification of Intellectual Disability, cognitive assessment data from when he was a young child suggested he may be on the cusp of qualifying for this diagnosis. He held a job in food service on campus, and was interested in pursuing future employment in this area. His areas of particular interest included weather, science, biology, and history.

**Language assessment.** Bryce's Core Language Index score on the CASL was indicative of overall language skills approximately two and a half standard deviations below the mean. His performance on the Synonyms, Grammaticality Judgment, and Pragmatic Judgment subtests was approximately two standard deviations below the mean. He had more difficulty with the two subtests in the Supralinguistic category, showing performance in the range of three to four standard deviations below the mean. Bryce seemed unwilling to take risks during testing if he was unsure of an answer, but he was willing to work slowly and methodically through all of the tasks presented to him.

Teacher report on the CELF-5 Observational Rating Scale indicated no particular difficulty in many areas of listening and speaking in the classroom. Bryce's teacher characterized his greatest area of challenge as difficulty with processing and understanding what others say, which she described as having a significant impact on his ability to respond quickly to questions and participate in conversation at a typical pace. She also observed he sometimes had difficulty talking in a group, looking at people when they were talking, and engaging in conversational repair. Maintaining the movement and flow of conversation was difficult for Bryce, and he often focused heavily on familiar topics of personal interest.

**Pre-intervention questionnaires.** Bryce indicated a high level of interest in talking to others, and reported all aspects of maintaining and responding in conversation were easy for him.
He identified no particular conversation skills he wished to improve. His teacher concurred with his self-assessment of strong ability to maintain conversation and have interesting conversations with others, largely because of his extensive background knowledge about various topics. She observed he was able to respond well to questions, but noted slightly more difficulty responding to comments and nonverbal cues.

Bryce's conversation partner reported finding it very challenging to maintain a conversation with him. She noted his utterances were very short and he was not at all able to help share the burden of maintaining a conversation. She did report it was somewhat interesting to talk to him, and also observed he was more able to respond to questions than comments and nonverbal cues.

Bryce and his teacher both reported few difficulties in basic and complex interpersonal skills, excepting mild difficulty responding to social cues. Additionally, Bryce reported mild difficulty following social rules. Bryce's teacher reported no difficulty with higher-level cognitive functions except mild to moderate difficulty with cognitive flexibility and problem-solving. Bryce reported mild difficulty with abstract thinking and problem-solving, but no difficulty with cognitive flexibility. In terms of applying knowledge, Bryce and his teacher both reported mild difficulty with decision making, and Bryce also saw himself as having mild difficulty focusing his attention.

Clinical impressions. As indicated by his teacher, Bryce's dyadic conversation was marked by his significant need for wait time, which could be disconcerting for an unfamiliar partner. Given enough time, Bryce usually had interesting things to share on a wide variety of topics, and could ask partner-focused questions. He genuinely seemed to enjoy interacting with
others, and particularly liked to talk about science and the weather, sometimes to a level which exceeded a partner's interest. When Bryce first met someone new, his eye contact was particularly poor, to the extent he oriented his entire body away from his partner. This was observed to grow less significant with time and growing familiarity.

Cara

At the time of this study, Cara was a 20 year-old female in her final year of the inclusion program. She received services as a student with Autism, and also had a secondary classification of Intellectual Disability. She held a job doing clerical work on campus during portions of this study. She was highly interested in sports, particularly running, cheerleading, and softball.

Language assessment. On the CASL, Cara demonstrated performance within the low average range on the Synonyms subtest, and fairly level performance across the other subtests, with scores approximately two to three standard deviations below the mean. The Meaning from Context subtest was not able to be administered and prevented calculation of the Core Language Index score. Over time, Cara seemed to grow less motivated to engage seriously with the testing process while simultaneously showing increased interest in interacting socially with the examiner. She was noted to be highly distracted by her environment, and testing sessions were often inefficient.

Teacher report on the CELF-5 Observational Rating Scale corroborated the examiner's experience during testing; Cara's teacher also noted she had significant difficulty sustaining attention in the classroom setting. She reported Cara often got upset when others did not understand her, but had a hard time staying on topic, getting to the point, and adding needed
detail when expressing her ideas. She reported Cara often engaged in fabrication, which could make her speech sound disjointed, as she was often "thinking ahead of how to spin a story." She also observed Cara could struggle to understand what others were saying, and had difficulty asking for help when needed and understanding and drawing inferences in reading.

**Pre-intervention questionnaires.** Cara's teacher perceived her to be very interested in social interaction, although Cara herself reported she was only somewhat interested in talking to others. Cara reported it was easy for her to have conversations and respond to questions, comments, and nonverbal cues. She described strengths in starting conversations, listening to others, and ending conversations. She noted it was more challenging to keep a conversation going, and reported some interest in working on improving that skill. Cara's teacher reported she perceived Cara's greatest area of need as related to ensuring topics were interesting to a conversation partner. She also reported Cara had significant difficulty responding appropriately to questions, but was somewhat more able to respond to comments and nonverbal cues.

Cara's conversation partner reported Cara was usually very talkative, especially about her own interests, but that it could take a few minutes to get her involved in conversation. She also noted Cara's mood significantly impacted her interest and level of interaction. She did report conversation with Cara could be interesting, but observed Cara infrequently asked partner-focused questions. She also reported Cara was not really able to do her share of the work to maintain a conversation, making it somewhat difficult to interact with her. She noted Cara had some difficulty responding to questions, and even greater difficulty responding to comments and nonverbal cues.
Cara reported no difficulty with basic and complex interpersonal interaction, however her teacher reported she perceived moderate to severe difficulty responding to social cues and maintaining warm, close relationships. Cara reported mild difficulty with higher-level cognitive functions, whereas her teacher reported moderate difficulty across these areas. Both Cara and her teacher observed mild difficulty focusing attention. Cara's teacher reported no difficulty making decisions, but Cara reported moderate difficulty in this area.

**Clinical impressions.** Cara was capable of engaging fairly typically in conversation, but she did not always do so. When she was interested in the topic and in a good mood she could be attentive and responsive, although she did have a tendency to stick with a topic for too long and often provided more detail than was necessary. However, she was often very focused on her own physical, personal, and emotional concerns, sometimes sharing more detail than was appropriate for the setting or the relationship. As noted by her teacher, it could sometimes be unclear which of the sometimes concerning things she shared were true, and which were embellished. The examiner also shared the teacher's impression that Cara liked to interact with others and valued social interaction and social relationships.

**Darcy**

At the time of this study, Darcy was a 19-year-old female. Darcy was the youngest of the four participants and the only one in her first year of the inclusion program. Her primary classification was as a student with an Intellectual Disability, but she also had a secondary classification as a student with Autism. She worked on campus two days a week doing clerical tasks. She enjoyed singing and coloring, and liked to play sports such as basketball and
cheerleading. There were also several reality television shows she followed, and she enjoyed talking about them with others.

**Language assessment.** Darcy had great difficulty with the formal language tasks on the CASL, and was unable to complete even the example items of three of the subtests. Therefore, the Core Language Index score could not be calculated. She was able to complete the Synonyms subtest, receiving a score approximately two standard deviations below the mean, but this should be interpreted with caution as administration procedures were not standardized. She was unable to complete any of the items given auditory-only presentation, but was successful given a written list of the word choices. She was also able to complete the Pragmatic Judgment subtest, again with modifications, scoring four standard deviations below the mean. The examiner related all of the questions to Darcy's own personal experience, by introducing items with "Pretend you…” and modifying content slightly to fit that format.

Teacher report on the CELF-5 Observational Rating Scale revealed intact listening and speaking skills across many areas, however Darcy’s teacher noted she frequently had difficulty answering questions, expressing her thoughts, describing things to people, and expanding on her ideas. Some difficulty paying attention and maintaining eye contact was also noted. Darcy’s teacher observed she could be animated during conversation about social topics of interest, but when pressed to answer academic questions she often put her head down and did not respond. Reading comprehension and inference were also noted to be areas of significant difficulty.

**Pre-intervention questionnaires.** Darcy reported it was fairly easy for her to have a conversation with someone. She noted responding to questions was easy, but comments were a little more challenging. Darcy’s teacher reported Darcy had some general difficulty engaging in
conversation, and even greater difficulty responding to questions and comments. Darcy's teacher described her conversation skills as “emerging”; "when put on the spot in a conversation she can clam up, however if it is a topic she is comfortable with she can be a chatterbox." She also noted Darcy had difficulty conveying original thoughts rather than just repeating what others had said, and difficulty taking others' perspectives. Finally, she noted Darcy could sometimes speak too loudly for the situation.

Both Darcy and her teacher indicated she was interested in social interaction with others, however Darcy’s conversation partner reported Darcy's lack of eye contact and attention during conversation made her feel as though she was uninterested in interacting with her. Her conversation partner also noted Darcy could answer questions but provided much too much information, frequently repeating herself. She reported this excess information often made it difficult to understand Darcy because she frequently introduced unknown details and names without providing the necessary background information. Darcy’s conversation partner reported feeling she carried sole responsibility for keeping the conversation going as Darcy did not ask questions, which she admitted made interacting with Darcy fairly challenging and uninteresting.

Darcy's teacher observed mild difficulty in basic and complex interactions while Darcy herself reported moderate to severe difficulty responding to social cues, forming relationships, and maintaining social space. Darcy's teacher reported mild to moderate difficulty in higher cognitive functions, although she noted little difficulty in planning and organization. Darcy again reported a somewhat different profile with no difficulty in abstract thought, moderate difficulty with planning, organization, and problem-solving, and severe difficulty with cognitive flexibility. Darcy's teacher reported no difficulties in areas associated with applying knowledge,
but Darcy noted moderate difficulty maintaining focus and making decisions. Given Darcy's relatively low cognitive functioning, her reported difficulty completing this questionnaire, and the seemingly random distribution of her answers, her responses should be interpreted with caution.

**Clinical impressions.** At first blush, in a short conversation, Darcy could appear to have relatively intact conversation skills. However, during lengthier interaction about complex topics, Darcy’s conversation skills quickly fell apart. She had great difficulty with responsivity, often talking in extremely long utterances that included an incredible amount of detail yet conveyed very little meaning. In addition, her speech contained many typical dysfluencies (e.g. mazes, false starts) and she often repeated herself, all of which combined to make it challenging for a listener to follow what she was saying. She was not able to summarize the main points of her message to aid her listener’s comprehension, and if a partner tried to steer the conversation or ask clarifying questions, those cues were often brushed aside or answered in cursory fashion before she picked up exactly where she had left off. She would often listen with seeming interest when a partner talked, but did not tend to ask questions about what was said.

**Group Intervention Structure and Design**

Instructional discourse was used to help participants develop understanding of and ability to use appropriate responsive and assertive conversational acts (Fey, 1986). This group intervention addressed responding in three different target contexts: responding to questions; responding to comments; and responding to short response tokens. This was in keeping with Paul and colleagues' (2009) suggestion for interventions to provide participants with strategies for
identifying and responding to important social cues in ways that help them contribute to ongoing conversation. Several components of successful interventions were incorporated and adjusted as needed to fit the unique needs and context of this college-based inclusion program.

Social Validity

Increased involvement of stakeholders in research and intervention design is an area of need in the field of ASD (e.g. McDonald & Machalicek, 2013) and disability research in general (e.g. Williams, Krezman, & McNaughton, 2008). To help ensure the intervention had the potential to engender meaningful change for the participants with ASD, the principal investigator consulted with the program teacher on various aspects of intervention design, including selection of intervention targets. Input was also solicited from NT conversation partners, who began meeting with participants before the group began meeting. The program teacher also provided input to help ensure the group was designed to fit the program's schedule so the intervention would have as little impact as possible on participants' busy days.

Schedule and Duration

It is not yet clear what length or duration of intervention is likely to be the most effective (e.g. McMahon, Lerner, & Britton, 2013). Hillier and colleagues (2007) successfully implemented a similar type of intervention over a duration of only eight weeks. Working within the constraints of the inclusion program, this group met twice weekly for 30 minute sessions over a duration of nine weeks. Seventeen sessions were planned (two introductory, five for each of the three target skills), but one session was cancelled due to a program conflict. Altogether there
were 16 sessions (two introductory, five for questions and comments, four for response tokens). See Appendix C for a detailed intervention schedule and description of planned lessons.

Session Format

**Introductory Sessions**

The first two sessions were introductory in nature and were used mainly to establish group rapport and convey expectations for group comportment. The leader asked participants to brainstorm rules for group interaction (see Appendix D).

Discussions also focused on sharing ideas about conversation and communication, setting the stage for work planned in later sessions. In the second session, a set of rules designed to help participants pinpoint the important component skills of successful conversational responding was introduced. A visual cue card (see Appendix D) and acronym (A-I-R = Attend, Interpret, Respond) were used to help participants remember these rules. The "attend" component reminded participants to look toward their partner and listen to what was said, "interpret" reminded them to try to determine what the speaker really meant so they could "respond" with an on-topic answer that maintained the conversation. The intention had been to incorporate both sets of rules throughout the program, but participants complained vociferously the second time each was introduced, and subsequent use was discontinued.

**Instructional Sessions**

At the beginning of each session the leader allowed members to briefly check in with each other, then started instruction by presenting the session's purpose and planned activities. All
sessions included a brief review of previous learning (Merritt et al., 1998), planned activities where participants discussed conversational interaction (see Appendix C), and opportunities for group socialization. Discussion, modeling, direct explanation, and evaluation of negative and positive examples were the main instructional tools. The leader worked to establish a balance of questioning and commenting, tailoring the difficulty level of questions based on her knowledge of participants' linguistic and cognitive abilities. The leader also used elaboration, expansion, and recasting to help participants identify how ideas raised during discussion fit together (Merritt et al., 1998). Participants were encouraged to share ideas and provide others with feedback.

When a new target (questions, comments, response tokens) was first introduced, the amount of direct explanation was high compared to the subsequent four sessions (three sessions for response tokens). The leader presented multiple examples, explained the purpose of that type of communication (e.g. requesting information, sharing ideas, managing conversational flow), and discussed considerations for responding. The leader then assisted the group in brainstorming and evaluating various possible responses. Six response types, defined based on quality and quantity of information, were applied consistently across target areas to support practice and discussion (see Appendix D). Although each of the response types might be found in typical conversation, three were responses the group discussed trying to use less frequently (off-topic, very short, very long), and three were responses the group discussed trying to use more frequently (expected amount of information, extending the conversation by adding unexpected but on-topic details, and extending the conversation by asking a partner-focused question).

Once the leader had presented the necessary background information, subsequent discussions focused on practicing the different types of responses and evaluating the possible
impact on a partner of using each of the response types. For example, the group discussed how a short response token such as "yeah!" shows attention and interest, while "OK," especially if a partner says, “OK” several times in a row, might show boredom and readiness for a new topic (Fels & Astell, 2011; McCarthy, 2003; Norrick 2008; 2012). Participants then worked together to brainstorm ways to respond in each situation and evaluated the responses. During discussion it was often clear participants had different personal preferences for certain types of responses. The group leader worked to incorporate this idea of individual differences into discussion, which helped participants understand the types of appropriate responses that most fit their own style, and highlighted the idea different partners may require different things during conversation.

Video stimuli and prompts provided by the leader were most frequently the catalyst for instructional discussions. In addition, participants were increasingly noted to come to group with stories they wanted to share. When this occurred, the leader tried to incorporate the planned instructional discussion within the social discussion, however participants were often resistant to this practice. Whole-group social interaction comprised an important component of each session as it allowed participants a chance to practice the principles of responding and maintaining conversation in a group setting while receiving support and feedback from other group members. However, finding and maintaining the appropriate balance between social interaction and instructional interaction was challenging. This tension is discussed in subsequent chapters.

**Materials**

Koegel, Kim, Koegel, and Schwartzman (2013) showed high school students with ASD increased socialization with NT peers given materials and settings that supported interaction
around preferred interests. In the current study, video clips publicly available on the Internet (e.g. YouTube.com, CBS.com, Netflix.com) were selected to target participants’ interests and provide stimuli for engagement in group discussion about the events shown in the video. Trammell (2013) and Breen (2007) described successful use of television dramas and sitcoms to support development of social skills and social cognition, however, the participants in the current study preferred shows about science and technology (e.g. MythBusters, Top Gear). Although examination of dialogue and social interaction in sitcoms or dramas may have benefitted instruction, motivation and engagement certainly would have suffered as participants often rejected these offerings outright. For each session, the leader prepared several clips and allowed participants to vote, thus supporting interest and motivation by ensuring the selected clips were acceptable to all (Merritt et al, 1998; Plavnick et al., 2013; Sze & Wood, 2007).

Visual support is another component of many effective social skills interventions (Reichow & Volkmar, 2010) and is useful in facilitating instructional discourse (Merritt et al., 1998). Cards were created to support recall of the A-I-R rules and each of the six established response types. In addition, comic strips were sometimes used to support specific discussions, especially regarding response tokens as these elements of conversation have low salience; visuals were useful for drawing participants’ attention to the relevant targets (see Appendix D).

Recording

Initially, group sessions were captured using a video recorder, but participants' strong protestations negatively impacted the physical setting of the group; members jockeyed to array themselves out of the line of sight of the video camera, which resulted in the group leader sitting
alone on one side of the seating area with everyone else sitting across from her. After it was
determined accurate transcripts could be constructed from audio recordings, the remainder of the
sessions were audio recorded using an Olympus VN-702PC digital voice recorder.

**Physical Setting**

The group met in an oval-shaped seating area in the campus building where the inclusion
program’s classroom was housed. Meetings took place first thing in the morning as the typically
busy building was fairly quiet at this time.

Seating was fluid during the first few sessions, which was likely due to the presence of
the video camera. Once the video camera was removed, members chose and maintained regular
seats. Alex typically sat immediately to the group leader’s left and next to his NT mentor. Darcy
usually sat directly across from Alex and the group leader, next to helpers who supported her
participation in group discussion. Cara sat on the same side as Darcy farther down the long side
of the oval, and Bryce usually sat across from her, two seats to the right of the leader. Group
helpers arrayed themselves between these relatively stable anchor points.

**Support for Generalization**

To support generalization, participants with ASD met with a NT conversation partner
outside of the group. Similarly, Bauminger (2002, 2007a, 2007b) assigned children with ASD to
meet with a NT peer twice weekly for practice. Additionally, adults with ASD who had
experience participating in support groups reported desiring more opportunities for outside
practice (Jantz, 2011). In the current study, dyads composed of a NT conversation partner and a
participant with ASD met twice weekly for 10-15 minutes in a location of their choice near where the group meetings occurred. Conversation partners were advised to provide wait time and promote a slow pace of conversation, but otherwise no training was provided.

Dyads started meeting a few weeks before the group began and continued through all nine weeks of the intervention. The pre-intervention meetings had no structure; the dyads were free have a brief conversation on a topic of choice. Sometimes NT conversation partners prepared a short video to help jump-start conversation, but Bryce’s partner was the only one who regularly used this strategy. Once the intervention began, the conversation partner began the meeting by briefly showing the participant with ASD a small card that said, "Remember what we've been talking about in group!" on one side, and showed the A-I-R graphic on the other. The principal investigator was only involved in directing these meetings in the event a conversation partner consulted her about an issue.

Post-intervention Data Collection and Preparation

Transcription of Intervention Sessions

Group sessions were transcribed verbatim from audio recordings. Transcripts enabled detailed behavioral coding, a form of measurement recommended based on its high ecological validity (McMahon, Vismara, & Solomon, 2013; Reichow & Volkmar, 2010). The first draft of the transcript was created by undergraduate research assistants. The principal investigator then independently confirmed the accuracy of each transcript using Tempo SlowMo, a freely available app that slows audio material significantly without distorting pitch, making corrections as
needed. Transcripts were carefully constructed to faithfully represent the complicated sequence of turn-taking and interaction that occurs during group conversation. Notations were included to indicate multiple simultaneous speakers, attempts to talk over other speakers, pauses (pauses longer than 2 seconds were timed out to the nearest second), laughter, sound effects, and background noise. Place holders (XXXX) were used to indicate unintelligible words.

Transcripts attempted to capture everything that was said during group sessions, except when the focus of the group was split and there was no whole group conversation. Episodes of "side conversation" were identified and removed when there were two or more separate conversations being conducted over a duration greater than 15 seconds. The section that was removed began with the initiating utterance, often an off-topic question or comment, and ended when an attention-getting statement brought the group back together. If the side conversation(s) petered out naturally without an intervening attention-getting statement, transcription resumed at the point a new whole-group topic was initiated, or when a single remaining conversation continued for at least 15 seconds without other side conversations developing. If only two individuals were involved in the side conversation, that conversation was relatively brief, and the speakers talked quietly while others appeared to remain engaged with the main conversation, no content was removed. If a group member made a brief side comment or unsuccessfully attempted to start a side conversation (i.e. less than 15 seconds in duration; attempt was ignored), no content was removed. In addition, comments during videos and conversations that took place before group started (all members not yet present; multiple conversations co-occurring as everyone settled in) or after it ended (the group leader made a concluding statement; members
started to leave) were removed. Any episodes that were removed were carefully timed to track total amount of time removed.

**Post-intervention Social Validity Measures**

**Study-specific questionnaires.** Understanding more about the social validity of an intervention supplies important information that can help optimize future intervention design (McDonald & Machalicek, 2013). McMahon, Lerner, and Britton (2013) suggested peer report measures might be one way to add a meaningful and ecologically valid piece to this puzzle. Therefore, in addition to the participants with ASD, NT group helpers who regularly attended meetings completed questionnaires that asked them to describe the utility and efficacy of the group, changes in group interaction over time, and recommendations for the future. Given some participants with ASD needed support to complete the pre-intervention questionnaire, the post-intervention questionnaire was orally administered to all participants with ASD using an interview format. This enabled the principal investigator to scaffold language and understanding in a consistent manner, and allowed participants to express their ideas efficiently. Interviews lasted 7-16 minutes, and were recorded and transcribed by the principal investigator.

The program teacher completed a questionnaire regarding her perception of any generalization of group interaction skills to other groups within the classroom setting, and NT conversation partners similarly completed a questionnaire regarding their perceptions of any generalization of responsivity to the dyadic conversational setting. All questionnaires followed the same format, incorporating open-ended questions as well as questions that used a four-point Likert scale. See Appendix B for full versions of the questionnaires.
Coding System

Initial coding definitions were developed on the basis of the researcher’s theoretical propositions and existing literature (Yin, 2009). Although many of the studies that have used a coding system to describe social and conversational interaction have dealt with dyads rather than groups, this literature provided a useful starting point to begin developing a coding scheme that would meaningfully classify full sessions of group conversation (Stake, 1995). These initial definitions were refined in consultation with other researchers to create a clear and usable scheme that captured all of the complexity required to address the stated research objectives (Yin, 2009).

Review of Existing Coding Systems

Elizabeth and colleagues (2012) evaluated the quality of classroom-based instructional discourse using several different established microanalytic and macroanalytic procedures. Microanalytic approaches utilized detailed coding schemes to analyze specific "moves" or conversational turns, whereas macroanalytic approaches looked at "types of talk" to describe overall climate, structure, and quality of discourse. They compared these data with information gathered during interviews with the teachers who had facilitated the discussions. Elizabeth and colleagues found none of the analytic approaches adequately captured the improvements in social behavior, participation, and development of productive interaction that teachers reported had occurred over the course of several months of practice. In response, they proposed a preliminary coding matrix that attempted to capture developmental trends in both the academic and social components of successful instructional discourse. They emphasized the importance of
further developing coding systems that include teacher-student as well as student-student interaction, document the overall role of the teacher, and capture how each utterance contributes to the continued development of conversation.

Bauminger (2002) described a scheme for coding social interaction, which has since been used by several other researchers. Bauminger's scheme included five major categories of verbal and nonverbal social behavior: social initiation, social response, positive social interaction, negative social interaction, and low-level interaction (clear social intent but minimal actual interaction). The studies that implemented this system (Bauminger, 2002, 2007a, 2007b; Lerner & Mikami, 2012; McMahon, Vismara & Solomon, 2013) used it to code behavior during short blocks (10-15 minutes) of free play time. McMahon, Vismara, and Solomon (2013), who added a context code (dyadic vs. small-group vs. time by self), recommended further refinements to capture appropriateness of responses and initiations, record who participants interact with, and establish a clearer differentiation between low level responses and nonexistent responses.

Nadig and colleagues (2010) implemented a more linguistically oriented coding scheme. Based on Tager-Flusberg and Anderson’s (1991) definition of a contingent utterance as one that maintains the topic “without being a simple imitation” (p. 1126), they coded responses and initiations (questions) based on whether they were contingent. Another level of coding described the amount of information provided as appropriate (added to the topic and allowed conversation to continue), overinformative (conveyed too much information disrupting conversational flow), or underinformative (short, inadequate in the given context). They also coded the presence of "atypical utterances," including scripted speech, listing, pedantic utterances, unusual word use or phrasing, and illogical utterances to investigate their impact on the flow of conversation.
**Development of the Current Coding System**

The multi-layered, linguistically based coding scheme needed to describe the full complexity of the current data was developed on the basis of the coding systems and recommendations described above. Codes were assigned on three levels: Utterance codes, Target subcodes, and Context Unit identifiers. Utterance codes described the quality of information and communicative function conveyed, Target subcodes captured who was being addressed, and Context Unit identifiers described the purpose of a cohesive block of conversation (e.g. social vs. instructional). Although NT helpers were the same age as the participants with ASD, their role was to follow the leader in supporting discussion, providing feedback, and modeling responses. Therefore, leader and helper contributions were grouped and coded according to the same set of Utterance codes. Target subcodes were not identified for this group. While much of communication is nonverbal in nature, the current coding system focused on verbal language use and did not incorporate nonverbal information. See Appendix E for full definitions of each code.

**Participant Codes**

Four main Utterance codes were defined for participants: Inadequate Response, Satisfactory Response, Assertiveness, and Meta-Assertion. Utterances whose meaning was unclear and could not be accurately allocated to one of these groups were assigned No Code.

**Inadequate Response.** Inadequate Responses were subdivided to differentiate

**Inadequate Off-Topic Responses**, which were off-topic or ignored an obligatory turn, from

**Inadequate On-Topic Responses**, which were on-topic, but were either underinformative or overinformative. For example, responding "yes" or "no" to questions that requested more
information was considered underinformative. Speakers sometimes use yes-no questions to stand in for indirect wh-questions, in which case a more detailed answer is warranted (Wahlster, Marburger, Jameson, & Busemann, 1983), for example:

   Leader: Did you hear my question, then?
   Alex: Yes.

Also included in this subgroup were brief, rude comments that tended to shut down interaction, such as laughing "haa-haa," at something not intended to be humorous, and abrupt answers used to avoid a turn, for example when a participant responded, “I don’t know,” with no further effort to ask clarifying questions or provide the expected information.

   **Satisfactory Responses.** Satisfactory Responses met the information requirements of preceding utterances, maintaining and extending the conversation. Satisfactory Responses were also subdivided. **Satisfactory Attentive Responses**, included brief responses that showed interest or attention during nonobligatory turns, for example “Mmhmm” or “Yeah!” This subgroup also included repetition used appropriately to confirm or affirm what another person said, as in the following conversation about a video of someone playing a drum very fast:

   Alex: At 30 seconds he was at 1000 notes.
   Bryce: **1000 notes.**

Answering "yes" or "no" in response to a yes-no question when no further information was expected was also considered a Satisfactory Attentive Response, for example:

   Leader: Yeah, so you’re saying you have a fast metabolism?
   Cara: **Yes!**
The other subdivision identified **Satisfactory Informative Responses**, which truly added new information to the conversation in response to others' comments or questions, i.e. the amount of information was appropriate, and the content was elicited by a foregoing turn.

**Target subcode.** For Inadequate and Satisfactory Responses, the person the speaker responded to was coded Leader/Helper or Participant. This was determined by examining the content of preceding and subsequent turns. If the utterance could be seen as a response to more than one person, it was coded as a response to the person who had spoken most recently.

**Assertiveness.** Assertiveness was applied to response seeking and topic initiating utterances that introduced new information and were not elicited by prior utterances (Fey, 1986). Assertiveness included asking a question, telling a personal response story, or sharing a new idea. This code was subdivided to distinguish **Expected** and **Unexpected Assertiveness**.

Expected Assertiveness was responsive to the ongoing conversation, occurred at appropriate times, and helped move the conversation forward. For example, when discussing a video about tearing down a house, the following Expected Assertiveness occurred:

Leader:  ...There's a song that I really like about, um, like, building h-, or remodeling houses, and it's called "I'm downright destr-, I'm downright amazed at what I can destroy with just a hammer." ...It's pretty awesome.

Alex:    **That's a song name??!!**
Leader:  It is a song name.
Bryce:   ......3s.....**Why don't you find it, then?**
Leader:  ...Uh..... I have it at home. I don't have it on my phone, though.
Bryce:   **You can YouTube it.**
Leader:  I could. I could. We could maybe at the end if you guys wanna hear it.
Unexpected Assertiveness was topically unrelated to ongoing conversation, interrupted other speakers, used repetition inappropriately to gain attention, or pressed a topic after the rest of the group had signaled readiness to move on. Unexpected Assertiveness was disruptive to the flow of conversation as in the following example:

Leader: OK. So, we can sort of see that when we...

Bryce: [G'day mate]

Leader: ...make a comment in a conversation, we're still...

Bryce: [G'day mate]

Leader: ...expecting ...our partner to respond in some way.

Alex: [Shrimp on the bah-bie]

Leader: ...But it's... ..a little.. ..stay with me, we're almost there!

Note. Content in [ ] represents overlapping speech

**Target subcode.** For Assertiveness, the Target was identified as Leader/Helper or Participant based on who responded to the utterance. Additionally, Ignore/? was used if an utterance had been ignored, or several individuals had made similar comments during a fast moving discussion and it was unclear anyone responded specifically to the utterance under consideration. Assigning Target subcodes in this way focused on the functional result of the utterance, which was in keeping with the goals of the current study.

**Meta-Assertion.** Meta-Assertions conveyed participants' assessments or attitudes toward conversation, language, behavior, or group activities. Meta-Assertions included statements about participants' ability or willingness to participate, descriptions of the perceived appropriateness or quality of an utterance, attempts to change what another group member was doing or how he or she was interacting, and opinions about group activities. For example, in the following
discussion of an activity that involved using stimulus cards to help participants practice responding to response tokens:

Leader: What have I done?
Alex: What HAVE you done?
Cara: Yeah! What have you done?
Alex: You've given us cards, and like, everybody's like, just, like, saying whatever's on the cards.
Leader: Uh, yes. [I'm-]
Alex: And not being natural.
Leader: I'm aware of what's happening, thank you. {laughing}
Cara: Thanks a lot!

Note. Content in [ ] represents overlapping speech

**Target subcode.** For Meta-Assertions, Target was coded Leader/Helper, Participant, Self, or Activity based on the topic of the Meta-Assertion, e.g. a comment about a participant's own willingness to participate was coded Self, whereas a comment about another participant's interaction was coded Participant. If the target was unclear, the utterance was coded Ignore/?.

**Leader and Helper Codes**

Leader and helper codes were assigned in binary fashion: utterances with an instructional or organizational purpose were coded Teaching; utterances with a purely social purpose were coded No Code. The Teaching code was subdivided into four subcodes: Response Elicitation, Concept Development, Feedback, and Management.

**Response Elicitation.** Response Elicitation was applied to questions or implied questions with an instructional purpose. Response Elicitation encouraged participants to discuss
the elements of conversation, for example soliciting feedback about a particular response the
group had generated. Questions used during social interaction to address issues of conversation
and conversational repair were also coded Response Elicitation.

**Concept Development.** Concept Development included examples, extended
explanations, evaluation of responses, and feedback used to support instruction and learning.

**Feedback.** Feedback highlighted the need for a participant to change his or her behavior,
interaction, or participation. Feedback also included negotiation of an individual's participation
or engagement with an activity.

**Management.** Management was applied to utterances designed to manage or organize
session flow on a whole-group level. Management included provision of general instructions
and task parameters, or statements designed to orient participants to future instructional tasks.
Management also included utterances that organized conversation by creating an opportunity for
a participant to take a turn, or providing discussion prompts for the whole group to consider.

**Context Unit Identifiers**

The third level of coding assigned a Context Unit identifier to cohesive blocks of
collection. Units were at least ten turns long, although shorter units were allowed at transition
points (e.g. beginning/end of a session, adjacent to a video or side conversation). Three types of
Context Unit identifiers were assigned: Teaching, Management, and Social.

**Teaching Context Units.** The main purpose of Teaching Context Units was concept
development. Teaching Context Units began with a Teaching code, instructional question from a
participant, or interaction necessitating conversational repair. In Teaching Context Units, the majority of the leader's utterances were coded Response Elicitation or Concept Development.

**Management identifier.** The main purpose of Management Context Units was to discuss session plans or organize video selections for current or future sessions. Negotiation of directions and explanations about materials were also considered episodes of Management.

**Social identifier.** The primary purpose of Social Context Units was social discussion and sharing ideas about things of mutual interest. Social Context Units contained no established instructional purpose or continuing effort at concept development on the part of the leader. Social Context Units were generally initiated by participants. Social initiations that occurred during Teaching Context Units were established as new Social Context Units if the leader did not redirect to the teaching task within three turns. Social Context Units contained very few leader utterances coded Response Elicitation or Concept Development. Levels of Feedback and Management varied depending on the level of leader direction.

**Data Analysis Procedures**

The analytic approach utilized in this study focused mainly on attributing meaning through explanation building and time-series chronicling (Yin, 2009). "The search for meaning often is a search for patterns, for consistency, for consistency within certain conditions" (Stake, 1995, p. 78). These techniques were well suited to illuminating important patterns in these data.

Explanation building is a type of pattern matching approach where the goal is to “analyze the case study by building an explanation about the case” (Yin, 2009, p. 141), thus formulating ideas and hypotheses for future investigation. Yin (2009) described this as an iterative process
whereby researchers look for causal links to explain how or why something happened. The researcher bases these iterative actions on the theoretical propositions posited during the design process, and the evidence collected about the case. Throughout explanation building the researcher considers rival explanations, investigating and revising until ultimately the researcher can thoroughly justify which ideas that are most strongly supported by the data (Yin, 2009).

Time-series analysis allows examination of change and development over time (Yin, 2009). Chronicles use simultaneous display of multiple variables to support rich description of time-series data. This tool was used to support explanation building and hypothesis generation.

**Selection of Subunits for Coding and Analysis**

The embedded, single-case design used in the current study required selection of the specific sessions, or subunits, that would be analyzed. Nine out of the 16 sessions were selected; this enabled in-depth examination of session characteristics and provided a sufficient but not excessive amount of information for meaningful analysis (Stake, 2006). This subset of nine sessions represented approximately half of the available sessions, and allowed for inclusion of three sessions in each of the three target areas (questions, comments, response tokens).

Yin (2009) suggested subunits could be selected through sampling procedures or cluster techniques. Two sessions where participants had been absent, as well as the two introductory sessions were excluded. Random sampling was then used to select nine sessions from among those that remained, with the stipulations there would be three sessions from each target area, at least one session from each week, and a balance of Tuesday and Thursday sessions. The sessions that were selected for coding are indicated in Table 3.
Table 3
**Sessions Sampled for Analysis**

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Adj. Length</th>
<th>Absent</th>
<th>Session # (Target) [# of #]</th>
<th>Day</th>
<th>Adj. Length</th>
<th>Absent</th>
<th>Session # (Target) [# of #]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tues</td>
<td>25:56&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Bryce</td>
<td>Thurs</td>
<td>20:13&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tues</td>
<td>21:12&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Darcy</td>
<td>Thurs</td>
<td>19:03</td>
<td>1 (Q) [2 of 5]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tues</td>
<td>29:29&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>Thurs</td>
<td>25:34</td>
<td>2 (Q) [3 of 5]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tues</td>
<td>29:08</td>
<td>3 (Q) [5 of 5]</td>
<td>Thurs</td>
<td>29:33</td>
<td>4 (C) [1 of 5]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tues</td>
<td>27:20</td>
<td>5 (C) [2 of 5]</td>
<td>Thurs</td>
<td>21:22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Tues</td>
<td>25:50</td>
<td>6 (C) [4 of 5]</td>
<td>Thurs</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Tues</td>
<td>26:34</td>
<td></td>
<td>Thurs</td>
<td>22:58</td>
<td>7 (T) [1 of 4]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Tues</td>
<td>18:18</td>
<td></td>
<td>Thurs</td>
<td>23:51</td>
<td>8 (T) [3 of 4]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Tues</td>
<td>23:06</td>
<td>9 (T) [4 of 4]</td>
<td>Thurs</td>
<td>NS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Adj. Length = adjusted length, or total time spent in whole-group conversation adjusted for side conversation and videos; Session # = assigned session number for coded sessions; Target = type of responding targeted during the session; # of # = session number out of the total number of sessions conducted within the target area; Target = type of responding targeted during the session; # of # = session number out of the total number of sessions conducted within the target area; Q = questions; C = comments; T = response tokens.

<sup>a</sup> Removed before random sampling.

<sup>b</sup> Cara had to leave early and missed the last 6:17.

<sup>c</sup> Alex stepped out for 2 minutes during the session.

**Unit of Analysis and Data Summarization**

The pacing of conversation and number of actively engaged speakers varied by topic, mood, and interest level. Sometimes, a complete thought was expressed in a single turn; at other times it took multiple turns. Therefore, the coding rules stipulated all speaking turns required to
complete a thought receive the same code. This practice had ramifications for data analysis, since simply counting the frequency of each code would paint a misleading picture.

Some researchers have used time-based measures with similar types of data (e.g. King & Saxton, 2010; McMahon, Vismara, & Solomon, 2013), however, data collection and coding procedures did not support time-based calculations. Furthermore, the prevalence of simultaneous utterances rendered this type of analysis problematic. Zemel, Xhafa, and Cakir (2007) analyzed episodes of online chat-based problem solving, and similarly observed participants used multiple posts in "long turns" to comprise a single cohesive message. They presented their data as relative frequency of activity per code, calculating percentage of total posts that received a given code. Given the variability in turn density and turn length, calculating the percentage of each code on the basis of number of words spoken was judged the best way to provide the clearest platform for comparison across sessions.

The number of words spoken per code was summed and used to calculate percentage of total words in each Utterance type by session, Context Unit, and participant. Further fine-grained calculations documented word totals within theoretically significant combinations of Utterance and Target codes, including the relative frequency of each Meta-Assertion Target, and the breakdown of Utterance types within participant-to-participant interaction. Other metrics of interest were also calculated, including relative amounts of participant contribution, average words per minute, overall group length, and allocation of words within each Context Unit type.
CHAPTER 3

Results

Analysis was conducted in two stages. The first involved descriptive use of time-series chronicles to illuminate patterns in various aspects of group interaction across all of the sampled sessions. The second used detailed analysis of Teaching and Social Context Units to identify within-session patterns that contributed to successful group interaction.

Session Characteristics

The nine sessions that were analyzed ranged in adjusted length from 19:03 to 29:33 (see Table 4). Video materials were used to stimulate conversation in all but one session. Most side conversations lasted approximately 30 seconds before the leader redirected the group; the maximum total time removed for side conversation was 1:23. Cara was absent the last 6:17 of session 2, and Alex left for 2 minutes during session 4. The other characteristics of these sessions appear to be fairly typical, and these absences do not seem to have had significant impact.
The total number of words per session and overall words per minute were variable but relatively stable across sessions. The time-series trends for total words per session and words per minute were plotted together to facilitate comparison of the shapes of the trend lines (Figure 1). Readers should be alert to the significant scale differences between these two measures and use caution in interpretation. These trends followed a similar path with the exception of session 1, where the rate of speech was high relative to the number of words spoken. The triangles marking sessions 1, 4, and 7 indicate these were the first sessions selected from each of the three target areas. Looking at the data from this perspective, it can be seen words per minute and total

<table>
<thead>
<tr>
<th>Session (target)</th>
<th>Adjusted Length</th>
<th>V Length</th>
<th>V (#)</th>
<th>SC Length</th>
<th>SC (#)</th>
<th>Total words</th>
<th>WPM</th>
<th>P:L/H</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Q)</td>
<td>19:03</td>
<td>4:37</td>
<td>2</td>
<td>—</td>
<td>0</td>
<td>3848</td>
<td>202.0</td>
<td>0.54</td>
</tr>
<tr>
<td>2 (Q)</td>
<td>29:29</td>
<td>—</td>
<td>0</td>
<td>0:46</td>
<td>2</td>
<td>5026</td>
<td>170.5</td>
<td>0.59</td>
</tr>
<tr>
<td>3 (Q)</td>
<td>29:08</td>
<td>4:47</td>
<td>2</td>
<td>0:28</td>
<td>1</td>
<td>4422</td>
<td>151.8</td>
<td>0.40</td>
</tr>
<tr>
<td>4 (C)</td>
<td>29:33</td>
<td>3:48</td>
<td>2</td>
<td>0:46</td>
<td>1</td>
<td>5410</td>
<td>183.1</td>
<td>0.70</td>
</tr>
<tr>
<td>5 (C)</td>
<td>27:20</td>
<td>3:05</td>
<td>1</td>
<td>1:00</td>
<td>1</td>
<td>5036</td>
<td>184.2</td>
<td>0.90</td>
</tr>
<tr>
<td>6 (C)</td>
<td>25:50</td>
<td>6:01</td>
<td>2</td>
<td>0:25</td>
<td>1</td>
<td>4373</td>
<td>169.3</td>
<td>0.60</td>
</tr>
<tr>
<td>7 (T)</td>
<td>22:58</td>
<td>2:57</td>
<td>1</td>
<td>1:23</td>
<td>3</td>
<td>4513</td>
<td>196.5</td>
<td>1.07</td>
</tr>
<tr>
<td>8 (T)</td>
<td>23:51</td>
<td>5:12</td>
<td>2</td>
<td>1:01</td>
<td>2</td>
<td>4627</td>
<td>194.0</td>
<td>1.10</td>
</tr>
<tr>
<td>9 (T)</td>
<td>23:06</td>
<td>6:40</td>
<td>2</td>
<td>—</td>
<td>0</td>
<td>4160</td>
<td>180.1</td>
<td>0.80</td>
</tr>
</tbody>
</table>

Notes. Q = questions; C = comments; T = response tokens; V = video; SC = side conversation; WPM = words per minute; P:L/H = ratio of participant to leader/helper words. If P:L/H < 1, participants spoke fewer words, if P:L/H ≈ 1, number of words spoken by each group was comparable. Times shown are minutes:seconds.

a Adjusted length reflects time in whole-group conversation, calculated by subtracting video/side conversation and pre-/post-session chatting time (not shown) from recording time.
b Calculated based on adjusted session time.
number of words showed a decreasing within-target-area trend, despite lack of a clear overall trend in either direction.

![Figure 1](attachment:image.png)

*Figure 1.* Total words per session plotted with words per minute per session. Triangle markers on sessions 1, 4, and 7 indicate these were the first sessions sampled from each target area. Recall when interpreting this and subsequent graphs, sampled sessions were not distributed identically within target area groups (see Table 3). For example, although session 1 was the first session sampled, it was actually the second of five sessions that targeted responding to questions. Sessions 4 and 7 were the first sessions conducted within their respective target areas.

**Clinical Observation of Participant Engagement During Group Sessions**

*Alex*

Alex's mood significantly impacted his willingness to engage in conversation. He was frequently tired and taciturn on Tuesdays, as he worked late Monday nights. In many ways Alex was a leader, and his mood and interaction style set the atmosphere for the entire group. Other participants often echoed his Meta-Assertions, particularly about Activity and Leader/Helper,
which he did not always appreciate. If he felt they took it too far, he let them know he thought they should stop. He and Bryce were good friends outside of the group, but in the group setting Alex was usually most interested in interacting with his mentor or the group leader. His mentor typically came about 5-10 minutes after group had started, and Alex was often distracted until she arrived. He frequently tried to engage her in conversation when he became bored or annoyed with the group discussion. He sometimes had little patience for his peers with ASD, especially when they got off-topic or took the conversation in a direction he did not like. Initially he displayed many anxious behaviors in the group and seemed worried his participation was not up to par, but after a few sessions he seemed much more relaxed.

**Bryce**

While Bryce often needed significant wait time to respond in dyadic conversation, this was less obvious during group interaction. It may be the case the group setting allowed him extended time to think while others were talking. Because he and Alex spent time together outside of group, Alex sometimes supported Bryce in moving a story forward. As did everyone else, he had bad days and good days, but he was generally a willing participant in discussion and took the task of thinking about conversation seriously. However, he also had a tendency to persist in interjecting random ideas at inappropriate times, and sometimes had difficulty responding to implicit and explicit cues that it was time to move on from a particular topic.
Cara

Cara was usually willing to work seriously on understanding conversational interaction, and could often be counted on to contribute well-developed, insightful ideas. She tended to feed off others’ moods, for example if Alex said he was in a bad mood, she would suddenly announce she was also in a bad mood. She often repeated these types of off-topic statements to bid for attention, and would grow increasingly loud in talking over others to get that attention and have her ideas heard. If she was unable to engage the whole group in this way, she often turned to a helper and tried to engage her individually. If she had an idea she wanted to express or a story she wanted to tell, she would persist beyond peer and leader feedback that she needed to move on until she was satisfied she had had her say. Sometimes this meant she would finish a thought several minutes after the leader had moved the conversation forward. She could also become recalcitrant if she felt slighted, but usually could be coaxed back to a more positive attitude with a small amount of encouragement.

Darcy

As Darcy’s teacher observed, while she could be a “chatterbox” about topics of interest, she could have a very difficult time performing on demand in structured conversation. Darcy’s participation in the group was extremely minimal. She attended to the videos and sometimes laughed and engaged minimally during social conversation, but other participation was almost always prompted by the leader. She was not able to take turns quickly, often needing greater than 10 seconds of wait time, which is a very long time in a group situation. The leader utilized various techniques to scaffold her participation, including presenting questions with answer
choices, and having her work quietly with a helper before being asked to tell the group her response. Even given these supports, her responses were generally very short and she often required questions to be presented several times and in multiple ways before she could respond. This level of functioning was very different from the others in the group, and it could become problematic as they sometimes made rude comments while waiting for her to take a turn.

**Patterns of Change in Amount and Quality of Interaction**

**Distribution of Utterance Codes Across Sessions**

The distribution of utterance codes across sessions was plotted to illuminate changes in the types of interaction that occurred. The relative distribution of all types of Utterance codes (henceforth referred to simply as “codes”) is depicted visually in Figure 2. See values in Table 5.

*Figure 2. Distribution of codes by session (Inadequate and Satisfactory Response subcodes collapsed). Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.*

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Time-series and percent distribution of participant codes are depicted in Figures 3 and 5, respectively. Leader and helper codes are depicted in Figures 4 and 6. As is apparent from Table 5, the percentage of participant No Codes was extremely small. To support readability, the participant proportion of No Code words was not presented. Unless otherwise noted, No Code refers only to the non-teaching and social contributions from the leader and group helpers.

<table>
<thead>
<tr>
<th># (type)</th>
<th>I-Off</th>
<th>I-On</th>
<th>S-A</th>
<th>S-I</th>
<th>E-A</th>
<th>U-A</th>
<th>M-A</th>
<th>RE</th>
<th>CD</th>
<th>F</th>
<th>M</th>
<th>NC-P</th>
<th>NC-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Q)</td>
<td>0.4</td>
<td>0.9</td>
<td>1.8</td>
<td>8.7</td>
<td>7.7</td>
<td>7.6</td>
<td>7.3</td>
<td>12.6</td>
<td>15.0</td>
<td>3.3</td>
<td>20.5</td>
<td>0.7</td>
<td>13.7</td>
</tr>
<tr>
<td>2 (Q)</td>
<td>0.1</td>
<td>5.5</td>
<td>1.9</td>
<td>12.7</td>
<td>5.3</td>
<td>5.4</td>
<td>5.9</td>
<td>11.0</td>
<td>16.2</td>
<td>6.1</td>
<td>12.5</td>
<td>0.4</td>
<td>17.0</td>
</tr>
<tr>
<td>3 (Q)</td>
<td>0.1</td>
<td>1.2</td>
<td>1.9</td>
<td>8.0</td>
<td>8.2</td>
<td>4.6</td>
<td>3.3</td>
<td>2.7</td>
<td>10.2</td>
<td>4.3</td>
<td>34.1</td>
<td>0.2</td>
<td>21.0</td>
</tr>
<tr>
<td>4 (C)</td>
<td>0.9</td>
<td>1.5</td>
<td>1.7</td>
<td>13.0</td>
<td>8.5</td>
<td>8.9</td>
<td>5.3</td>
<td>9.6</td>
<td>20.7</td>
<td>5.5</td>
<td>12.3</td>
<td>0.7</td>
<td>11.3</td>
</tr>
<tr>
<td>5 (C)</td>
<td>0.7</td>
<td>1.1</td>
<td>1.2</td>
<td>10.2</td>
<td>15.8</td>
<td>11.6</td>
<td>5.5</td>
<td>4.1</td>
<td>9.9</td>
<td>5.1</td>
<td>13.1</td>
<td>0.5</td>
<td>21.1</td>
</tr>
<tr>
<td>6 (C)</td>
<td>0.1</td>
<td>2.9</td>
<td>2.0</td>
<td>8.9</td>
<td>13.0</td>
<td>6.6</td>
<td>3.1</td>
<td>3.7</td>
<td>7.6</td>
<td>3.6</td>
<td>14.1</td>
<td>0.2</td>
<td>34.1</td>
</tr>
<tr>
<td>7 (T)</td>
<td>1.0</td>
<td>3.1</td>
<td>1.8</td>
<td>10.0</td>
<td>12.3</td>
<td>17.3</td>
<td>6.0</td>
<td>4.9</td>
<td>10.2</td>
<td>3.1</td>
<td>12.5</td>
<td>0.3</td>
<td>17.5</td>
</tr>
<tr>
<td>8 (T)</td>
<td>0.2</td>
<td>1.7</td>
<td>3.0</td>
<td>14.2</td>
<td>14.9</td>
<td>12.7</td>
<td>5.2</td>
<td>2.6</td>
<td>3.7</td>
<td>2.1</td>
<td>13.4</td>
<td>0.5</td>
<td>25.8</td>
</tr>
<tr>
<td>9 (T)</td>
<td>1.3</td>
<td>1.9</td>
<td>3.5</td>
<td>13.3</td>
<td>11.2</td>
<td>8.2</td>
<td>4.8</td>
<td>3.8</td>
<td>5.6</td>
<td>3.9</td>
<td>19.0</td>
<td>0.8</td>
<td>22.7</td>
</tr>
</tbody>
</table>

*Note.* # = session number; Q = questions, C = comments; T = response tokens; I-Off = Inadequate Off-topic Response; I-On = Inadequate On-topic Response; S-A = Satisfactory Attentive Response; S-I = Satisfactory Informative Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code; P = Participant; L = Leader
Figure 3. Time-series of participant codes by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.

Figure 4. Time-series of leader/helper codes by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.

I-Off = Inadequate Off-topic Response; I-On = Inadequate On-topic Response; S-A = Satisfactory Attentive Response; S-I = Satisfactory Informative Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 5. Percent distribution of participant codes by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.

**Legend:**
- I-Off = Inadequate Off-topic Response
- I-On = Inadequate On-topic Response
- S-A = Satisfactory Attentive Response
- S-I = Satisfactory Informative Response
- E-A = Expected Assertiveness
- U-A = Unexpected Assertiveness
- M-A = Meta-Assertion
- RE = Response Elicitation
- CD = Concept Development
- F = Feedback
- M = Management
- NC = No Code

Figure 6. Percent distribution of leader/helper codes by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.
Both Expected and Unexpected Assertiveness showed an overall rising trend (Figure 3, Figure 5). There was a slight overall increase in both types of Satisfactory responses. It is not clear there were any overall changes in the amount of Inadequate responses or Meta-Assertions, although Meta-Assertions showed a slight within-target-area falling trend.

The group leader and helpers showed an increase in social and non-teaching interaction (No Codes) (Figure 4, Figure 6). This was accompanied by a decrease in utterances designed to facilitate instruction, specifically Response Elicitation and Concept Development. Feedback utterances also decreased. Management and No Codes increased within-target-areas, while Concept Development and Response Elicitation decreased within-target-areas.

Participant contribution increased relative to the group leader and helpers (Figure 7). Initially, participants contributed less, but over time these two groups began to participate more equally. However, amount of participant contribution did show a within-target-area decrease.

![Figure 7](https://example.com/figure7.png)

**Figure 7.** Percentage of words spoken by participants compared to leader/helpers by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.
Amount of Participation by Person

While analysis focused mainly on the group dynamic, each member's participation was plotted to present a clearer picture of the individual components that contributed to the group trends (Figure 8). The biggest change was an overall reduction, accompanied by within-target-area increase, in the amount of contribution from the group leader. With the exception of Darcy, all other participants as well as the group helpers showed increased participation. No within-target-area trends were evident for these group members.

![Figure 8. Time-series of member participation by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.](image)

Changes in Participant Interaction

Participant-to-Participant Interaction

Over half of participants' interaction was with the group leader or helpers. This metric showed increases across the first two target-areas, but relative stability overall (Figure 9). While
there was a slight overall rising trend in the amount of participant-to-Participant interaction, overall rates remained fairly low.

The quality of participant-to-Participant interaction was described by plotting the percentage of Satisfactory Responses and Expected Assertiveness assigned a Participant Target subcode. There was a substantial increase in these desirable types of participant-to-Participant exchanges despite significant variability (Figure 10).

Figure 9. Percentage of participant words directed to Participant and Leader/Helper by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.

The quality of participant-to-Participant interaction was described by plotting the percentage of Satisfactory Responses and Expected Assertiveness assigned a Participant Target subcode. There was a substantial increase in these desirable types of participant-to-Participant exchanges despite significant variability (Figure 10).
Changes in Appropriate Responsivity and Assertiveness

To better understand changes in participants’ development of appropriate responsivity and assertiveness, these codes were plotted as a proportion of total participant words rather than total session words. Inadequate Responses were plotted with Satisfactory Responses (Figure 11). The proportion of Satisfactory Informative Responses was highly variable and did not show any overall trend. Satisfactory Attentive Responses were fairly stable, showing an increasing within-target-area trend. There was no apparent overall change in either type of Inadequate Response. However, incidents where an obligatory turn went unanswered would not be recognized in this word-based analysis. To support deeper understanding, further analysis used incident counts of Inadequate Off-topic Responses to calculate an average number of words per turn. For the four sessions marked with a blue square (Figure 11) there was an average of less than two words per

Figure 10. Percentage of participant-to-Participant exchanges coded Satisfactory Responses or Expected Assertiveness by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.

Changes in Appropriate Responsivity and Assertiveness

To better understand changes in participants’ development of appropriate responsivity and assertiveness, these codes were plotted as a proportion of total participant words rather than total session words. Inadequate Responses were plotted with Satisfactory Responses (Figure 11). The proportion of Satisfactory Informative Responses was highly variable and did not show any overall trend. Satisfactory Attentive Responses were fairly stable, showing an increasing within-target-area trend. There was no apparent overall change in either type of Inadequate Response. However, incidents where an obligatory turn went unanswered would not be recognized in this word-based analysis. To support deeper understanding, further analysis used incident counts of Inadequate Off-topic Responses to calculate an average number of words per turn. For the four sessions marked with a blue square (Figure 11) there was an average of less than two words per
Inadequate Off-Topic Response, suggesting ignore responses were relatively more common earlier on in this intervention than the time-series alone indicates.

![Graph](image)

**Figure 11.** Time-series of Satisfactory and Inadequate responses within participant utterances by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.

I-Off = Inadequate Off-topic Response; I-On = Inadequate On-topic Response; S-A = Satisfactory Attentive Response; S-I = Satisfactory Informative Response

Overall, the proportion of both Expected and Unexpected Assertiveness within participant interaction increased over time, despite significant variability (Figure 12). There is no clear difference in the slope of either trend, and no evidence of within-target-area trends for either code.
Changes in Meta-Assertions

Meta-Assertions, which described participants' opinions about activities, other group members, and their own willingness to participate were plotted by Target. There was significant variability in these data, and the time-series plot does not suggest any meaningful trends (Figure 13).

Figure 12. Time-series of Expected and Unexpected Assertiveness within participant utterances by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.

E-A = Expected Assertiveness; U-A = Unexpected Assertiveness
Context Units

Distribution of Content to Context Units

Within each session Teaching, Social, and Management Context Units were identified. The order of Context Units and allocation of words by Context Unit type showed significant variability. The number of each type of Context Unit per session is displayed in Table 6.

Table 6

Number of Context Units by Type per Session

<table>
<thead>
<tr>
<th>Session</th>
<th>1 (Q)</th>
<th>2 (Q)</th>
<th>3 (Q)</th>
<th>4 (C)</th>
<th>5 (C)</th>
<th>6 (C)</th>
<th>7 (T)</th>
<th>8 (T)</th>
<th>9 (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td># Teaching</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td># Social</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td># Management</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. Q = questions, C = comments; T = response tokens

Figure 13. Time-series of Meta-Assertion Targets by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.
The average number of words per Teaching and Social Context Unit varied across sessions, whereas the average number of words per Management Context Unit was fairly stable, showing a slight rising trend (Figure 14). There was a tendency for Social and Teaching Context Units to show increasing average words counts within-target-areas.

![Figure 14. Average words per Context Unit type by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.](image)

The percentage of words occurring in Teaching Context Units decreased, while the words in Social and Management Context Units increased (Figure 15). The majority of the shift occurred between Social and Teaching Context Units, with Social Context Units ultimately predominating. There was a within-target-area trade-off between the proportion of each session allocated to Social and Teaching Context Units, such that initial sessions showed more interaction in Teaching, and latter sessions were more devoted to Social conversation. In comparing Figures 14 and 15, it is apparent sessions with a large number of words per Teaching
Context Unit (i.e. long Teaching Context Units) tended to have a relatively lower overall proportion of words allocated to Teaching Context Units (i.e. less time spent in Teaching Context Units). This trend was not seen for Social Context Units.

![Figure 15. Percent of total words allocated to Context Unit type by session. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.](image)

**Participant Interaction Within Context Units**

Plotting the ratio of participant to leader/helper words as a factor of Context Unit type showed increased contributions from participants relative to the leader and helpers within Social Context Units (Figure 16). There was no clear indication of overall changes in participant contribution within Management and Teaching Context Units, although all three types showed within-target-area trends of decreasing participant contribution.
There was clear indication of increasing participant-to-Participant interaction within Social Context Units (Figure 17). Overall, participant-to-Participant interaction within Teaching Context Units was relatively low, and even seemed to decrease over time. There was no clear trend within Management Context Units, and no apparent within-target-area trends for any Context Unit type.

*Figure 16.* Ratio of participant to leader/helper words by Context Unit type by session. Numbers less than one indicate participant contribution is less than leader/helper contribution. Triangle markers (sessions 1, 4, 7) indicate the first sessions sampled from each target area.
Session Analysis

A further analysis was conducted at the session level to identify factors that facilitated appropriate responsivity and assertiveness, contributed to successful and effective instruction, and precipitated high levels of Meta-Assertion. This analysis was supported by the session diagrams in Figures 18-27. These diagrams display detailed information about each session’s structure, including order of Context Units, relative “size” of each unit (by percent of total words), distribution of participant and leader/helper codes (Inadequate Response and Satisfactory Response subcodes collapsed), relative amount of participation between the two groups, and amount of participant-to-Participant interaction. This analysis focused on Social and Teaching Context Units only, as these were most clearly related to the phenomena of interest. In order to
concentrate on the most salient aspects of each session, only Context Units comprising 5% or more of the total words spoken were included on the diagrams. Organization of session diagrams is explained in Figure 18.

Figure 18. Glossary for session diagrams.

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 19. Session 1 diagram. Session target = Questions

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 20. Session 2 diagram. Session target = Questions

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 21. Session 3 diagram. Session target = Questions

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 22. Session 4 diagram. Session target = Comments

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 23. Session 5 diagram. Session target = Comments

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
**Figure 24.** Session 6 diagram. Session target = Comments

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 25. Session 7 diagram. Session target = Response tokens

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 26. Session 8 diagram. Session target = Response tokens

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
Figure 27. Session 9 diagram. Session target = Response tokens

I = Inadequate Response; S = Satisfactory Response; E-A = Expected Assertiveness; U-A = Unexpected Assertiveness; M-A = Meta-Assertion; RE = Response Elicitation; CD = Concept Development; F = Feedback; M = Management; NC = No Code
What Factors Facilitated Responsivity and Appropriate Assertiveness?

In both Teaching and Social Context Units, high proportions of Satisfactory Responses and Expected Assertiveness were often accompanied by a high level of leader involvement. In the case of Teaching Context Units, a high proportion of Response Elicitation and Concept Development often co-occurred with high levels of Satisfactory Responses and Expected Assertiveness (e.g. session 1, #1; session 7, #3; session 9, #2). However, participant contributions were often relatively low compared to leader/helper contributions, especially in the session 7 example. Furthermore, a high level of Response Elicitation and Concept Development did not always guarantee Satisfactory Responses and Expected Assertiveness. An example of this was seen in session 8 (#2); the leader attempted to present examples of response tokens, but members either disliked or were distracted by the materials, thus Meta-Assertion about Activity and Unexpected Assertiveness were fairly high.

The Social Context Units with high levels of appropriate responding, even those with a large proportion of participant-to-Participant interaction, frequently also showed high levels of Management, indicating the leader's involvement in directing the flow of the discussion (e.g. session 3, #1; session 9, #4), or high levels of leader and helper social contributions (>50% No Code) (e.g. session 8, #3; session 6; #1 & 2). However, there were also several examples of conversations with a high proportion of Satisfactory Responses and Expected Assertiveness with only moderate levels of leader/helper involvement (e.g. session 7, #1; session 8, #1, 6; session 9, #5). In these cases, participants were actively engaged in debating about a video (e.g. session 8, #6; session 9, #5) or sharing personal stories with the group (e.g. session 7, #1; session 8, #1).
Sometimes high levels of participant engagement became problematic, leading to Unexpected Assertiveness. This commonly occurred in Social Context Units when group members disagreed strongly during debate, or competed for the opportunity to tell stories (e.g. session 5, #5 & 7; session 7, #2, 4, & 5; session 9, #3). Leader involvement in these Context Units was generally moderate to low, and often included Feedback and Management used to help regulate turn-taking and conversational flow. For example, in session 5 (#7) Bryce told a story about breathing fire using cornstarch, which proved divisive:

Leader:  
Alex:  
Helper 1:  
Leader:  
Alex:  
Helper 2:  
Cara:  
Helper 1:  
Cara:  
Helper 2:  
Alex:  
Helper 3:  
Cara:  
Bryce:  
Alex:  
Cara:  
Bryce:  

Note. Content in [ ] represents overlapping speech. XXXX = unintelligible word.
Unexpected Assertiveness was also prevalent when a participant persisted in telling a story despite cues it was time to move on (e.g. session 7, #2), or when the speaker did something unexpected. For example, in session 4 (#1) Bryce suddenly announced, “Hey I can, I actually know ....some Japanese.” In these cases, the leader used Feedback and Management to assist with conversational repair and redirect the group.

High levels of Unexpected Assertiveness during Teaching Context Units frequently indicated attempts to avoid instructional activities (e.g. session 4, #3 & 4; Session 8, #2). For example, in session 4 (#3) after the leader scaffolded Bryce through conversational repair, she tried to discuss possible on-topic responses to Bryce’s initiation about speaking Japanese:

Leader: I could have said, “Oh, that’s really cool. I know Japanese too.”

Alex: **Speak it.**

Leader: And that would've been responding to keep the conversation going?

Cara: **Say it!** {talks over}

Bryce: **Like, also, I, I kind of have an Australian accent.**

Leader: Yeah? But we’re talking about Japanese right now so stay with me, [OK]?

High levels of Inadequate Responding tended to be incident-specific phenomena. For example, in session 7 (#4) Cara was highly engaged in telling a long story, and persisted despite Meta-Assertions from Alex. Bryce sometimes misunderstood questions from a partner and provided off-topic answers, necessitating leader support for conversational repair (e.g. session 5, #2). Darcy also occasionally engaged in telling long, detailed stories and had difficulty responding to comments and Meta-Assertions from the group (e.g. session 2, #3; session 6, #6).
What Factors Contributed to Successful and Effective Teaching Context Units?

When participants willingly engaged in high levels of Satisfactory and Expected Assertiveness during Teaching Context Units, the leader was able to proceed with Concept Development and Response Elicitation as planned, and instructional activities were productive. However, as mentioned above, this high level of leader direction often resulted in relatively low participant contribution. Session 5 (#6) provided one of the few examples of a Teaching Context Unit where participant and leader/helper contributions were relatively balanced, and participants successfully discussed conversational responding. In this example, the group had watched a video about riding a bicycle across a trough of Ooblek. The leader responded to a comment Darcy made, and the group became actively involved in debating whether it had been off-topic:

Leader: You thought it was funny? What part did you like?

Darcy: Um, when they keep, keep getting stuck, in the thing.

Leader: Mhm. ….So, that makes me think of one time that I was, um, walking, like I was running in the woods and I got stuck in the mud so bad that my shoes came off.

Alex: ............I slipped in the mud once.

Leader: Yeah?

Cara: Why are we talking about mud? It's not Ooblek!

Leader: OK. So you feel like my response was off topic?

Alex: [Whatever.]

Cara: Yes.

Leader: OK.

Cara: Yes, it was off topic.

Bryce: Pretty much mud is the same consistency.

Alex: Yeah, it is actually!
High levels of Unexpected Assertiveness, Meta-Assertions, and Inadequate On-topic Responses used to avoid participation (e.g. “Not now,” “I don’t know,” “I can’t”) occurred during Teaching Context Units that were less successful in engaging participants in planned instruction. Although participant and leader/helper interaction often appeared more balanced, these less desirable types of participant contributions distracted from instruction and frequently necessitated the leader's use of Management and Feedback over Response Elicitation and Concept Development (e.g. session 1, #4; session 2, # 4; session 4, #4 & 6). The following example (session 4, #4) illustrates how significant off-topic Unexpected Assertiveness disrupted a discussion about the quality of an Inadequate Response the leader had demonstrated:

Leader: OK. So I didn’t show any interest.
Bryce: Nope.
Leader: [OK.]
Alex: Hey, I do that all the time. Oop-!
Bryce: .........................That was funny!
Leader: So here’s-
Alex: Why do you, why do you think I li-, like your response?
Leader: You can, you can sometimes pull it off because you ARE funny-
Bryce: Boy, that was funny!
Leader: …but it’s something to think about. …..Just saying.
Cara: Yeah, I lose interest sometimes, too.
Leader: ………And that’s-
Comparison across sessions did not suggest any benefit to placing instruction toward the beginning or end, as there were examples of productive Teaching Context Units at all points of sessions. However, there was evidence participants had a threshold for teaching activities, after which they became increasingly resistant to continued instruction. For example, in sessions 1 and 2, while the initial Teaching Context Units were fairly productive, the subsequent units showed increasing levels of Meta-Assertion about willingness to participate, and leader Feedback as she worked to negotiate participation. Session 4 provided an opportunity to examine the progression of instruction over the course of a single session, as there was a very high percentage of words allocated to Teaching across several Context Units. The initial effort (#2) was relatively successful, but subsequent Teaching Context Units showed increasingly high levels of Unexpected Assertiveness and decreasing Concept Development (#3 & 4). The two final Teaching Context Units (#5 & 6) were more productive and also relatively balanced, possibly in response to the leader shifting to a new activity involving watching videos and practicing newly introduced skills during the subsequent discussion.

Cara: Actually, almost all the time.
Leader: ….that’s part of why conversations are [so tricky, because]-
Alex: I actually slipped that time, I wasn’t joking. {talks over}
Bryce: That was funny.
Leader: …because…
Bryce: That was pretty funny.
Leader: …it sorta depends on the person you’re talking to, right?

*Note.* Content in [ ] represents overlapping speech.
What Factors Precipitated High Levels of Meta-Assertions?

The trends in Meta-Assertion were highly variable across sessions. Initial trends were identified using session diagrams, however it became clear some of these patterns also continued into Management Context Units. Thus, this analysis was based on both session diagrams as well as more detailed examination across entire transcripts.

About Participant

Meta-Assertions about Participant were used to regulate quality or amount of contribution. Eliciting another's participation was most common in Teaching Context Units. Sometimes this was expressed as encouragement, for example Alex cajoled Bryce with, “Bryce, you gotta have something in that head!” (session 1, #4), but sometimes it was more forceful (session 2, #4):

- Helper: Alex should go next.
- Cara: Make Alex go.
- Darcy: Yeah, make Alex go.
- Leader: Um…
- Cara: Make Alex go!

Meta-Assertions also were used to comment on speed of participation. Alex and Cara in particular had little tolerance for Darcy's slow speed of responding, which they initially expressed by singing the Jeopardy! theme song while they waited.

Meta-Assertions were common when others made off-topic comments or talked about a topic of interest for too long, most frequently during Social Context Units. For example, in session 4 when Bryce announced he knew Japanese, Alex reacted strongly, and was active in
communicating his thoughts to Bryce: "It was completely, I didn't know. It was like, it was off-topic.... I don't even know where Japanese came from." Session 7 (#4) provided an example of Meta-Assertions that occurred during a lengthy story Cara told the group:

Alex: Can we get on with the video? I'm kidding...
Cara: ...I had to go there every summer to get
Alex: This is the one of those situations where-
Cara: Awesome, awesome food.
Leader: Very cool.
Alex: Situations where she talk talk talk talk talk talk
Leader: We're ready, we're ready, we are ready!
Cara: Shush!
Alex: Too much information!

About Self

Meta-Assertions about Self occurred most frequently in Teaching Context Units, and expressed interest, ability, or willingness to participate. For example, in session 3 (#2) when the leader asked participants to practice making and responding to comments by talking about a video the group had watched:

Leader: Alright, so is anybody ready to tell me what happened in the video? [Summarize the video.]
Bryce: I can't think of anything.
Leader: Are you kidding me!?!?
Cara: Mmm, I can't either.
Leader: Oh my gosh, you guys are killing me.
Bryce: There's no, for real.
Examination across sessions did not suggest any specific external stimuli that triggered this type of Meta-Assertion, as most instances seemed to stem from individual factors such as mood and energy level. For example, Alex announced in session 1, "You're lucky I'm awake today, you know that, right? ...Well, I’m not really awake, I’m kinda wired-awake." Within the culture of this group, these Meta-Assertions often revolved around finding the optimum amount of coffee to promote readiness to work, or inability to work due to insufficient coffee consumption.

**About Activity**

Meta-Assertions about Activity were most common during Teaching Context Units and Management Context Units, where instructional activities and materials were sometimes introduced. For example, at the beginning of session 1 (first Management Context Unit) the leader asked participants to review the A-I-R rule cards, and met with significant resistance:

Leader: OK. So, before we do I just, I want you guys just on your own really briefly-

Cara: **Ohhhh, nooooooo.**

Leader: Just, just humor me! [XXXXXX on your own.]

Alex: *I, I, I've already seen this! {talks over}*

Leader: I know!

Bryce: [No]

Cara: [Noo!]

Alex: I've seen this before.

Leader: I know.
Often, Meta-Assertions about Activity were specific complaints about the materials that had been prepared. For example, in session 6 the group watched a video Alex did not like; he complained throughout the video and into the subsequent Social Context Unit (#4). Similarly, the cards (Appendix D) the leader used to help members practice response tokens in session 8 (#4) were poorly received and did not promote effective instruction:

Alex: **This is such a bad idea!**
Darcy: Really. {reading from card}
Cara: Sure! OK. {reading from card}
Darcy: Really! {reading from card}
Alex: **You give them, you give them cards, and then, like, everybody cards, and it’s like, ehhhhhh.**

**About Leader/Helper**

Meta-Assertions about Leader/Helper most commonly expressed participants’ desire for an activity to be run differently. Initially, these comments were relatively infrequent, but session 5 marked the start of a pattern of Meta-Assertion regarding implementation of “lessons” that continued throughout the remaining sessions. This terminology emerged from a comment the leader made after she attempted, with marginal success, to discuss the group’s responses to a funny story Alex told about an incident at work (first short Teaching Context Unit):
The other participants quickly began to echo this protest, for example, as Bryce was telling a story about shooting a shotgun in Boy Scouts (session 5, #4):

Cara:  [Don't you even!]
Bryce:  [At targets.] At targets.
Cara:  Don't you even turn it into a [lesson].
Bryce:  We did skeet shooting.
Cara:  Don't!

Note. Content in [ ] represents overlapping speech.

The pejorative identification of “lessons” often occurred when the leader interjected a point about conversational interaction outside of organized instruction, for example during Social or Management Context units as in this example from session 8 (4th Management Context Unit):

Alex:  And that XXXX, and that's your lesson XXXXXX. .......
           .........See???
Leader:  It's my job.
Cara:  See, you do it all the time! {talks over}
Alex:  I know.
Leader:  It is my JOB.

Note. XXXX = unintelligible word.

"Lessons" were also identified after extensive Concept Development (e.g. session 7, #3):

Alex:  It's a lesson!
Leader:  Yeah!
Cara:  Again!??!
Social Validity Ratings

Feedback About the Group

Participants with ASD

Feedback was solicited from participants with ASD regarding their time in the group. When asked if the group had helped him, Alex responded, "Not much. I mean, it, it did a little bit." He reported he had not enjoyed the group very much, and described it as an opportunity for social interaction more than for learning. He stated he would not recommend it to others because “I would forget about it.” Darcy also reported she did not think the group helped her, but stated she had liked being part of the group. She said she would recommend it to others "a little," but she would not choose to participate in this type of group again. Bryce's perception of the group was more positive. He had enjoyed it "a little" and reported it had really helped him. He stated he would be willing to do a group like this again provided he could do it with friends, and would recommend this type of group to others "a little." Cara also felt the group had been very helpful, reporting she would recommend it to others and would be willing to do it again.
All participants reported it got easier to interact in the group. Bryce felt this was related to improvements in his ability to respond to others, and Cara noted she had gotten better at talking to the people she did not know very well. Darcy and Alex were more qualified in their acknowledgement of improved ease of group interaction; as Alex said, "There was more times that it was really, there was more times that it was hard than times it was easy."

All participants reported watching videos was the part they liked best, and Alex also reported he liked having his mentor participate with him. Bryce thought the discussions were most helpful in supporting his learning. Cara felt the most important component for her was the opportunity to practice having conversations, although she did begrudgingly agree the discussions may have been somewhat helpful. Darcy, reported she had liked receiving extra support from the leader and helpers to facilitate her participation in group discussion, although feedback from one NT helper suggested the high level of assistance allowed Darcy to "take the easy way out," and she actually could have done more.

Alex and Cara were adamant they did not like it when the leader turned the group conversation "into a lesson." While Cara was united with Alex in this dislike of "lessons," she did not offer suggestions for how to run a conversation group without incorporating lessons. Alex suggested employing a more naturalistic approach and "blending it" so "like, like, you can't tell it's a lesson." He suggested the leader “Talk, try to talk about it without like, making it, turn it into something.... Don’t like, point it right out, like, right, just like, more like, I wouldn’t know it’s a lesson.” When asked whether he thought group members would notice these "discreet" lessons, he said, “Yeah, I mean, like if it's blended nicely, I think we'll all notice but, ..it'll, like, will be out in the open, like, oh, like, it'll out, like, to the point where I'll notice, but not so bad.”
Alex reported he found it frustrating when group conversation got off-topic, and he thought the group was too large to effectively support productive conversation. Alex suggested future groups should be much smaller, “no more than like two people.” His recommendation for the ideal composition of this small group was himself and his NT mentor, although he did agree including Bryce would be acceptable. Conversely, Cara indicated she liked the size and frequency of the group. Finally, Darcy reported she did not like the comic strips (Appendix D). Bryce did not identify any areas for improvement as his "brain went blank on that."

**Neurotypical Group Helpers**

Feedback was obtained from four NT group helpers. All had attended between 12 and 15 sessions. Their perceptions about the group were very positive. All of the helpers reported the group had been very worthwhile for the participants with ASD, and they would be highly likely to recommend a similar group to others in the future. Three helpers indicated group dynamic, interaction between participants, and quality of participants' contribution to group discussions improved "a lot," and the fourth identified "a little" improvement.

One helper noted she had observed an increase in participants' ability to share their thoughts and opinions, which she felt was beneficial. She thought participants had gotten better at listening to others and waiting their turn to speak, but noted there was still considerable room for improvement. Two respondents observed participants with ASD had become more aware of the purpose of the group, and had grown relaxed and were more willing to participate; “They have been catching on to you making it into a lesson, but I have seen improvement in their conversation skills without them noticing they are doing what you were telling them.” This
respondent thought the open conversation format allowed participants to express their feelings and facilitated a different type of interaction than what was possible in the classroom. She also indicated she had enjoyed participating in the group. Several helpers reported they liked the use of videos; one observed the videos helped support NT helpers in relating to the participants with ASD. Finally, they recommended future groups should work to incorporate a greater variety of activities and prompts to elicit desired responses.

**Program Teacher**

The program teacher also shared a very positive overall perception of the group intervention. She reported she would highly recommended similar groups to teachers of other transition programs. She felt the attention participants received in the group had helped improve their self-confidence, and suggested further benefits might be supported by incorporating opportunities for one-on-one attention as an adjunct to whole-group interaction. She also suggested future groups should be provided over a longer duration.

**Conversation Partner Meetings**

Both participants with ASD and NT conversation partners provided positive feedback about the dyadic conversation partner meetings, reporting they had enjoyed meeting with each other. Alex's response was qualified; he “got used to it,” but his level of enjoyment “just depended on the mood, and the day.” Alex, Cara, and Bryce's partners reported feeling they had developed genuine regard and acquaintanceship with someone they might not have otherwise gotten to know. Cara's partner said, “Meeting with Cara turned out being something I looked
forward to rather than something I ‘had to do.’” Darcy's partner, whose experience was somewhat different, reported it had been easy for her to meet with Darcy, and she would have been willing to continue doing it over a longer duration.

All dyad members reported conversation had gotten easier over time; again, Alex was conservative, specifying it was only "slightly" easier. While Darcy felt increased ease of interaction was mainly due to increased familiarity, Cara, Bryce, Alex, and their partners felt this change related to both increased familiarity and increased skills for both parties. For example, Bryce's partner noted the interaction had been facilitated by his increased interest, laughter, and use of partner-focused questions along with her improved ability to provide the time he needed to develop his responses. Cara's partner noted interaction was facilitated as they learned they shared several mutual interests and hobbies. Darcy's partner felt adopting a more directive approach to managing the flow of conversation had been instrumental in supporting their interaction. She and Bryce's partner noted the increased familiarity allowed them to plan ahead by generating ideas for topics they could discuss. Bryce's partner also described the benefit of preparing videos they could watch together, but the others did not find this strategy useful.

Cara and Bryce reported they thought this was a good way to practice conversation skills, Alex was noncommittal, responding, "I guess" when queried, and Darcy stated she enjoyed hearing about her partner's day when they met, and saw it mostly as an opportunity for fun conversation. Conversation partners made several suggestions for the future, including meeting in a familiar, comfortable, distraction-free location; scheduling a meeting time and maintaining a routine; creating expectations for the individuals with ASD to ask a certain number of questions; assigning topics for discussion; and making conversation partners more aware of what is being
done in group so they can help support carryover. Darcy's partner, who has a brother with ASD, suggested partners who do not have this background should receive training in strategies for maintaining conversation. Finally, Bryce and Alex's partners underscored the importance of patience. As Alex's partner said, “Sometimes the conversations were a little rough and awkward, but you just have to keep with it.”

**Stakeholder Perceptions of Outcomes**

**Alex**

Alex perceived little change in his conversation skills, but reported he had gotten better at avoiding off-topic responses and understanding a partner’s information needs. Alex's teacher noted some improvement in his conversation skills and conversational balance, but little change in responding for maintenance or showing awareness of a conversation partner’s needs. She noted Alex benefits most from one-on-one attention, suggesting he may have been less likely to profit from group instruction. Alex's teacher reported he is rarely comfortable participating in group meetings, so she did not have opportunity to observe skill generalization. She also reported he had recently shown increased anxiety due to changes in his home situation. Alex's conversation partner reported he had gotten better at asking clarifying questions and engaging in conversational repair. She noted he was increasingly willing to tell stories about his life rather than just answering her questions. She felt she had seen some improvement in his conversation, specifically his ability to maintain balance and his awareness of her needs for information, and a lot of improvement in his ability to respond in a way that maintained the conversation.
**Bryce**

Bryce reported his conversation skills had improved, especially ease of conversing with others, maintaining balanced conversation, and responding in a way that helps maintain conversation. He also felt he had gotten a little better at understanding a partner’s needs for information. Bryce's teacher agreed with his self-assessed improvement in these areas. She noted the attention he received in the group had helped improve his self-confidence during conversation. She also noted there had been recent growth in his overall maturity, although it is unclear whether that may have been facilitated by the group, or rather was a factor that helped him take advantage of the group. Bryce's conversation partner reported he had started asking more questions, and she noted a little improvement in overall conversation skills and maintenance of conversational balance. She felt she had seen a lot of improvement in his ability to respond in a way that maintains conversation, but not much improvement in his awareness of her needs for information and reciprocity.

**Cara**

Cara reported her conversation skills had gotten better, specifically identifying improvements in thinking before talking and maintaining balanced conversations. She felt she had not improved in her ability to avoid off-topic or very long responses, but asserted these had not been problem areas before the intervention. While Cara reported she had gotten a lot better at understanding a partner’s needs, her teacher noted she was still very self-centered during group conversation, and needed continued practice in taking others' perspectives into consideration. She reported Cara had not made much improvement in maintaining balanced
conversation or responding to maintain interaction. She also noted there had been many significant and stressful changes in Cara's home situation, which she felt had led to a lack of focus. Cara's conversation partner reported improved eye contact, and felt Cara had started to show more interest in what she had to say. Cara's conversation partner reported some improvement in her overall conversation skills, maintenance of balanced conversation, responding, and awareness of a partner’s needs.

**Darcy**

Darcy reported it got a little easier to have conversations, but she had not seen much improvement in responding to maintain conversation or avoiding very long responses. She thought she had gotten a little better at understanding her partner’s needs, although her teacher and conversation partner did not note any particular improvement in this area. Darcy's teacher did report she had noted some improvement in Darcy's conversation skills in the work place, and felt Darcy had grown more willing to engage in conversation about comfortable topics, although she still struggled to interact about structured or academic topics. Darcy's teacher observed some improvement in her participation in balanced conversations and responding to support conversational maintenance. Darcy's conversation partner observed a reduction in her “rambling on” and noted she had started responding to stories with a word or two, which she had not done initially. She reported some improvement in Darcy's overall conversation skills, but noted little change in her ability to maintain balance, and no improvement in her ability to help maintain conversation through appropriate responding.
Discussion

Fine-grained analysis of group interaction provided a unique perspective on the types of interaction that may occur during small-group discussion among emerging adults with ASD, both with and without concomitant ID. Examination across this sample of nine sessions supported identification of several patterns of interest in participant and leader interaction, as well as changes in the distribution of interaction types (Context Units) within and across sessions.

Changes in Amount and Type of Participants’ Contributions to Group Discussion

Over the course of the intervention, participant contributions increased relative to leader and helper contributions. Context Unit analysis showed this was largely due to increased participant engagement within Social Context Units; participant contributions in Teaching Context Units actually decreased slightly across the intervention. This evidence of increased social interaction may reflect the influence of this intervention in fostering confidence and facility in conversation. This interpretation is supported by stakeholder report that all participants showed some improvement in conversation skills. Increased familiarity and comfort within the group setting, and establishment of group culture and expectations (Breen, 1985) also likely played a role in facilitating these changes. Finally, a decrease in the overall amount of contribution from the leader was noted, which may have facilitated this change by creating conversational space for increased participant interaction. However, it is also possible growth in participants' ability to interact successfully with other members could have been the change that allowed the leader to pull back and provide less support and direction.
Reduced participant contribution within Teaching Context Units may be reflective of increasing resistance to instructional activities perceived as "lessons." There was a within-target-area trend for decreasing participant contribution toward the culmination of each section of the intervention. This was not effectively explained by attitude changes relative to day of the week; a similar pattern was shown across each target area, but the distribution of days sampled was not identical. Instructional targets were the only other factor that changed systematically over the course of this program. It is possible negative attitudes that increased with repeated focus on an instructional target may have influenced other areas, resulting in generally reduced participant contribution in the latter portion of each target area, even across Social and Management Context Units. The within-target-area trend showing decreased total words and slower rate of interaction supports this explanation of overall reduction in participant engagement related to repetition of instruction. The corresponding within-target-area trend for increasing Management from the leader and helpers further supports this interpretation, as Management was a tool used to direct conversation and participation on a whole-group level. Within-target-area increases in No Codes coupled with increases in helper contributions may also reflect participants' preference for engaging the leader and helpers socially rather than participate in instructional discussion about topics they felt had already been covered. This may also explain the within-target-area trend for decreasing Meta-Assertions, which were less likely to occur during social interaction.

Changes in Type and Amount of Participant-to-Participant Interaction

Similarly to McMahon, Vismara, and Solomon (2013), there was evidence of a slight overall increase in the proportion of participant utterances directed to other Participants, although
it should be noted the frequency of participant-to-Participant communication remained relatively low. Context Unit analysis suggested this change occurred largely during Social Context Units, as participant-to-Participant interaction was relatively stable within Teaching and Management Context Units. Additionally, there was a variable but clear increase in the proportion of participant-to-Participant utterances coded Satisfactory responses or Expected Assertiveness, suggesting participants' ability to engage each other in positive interaction improved over the course of this intervention. This interpretation was corroborated by reports from NT helpers. The decrease in leader Feedback may also support this conclusion, as Feedback was one tool the leader used when participants spoke inappropriately to one another. This finding is promising for the development of future small-group interventions for emerging adults with ASD, although it is unclear whether this change was brought about by the planned instruction, Feedback and support provided by the leader and helpers, or Meta-Assertions from other participants.

Changes in Appropriate Responsivity and Assertiveness Relative to Inappropriate Responsivity and Assertiveness

Responsivity and Assertiveness

There was an overall trend showing increased Satisfactory Attentive Responses, Satisfactory Informative Responses, and Expected and Unexpected Assertiveness. However, examination of the distribution of these codes within participant words indicated absolute increases were seen only in Expected and Unexpected Assertiveness, suggesting this intervention, group environment, or leader's interaction style may have been more effective in encouraging assertiveness than responsivity. Undifferentiated growth in Assertiveness may reflect the difficulty of negotiating turn-taking during group conversation (e.g. Bauminger
2007b). This explanation was supported by the frequency of Assertiveness that was Unexpected largely because of inappropriate timing, as well as feedback from NT helpers indicating participants showed growth in their ability to listen to one another but further improvement was still needed.

Whichever factor or combination of factors facilitated growth in Assertiveness, the fact participants became more independent in sharing personal stories, asking one another questions, and debating topics of interest showed they were increasingly able to actively direct group discussion. This change may be related to reductions in leader Feedback, which was used to encourage participation, and may have been a factor that allowed the leader to reduce her overall level of contribution to group discussions. A within-target-area trend suggesting increasing Satisfactory Attentive Responses toward the latter portion of each target area may also be reflective of increased Assertiveness, as these responses were frequently seen when participants worked together to tell a story or shared opinions during social discussion.

There was no reduction in Inadequate responses that provided too much information or were off-topic, although the overall rate of these responses was relatively low since they were usually regulated by Meta-Assertions from the group and Management from the leader and helpers. Participants often used Inadequate On-topic responses that did not provide enough information to avoid taking a turn, particularly during instructional discussions or highly structured Social Context Units. There was a decrease in the number of direct questions left unanswered, although this was largely reflective of the leader adopting more successful strategies for supporting Darcy’s participation. As Inadequate Responses tended to be regulated externally
or used purposefully to avoid participation, it is difficult to draw meaningful conclusions about changes in participants' overall responsivity from examining these codes.

**Facilitating Responsivity During Group Discussion**

High levels of leader direction, specifically Concept Development and Response Elicitation, along with highly engaging topics, facilitated Satisfactory Responses and Expected Assertiveness during Teaching Context Units. In these Teaching Context Units, many of the leader's utterances followed the IRF/E model, a pattern of teacher initiation, student response, and teacher feedback/evaluation common during instructional discussions (e.g. Sinclair & Coulthard, 1975). However, as observed by Elizabeth and Colleagues (2012), this often came at the price of a high proportion of contribution from the leader and helpers. A relatively high level of leader and helper social involvement, Management, and selection of motivating topics similarly facilitated desirable participant responses during Social Context Units.

**Changes in the Success and Efficiency of Instruction**

There was a within-target-area trend showing a higher proportion of words, particularly within the Concept Development code, allocated to Teaching Context Units during initial sessions of a new target area. However, the proportion of communication occurring during Teaching Context Units, as well as the overall level of Concept Development and Response Elicitation, decreased steadily irrespective of this within-target-area trend. Participants showed resistance to instruction by using Unexpected Assertiveness, Meta-Assertion, and short Inadequate On-topic Responses. Resistance tended to increase across target areas, and was
observed to be particularly strong in response to lengthy episodes of Concept Development. This was likely a significant factor precipitating the overall reduction in Concept Development and Response Elicitation. Co-occurring high levels of Management in these Context Units may be indicative of the leader's efforts to regulate the group and complete planned instructional activities. The suggestion of an inverse relationship between the size of Teaching Context Units and the total percentage of words allocated to Teaching Context Units may be a product of these factors. It is possible some of the reduction in participants' willingness to engage in instruction occurred as the types of responding being targeted became increasingly complex, although this does not plausibly explain the within-target-area reductions seen across all three target areas.

Factors That Contributed to Productive Instruction

The high levels of leader facilitation and selection of motivating and engaging activities that facilitated Satisfactory Responding and Expected Assertiveness also fostered productive instruction. These "successful" Teaching Context Units were often characterized by unbalanced participation, with the leader doing most of the talking. However, many of the Teaching Context Units that were more balanced were also defined by high levels of Unexpected Assertiveness and Meta-Assertion, which led to laborious and minimally productive instruction. The few examples of productive yet balanced Teaching Context Units occurred when participants became highly engaged in friendly debate. Thus, it may be the case providing ambiguous examples for participants to discuss can facilitate balanced participation while simultaneously helping develop more sophisticated knowledge about the target constructs.
There appeared to be no particular benefit to placing instruction within a certain portion of the session, although the evidence does suggest it may be beneficial to plan multiple shorter episodes of instruction interspersed with social interaction or motivating video stimuli. Pre-planning a variety of highly motivating activities and tailoring instruction on the spot may help shift the group atmosphere if participants are reluctant on any given day.

**Participant Comments in Response to Features of Instruction and Group Interaction**

Meta-Assertions about Participant were used to comment on another participant's speed of response, participation, or quality of contribution. Participants sometimes used the language of instruction, telling each other something was "off-topic" or provided "too much information," which may suggest they saw this as an extension of the evaluation they were being asked to do during instructional discussions about conversation. These Meta-Assertions had the effect of regulating the group and helping to maintain on-topic, organized interaction, although the leader occasionally needed to provide Feedback if Meta-Assertions were rudely delivered.

Meta-Assertions about Self detailed participants' willingness to contribute to group discussion, and were often reflective of the vagaries of day-to-day changes in mood, energy, and motivation. Much of this was outside the leader's control, although participants could often be coaxed into more productive participation through application of encouragement, positive Feedback, and modification of instruction to support motivation and interest.

Meta-Assertions about Activity most frequently conveyed opinions about the materials that had been prepared. Participants were extremely resistant to the presentation of printed rules detailing expectations for group participation, and although the A-I-R rule cards did not initially
cause problems, participants protested strenuously when they were introduced a second time (see Appendix D). It seems the strongest objections occurred when participants felt they were being presented with materials that were not suited for adults; instructional cards with words were generally accepted, but visuals that incorporated graphics were more problematic. Santhanam (2014) similarly described her client's strong resistance to video modeling because it "made him feel treated like a less mature person" (p. 31). Visual support has commonly been incorporated into intervention for individuals with ASD (e.g. Reichow & Volkmar, 2010), but clearly care should be exercised in designing visuals for emerging adults to ensure they are adult-appropriate and are truly effective in providing needed support.

Meta-Assertions to Leader/Helper involved commentary on the leader's implementation of instructional activities and "lessons." It was sometimes unclear what prompted this pejorative label since participants were not always consistent in this regard, however lengthy Concept Development and commenting about instructional points (Merritt et al., 1998) within Social or Management Context Units frequently elicited this assessment. It is also possible participants decided they would rather spend time socially interacting as a group, and thus became resistant to the less preferred instructional discussions.

Social Validity

The program teacher, NT helpers, and NT conversation partners reported positive impressions of this intervention. Stakeholders perceived varying levels of improvement across participants, although all were reported to show some benefit. The program seemed to be well tolerated by the participants with ASD, who showed excellent attendance and often arrived eager
to share a story with the group. Bryce and Cara reported a very positive experience and indicated significant improvement in their own skills, although this assessment of marked improvement was corroborated only for Bryce. The program teacher and NT conversation partners also indicated they had observed improvement in Alex and Darcy's conversation skills, but Alex and Darcy themselves were less positive about their overall experience and skill growth. Darcy rarely engaged in group discussion, and teacher report indicated significant upheaval in home situation for Cara and Alex, which likely played a role in influencing treatment response for each of these individuals.

Participants and NT conversation partners spoke in positive terms about their biweekly meetings, suggesting the value of supporting generalization in this way. Both parties reported enjoying the interaction, although the NT conversation partners noted maintaining the interaction could sometimes be challenging. Similarly to Bauminger (2007a), some of the NT partners in the current study reported increased familiarity had led to increased closeness and mutual regard.

Limitations and Future Directions

Future Directions Related to Limitations in Research Design and Procedure

This study used an ethnographic participant-observer approach to provide deep description of interaction during small-group intervention for emerging adults with ASD with and without ID. This use of an ethnographic approach to data collection and analysis enabled investigation of group culture and dynamic from an inside perspective, but precluded use of multiple raters in verifying coding procedures. Future studies may consider training multiple
raters who all have experience in the group, or evaluating whether using video enhances a naïve rater's ability to code this type of data. This study was strengthened by using a single-case embedded design and incorporating quantitative and qualitative information obtained from multiple sources, but readers should recall these conclusions are based on a subset of nine out of 16 sessions. Additionally, the within-session analysis included only the larger Teaching and Social Context Units; future studies should investigate whether smaller transitional elements reveal any important information about this type of intervention group.

This research design did not allow for determination of which factors contributed to improvements in group interaction. The content of instructional discussions, the nature of group culture, positive rapport between group leader and participants, and leader interaction style are some of the factors that could have influenced outcomes. In addition, while participants received no other structured language or social skills training during this study, social and communication skills were still being addressed within the curriculum of the inclusion program. Future studies should consider the possible influence of these and other factors when designing similar groups.

There were also several limitations related to measurement and data validation. Accurate transcriptions were able to be created on the basis of audio recordings, but adding nonverbal information by collecting video may enhance future studies. While stakeholder report indicated benefits were seen outside the group, objective measures were not used to evaluate maintenance or generalization, which limits conclusions about intervention efficacy. Furthermore, it was not possible to blind stakeholders to intervention status, so these reports may be biased. Completion of member checking was not possible due to the schedule of the inclusion program. This is a step researchers should endeavor to incorporate in future similar studies.
Participants represented a broader range of cognitive and linguistic functioning, and a more even gender balance than has generally been reported in previous studies (e.g. Kaat & Lecavalier, 2014; Reichow & Volkmar, 2010). Individual characteristics were thoroughly described to support interpretations and generalization, but it is unclear to what degree participants are truly representative of individuals with ASD. Participants were recruited from among the students with ASD attending a college-based inclusion program. Five individuals were provided recruitment information, four elected to participate. No information was available regarding the student who did not participate. Finally, diagnosis of ASD and ID were confirmed using teacher report and school record review; no formal evaluation reports were available.

**Research Questions Related to Study Findings**

Future studies implementing this type of intervention should endeavor to understand more about how to build a desirable balance between leader direction, productive instruction and concept development, meaningful practice and feedback, and naturalistic interaction. Some level of leader direction or facilitation is likely necessary to achieve instructional goals, but feedback from the current participants indicated more naturalistic activities were preferred.

Future research should continue working to identify factors that impact the success of group interventions. Participants reported different experiences in the group, had different suggestions for the future, and engaged with group activities in different ways, which likely contributed to the variance in reported benefit. It is important to determine guidelines and assessment tools that can help ensure group composition and design will be productive and satisfying for all members, including determination of how to best tailor group structure, format,
and activities on the basis of member preferences and characteristics (e.g. Jantz, 2011; Tobin et al., 2014).

Finally, it has been noted implementation fidelity may decrease in the field (McMahon, Lerner, & Britton, 2013; Reichow & Volkmar, 2010). In the current study, resistance to instruction and the need to tweak activities to support motivation were factors that sometimes made following a pre-established session plan difficult. This highlights the need to better understand how to design interventions that allow for flexibility without impacting efficacy.

**Clinical Implications**

Clinicians should be thoughtful about designing for motivation when crafting group interventions for adolescents and emerging adults with ASD (e.g. Plavnick et al., 2013; Santhanam, 2014). Evidence from the current study suggests high levels of desirable, productive interaction occurred when participants engaged in debate-style discussion, for example, when the leader provided non-representative examples for participants to evaluate. However, debate was counterproductive if participants became too invested and began arguing. Thus, it may be the case designing for motivation in a group setting is most effective when a moderate rather than high intensity of motivation is targeted. Another component of designing for motivation is ensuring materials are useful and pitched appropriately for the group; care should be taken to ensure materials will not be perceived as demeaning by adults with ASD (e.g. Santhanam, 2014).

Participants and NT group helpers were overwhelmingly positive in their feedback about the use of video clips to stimulate conversation on a variety of interesting topics. Even with a diverse group of participants it is often possible to find videos that are enjoyable for all. In the
current group, participants did not share many interests or hobbies, but were equally engaged by clips pulled from "infotainment" shows (e.g. Top Gear, MythBusters, Dirty Jobs). These programs showed humorous and interesting events participants could relate to, and they often had ideas to share with each other after watching the videos. This provided an opportunity for participants to practice target skills during the ensuing naturalistic group discussion.

Incorporating variety into the intervention plan may help avoid the trend of increasing resistance to instruction that was seen in the current study. One way to accomplish this goal may be to cycle through target areas, which allows for regular change while still devoting the same amount of instructional time to each target. Clinicians should also consider using a variety of activity types, and reducing lengthy explanations and didactic instruction.

The current study provided evidence individuals with a disparity in language relative to other group members may not participate productively, underscoring the importance of using pre-intervention assessment when composing groups. Based on the data gathered in the current study, it is recommended clinicians assess conversation skills, and ability and willingness to respond quickly to requests for information. The profile observed in dyadic settings may differ from what is seen in a group, so it is extremely important to assess these skills in both settings. This information should be gathered through observation as well as direct interaction and teacher or caregiver report. On the basis of the current study, it is judged likely individuals who have similar informal conversation skills and speed of responding within the group will function well together, provided there is no major personality clash.

In addition, clinicians should consider assessing individual preferences for group format, style, and size, and endeavor to be responsive to these preferences when designing interventions
and grouping participants (e.g., Jantz, 2011). Within the group, members may prefer different types of activities, but much of this can be resolved through ongoing person-centered planning. Involving group members in selecting and planning activities can help ensure engagement and motivation (e.g., Santhanam, 2014), and may be accomplished in a group setting through consensus-taking and group negotiation.

Group culture strongly influences group interaction and functioning. When designing groups it is important to think about building a productive culture that will support the planned intervention. In this case, the leader established an environment where participants understood they were expected to interact with one another respectfully, and to participate in group discussions. As can be seen in the examples above, the leader used a joking tone to remind participants when they were not meeting these expectations. This relaxed style may have helped participants feel recognized as adults, and contributed to positive group rapport. Although not initially a planned component, conversational storytelling became an important aspect of this group's culture. Clinicians may consider working to incorporate this practice from the outset as it supported active engagement, but should establish the expectation learning and feedback can occur even when members are sharing stories for social purposes.

One instructional component that was difficult to implement in the group setting was provision of structured and focused feedback. This may be addressed in the future by establishing a culture where participants expect to receive detailed feedback on their performance during the group. However, it may be more desirable to deliver feedback individually during brief meetings outside the group. As noted by the program teacher, this
individual attention may be highly beneficial for group members, and allows specific feedback to be delivered privately and respectfully (e.g. Koegel, Ashbaugh, et al., 2013).

Finally, incorporation of NT group helpers and conversation partners was productive, useful, and perceived in a positive light by all involved. Neurotypical peers should be included in future interventions to facilitate skill development and generalization to naturalistic settings (e.g. Barnhill, 2014). In addition, this practice could ultimately help establish acquaintanceships in the community for emerging adults with ASD, which is an important support for QoL and community participation (e.g. Farley et al., 2009; Renty & Roeyers, 2006). Clinicians should be thoughtful of developing strategies for using NT helpers to maximum advantage.

**Conclusion**

This study was unique in providing a detailed description of group interaction and social engagement by individuals with ASD across a range of cognitive and linguistic abilities during a group social skills intervention (Kaat & Lecavalier, 2014; Reichow & Volkmar, 2010). While the current group was provided alongside an existing inclusion program, many young adults with ASD do not have access to such programs. The compiled evidence suggests emerging adults with ASD can benefit from naturalistic, discussion-based intervention groups, which is a model that may also be accessible through the adult service system (e.g. Jantz, 2011). Inclusion of NT peers as group helpers and conversation partners was an important component of group design and likely contributed to skill development and generalization. This practice was already well-supported within the inclusion program, but group leaders should also investigate ways to involve NT peers in community-based intervention groups.
Clinicians who lead social and conversation skills groups may have varying professional backgrounds, but simple pre-intervention assessment can be used across settings and disciplines to support grouping on the basis of conversation abilities. The apparent importance of grouping by language skills suggests any individual desiring social skills support might be successfully included in this type of group, irrespective of disability status. Group leaders should inventively design for moderate levels of motivation, purposefully craft a productive group culture, and use respectful, adult-appropriate techniques to provide feedback about behavior, participation, and skill development. Finally, leaders should implement ongoing person-centered planning to involve group members in directing the development of activities, helping to ensure the group is beneficial for all.
REFERENCES


Tempo SlowMo: BPM Slow Downer (Version 1.3.16). [iPad application]. Martian Storm Ltd.


APPENDIX A: TRANSITION PROGRAM INFORMATION

Minimum Criteria for Admission Consideration

This is a 2-3 year enrichment program for students with intellectual and physical disabilities who typically remain in secondary education until they turn 21 years of age. In order to be considered for admission a student desiring to attend this program must meet the following minimum criteria.

Student must have successfully completed 12th grade or the equivalent of 4 years at the high school level in our school district. If graduating on credits, a student must have completed the credits necessary to graduate including good attendance and active participation.

If a student is new to our district, he/she must complete at least one year in the high school to be eligible to submit an application for consideration to attend this program the following fall semester.

Additional minimum criteria:

1. Student must be an active participant in a transition class while in the high school.

2. Student must demonstrate mature and responsible conduct.

3. Student must always demonstrate respect for other people, property, and ideas.

4. Students should have demonstrated independence with both academic and nonacademic activities.

5. Students must be willing to work closely and socialize with student mentors both in and out of the university and program classroom.

6. Student must be employed or working on career goals.

7. Student must be willing to participate in university activities and must maintain a full schedule of classes. Under approved circumstances, student may have a combination of classes and employment during the school day.

8. Students are expected and required to follow the rules of program, the school district Student Code of Conduct as well as the university Student Code of Conduct.
Referral Process

1. Prior to the referral the case manager must review the program criteria for consideration and verify the student’s eligibility.

2. A referral for consideration of a student to the program is to be made by the IEP case manager (i.e. Learning Support, Emotional Support or Autistic Support Teacher) and is to occur during January of the school year prior to seeking admission.

3. Referrals for consideration are to contain a synopsis of the student’s academic, behavioral, and emotional history, the rational supporting the referral, and at least two letters of reference: one of whom is to be from a general education teacher or building administrator.

4. With the IEP team’s approval, referral information should be forwarded to the program teacher with a copy sent to the Special Education Administration.

5. In February, if there is an agreement that the student applicant is eligible for admission consideration, arrangements should be made for the student to spend a day at the program (including morning transition).

6. Following the visit, program staff and a representative from the Special Education administration will interview the student. During this interview process it is required that the student’s parent(s) or guardian(s) visit the program.

7. Program staff will review the application and interview information and come to an admission decision. The recommendation will be sent to the Special Education Administration for final review and approval.

8. The student and their family will be notified of the decision via letter by the end of March from the Special Education Office. If accepted, the program teacher will contact the student and their family about scheduling. If the student is not accepted, they will have the opportunity to meet with part of the Special Education Administration to discuss future opportunities.
Application For Admission

Please write your answer to the following questions on a separate sheet of paper and attach it to this document:

1. Why do you want to go to this program?
2. What are your goals while at this program?

Please circle the appropriate answer to the following questions:

1. Have you completed at least four years at the high school level or attained sufficient credits to graduate?
   
   Yes       No

2. Do you come to school everyday?
   
   Yes, except when I am sick       Sometimes       No, I miss a lot of days

3. How often do you act appropriately in school?
   
   Always       Most of the time       Sometimes       I need help in this area

4. How often do you act appropriately with your fellow peers?
   
   Always       Most of the time       Sometimes       I need help in this area

5. How often do you act appropriately with adults?
   
   Always       Most of the time       Sometimes       I need help in this area

6. Do you respect other people, their property, and their ideas?
   
   Always       Most of the time       Sometimes       I need help in this area
7. Are you good at working with others in a group?
   Always       Most of the time       Sometimes       I need help in this area

8. If you are employed, do you have good attendance at work?
   Always       Most of the time       Sometimes       I need help in this area

9. If you are employed, how often do you act appropriately at work?
   Always       Most of the time       Sometimes       I need help in this area

10. Are you willing to work on your career goals?
    Yes       Maybe       I need help in this area

11. Do you feel you will be able to act appropriately on the university campus with other program students and/or student mentors without adult supervision?
    Yes       Sometimes       I may need help in this area

12. Are you willing to participate in university activities?
    Yes       Depends on the activity       I need help in this area

13. During the past year, you have had ________ disciplinary actions?
    None       Some       Many

14. Do you feel you are capable of following the rules at this program?
    Always       Most of the time       Sometimes       I need help in this area
APPENDIX B: QUESTIONNAIRES

Pre-intervention Survey—Teacher

Teacher’s name: _________________________________________________ Date: _________
Student’s name: _________________________________________________

Please respond to the following questions about this student’s conversation skills.

1. In general, how would you describe this student’s conversation skills?
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________  

2. In what area of conversation skills do you think this student needs the most help?
_____________________________________________________________________________________
_____________________________________________________________________________________  

Circle one choice for each of the following questions:

3. Is this student interested in social interaction with others?  
   - Very  - A little  - Not really  - Not at all

4. Is it easy for this student to maintain a conversation with someone?  
   - Very  - A little  - Not really  - Not at all

5. Is it easy for this student to have conversations that are interesting to a conversation partner?  
   - Very  - A little  - Not really  - Not at all

6. Is it easy for this student to respond to questions with answers that are on-topic, clear, and concise?  
   - Very  - A little  - Not really  - Not at all

7. Is it easy for this student to respond to comments and nonverbal cues from a conversation partner?  
   - Very  - A little  - Not really  - Not at all

8. Do you currently provide this student with any language/conversation supports in the classroom?  
_____________________________________________________________________________________
_____________________________________________________________________________________
Please rate the level of difficulty this student has in the following areas:

<table>
<thead>
<tr>
<th>Area</th>
<th>No difficulty</th>
<th>Mild difficulty</th>
<th>Moderate difficulty</th>
<th>Severe difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Basic interpersonal interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Respect and warmth in relationships</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>b. Responding to social cues in relationships</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>10. Complex interpersonal interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Forming relationships</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>b. Interacting according to social rules</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>c. Maintaining social space</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>11. Higher-level cognitive functions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Abstract thinking</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>b. Organizing and planning</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>c. Cognitive flexibility</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>d. Problem-solving</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>12. Applying knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Focusing attention</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
<tr>
<td>b. Making decisions</td>
<td>No difficulty</td>
<td>Mild difficulty</td>
<td>Moderate difficulty</td>
<td>Severe difficulty</td>
</tr>
</tbody>
</table>
Pre-intervention Survey—Conversation Partner

Name: ____________________________________________ Date: ________
Age: ____________________
Year in school: ____________________
Partner’s name: ____________________________________________

Please respond to the following questions about this person’s conversation skills.

1. In general, how would you describe this person’s conversation skills?
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Circle one choice for each of the following questions:

2. Is it easy to have a conversation with this person?
   Very   A little   Not really   Not at all

3. Is this person able to do his or her share of the work to maintain the flow of conversation?
   Very   A little   Not really   Not at all

4. Is it interesting to have a conversation with this person?
   Very   A little   Not really   Not at all

5. Is it easy for this person to respond to your questions with answers that are on-topic, clear, and concise?
   Very   A little   Not really   Not at all

6. Is it easy for this person to respond to your comments and nonverbal cues?
   Very   A little   Not really   Not at all

7. Any other comments about interacting with this person?
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________


Pre-intervention Survey—Participant

Name: ___________________________________________ Date: ________

Please respond to the following questions.
Circle one choice for each of the following questions:

1. How interested are you in talking to other people?

<table>
<thead>
<tr>
<th>Very</th>
<th>A little</th>
<th>Not really</th>
<th>Not at all</th>
</tr>
</thead>
</table>

2. How easy is it for you to have a conversation with someone?

<table>
<thead>
<tr>
<th>Very</th>
<th>A little</th>
<th>Not really</th>
<th>Not at all</th>
</tr>
</thead>
</table>

3. How easy is it for you to answer questions from someone you’re talking to?

<table>
<thead>
<tr>
<th>Very</th>
<th>A little</th>
<th>Not really</th>
<th>Not at all</th>
</tr>
</thead>
</table>

4. How easy is it for you to know how to respond if someone makes a comment while you are talking?

<table>
<thead>
<tr>
<th>Very</th>
<th>A little</th>
<th>Not really</th>
<th>Not at all</th>
</tr>
</thead>
</table>

5. What parts of having a conversation are easy for you?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

6. What parts of having a conversation are hard for you?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

7. Is there anything about having conversations you would like to be better at?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Please rate the level of difficulty you have in the following areas:

<table>
<thead>
<tr>
<th>Area</th>
<th>No difficulty</th>
<th>Mild difficulty</th>
<th>Moderate difficulty</th>
<th>Severe difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Basic interpersonal interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Respect and warmth in relationships</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Responding to social cues in relationships</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Complex interpersonal interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Forming relationships</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Interacting according to social rules</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Maintaining social space</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Higher-level cognitive functions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Abstract thinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Organizing and planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Cognitive flexibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Problem-solving</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Applying knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Focusing attention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Making decisions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Post-intervention Survey—Teacher

Teacher’s name: _________________________________________________ Date: _________
Student’s name: _________________________________________________

Please respond to the following questions about this student’s conversation skills after participating in the conversation group.

1. Please describe any changes you have seen in this student’s conversation skills.

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Circle one choice for each of the following questions:

2. How much has participation in this conversation group helped improve this student’s overall conversation skills?

<table>
<thead>
<tr>
<th>A lot</th>
<th>A little</th>
<th>Not much</th>
<th>Not at all</th>
</tr>
</thead>
</table>

3. How much has this student’s ability to participate in a balanced conversation improved?

<table>
<thead>
<tr>
<th>A lot</th>
<th>A little</th>
<th>Not much</th>
<th>Not at all</th>
</tr>
</thead>
</table>

4. How much has this student’s ability to respond to partners in a way that helps maintain the conversation improved (e.g. adding interesting details, initiating new topics, or asking questions about the partner)?

<table>
<thead>
<tr>
<th>A lot</th>
<th>A little</th>
<th>Not much</th>
<th>Not at all</th>
</tr>
</thead>
</table>

5. How much has this student’s awareness of a conversation partner’s needs improved (e.g. reduction of responses that are off topic, very brief, or extremely long and overly detailed).

<table>
<thead>
<tr>
<th>A lot</th>
<th>A little</th>
<th>Not much</th>
<th>Not at all</th>
</tr>
</thead>
</table>

6. How much would you recommend other teachers of transition programs consider including a similar type of group for transition-aged students with ASD?

<table>
<thead>
<tr>
<th>A lot</th>
<th>A little</th>
<th>Not much</th>
<th>Not at all</th>
</tr>
</thead>
</table>

7. What do you think worked well about this conversation group?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
8. What changes would you recommend for future groups?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

9. Over the course of this semester, we have worked a lot on developing a productive group dynamic and effective participant-to-participant interaction during group discussions. Have you seen any generalization of these skills to other group activities in the classroom (e.g. morning transition meeting)? If so, please explain.

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

10. Anything else you think would be important for me to know?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Post-intervention Survey—Conversation Partner

Name: ____________________________________________________________ Date: ________
Partner’s name: ____________________________________________________

Please respond to the following questions about this person’s conversation skills after participating in the conversation group.

1. Please describe any changes you have seen in this person’s conversation skills.
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

2. Has it gotten easier to have a conversation with this person? In what ways?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

3. If you’ve noted improvement, do you think the changes have been mainly in your conversation partner, mainly in yourself and how you interact with your partner, or both?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

Circle one choice for each of the following questions:

4. How much has participation in this conversation group helped improve this person’s overall conversation skills?

   A lot  
   A little  
   Not much  
   Not at all

5. How much has this person’s ability to participate in a balanced conversation improved?

   A lot  
   A little  
   Not much  
   Not at all

6. How much has this person’s ability to respond to you in a way that helps maintain the conversation improved (e.g. adding interesting details, initiating new topics, or asking questions about you)?

   A lot  
   A little  
   Not much  
   Not at all

7. How much has this person’s awareness of your needs as a conversation partner’s needs improved (e.g. reduction of responses that are off topic, very brief, or extremely long and overly detailed).

   A lot  
   A little  
   Not much  
   Not at all
8. What do you think worked well about your involvement with this person?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

9. What changes would you recommend for future projects like this?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

10. Based on your experience, is there any information or training you think would be beneficial to other college students who might serve as conversation partners for young adults with ASD in the future?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

11. How would you describe the conversations that you think went well? What made them good?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

12. How would you describe the conversations that you think went poorly? What made them challenging/unenjoyable?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

13. Anything else you think would be important for me to know?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________
Post-intervention Survey—Mentor

About how many group meetings do you think you attended? (out of 17 total): ___________

1. Please describe any changes you have seen in the group over the course of the semester.
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

Circle one choice for each of the following questions:

2. How much has the overall group dynamic improved since the group started?
   A lot  A little  Not much  Not at all

3. How much has the quality of interactions between LifeLink students improved since the group started?
   A lot  A little  Not much  Not at all

4. How much has the overall quality of LifeLink student participation in group discussions improved since the group started?
   A lot  A little  Not much  Not at all

5. In general, how worthwhile do you think this group was for LifeLink students?
   A lot  A little  Not much  Not at all

6. How much would you recommend other young adults with disabilities participate in this type of group in the future?
   A lot  A little  Not much  Not at all

7. What do you think worked well about this group?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

8. What changes would you recommend for future groups like this?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

9. Anything else you think would be important for me to know?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
Post-intervention Survey—Participant

Name: _________________________________________________  Date: _______

Please respond to the following questions about your conversation skills after participating in the conversation group.

1. Do you think your conversation skills changed during this group? How?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

Circle one choice for each of the following questions:

2. How much has it gotten easier to have a conversation with someone?
   - A lot
   - A little
   - Not much
   - Not at all

3. How much have you gotten better at having a balanced conversation with someone?
   - A lot
   - A little
   - Not much
   - Not at all

4. How much have you gotten better at responding to partners in a way that helps maintain the conversation?
   - A lot
   - A little
   - Not much
   - Not at all

5. How much have you gotten better at avoiding responses that are off topic, very short, or very detailed?
   - A lot
   - A little
   - Not much
   - Not at all

6. How much do you think you have a better understanding of the type of responses a conversation partner needs from you?
   - A lot
   - A little
   - Not much
   - Not at all

7. How much did this conversation group help you?
   - A lot
   - A little
   - Not much
   - Not at all

8. How much did you like participating in this conversation group?
   - A lot
   - A little
   - Not much
   - Not at all

9. Would you like to participate in a group like this again?
   - A lot
   - A little
   - Not much
   - Not at all

10. How much would you recommend others participate in similar types of groups in the future?
    - A lot
    - A little
    - Not much
    - Not at all

11. Did it get easier to talk to your conversation partner each week? Was this mainly because you got better at conversations, or because you got to know your partner better?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________
12. Did you like meeting with your conversation partner? Do you think this was a good way to practice conversation skills?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

13. What did you like the most about this group?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

14. What did you like the least about this group?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

15. What aspect of this group helped you learn the most?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

16. Over time, did it get easier to interact with the other people in the group? If so, how?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

17. What changes would you recommend for future groups like this?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________

18. Anything else you want to tell me you think would be important for me to know?
_______________________________________________________________________________________
_______________________________________________________________________________________
_______________________________________________________________________________________
## APPENDIX C: INTERVENTION SCHEDULE AND LESSON PLAN

### Week 1

#### Tuesday—Introduction
- Introductions
- Rules brainstorm

#### Thursday—Introduction
- Review rules
- Review session plan
- Discussion:
  - Why do we communicate?
- Video (Dirty Jobs) and discussion:
  - What do people do in a conversation?
- A-I-R rules (introduce card):
  - Describe purpose and use, how it can benefit us, where it can be used

### Week 2

#### Tuesday—Questions
- Review A-I-R rules and use:
  - Where we can use the strategy?
- Discussion:
  - Initiating vs. responding
- Instruction: Responding to questions
  - Introduce 6 possible types of responses to questions (visual: response cards)
- Video (Ellen):
  - Use cards to identify different types of responses to questions

#### Thursday—Questions (Session 1)
- Independent review of A-I-R rules
- Activity:
  - Videos (MythBusters, Top Gear)
  - Brainstorm questions about the clip
  - Members respond in one of the 6 established ways
  - Members evaluate and provide feedback on responses

### Week of 3/10-3/14—SCHOOL BREAK

### Week 3

#### Tuesday—Questions (Session 2)
- Review of different types of answers and where/when to use them
- Activity:
  - Prompt: What is the best thing you did over break?
  - Members respond in one of the 6 established ways
  - Members evaluate and provide feedback on responses

#### Thursday—Questions
- Activity:
  - Video (MythBusters)
  - Prompt: How would you describe this video to someone who has never seen it?
  - Members respond in one of the 6 established ways
  - Members evaluate and provide feedback on responses
### Week 4

<table>
<thead>
<tr>
<th>Tuesday—Questions (Session 3)</th>
<th>Thursday—Comments (Session 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Activity:</td>
<td>• Discussion:</td>
</tr>
<tr>
<td>- Videos (Dirty Jobs, Top Gear)</td>
<td>- What is the purpose of what we’ve been practicing and where can we use it?</td>
</tr>
<tr>
<td>- Brainstorm questions about the clip</td>
<td>- Instruction: Responding to comments</td>
</tr>
<tr>
<td>- Members respond in one of the 6 established ways</td>
<td>- Introduce 6 possible types of responses to comments (visual: response cards)</td>
</tr>
<tr>
<td>- Members evaluate and provide feedback on responses</td>
<td>• Activity:</td>
</tr>
<tr>
<td></td>
<td>- Videos (Coffee and Your Brain, Treehouse Masters)</td>
</tr>
<tr>
<td></td>
<td>- State a comment about the clip</td>
</tr>
<tr>
<td></td>
<td>- Members respond in one of the 6 established ways</td>
</tr>
<tr>
<td></td>
<td>- Members evaluate and provide feedback on responses</td>
</tr>
</tbody>
</table>

### Week 5

<table>
<thead>
<tr>
<th>Tuesday—Comments (Session 5)</th>
<th>Thursday—Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Activity:</td>
<td>• Activity:</td>
</tr>
<tr>
<td>- Video (Hard Science—Riding a Bike on Liquid)</td>
<td>- Video (Ferris Bueller’s Day Off, 5:53-6:45)</td>
</tr>
<tr>
<td>- State a comment about the clip</td>
<td>- Discuss actors' responses and brainstorm better responses</td>
</tr>
<tr>
<td>- Members respond in one of the 6 established ways</td>
<td>• Poll: What sitcoms do you like? (examples: Community, Bones, The Mindy Project, Big Bang Theory, Modern Family)</td>
</tr>
<tr>
<td>- Members evaluate and provide feedback on responses</td>
<td>• Activity:</td>
</tr>
<tr>
<td></td>
<td>- Videos (Large Dangerous Rocket Ships, MythBusters)</td>
</tr>
<tr>
<td></td>
<td>- State a comment about the clip</td>
</tr>
<tr>
<td></td>
<td>- Members respond in one of the 6 established ways</td>
</tr>
<tr>
<td></td>
<td>- Members evaluate and provide feedback on responses</td>
</tr>
</tbody>
</table>
### Week 6

<table>
<thead>
<tr>
<th>Tuesday—Comments (Session 6)</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity (NOTE: planned but rejected):</strong></td>
<td><strong>SESSION CANCELLED</strong></td>
</tr>
<tr>
<td>- Video (Better Off Ted)</td>
<td></td>
</tr>
<tr>
<td>- Discuss actors’ responses and brainstorm better responses</td>
<td></td>
</tr>
<tr>
<td><strong>Activity:</strong></td>
<td></td>
</tr>
<tr>
<td>- Videos (How it’s Made, Top Gear)</td>
<td></td>
</tr>
<tr>
<td>- State a comment about the clip</td>
<td></td>
</tr>
<tr>
<td>- Members respond in one of the 6 established ways</td>
<td></td>
</tr>
<tr>
<td>- Members evaluate and provide feedback on responses</td>
<td></td>
</tr>
</tbody>
</table>

### Week 7

<table>
<thead>
<tr>
<th>Tuesday—Comments</th>
<th>Thursday—Response Tokens (Session 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity:</strong></td>
<td><strong>Discussion</strong></td>
</tr>
<tr>
<td>- Brainstorm different types of responses to comic strip (cornstarch fire-breathing)</td>
<td>- Review purpose of what we’re practicing and where to use it</td>
</tr>
<tr>
<td><strong>Discussion:</strong></td>
<td><strong>Instruction: Responding to response tokens</strong></td>
</tr>
<tr>
<td>- How was the class trip?</td>
<td>- Introduce 6 possible types of responses (visual: response cards)</td>
</tr>
<tr>
<td>- Members respond in one of the 6 established ways</td>
<td><strong>Activity:</strong></td>
</tr>
<tr>
<td>- Members evaluate and provide feedback on responses</td>
<td>- Brainstorm a list of short responses and think about what they mean</td>
</tr>
<tr>
<td><strong>Activity:</strong></td>
<td><strong>Activity:</strong></td>
</tr>
<tr>
<td>- Videos (Cornstarch fire-breathing, Bill Nye)</td>
<td>- Analyze meaning of 2 response tokens depicted in comic strip (Dirty Jobs)</td>
</tr>
<tr>
<td>- State a comment about the clip</td>
<td>- Brainstorm responses</td>
</tr>
<tr>
<td>- Members respond in one of the 6 established ways</td>
<td><strong>Activity:</strong></td>
</tr>
<tr>
<td>- Members evaluate and provide feedback on responses</td>
<td>- Introduce 6 possible types of responses to questions (visual: response cards)</td>
</tr>
<tr>
<td><strong>Activity:</strong></td>
<td><strong>Activity:</strong></td>
</tr>
<tr>
<td>- Video (Bill Nye)</td>
<td>- Video (Bill Nye)</td>
</tr>
<tr>
<td>- Members respond to clip</td>
<td>- Members respond to clip</td>
</tr>
<tr>
<td>- Leader uses response tokens to encourage/discourage more responses</td>
<td>- Leader uses response tokens to encourage/discourage more responses</td>
</tr>
<tr>
<td>- Leader provides feedback on identifying response tokens/responding appropriately</td>
<td>- Leader provides feedback on identifying response tokens/responding appropriately</td>
</tr>
</tbody>
</table>
### Week 8

<table>
<thead>
<tr>
<th>Tuesday—Response Tokens</th>
<th>Thursday—Response Tokens (Session 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity:</strong></td>
<td><strong>Activity:</strong></td>
</tr>
<tr>
<td>- Analyze meaning of two response tokens depicted in comic strip (smiley faces)</td>
<td>- Videos (Bill Nye, Top Gear)</td>
</tr>
<tr>
<td>- Brainstorm responses</td>
<td>- Members respond to clip</td>
</tr>
<tr>
<td><strong>Activity:</strong></td>
<td>- Members use example cards to practice using different response tokens (NOTE: abandoned, returned to regular model)</td>
</tr>
<tr>
<td>- Videos (Bill Nye, MythBusters)</td>
<td>- Leader provides feedback on identifying response tokens/responding appropriately</td>
</tr>
<tr>
<td>- Leader uses response tokens to encourage/discourage more responses</td>
<td></td>
</tr>
<tr>
<td>- Leader provides feedback on identifying response tokens/responding appropriately</td>
<td></td>
</tr>
</tbody>
</table>

### Week 9

<table>
<thead>
<tr>
<th>Tuesday—Response Tokens (Session 9)</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discussion:</strong></td>
<td>WRAP-UP PARTY</td>
</tr>
<tr>
<td>- Brainstorm and analyze meaning of two brainstormed response tokens</td>
<td></td>
</tr>
<tr>
<td><strong>Activity:</strong></td>
<td></td>
</tr>
<tr>
<td>- Video (Top Gear x 2)</td>
<td></td>
</tr>
<tr>
<td>- Members respond to clip</td>
<td></td>
</tr>
<tr>
<td>- Leader uses response tokens to encourage/discourage more responses</td>
<td></td>
</tr>
<tr>
<td>- Leader provides feedback on identifying response tokens/responding appropriately</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D: INTERVENTION MATERIALS

A-I-R Rule Card
Brainstormed Rules

1. No spacing out!! Listen when other people are talking.

2. Be respectful of the other people in the group.

3. Everyone gets a turn to talk.

4. Have fun, but be serious about group activities.
### Response Cards

<table>
<thead>
<tr>
<th><strong>Off topic:</strong></th>
<th><strong>Very short:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Respond by talking about something different and unrelated</td>
<td>Respond with only 1 or 2 words</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Very long:</strong></th>
<th><strong>Expected response:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Respond with a LOT of details</td>
<td>Give a complete response that includes 1-3 details</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Keep the conversation going with a response story:</strong></th>
<th><strong>Keep the conversation going with a question:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Give the expected response + TELL your own related story</td>
<td>Give the expected response + ASK your partner a related question</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Keep the conversation going with a new detail:</strong></th>
<th><strong>Keep the conversation going with a question:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer with the expected information + ONE new detail</td>
<td>Answer with the expected information + ASK a related question about your partner</td>
</tr>
</tbody>
</table>
Example Visual Support: Comic Strip

Using cornstarch is actually a pretty safe way to breathe fire!
Example Visual Support: Comic Strip

I just watched MythBusters. They measured the speed of a sneeze.

OK?

I just watched MythBusters. They measured the speed of a sneeze and then they measured how far the sneeze could go. Jamie and Adam competed to try to see who could sneeze the fastest and who could sneeze the farthest, and they made a really big mess, and then...

OK.
Activity Cards: Practicing Responding to Response Tokens

<table>
<thead>
<tr>
<th>really</th>
<th>yeah</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>so...</td>
</tr>
<tr>
<td>right</td>
<td>gotcha</td>
</tr>
<tr>
<td>cool</td>
<td>awesome</td>
</tr>
<tr>
<td>great</td>
<td>wow</td>
</tr>
</tbody>
</table>
## APPENDIX E: CODING SCHEME

### Utterance Codes—Participant

<table>
<thead>
<tr>
<th>IF A PARTICIPANT IS SPEAKING……</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I</strong> = INADEQUATE TURN (DOESN’T HOLD UP RESPONDENT’S END OF THE CONVERSATION)</td>
<td></td>
</tr>
<tr>
<td><strong>I-Off</strong> = INADEQUATE OFF-TOPIC (OR IGNORED)</td>
<td>➢ obligatory turn is ignored; response to obligatory turn is off topic or doesn't make sense</td>
</tr>
<tr>
<td><strong>I-On</strong> = INADEQUATE ON-TOPIC (BUT INADEQUATE INFORMATION)</td>
<td>➢ not enough/too much info; abrupt/brief responses that shut down interaction or allows participant to avoid the turn/work being requested; just Y/N when more info was expected; repeats old information; mean/rude response (laughing/taunting)</td>
</tr>
<tr>
<td><strong>S</strong> = SATISFACTORY TURN (HOLDS UP RESPONDENT’S END OF THE CONVERSATION)</td>
<td></td>
</tr>
<tr>
<td><strong>S-A</strong> = SATISFACTORY ATTENTIVE (INTEREST/ATTENTION DURING NONOBLIGATORY TURN; CONFIRMATION)</td>
<td>➢ backchannel, confirm/affirm (appropriately) through repetition, just Y/N when more info was likely NOT expected</td>
</tr>
<tr>
<td><strong>S-I</strong> = SATISFACTORY INFORMATIVE (RESPONSE ADDS EXPECTED AMOUNT/QUALITY OF NEW ON-TOPIC INFORMATION)</td>
<td>➢ includes when two people work together to complete a thought provided both contribute new information</td>
</tr>
</tbody>
</table>

***For above: indicate who the speaker responds to***

| **A** = ASSERTIVENESS |  |
| ➢ Furthers interaction (asking a question; response seeking; a comment or info that can’t be seen as elicited by a previous utterance) |
| **E-A** = EXPECTED ASSERTIVENESS | ➢ on-topic, responsive/related to ongoing conversation, appropriate segue/transition, occur at appropriate times, moves conversation forward/develops instruction/content (e.g. offering feedback when that is the purpose of the lesson) |
| **U-A** = UNEXPECTED ASSERTIVENESS | ➢ unrelated to/ignores ongoing conversation, interrupts, “what” for repetition b/c person wasn’t paying attention, or repetition of topic/idea for attention, for purpose of disruption, or after the topic seems to be closed |

***For above: indicate who responds to the speaker***

| **M-A** = META-ASSERTION (ABOUT CONVERSATION, LANGUAGE, BEHAVIOR, ACTIVITIES) |  |
| ➢ @ session/activity level, purpose is to convey information about INTEREST/ABILITY/WILLINGNESS TO PARTICIPATE/ATTITUDE/MOOD/ASSESSMENT toward the group or group activities |
| ➢ @ conversation/language level, purpose is to convey attitude/assessment re: APPROPRIATENESS/ADEQUACY/ROLE IN CONVERSATION of what was said or how it was said (re: own intentions or other) (e.g. irritation, mocking, feedback re: efficacy of communication; EXCLUDES on topic responding, e.g. agreement, amusement, attempts at changing thinking) |
| ➢ @ behavior level, PURPOSE is to change or assess what another group member is doing/how they are interacting |

***For above: indicate if comment is about A = activity; L/H = leader/helpers; P = other participant; S = self***
### Utterance Codes—Leader/Helper

<table>
<thead>
<tr>
<th>IF THE GROUP LEADER OR A HELPER IS SPEAKING………</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TEACHING</strong></td>
</tr>
<tr>
<td>RE = <strong>RESPONSE ELICITATION</strong> ABOUT CONVERSATION (META-LEVEL)</td>
</tr>
<tr>
<td>▶ Question (or implied question) or examples used for the purpose of eliciting responses related to CONCEPT DEVELOPMENT (e.g. asks for feedback/opinion, elicits response to established task), including support provided for the participant to provide his or her response and confirmation of answer/idea during discussion if posed as a question</td>
</tr>
<tr>
<td>▶ Any question used during social interaction to address issues of conversation/conversational repair/member communication</td>
</tr>
<tr>
<td>CD = EXAMPLES, EXPLANATIONS, FEEDBACK, RESPONSE CONFIRMATION to support <strong>CONCEPT DEVELOPMENT</strong></td>
</tr>
<tr>
<td><strong>F = FEEDBACK</strong> RE: APPROPRIATENESS, BEHAVIOR, OR PARTICIPATION (especially @ INDIVIDUAL level)</td>
</tr>
<tr>
<td>▶ Feedback (or reiteration of 5 statement) about a participant’s contribution often for the purpose of highlighting need for different behavior/participation/interaction (NOT general praise, NOT re: content); negotiating/discussing participation</td>
</tr>
<tr>
<td>▶ Information about the contribution and how it worked in conversation, i.e. silly/joking responses to inappropriate/unexpected utterances that acknowledge/assess/provide feedback</td>
</tr>
<tr>
<td><strong>M = MANAGEMENT/ORGANIZING SESSION FLOW/ESTABLISHING TASK EXPECTATIONS</strong> (especially @ GROUP level)</td>
</tr>
<tr>
<td>▶ Any provision of general instructions/task parameters to the (whole) group (esp re: materials/non-instructional)</td>
</tr>
<tr>
<td>▶ Instructions/session plans/rules/expectations conveyed not for immediate response but to orient THE GROUP to the task</td>
</tr>
<tr>
<td>▶ General effort to alter how the session/activity is going (e.g. questions used to create opportunity for someone to take a turn)</td>
</tr>
<tr>
<td>▶ Provision of a discussion prompt (or support) used to organize/direct conversation/task/change gears (not social responding)</td>
</tr>
<tr>
<td><strong>NO CODE</strong></td>
</tr>
<tr>
<td>▶ Any attempt/utterance that does not fit the above criteria; <strong>NOTE: for leader/staff, ALL SOCIAL TURNS are coded 9</strong></td>
</tr>
</tbody>
</table>
**Context Unit Identifiers**

- Units must be at least 10 turns long except for at the start or end of the session, or immediately preceding or following videos or side conversations, in which case they must be at least 5 units long
  - If there are components indicative of a new unit numbering fewer than 10 turns, code by content, but ascertain unit based on longer/more dominant characteristics
  - Unit is not changed for 5 utterances

<table>
<thead>
<tr>
<th>TEACHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starts with a 7 or instructional question from participant</td>
</tr>
<tr>
<td>Primary purpose is <strong>CONCEPT DEVELOPMENT/EXPLORATION/DISCUSSION</strong> (i.e. should have 7.1, 7.2)</td>
</tr>
<tr>
<td>NOTE: episodes of feedback and discussion intended to manage/negotiate participation in an activity are included as long as the general topic is still the activity or instructional task at hand</td>
</tr>
<tr>
<td>Leader support for conversational repair that involves concept development is considered teaching (if long enough)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>About session plans or video selection; generally starts with a short utterance used to summon attention, or an instruction or question that opens discussion about the plan for the current or future session</td>
</tr>
<tr>
<td>In general, any discussion about video regardless of who initiates is management UNLESS the primary purpose is simply for the participant to tell a story about a fun video he or she liked, in which case code social</td>
</tr>
<tr>
<td>Also includes negotiation of directions, explanation about materials or tasks, organization of task/role expectations, and provision of background information that does not involve concept development</td>
</tr>
<tr>
<td>Start new if split by video or side conversation</td>
</tr>
<tr>
<td>If reminding of the instructional task for a video, code 7.4 and continue with management/organization unit, if moves into actual discussion and elicitation of responses, establish new teaching unit if long enough</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOCIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starts with initiation by participant that is not redirected by the leader (i.e. leader takes 3 non-directing turns, seems to have temporarily suspended effort to continue instruction) OR 7.4 discussion prompt provided by leader/staff</td>
</tr>
<tr>
<td>NOTE: if it is a closely related topic that is tangential to instructional prompts, must be 5 non-directing leader turns to count as social; this ensures truly is a new unit and not merely an inefficient instructional moment</td>
</tr>
<tr>
<td>Primary purpose is <strong>SOCIAL DISCUSSION/SHARING IDEAS ABOUT THINGS OF (MUTUAL) INTEREST</strong>, i.e. there is no established/ongoing instructional purpose, often content is directed by participants (i.e. telling a story or talking about something of personal interest), but leader may also direct flow with 7.4 utterances</td>
</tr>
<tr>
<td><strong>HALLMARK OF SOCIAL UNITS IS ABSENCE (SCARCITY) OF 7.1, 7.2</strong></td>
</tr>
</tbody>
</table>
VITA

Megan C. Tobin
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EDUCATION

*The Pennsylvania State University*, University Park, Pennsylvania, 2011-present
  Doctoral studies
  Doctoral advisor: Kathryn D. R. Drager, PhD
  Areas of Specialization: autism spectrum disorders (ASD), language development, language disorders, special education

  M.S. in Communication Sciences and Disorders, 2007, Summa Cum Laude
  Area of Specialization: Working with individuals who are deaf and hard of hearing

*Bates College*, Lewiston, Maine, 1996-2000
  B.A. in Japanese Language, Summa Cum Laude

AWARDS and HONORS

- Graduate Student Research Endowment funds awarded to support completion of dissertation project, 2013-2014
- Ruth W. Ayres-Givens Scholarship, 2013-2014
- June E. Briant Graduate Scholarship in Communication Sciences and Disorders, 2013-2014
- The Pennsylvania State University, University Graduate Fellowship, 2011-2012
- Phi Beta Kappa, 2000

RESEARCH INTERESTS

- Transition planning for students with ASD.
- Training for families to help support improvement in outcomes for adults with ASD and reduced burden for parents.
- Support for adults with ASD, with a specific focus on social participation, social functioning, communication skills, and community involvement.

PUBLICATIONS
