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Defining Success for Students with Autism Spectrum Disorder: Social Academic Behavior in Secondary General Education Settings

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Abstract: An exploratory, observation-based study sought to strengthen understanding of the development of social communication skills that facilitate academic success, particularly within general education settings. Sixteen middle and high school students with Autism Spectrum Disorders (ASD), all of whom participated in at least one period per day of core academic instruction in a general education classroom, were observed over a period of one to three months each. Frequencies of five appropriate and three inappropriate social academic behaviors are described, in terms of their relative frequencies to one another, and their overall consistency over the course of observations. Students observed were more likely to engage in appropriate, facilitative behaviors within the classroom setting than they were to demonstrate communicative symptoms of ASD. Most social academic behaviors were demonstrated at consistent frequencies over time. Implications for educational decision-making, progress monitoring, and future research are discussed.

Autism spectrum disorder (ASD) is a complex neurodevelopmental disorder, involving deficits in social cognition and behavioral functioning. There are specific observable symptoms central to ASD, including deficits in expressive communication and social skills, repetitive stereotypic motor mannerisms, and restricted interests (APA, 2013). These deficits vary in frequency and intensity depending on the individual. For example, individuals with ASD who are considered to be high-functioning (i.e., IQ ≥ 70) tend to show fewer repetitive stereotypic behaviors, which are often replaced by strong, perseverative interests in highly specific topics. Regardless of the individual's level of functioning, these deficits can lead to daily challenges for those diagnosed with ASD (Stichter et al., 2010), which are often of particular concern within classroom settings.

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Prevalence in Public Education

The Center for Disease Control's Autism and Developmental Disabilities Monitoring Network currently estimates that the prevalence rate of Autism Spectrum Disorders is 1 in 68 children (Baio, 2014). This overall increase in the prevalence of autism is reflected in the heightened number of students identified as having autism and receiving special education services. According to the National Center for Education Statistics, the total number of children identified with autism who are receiving special education services has risen from 0.2 to 0.8% of total student enrollment in the past decade (NCES, 2013). That increase is partially due to the introduction of the special education eligibility category of "autism" being added to the Individuals with Disabilities Education Act (IDEA) in 1990. Since that time, there has been an increased emphasis on providing educational services to all students with disabilities, including those with ASD, within the least restrictive environment. The increased prevalence of ASD in the school-aged population has resulted in more students with ASD being served in inclusive

classrooms (Conroy, Asmus, Boyd, Ladwig, & Sellers, 2007). According to the 36th Annual Report to Congress approximately 61.5% of children with disabilities spend at least 80% of their time in an inclusive classroom with typical peers.

Inclusive Classrooms: Benefits and Considerations

Research has shown that students' progress in developmental areas of deficiency is positively correlated with the quality of educational services provided in general education classrooms (Soukakou, 2012). It should be noted that both professionals and parents of students with ASD increasingly prefer inclusion of these children in general education classrooms, so that children with ASD experience both greater acceptance and increased exposure to typical language and social role models (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011). Not only do students with ASD benefit from being a part of an inclusive classroom, but traditional students benefit as well. Students with ASD bring a unique perspective and presence, which can help to identify instructional concerns in the classroom (Chandler-Olcott & Kluth, 2009). Antecedent classroom factors have been found to significantly influence students' level of challenging behaviors and engagement, which is why it is important to develop successful service models for this population (Conroy et al., 2007; Ruble & Robson, 2007). For example, children with ASD may require clearer, briefer prompts from teachers to understand classroom tasks. Clear and direct instructions stand to benefit most students in a general education setting. Although these kinds of teaching procedures are well known and frequently used, it is also important to monitor the progress of successfully integrated students with ASD in inclusive classroom environments, as these characteristics can further facilitate the development of adequate assessment criteria, goal setting techniques, and interventions.

Progress Monitoring to Determine Appropriate Interventions

As the number of children and adolescents identified with ASD has increased, schools and educators have had to make changes in educational services offered to youth with ASD. When students are served via special education, decisions regarding the services provided should be based on reliable and valid practices, while individual modes of instruction and accommodation should be based on individual factors (IDEA, 2004). Specifically, goals set forth in the student's Individualized Education Plan (IEP) should address academic or behavioral deficits related to the disability, in order to practically monitor the student's progress in areas of deficit (Magiati, Moss, Yates, Charman, & Howlin, 2011). For students with ASD, this means targeting specific academic deficits, appropriate language use, and appropriate social and behavioral functioning (Muller, 2006). Unfortunately, while the formation of adequate IEP goals may be intended to indicate students' progress, this is not always the reality for students with ASD. IEPs for students with ASDs tend to more closely reflect the restrictiveness of a student's educational setting rather than individual needs (Etscheidt, 2006). Research has also found that many IEPs are faulted with leaving out important information about how to accurately measure success, motivate, and engage students with ASD in general education classrooms (Rosenblatt, Carbone, & Yu, 2013). This indicates that, while monitoring IEP goal achievement may indicate a perception of progress, the use of these goals alone does not always reliably measure skill acquisition in areas of deficit, or predict behaviors likely to be demonstrated by students with ASD who have made strong skills gains in response to educational services.

A better understanding of long-term goals for students with ASD is needed to address inconsistencies in assessment practices, goal setting, and educational services. Some tools currently exist, such as Functional Behavior Assessment (FBA), through which professionals can identify areas of deficit, antecedent conditions, and environmental factors that promote the acquisition of social, behavioral, and academic skills (Boyd, Conroy, Asmus, McKenney, & Richmond, 2008). This assessment tool is particularly helpful in developing individualized interventions in academic settings (Rosenblatt et al., 2013). FBA can help to determine whether an individual is responding positively to intervention services

and progressing in areas of deficit. However, functional assessment is not always implemented consistently within schools, and can be time consuming to conduct for all but the most intensively needy students (McKenney, Waldron, & Conroy, 2013). Additionally, the primary purpose of FBA is to assess the function of a behavior and not necessarily the frequency of a problematic behavior, although frequency data may be collected over the course of an FBA.

Once students have been deemed successful in response to interventions, it is probably more useful to observe whether they demonstrate classroom behaviors that reflect an acquired level of skill in a previous area of deficit, which would indicate that the model of service delivery is effective. There is currently no systematic assessment tool that allows for the monitoring of progress across all students with ASD who are receiving educational services. Also missing is a tool that assesses the long term effects of evidence-based interventions for students with ASD. Tools that can provide such evidence are likely to be especially helpful for students who demonstrate relatively strong progress in response to their educational services. Progress monitoring tools have been found to be important components for successful interventions in other areas. For example, monitoring progress is crucial to assessing the response of students with Specific Learning Disorders (SLD) in specific academic areas, such as reading (Justice, 2006). Systematic checks of performance accurately assess an individual's growth over time in comparison to benchmark measures, acting as both a problem identification system and a measure of progress in areas of deficit (Fuchs & Fuchs, 2006).

The current study addressed weaknesses in the applied intervention literature by observing students with ASD who were receiving general education instruction in at least one core academic area. Researchers observed whether participants' classroom behavior reflected acquisition of skills in core areas of ASD symptomology, specifically, social communication and restrictive behaviors. Consistent demonstration of specific behaviors across individuals with ASD who are successfully responding to educational services could lead to the development of an effective method of evaluating educational services for ASD. On an individual student level, confirming evidence of enhanced appropriate social and engagement behaviors may provide a means of evaluating whether a student demonstrates generalization of acquired skills in the core areas of deficit.

Method

Participants

Sixteen participants diagnosed with Autism Spectrum Disorder (ASD) were observed, ranging in age from 12 to 18 years. Fourteen participants were European American, one participant was multiracial, and one participant was Asian. Participants were recruited via nomination from special education teachers and directors in two school districts in a Metropolitan area in the Midwest. Inclusion criteria required participants to (1) have been identified with Autism Spectrum Disorder, via either medical diagnosis or school-based eligibility for special education, (2) be currently participating in general education instruction at least one academic period per day, (3) and have been served by their school's special education services at some point during their K-12 education. Once local administrators approved the project and potential participants were identified, parents were contacted by their special education directors and were mailed letters of informed consent. Teachers and special education case managers distributed informed consent packets, thus, it is not known exactly how many potential participants were contacted who did not consent to participate. Based on the number of packets given to teachers, participation rate among those contacted is estimated to be above 80%. Participants also provided written assent to participate.

A pilot study was conducted with four participants to determine relevant appropriate and inappropriate social academic behaviors to be observed. Social academic behaviors are defined as appropriate and inappropriate behaviors that have the potential to facilitate or hinder interpersonal communication within a classroom setting. A total of eight appropriate or inappropriate student behaviors were tar-

Participants' ASD symptomology and Intelligence Quotient Estimates

Participant #	Age & grade at time of obs.	Diagnosis at time of obs.	Most recent IQ	ASD symptomology measure reported in file
1	14, 7th	Asperger	130	ASDS
2	18, 12th	Asperger	99	GARS-2
3	14, 8th	HFA/Asperger	82	ASDS
4	12, 6th	Asperger	89	ADOS
5	13, 7th	Autism	47	GARS-2
6	15, 10th	Asperger	110	BASC-2 (Atypicality & Withdrawal)
7	17, 11th	Asperger	113	ASDS
8	11, 6th	Asperger	63	GARS-2
9	11, 6th	Asperger	72	GARS-2
10	18*, 12th	Asperger	91	GADS
11	14, 9th	Autism	115	ASDS
12	13, 7th	Autism	76	ABAS-II
13	17, 12th	HFA	82	Vineland-II
14	17, 11th	Asperger	112	BASC-2 (Atypicality &Withdrawal)
15	15, 10th	Autism	93	Not available
16	15, 10th	Asperger	100	BASC-2 (Atypicality)

Note: HFA = High-functioning autism; ASDS = Asperger Syndrome Diagnostic Scale; ADOS = Autism Diagnostic Observation Scale; GARS-2 = Gilliam Autism Rating Scale, Second Edition; BASC-2 = Behavior Assessment System for Children, Second Edition; GADS = Gilliam Asperger's Disorder Scale; ABAS-II = Adaptive Behavior Assessment System, Second Edition; Vineland-II = Vineland Adaptive Behavior Scales, Second Edition.

 * Participant provided informed consent rather than assent.

geted for observation for the duration of the study.

Participants' ASD symptomology was evaluated using the most recent ASD-specific measure in each participant's academic record (e.g., special education eligibility documents; Table 1). When necessary, additional information regarding diagnostic and educational history was provided via parent report. Twelve of the participants had been evaluated for ASD symptomology within the five years prior to observation; three participants within the prior 10 years. ASD-specific measures included the Autism Diagnostic Observation Scale (ADOS), the Gilliam Autism Rating Scale, Second Edition (GARS-2), the Asperger Syndrome Diagnostic Scale (ASDS), the Gilliam Asperger's Disorder Scale (GADS), and the Adaptive Behavior Assessment System, Second Edition (ABAS-II). Four participants' records did not contain results of any of the above assessments; however, the Behavior Assessment System for Children, Second Edition (BASC-II) Atypicality and Withdrawal scores

and the Vineland Adaptive Behavior Scales, Second Edition (Vineland-II) Socialization scores were reported and are described here to substantiate ASD symptoms in the population observed. One participant's file was not available with which to substantiate ASD symptomology.

Participants' estimated intelligence quotients were also evaluated using the most recent measure of cognitive ability reported in each participant's educational and/or medical file. The most common test of cognitive ability administered was the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), with nine participants having been administered this measure, followed by the Woodcock-Johnson III Tests of Cognitive Abilities (WJ III COG), with four participants administered this measure. The Wechsler Abbreviated Scale of Intelligence- Second Edition (WASI-II) and the Leiter International Performance Scale, Revised (Leiter-R) were each administered to one participant. Nine participants' scores fell within the average range,

between 85 and 115. Four participants' scores fell in the below average range (70–84). Two participants' scores fell in the low range (≤69). One participant's score fell in the above average range (116–130). Scores can be viewed in Table 1.

Measures

Five of the eight behaviors observed were categorized as being appropriate forms of social academic behavior. Such behaviors included Orientation to Speaker (OS), Appropriate Conversations with Others (AC), Appropriate Conversation with Teachers (TC), Prompted Statement to Teachers (PS), and Unprompted Statement to Teachers (US). Inappropriate social academic behavior observed included Mumbled or Jumbled Speech (MU), Interruptions (INT), and Perseverative Speech (PSP). See Table 2 for operational definitions.

Each of the social academic behaviors observed were operationally defined with examples and non-examples, and observers were trained to reliably record each target behavior via mock observation sessions. Training concluded when each observer demonstrated 80% or higher agreement on each target behavior for three or more mock data collection sessions. Inter-observer Agreement (IOA) was calculated using the formula (Agreements/ Agreements + Disagreements) * 100 (Kazdin, 1982). IOA was obtained for 32% of sessions, and total average IOA across participants was 98% (94–100). IOA was also calculated per each behavior measured, averages and ranges are available in Table 3.

Procedure

Students were observed during ongoing classroom activities during 10-minute observations. Data were recorded via hand-held iPod touch devices equipped with iBAA software (www. futurehelpdesigns.com). Frequency of each behavior was measured via 10-second partial interval recording, meaning that an interval was turned "on" for a particular behavior if the behavior occurred at any time during that interval. On average, each student was observed a total of 21 sessions, which resulted in each student being observed a total of approximately 3.5 hours throughout the course of

data collection. Often, students were observed more than once per class period.

Classes were selected for observation based on the following criteria: (1) general education, (2) the structure and content of the class allowed for opportunities for student-to-student and student-to-teacher interaction, and (3) the teacher gave permission to the researchers to observe. High school participants were observed in a variety of subject area classes, including algebra, trigonometry, geometry, honors algebra, earth sciences, biology, chemistry, physics, psychology, English, and government courses. Middle school students were observed in science, social studies, language arts, and mathematics courses. Across grade levels, science and social studies courses were the most frequently captured via observation (55% of courses observed), as they provided opportunities for social interaction as a part of instruction, and were attended by the broadest range of study participants (several study participants continued to receive math and language arts instruction in a special education setting, which was not observed).

Average frequencies of each observed behavior were evaluated to determine whether appropriate target behaviors were demonstrated more frequently than inappropriate target behaviors. Additionally, data were split in half, according to the first and second half of sessions collected, so that levels of social academic behaviors over time could be compared.

Results

In the overall sample, appropriate target behaviors ($M = 2.11$, $SD = 2.98$) were observed more frequently than inappropriate target behaviors ($M = 0.21$, $SD = 0.50$), $t = 4.79$, $p < .01$. The most frequently observed behavior was Oriented to Speaker ($M = 6.85$, $SD = 3.55$). On average, students were observed as being oriented to the speaker 6.85 intervals per session. Other frequently observed appropriate target behaviors include Appropriate Conversations with Others ($M = 1.35$, $SD = 1.40$), Appropriate Conversation with Teacher ($M = 0.97$, $SD = 0.91$), Prompted Statements to Teacher ($M = 0.89$, $SD = 0.75$), and Un-

TABLE 2

Operational Definitions of Target Classroom Behaviors

Target Behavior	Operational Definition
Oriented to speaker (OS)	The student is positioned toward the speaker for at least 3 continuous seconds. This may also be coded if the student is oriented toward the materials to which the speaker is oriented for at least 3 continuous seconds, if the material is the subject of the discussion for the student and his/her social partner. This behavior can be coded with reference to a teacher or a peer. Shoulder and/or face are pointing toward the speaker, rotated no more than 45 degrees away from the speaker's face.
Interruption (INT)	The student engages in speech that interferes with or halts the speaker's message. Student's speech may be related to the topic at hand, but inappropriately timed, or may be off-topic. If the interruption contains perseverative speech, interruption should be recorded first, and then perseverative speech should be coded.
Appropriate Conversation with Other (AC)	Target student engages in a three-step series of verbal interchanges with a social partner that leads to an interaction. Social partners in classroom settings include other students in the class, but not teachers. This can either begin with the target students (TS - P - TS) or the peer (P - TS - P). Even if a conversation carries over into the next interval, a series of three verbal interchanges on the same topic should be coded during each interval in which they occur.
Perseverative Speech (PSP)	The student introduces and persists in discussing a topic of his/her own interest. This behavior is considered perseverative when either a) the speech concerns a known restricted interest of the student or b) the student persists in discussing a particular topic after the social partner has indicated disinterest or attempted to change the subject.
Prompted Statement to Teacher (PS)	The student responds to a question presented by the teacher, either to the whole class or directly to the student. This should be coded if the student raises his/her hand to volunteer an answer or just says the answer out loud. The student's answer must be appropriate to the context of the question and typical classroom behavioral expectations.
Unprompted Statement to Teacher (US)	The student makes a statement to the teacher, when the teacher did not pose a question. The statement must be appropriate to the topic of class discussion.
Appropriate Conversation with Teacher (TC)	Target student engages in a three-step series of verbal interchanges with a teacher that leads to an interaction. This can either begin with the target student (TS – T – TS) or the teacher (T – TS – T). Even if a conversation carries over into the next interval, a series of three verbal interchanges on the same topic should be coded during each interval in which they occur. A new conversation may be coded three seconds after the previous conversation has ended.
Mumbling or Jumbled Speech (MU)	The student's speech is spoken at a low volume, with inadequate enunciation, or at a rate that interferes with intelligibility. This should not be scored if either the observer or the student's social partner(s) understand the statement well enough to formulate a response.

prompted Statements to Teacher ($M = 0.49$, $SD = 0.56$).

Across all participants, inappropriate target behaviors were observed less frequently than appropriate behaviors. Less frequently observed, inappropriate target behaviors include

TABLE 3

Inter-observer Agreement per Target Behavior

Target Behavior	IOA Range	IOA Average
Oriented to Speaker	(84–100)	93.87
Interruption	(100–100)	100
Mumbled or Jumbled Speech	(96–100)	99.56
Unprompted Statement to Teacher	(82–100)	97.25
Prompted Statement to Teacher	(93–100)	98.06
Conversation with Teacher	(88–100)	96.69
Conversation with Other	(93–100)	98.81
Perseverative Speech	(98–100)	99.75

Mumbled or Jumbled Speech ($M = 0.46$, $SD = 0.76$) and Interruptions ($M = 0.15$, $SD = 0.31$). On average, students were observed using mumbled speech and interrupting the speaker 0.46 and 0.15 times per session, respectively. Perseverative speech was observed so rarely, with an average of 0.03 times per session ($SD = 0.08$), that it was not included in further analyses examining differences in behavioral frequency over the course of observations.

Overall, frequencies of most observed behaviors remained consistent over time for all participants. Consistency estimates were evaluated by conducting paired-samples t-tests for each target behavior. There were no signifi-

cant differences found between the means of the first half and second half of data for all behaviors, except Oriented to Speaker and Appropriate Conversation with Teachers. Oriented to Speaker increased from the first half of data collection ($M = 5.73$) to second half of data collection ($M = 7.86$), $t = -2.65$, $p = 0.01$, Cohen's $D = 0.34$. Appropriate Conversation with Teachers decreased slightly from the first half of data collection ($M = 1.84$) to the second half of data collection ($M = 1.19$), $t = 2.07$, $p = 0.04$, Cohen's $D = 0.27$. Consistency estimates for each observed behavior are described in Table 4.

Discussion

Developing a comprehensive understanding of the behavioral markers of success for students with ASD is a lengthy and complex process. This study represents a first step in documenting the types of behavior that are often demonstrated by students who successfully participate in general education instructional settings. One of the clearest findings across participants in the current sample is that appropriate social academic behaviors occur more frequently that inappropriate behaviors, indicating that successful students with ASD are able to use age appropriate volume, enunciation, and conversational pacing, and do not frequently discuss their restricted interests during class. Not only were inappropriate behaviors consistently occurring less than once per observation, but they appeared to decline

TABLE 4

Consistency Estimates of Target Behaviors Over Course of Data Collection

Target Behaviors	M1	M2	t	Significance (p)
Oriented to Speaker	5.73	7.86	−2.65	0.01**
Appropriate Conversation with Others	1.33	1.76	−1.13	0.26
Appropriate Conversation with Teacher	1.84	1.19	2.07	0.04**
Prompted Statement to Teacher	1.32	0.96	1.93	0.06
Unprompted Statement to Teacher	0.43	0.55	−1	0.32
Mumbled or Jumbled Speech	0.74	0.51	1.66	0.10
Interruptions	0.23	0.17	0.86	0.39
Perseverative Speech	0.06	0.01	1.41	0.16

Note: Mean differences with significance (p) values less than .05, was considered statistically significant; $M1 = $ mean of first half of observations; $M2 = $ mean of second half of observations.

from the first to the second half of observations. Thus, being in a general education environment may continue to have an ameliorative effect on social excesses and deficits commonly observed among adolescents with ASD.

The changes observed over the course of data collection in Oriented to Speaker and Appropriate Conversation with Teachers indicate a need for further investigation. Increases in orienting to speakers within the classroom setting may reflect increased comfort on the part of students with ASD, or increasing knowledge of classroom routines and norms. This is consistent with previous findings that children with ASD exhibit temperamental characteristics of shyness, one of which is being slow to acclimate to novel situations (Clifford, Hudry, Elsabaggh, Charman, & Hudson, 2013). Indeed, shyness as a personality characteristic may underlie the ASD symptoms of insistence on sameness and distress at small changes (APA, 2013; Schriber, Robins, & Solomon, 2014). Thus, students with ASD may increase their eye contact with and looking at other people as they become more comfortable in the classroom environment. This finding needs replication, however, and its impact upon academic and social success should be examined directly.

While not significant, the rate at which students spoke to peers also increased, and the degree of change is similar to the change in conversation with teachers, which was significant and declined over time. One possible explanation for this finding is that students spoke less to teachers as they increased the number of times that they interacted with peers. Also, as the definition of interaction in the present study required relatively complex interactions (three back and forth utterances), students with ASD may have acquired skills and comfort in interaction over time that allowed them to begin to demonstrate higher order conversation skills (rather than single initiations and responses, which were not coded). Conversely, peers may have become more knowledgeable about their classmates with ASD, in ways that allowed them to foster and support lengthier conversations in the classroom setting. Perhaps simultaneously, teachers may have come to discourage lengthy interactions from students with ASD over

time, via verbal or nonverbal cues indicating their lack of availability for continued interaction. Each of the above hypotheses should be investigated, to determine the contextual factors that evoke and reinforce social academic behavior among adolescents with ASD. Such analyses would be strengthened by larger sample sizes, which would allow for stronger demonstration of significant changes, when they occur.

Students without ASD were not observed in this exploratory study. However, conclusions about the relative importance of each of the social academic behaviors explored here, as well as any other behaviors of concern in general education settings, will be strengthened by comparison to students without ASD. Future investigations of social academic indicators of success should include typically developing peers, including those with non-pervasive disabilities, such as Attention Deficit/Hyperactivity Disorder (ADHD) or learning disabilities (LD). Comparisons across these groups will provide much-needed knowledge of normative progression of social academic behaviors for students with a variety of disabilities, as well as provide guidance for educators regarding what kind of challenges they are likely to encounter in diverse general education secondary classrooms. If such analyses can be conducted longitudinally, including when students are first introduced to general education academic instruction, more information will be available about normative progression over time.

Understanding the progression of social academic behavior and its relation to ASD symptom presentation in adolescence has the potential to facilitate decision-making about when and to what degree students are ready for instruction in the large group, general education setting. This would represent an important advance, as there is evidence that, currently, educators making decisions about inclusion in general education settings for students with ASD consider many complex factors, but lack an integrated way of evaluating students' readiness (Sansosti & Sansosti, 2012). While it is indisputable that a constellation of social, behavioral, academic, and communicative skills are prerequisite for inclusion in general education, what is lacking is a systematic way of documenting a minimal

level of progress in each area that may qualify a student as being ready for instruction alongside typically developing peers. Future investigations of social academic behavior, such as those measured here, can address this lack by beginning to draw conclusions across behaviors about when and under what conditions important developmental shifts occur. A developmental focus on the growth of social academic behaviors for adolescents with ASD is appropriate, given both the developmental nature of ASD and recent evidence suggesting that development is as dynamic in adolescence as it is during the childhood years (Blakemore, 2012).

Finally, while knowing the social academic behaviors demonstrated by students with ASD vís a vís the behavior of typically developing peers will assist in decision-making and progress monitoring efforts, it is also possible that students with ASD may demonstrate a unique progression of social academic skills. Further, individual development cannot be forgotten, such that different individuals with ASD are likely to demonstrate no small degree of variability in their rates of skill acquisition. Thus, as future research delves further into how and when adolescents with ASD exhibit developmental leaps in their social academic behaviors, individual factors that contribute to relative differences in rates of progress should also be explored.

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