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# Comparing two naturalistic pragmatic assessments: The celf-5 pragmatic activities and the Yale in vivo pragmatic protocol (yipp)

Rebecca Reid  
*James Madison University*

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Comparing Two Naturalistic Pragmatic Assessments:  
The CELF-5 Pragmatic Activities and the Yale *in vivo* Pragmatic Protocol (YiPP)

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An Honors College Project Presented to  
the Faculty of the Undergraduate  
College of Health and Behavioral Studies  
James Madison University

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by Rebecca Mari Reid

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Accepted by the faculty of the Department of Communication Sciences and Disorders, James Madison University,  
in partial fulfillment of the requirements for the Honors College.

FACULTY COMMITTEE:

HONORS COLLEGE APPROVAL:

---

Project Advisor: Geralyn Timler, Ph.D.  
Director SLP-M.S. Residential, Comm. Sciences and  
Disorders

---

Bradley R. Newcomer, Ph.D.,  
Dean, Honors College

---

Reader: Stacey Pavelko, Ph.D.  
Undergraduate Program Director, Comm. Sciences  
and Disorders

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Reader: Marsha Longerbeam, Ph.D.  
Assistant Professor, Comm. Sciences and Disorders

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PUBLIC PRESENTATION

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### **Abstract**

Pragmatics, or the social use of language, is a dimension of communication skills that is very difficult to assess due to its dependence on cultural norms, situational context, and speaker differences. Of the current methods for evaluating pragmatic language skills in children, the literature most frequently recommends naturalistic assessment because it allows the clinician to most closely simulate a real-life interaction. Despite these recommendations, limited information exists to guide clinicians for making decisions about which activities yield the most representative pragmatic language sample. This preliminary study compared two naturalistic pragmatic assessments, the Pragmatic Activities from the Clinical Evaluation of Language Fundamentals, Fifth Edition (CELF-5) and the Yale in Vivo Pragmatic Protocol (YiPP), to answer two research questions 1.) Which of the two naturalistic assessments, yielded more child utterances, response to questions, and longer mean turn length? and 2.) Did these naturalistic assessments identify the pragmatic concerns reported by caregivers? Assessments were administered to six participants, three children with pragmatic language concerns, and three age-matched peers. This study found that the number of child utterances, response to questions, and mean turn length varied greatly across participants although subtle differences emerged across activities. On average, the Yale in Vivo Pragmatic Protocol (YiPP) elicited a longer mean turn length and a higher number of utterances per minute. In regard to the second research question, the CELF-5 pragmatic activities checklist matched up more closely with the pragmatic concerns identified by caregivers than the YiPP error/cue scores. The results of this study support use of the Pragmatic Activities Checklist as one assessment tool to confirm parent-identified pragmatic concerns in school-age children.

## **Introduction**

Pragmatic skills refer to the social use of language. They are defined by the American Speech-Language-Hearing Association (ASHA) as, “the effective and appropriate use of language to accomplish social goals, manage turns and topics in conversation, and express appropriate degrees of politeness, awareness of social roles, and recognition of others’ conversational needs” (ASHA, 2014). Most people use appropriate pragmatic language skills every day without even thinking about it. Pragmatic language skills include making eye contact while speaking, nodding to show conversational engagement, greeting a friend, asking questions when something is unclear, and standing an appropriate distance away from someone while having a conversation. Children with pragmatic difficulties struggle with these tasks. They are also more likely to withdraw socially, interact inappropriately with peers, and be excluded from peer groups, so intervention in this area of language skills is very important (Whitehouse, 2009).

According to a 2015 Caseload Survey conducted by ASHA, a typical caseload for any given Speech-Language Pathologist (SLP) across the nation included 29% language-based disorders, including pragmatic components, and 15% autism spectrum disorders. Together that is almost half of an SLP’s caseload that could include disorders with pragmatic elements (ASHA, 2015). Therefore, it is important for clinicians to have evidence-based information about the most useful methods for naturalistic pragmatic assessment. Problems with pragmatic skills are most often associated with Autism Spectrum Disorder (ASD) but can occur as symptoms of other disorders, for example Traumatic Brain Injury (TBI). They can also be the main etiology of a disorder as shown in Social Pragmatic Communication Disorder (Brukner-Wertman, Laor, & Golan, 2016; Matson & Sturmey, 2011; Paul, 2015). Social Pragmatic Communication Disorder (SPCD) was introduced in 2013 when the American Psychological Association released the fifth

edition of the Diagnostic and Statistical Manual. SPCD is a disorder that includes “problems with social interaction (e.g., speech style and context, rules for linguistic politeness), social cognition (e.g., emotional competence, understanding emotions of self and others), and pragmatics (e.g., communicative intentions, body language, eye contact)” (ASHA, 2017).

Since the introduction of the SPCD diagnosis in 2013, there has been a renewed interest in the examination of assessment tools to identify pragmatic language disorders. This study compares and contrasts the richness of data, in the form of total child utterances, response to questions, and mean turn length (the number of consecutive child turns), that can be elicited from two naturalistic pragmatic protocols, the Pragmatic Activities from the Clinical Evaluation of Language Fundamentals, Fifth Edition (CELF-5; Wiig, Semel, Secord, 2013) and the Yale in Vivo Pragmatic Protocol (YiPP; Simmons, Paul, & Volkmar, 2013).

### **Background**

Pragmatic language skills are very challenging to measure because the rules for pragmatics depend heavily on cultural norms, speakers, and situational context (Adams, Green, Gilchrist, & Cox, 2002; Adams et al., 2012; Young, Diehl, Morris, Hyman, & Bennetto, 2005). There has long been debate about how to appropriately diagnose pragmatic disorders. Reasons for this debate include: differences in terminology and diagnostic criteria across pragmatic research, a shortage of culturally appropriate, reliable, norm-referenced tests, and not many comparisons of testing across different types of disorders with pragmatic components (Norbury, 2014). Today, there are three classifications of assessments that exist for pragmatics: norm referenced tests, observational checklists and questionnaires, and naturalistic assessment.

A norm-referenced test is a test that has been performed on a large population in order to provide data that is representative of a predetermined group. A score on a norm-referenced test



compares an individual's score to the scores of their same-age peers using a normal curve. When a clinician is administering a norm-referenced test to a child, he or she must follow very specific instructions from a test manual to ensure reliability of implementation and scoring. This can sometimes cause the interaction to feel overly formal or unnatural to the child (Simmons, Paul, & Volkmar, 2014). Norm-referenced tests such the Test of Pragmatic Language 2<sup>nd</sup> Edition (TOPL-2; Phelps-Terasaki, 2007) use picture cards, prompts, and hypothetical situations to assess pragmatic skills. While norm referenced tests have the value of peer comparison, they are not always the best measure of a highly variable skill such as pragmatics. The main problem is that children with pragmatic disorders often perform well on decontextualized tests of pragmatics; that is, they know what to do when presented with a hypothetical situation, but when it comes to the actual implementation of pragmatic skills, (i.e. with peers, in day-to-day situations) they struggle (Simmons et al., 2014). Therefore, norm-referenced tests may not accurately capture the difficulties the child may demonstrate with social communication.

Observational checklists contain a variety of behaviors that a clinician can check off in order to see which areas a child is struggling the most. These are used in conjunction with classroom observation, social observation (on the playground, at lunch), or therapy-based observation. The most recent of these is the Targeted Observation of Pragmatics in Children's Conversations (TOPICC), which Adams et al. developed in 2012. This checklist is categorized into areas such as turn taking, taking the listener into consideration, verbosity, and topic management (Adams, et al., 2012). Report measures are given to parents and teachers and the results give clinicians a general idea of the concerns that caregivers have about the child. The Children's Communication Checklist (CCC-2), another observational checklist, is similar to the TOPICC and is the most widely used parent/teacher report measure of a child's pragmatic skills

(Norbury, 2014; Swineford, 2014). While these checklists and report measures can be helpful for gauging environments that pose challenges for the child, additional information from direct observation by the SLP is needed to confirm a diagnosis of a pragmatic disorder.

The last grouping of existing assessments is naturalistic assessment. This assessment type involves interacting with the child in such a way and in such an environment that best simulates a typical social interaction. A naturalistic assessment allows a clinician to respond organically to situations as they arise instead of closely following a script. This causes the conversations to feel more natural and to more closely simulate how the child would react in a real-life situation.

The first such naturalistic evaluation to be developed was called The Peanut Butter Protocol. The Peanut Butter protocol was developed in 1984 and was used with children aged 3-5 to assess their communicative intent. In this protocol, the child is presented with situational prompts that they must respond to including opening a jar of cookies with a tight lid, assembling a peanut butter sandwich, and drawing and describing a picture (Carpenter & Strong, 1988; Hwa-Froelich, 2014; Roth & Spekman 1984). This pragmatic protocol assesses many dimensions of a child's pragmatic skills including requesting, turn-taking, denial, specificity, clarification, and more (Creaghead, 1983). The disadvantage of this particular assessment is that it is for younger children. However, The Peanut Butter Protocol has been since adapted in many different ways for use in pragmatic evaluation with older children. These adaptations are included in assessments like the CELF-5 and the YiPP.

The gap in knowledge that currently exists is that, if naturalistic assessment is a more appropriate way to observe pragmatics, what protocol produces the clinically richest information? This preliminary study addressed two research questions: 1.) Which of these two naturalistic assessments, the CELF-5 Pragmatic Activities or the YiPP, yielded the most total

child utterances, response to questions, and longest mean turn length? and 2.) Did these naturalistic assessments identify the pragmatic concerns reported by caregivers?

## **Design and Methods**

### **Recruitment**

After IRB approval was obtained, recruitment of participants began. Participants were recruited via word of mouth, study fliers (Appendix A), and clinical referrals. All participants received a \$15 gift card to a local store for participating in the study.

### **Participants**

Six children, (2 female, 4 male) ages 7;5-9;5 participated in this study. Participants were all native English speakers and not Hispanic or Latino. Race was identified by caregivers and consisted of 4 White participants and 2 Asian participants. Three of the children were recruited for this study due to caregiver concerns about pragmatic skills and three children participated as age-matched peers. No participant had a diagnosed pragmatic disorder. Areas of pragmatic concern were based only on caregiver reported concerns.

### **Instruments**

This study used the following assessment instruments:

**Children's Communication Checklist** (Bishop, 2006). The CCC-2 is a 70-item parent report measure for use with children age 4;0-16;11, that uses a 4-point numeric frequency scale ranging from "0 (less than once a week [or never]) to 3 (several times [more than twice] a day [or always]" and helps identify areas of concern in seven areas of a child's communication skills

(Bishop, 2006). These seven areas are (A) speech, (B) syntax, (C) semantics, (D) coherence, (E) initiation, (F) scripted language, (G) context, (H) nonverbal communication, (I) social relations, and (J) interests. Each area is addressed with ten questions. Pragmatic language skills are covered under sections on E, H, I, and J. Scoring of the CCC-2 provides two scores, one composite score called the General Communication Composite (GCC) and one index score called the Social Interaction Difference Index (SIDI; Bishop, 2006). The GCC is a norm-referenced score that can be used to evaluate overall communication skills while the SIDI is a difference index that can be found by, “the summed difference between the structural language scales (A, B, C, and D) and the pragmatic language scales (E, H, I, and J)” (Bishop, 2006). As noted by Bishop, “SIDI scores between -10 and 10 are considered typical; scores within this range were obtained by 90% of the CCC-2 normative sample. Scores  $\geq 11$  suggest syntactic/semantic skills are deficient and relatively poorer than pragmatic skills, whereas scores  $\leq -11$  suggest pragmatic language skills are deficient and relatively poorer than syntactic/semantic skills...” (Bishop, 2006). However, using the SIDI score to differentiate pragmatic language abilities from symptoms of language impairment or autism-spectrum disorder have had varied results (Ash, Redmond, Timler, & Kean, 2017). Because of this, researchers have created their own versions of pragmatic composites to better capture clinically significant pragmatic weaknesses (Ash, et al., 2017). This study will use a pragmatic composite based on coherence, initiation, scripted language, and context (sections D, E, F, G, and H).

**Clinical Evaluation of Language Fundamentals, Fifth Edition, Pragmatic Activity Checklist** (CELF-5; Wiig, Semel, & Wayne, 2013). The CELF-5 is a battery of tests used for assessment and diagnosis of language disorders. It includes a supplementary criterion-referenced

measure called the “Pragmatic Activity Checklist” that can be used with children ages 5-21 years old to evaluate functional communication skills, including verbal and nonverbal pragmatic skills within an authentic interaction. Activities include making a paper airplane or assembling a puzzle, making a card or wrapping a present, having a snack which was adapted from the Peanut Butter Protocol activity (Creaghead, 1984), or looking through a catalog and suggesting a gift. These activities last no longer than 5-10 minutes and can be modified for different ages. Scoring is completed using a 32-item checklist. The checklist is broken into four categories including nonverbal communication (10 items) and verbal communication across three subcategories (i.e., Manner of Communication—7 items, Relevance of Communication—6 items, Quality & Quantity of Communication—9 items; Wiig et al., 2013). The statements on the checklist pertain to atypical pragmatic behaviors e.g., “did not maintain culturally appropriate eye contact with speaker; asked the same questions repeatedly” (Wiig et al. 2013). A behavior is checked if it is observed and receives a score of 1, therefore higher scores reflect more observations of atypical pragmatic behaviors. The Pragmatic Activities criterion cut score for adequate pragmatic language skills for ages 5;0-21;11 is  $\leq 9$ . If a score exceeds the criterion cut score of 9, a follow-up evaluation of pragmatic language skills is recommended (Wiig et al., 2013).

**Yale in Vivo Pragmatic Protocol** (Simmons, Paul, & Volkmar, 2014). The YiPP is a dynamic assessment that was developed to give clinicians a “quantitative measure of pragmatic competence in specific domains that can be used to establish a level of baseline function or document change in intervention” and “to validate the identification of pragmatic language impairment in individuals with autism whose basic language performance falls within the average range on standardized testing” (Simmons et al., 2014, p 2163, 2167). The YiPP takes the form of a thirty-minute conversation used with school age children (normed on children age 9-

17) in which the clinician uses 19 different “pragmatic probes” and looks for target behaviors in four conversational domains: discourse management (6 probes), communicative functions (4 probes), conversational repair (4 probes), and presupposition (5 probes) (Simmons et al., 2014). Some probes are based on activities adapted from the Peanut Butter Protocol (Creaghead, 1984) and other probes were designed to emphasize participant performance or examiner feedback, e.g. turning your head to a loud noise, knowing when to stop speaking so your conversational partner can speak. (Simmons et al., 2014). If the child does not respond to the presented pragmatic probe, the clinician cues the child using a hierarchical cue system. Cues are presented in order from least supportive (ex. expectant waiting) to most supportive (ex. a specific verbal cue) (Simmons et al., 2014). Though the test utilizes prompts to elicit responses, it is naturalistic because the clinician can go “off-script” and conversation is flexible and child-centered. It is recommended that the protocol be video recorded and scored later or scored by another clinician outside of the room. Scoring is completed by assigning each pragmatic probe an “error score” and a “cue score.” “Error scores range from 0 through 2, with a score of 0 representing the best possible performance (e.g., a correct, appropriate pragmatic response), a score of 1 representing a mildly inappropriate response, and a score of 2 representing a clearly inappropriate or no response” (Simmons, et al., 2014, p 2166). The cue score is a measure of how many cues it took for the participant to elicit the pragmatic response. “Cue scores ranges from 0 through 6, with 6 indexing an appropriate, spontaneous response with no cue; a score of 0 indicated no response regardless of level of cueing provided. Thus, lower error scores are indicative of better performance on the YiPP, whereas lower cue scores are indicative of worse performance” (Simmons, et al., 2014, p 2166).

## **Procedures**

**Stimulus Materials.** Stimulus materials required for the CELF-5 Pragmatic Activities included a deck of playing cards, blank and lined paper for making paper airplanes, and two catalogs (one of interest to the child and one not of interest). This study used a catalog from Toys-R-Us and one from the home furnishing store Crate and Barrel. Stimulus materials required for the YiPP included a voice recorder (not functioning), a box with bells or other noise maker inside, two different magazines (one of interest to the child, one not), a pencil, and YiPP forms A-D.

**Assessment.** All assessment took place in the James Madison Social Communication and Language Evaluation (SCALE) Lab in a controlled testing room with a one-way mirror. Parents were given the option of observing the session behind a one-way mirror. Sessions were conducted by the student researcher and were video recorded. Parents were asked to complete the CCC-2 as well as a developmental history form. After the assent form was read to and signed by the child, the assessment began.

For participants PRAG01, PRAG02, and PRAG03, the assessment began with three activities from the CELF-5 Pragmatic Activities Checklist. The goal of these activities is to provide a context in which the clinician and the client may have a natural and flowing conversation with suggested topics for discussion. The first activity was, "Teach and Play a Game." Participants were asked if they were familiar with the card game, War. If so they were asked to explain the rules they played by. If not, the rules were explained by the student researcher. During the game, topics of discussion included, favorite or preferred games, board games, game shows, invented or novel games, and preferred play partners. The second activity

was “Make a Paper Airplane.” In this activity the student researcher asked the participant to instruct her on how to make a paper airplane. Topics of discussion included: the participant’s experiences on a plane, places they have travelled, professions involving flight (i.e. pilot, flight attendant), and places the participant would like to visit. The third activity was “Recommend a Gift.” In this activity the student researcher told the participant that she had a neighbor his/her age that had a birthday coming up and needed the participant’s help to choose a gift. Two magazines were provided, one preferred magazine (Toys R Us) and one non-preferred magazine (Crate and Barrel). Topics of conversation included which magazine to look through, popular toys for children their age, gifts the participant has received for their birthday, price of the gift, and recommended gift selection.

After these activities, the Yale in vivo Pragmatic Protocol (YiPP), a 30-minute conversation with embedded pragmatic probes such as “topic initiation” and “request for clarification,” was administered. For participants PRAG04, PRAG05, and PRAG06, the order of the protocols was counterbalanced to avoid skewing results based on order of presentation and rapport built with the student researcher. For these three participants, the assessment began with the YiPP then proceeded with “Choosing a Gift” and “Making a Paper Airplane,” and concluded with “Teach and Play a Game.”

## **Data Analysis**

**Systematic Analysis of Language Transcripts** (Miller and Iglesias, 2016) All six participant sessions were transcribed into the computer program, SALT and separated by activity i.e. “PRAG01\_Cards”, “PRAG01\_Plane”, “PRAG01\_Gift” and “PRAG01\_Yale” in order to examine differences across the individual activities. This program was used to obtain the



following: the number of total child utterances, response to questions, and mean turn length. SALT files were transcribed by the student researcher and two trained student research assistants, Marissa Arkus and Kaitlyn Bresette. To establish reliability, each transcription file was checked over by another transcriber who had not transcribed the original file.

**CCC-2.** Scores from the CCC-2 were used to identify caregiver-reported areas of concern and to determine if the child's pragmatic language skills scores were higher or lower than their syntactic and semantic skills scores.

**CELF-5.** This measure was scored in accordance with the 32-item Pragmatic Activities Checklist included in the CELF-5 (Appendix B). A score of  $\geq 9$  indicates concern and recommendation for further assessment of pragmatic skills.

**YiPP.** The YiPP is scored using the Coding Rubric- Form C (Appendix C) provided in the supplemental materials section of the protocol. Each of the 19 pragmatic probes is assigned both a cue score and an error score. A cue-score ranges from 6-0 and an error-score ranges from 0-2. As previously mentioned, a higher cue-score indicates less cueing and therefore better performance. A lower error-score indicates less errors and therefore a better performance. The 19 pragmatic probes are divided into four conversational domains: Discourse Management (DM), Communicative Function (CF), Conversational Repair (CR), and Presupposition (P). After assigning a cue and error score to each probe, the total score for each domain is summed and divided by the total number of probes in that domain. For example, if a participant received a summed error score of 2 in the DM domain, that score would be divided by 6, the total number of probes in the DM domain, for a resulting score of 0.33 in the DM domain. If a participant receives a summed cue score of 29 in the DM domain, that summed score would also be divided

by 6 for a total cue score of 4.8 in the DM domain. Both of these scores fall within the normal limits for this domain for a typically developing child as displayed in Table 1 (Simmons et al., 2014). The Simmons et al. (2014) study also provided recommended cut scores to reliably differentiate between the typically developing (TD) group and the high-functioning autism (HFA) group. The cut scores include total error and cue-scores. Total error and cues scores are calculated by summing the mean scores from each domain and dividing by 4 (the total number of domains). The researchers calculated the cut scores by adding one standard deviation to the mean total error and cue scores of the typically developing group. The cut scores were found to be a total error score above 0.83 and a total cue score of above 5.31. If a participant scored above these cut scores they were classified as High-Functioning Autism, if they scored below they were classified as typically developing. (Simmons et al., 2014).

Table 1: Error and Cue Cut Scores

	Error Score				Cue Score			
	Disc. Mgmt.	Comm. Funct.	Conv. Repair	Presupp.	Disc. Mgmt.	Comm. Funct.	Conv. Repair	Presupp.
TD	0.34	0.72	0.58	0.55	5.19	4.17	4.39	4.12
HFA	0.72	0.68	0.84	0.82	4.38	4.13	3.66	3.48

As reported by Simmons et al., 2014

TD- Typically Developing; HFA- High Functioning Autism

## Findings

As a reminder, this study addressed the following research questions: 1.) Which of these two naturalistic assessments yielded the most total child utterances, response to questions, and longest mean turn length? and 2.) Did these naturalistic assessments identify the pragmatic

concerns reported by caregivers? Findings are reported by assessment category beginning with the pragmatic concerns identified by caregivers in the CCC-2 and moving to answer the stated research questions.

**Children’s Communication Checklist (CCC-2).** Scores for the CCC-2, a caregiver report measure, were totaled using a pragmatic composite. The pragmatic composite consisted of items D (Coherence), E (Initiation), F (Scripted Language), G (Nonverbal Communication), and H (Nonverbal Communication). Scores for these items are shown in Table 2. The total pragmatic composite score is based on a mean of 50 with a standard deviation of +/- 15. Within each category, scores are based on an average of 10 +/- 3. Scores within one standard deviation of the mean are considered within typical limits.

*Table 2: CCC-2 Pragmatic Composite Scores*

Participant	Coherence	Initiation	Scripted Language	Context	Nonverbal Communication	Total
<b>PRAG01</b>	13	15	13	14	13	68
<b>PRAG02</b>	13	15	13	14	13	68
<b>PRAG03</b>	9	9	11	10	9	48
<b>PRAG04</b>	11	9	13	11	10	54
<b>PRAG05</b>	8	7	10	8	7	40
<b>PRAG06</b>	9	9	9	7	7	41

In this study, the CCC-2 measured the type and severity of concerns that the caregiver had about their child’s pragmatic language skills. As a reminder, participants, PRAG01, PRAG02, and PRAG03 participated as age-matched peers while participants PRAG04, PRAG05, and PRAG06 participated because their caregivers had concerns about their pragmatic language skills. Participant PRAG04 scored within the normal range, although the caregiver reported that they had mild concerns about CCC-2 items related to his/her preference for desired

topics/activities and willingness to socialize with peers not interested in those topics/activities. For the item “talks repetitively about things no one is interested in,” the caregiver gave the participant a score of 2, meaning that the behavior occurs “once or twice a day (or frequently).” This was noted both by the student researcher and the student research assistants as occurring very frequently during the assessment sessions.

While participants PRAG05, and PRAG06 scored within one standard deviation of the total composite score, several of their scaled scores were lower in comparison with the other participants. In the “Initiation” and “Nonverbal Communication” scales, participant PRAG05 received a score of 7. This score, while still technically within typical limits, is an indicator that his/her caregiver has observed the participant having difficulty with these particular pragmatic areas. The same can be said for participant PRAG06 who received of 7 by his/her caregiver in the “Context” and “Nonverbal Communication” scales. Examples of statements from these scales on the CCC-2 are, “Stands too close to people when talking to them” (Nonverbal Communication) and “Talks to people without any encouragement or starts conversations with strangers” (Initiation).

Table 3: Times for Activities

Participant	CELF-5				YiPP		
	Cards	Plane	Gift	Total	Yale	Transitions	Total
<b>PRAG01</b>	8:27	8:24	6:32	23:23	27:44	1:22	51:49
<b>PRAG02</b>	10:01	7:55	10:30	26:31	32:42	0:40	1:01:48
<b>PRAG03</b>	7:47	6:59	8:35	23:21	24:48	0:33	48:42
<b>PRAG04</b>	7:28	13:31	8:31	29:30	1:01:02	0:26	1:30:58
<b>PRAG05</b>	5:46	8:13	7:10	21:09	51:47	1:35	1:14:31
<b>PRAG06</b>	9:07	10:38	5:56	25:41	39:08	0:42	1:05:31

**Systematic Analysis of Language Transcripts (SALT).** The SALT transcripts were used to examine the child utterances from each activity (Teach and Play a Game, Make a Paper

Airplane, and Recommend a Gift) separately, as well as in comparison with the YiPP. Times taken to administer assessment activities are shown in Table 3.

The SALT analyses focused on the total number of child utterances, response to questions, and mean turn length across the assessment activities. A summary of that data can be found in Table 4 and Table 5. The data varied widely across participants. For example, the same activity, Teach and Play a Game (“Cards”), counterbalanced and administered with PRAG01 elicited 70 total utterances whereas with PRAG06, the same activity elicited 106 total utterances. Participant PRAG01 appeared to have a more reserved personality and participant PRAG06 was identified by his/her caregiver as a child who will talk to anyone even total strangers. Differences in number of responses to questions were related to participant talkativeness. Participants who were more talkative such as PRAG04, PRAG05, and PRAG06 were asked fewer questions by the student researcher because they had a tendency to dominate the conversation and not pass the conversational turn appropriately. This is also confirmed in their generally higher mean turn length in the CELF-5 Pragmatic Activities. The higher the mean turn length, the more consecutive turns the child took during the conversation. In the YiPP, it is clear that participant PRAG04 dominated the conversation with a MTL of 4.21, far higher than any of the other

Table 4: Summary of Pragmatic Activities Data

Participant	Cards			Plane			Gift		
	Utter.	Response to Qs	MTL	Utter.	Response to Qs	MTL	Utter.	Response to Qs	MTL
PRAG01	78	57	1.24	65	39	1.1	65	42	1.25
PRAG02	73	46	1.14	74	40	1.37	100	39	1.34
PRAG03	89	32	1.76	101	27	1.81	112	24	1.37
PRAG04	71	6	1.73	123	23	1.85	73	11	1.42
PRAG05	30	19	1.03	76	31	1.19	55	19	1.22
PRAG06	106	23	1.86	72	15	1.57	75	15	1.67

participants. However, due to this participant’s verbosity, the YiPP went on for twice as long as for the other participants.

Table 5: Summary of YiPP Data

Participant	Total Utter.	Response to Qs	Mean Turn Length
<b>PRAG01</b>	303	153	1.36
<b>PRAG02</b>	398	136	1.82
<b>PRAG03</b>	354	110	1.68
<b>PRAG04</b>	923	54	4.21
<b>PRAG05</b>	501	214	1.66
<b>PRAG06</b>	399	65	1.84

To account for the difference in length of time between the activities, the total utterances per minute (UPM) were calculated. To find this, participants’ total utterances per activity were divided by the number of minutes the activity lasted. The “Total” column was found by summing the utterances for each CELF-5 activity and dividing by the total time taken for all three activities. This was done in order to give a closer comparison to the lengthier YiPP. Results are shown in Table 6.

Table 6: Total Utterances Per Minute (UPM)

Participant	CELF-5				YiPP
	Cards	Plane	Gift	Total	Yale
<b>PRAG01</b>	9.2	7.7	9.9	8.89	10.9
<b>PRAG02</b>	7.3	9.4	9.5	9.31	12.4
<b>PRAG03</b>	11.4	14.4	13.1	12.9	14.3
<b>PRAG04</b>	9.5	9.1	8.6	9.1	15.1
<b>PRAG05</b>	5.2	9.2	7.7	7.6	9.6
<b>PRAG06</b>	11.64	6.8	12.7	9.9	10.2

From this table, it is clear that UPM varied between participant and activity. With all participants, the YiPP elicited a larger UPM than the CELF-5 activities, however, this could be due to the YiPP being a 30-minute cohesive conversation while the pragmatic activities are broken up into smaller (~10-minute) conversations. No notable patterns emerged between the individual CELF-5 pragmatic activities.

**Clinical Evaluation of Language Fundamentals, Fifth Edition, Pragmatic Activity Checklist (CELF-5).** The CELF-5 Pragmatic Activity Checklist was scored using a 32-item checklist. The checklists were completed by two examiners independently and at separate times. E1 is representative of scoring by student researcher and E2 is representative of scoring completed by research assistant, Marissa Arkus (a student research assistant in the SCALE Lab). As a reminder, scores are calculated by checking a box if an atypical pragmatic behavior is observed, thus higher scores reflect more observances of atypical pragmatic behaviors. If a score is  $\geq 9$ , a follow-up evaluation of pragmatic language skills is recommended. Table 7 shows the total score awarded as well as score by category (Nonverbal and Verbal-Manner, Relevance, and Quality). Scoring between E1 and E2 was within 2 points for all categories and no difference in scored changed the score from being above or below the cut score. Participants PRAG05 and PRAG06 scored at or above a total score of 9, while PRAG01, PRAG02, PRAG03 demonstrated significantly lower observances of atypical pragmatic language skills. PRAG04 scored a 7 with E1, who administered the protocol, and a 5 with E2, who watched a video recording of the assessment session. Both examiners agreed that PRAG04 had some atypical pragmatic behaviors that were merited further evaluation such as return to a preferred topic, and domination of the conversation. Participants PRAG05 and PRAG06 both given scores of 9 points or greater and had especially high observances of atypical pragmatic behaviors in the Verbal Manner and Verbal Quality categories. Examples of atypical behaviors observed in these categories that were marked by the examiners include: “spoke too fast to be understood,” “said things that didn’t seem to relate to topic or make sense logically,” “provided too much information,” and “did not pass the conversational turn.”

Table 7: Pragmatic Activity Checklist Scores

Participant	E1					E2				
	Nonverbal	Verbal (Manner)	Verbal (Relevance)	Verbal (Quality)	Total	Nonverb.	Verbal (Manner)	Verbal (Relev.)	Verbal (Qual.)	Total
PRAG01	0	0	0	1	1	0	0	0	1	1
PRAG02	0	1	0	1	2	0	1	0	1	2
PRAG03	0	0	0	2	2	0	0	0	2	2
PRAG04	0	0	3	4	7	0	1	2	2	5
PRAG05	0	4	2	4	10	0	5	2	2	9
PRAG06	1	3	2	5	11	0	3	1	5	9

**Yale in Vivo Pragmatic Protocol (YiPP).** The YiPP was also scored by two examiners independently and at separate times. As a reminder, the YiPP uses error (0-2) and cue (0-6) scores to capture how pragmatically appropriate the participant's response is and how much cueing is necessary to elicit that response (i.e. spontaneous, expectant waiting, specific verbal cue). A lower error score indicates a more appropriate pragmatic response while a higher cue score indicates that less cues were necessary to achieve the desired response to the pragmatic probes. Scores in each of the domains were calculated by summing the numerical scores assigned to each probe in the domain and dividing by the total number of probes in each domain (i.e. Discourse management has 6 probes). As stated in the Simmons et al. article (2014), if a probe is excluded by the examiner it should be removed from the total number of probes per domain, so the child's score is not penalized. In this study, the student researcher (E1) excluded probe 2 in the Discourse Management (DM) domain ("I have some hobbies too"- Request Information) in every assessment so each DM numerical score was divided by 5 probes instead of 6. Probes excluded in other domains are denoted by an asterisk, indicating that one less probe was included in the total score. Probes were excluded either accidentally or cut for time purposes as in the case of participants PRAG04 and PRAG05 who were very talkative. Scores are shown in Tables 8 and 9.

According to Simmons et al. (2014) the total error score is a measure of specificity (predictor of true negatives) and the total cue score is a measure of sensitivity (predictor of true positives). The authors do note however, that the test had good diagnostic accuracy (0.85-0.88, when 0.81-0.9 are considered "good") with the exception of the total cue score for the younger (age 9-12) group of participants where the diagnostic accuracy was 0.67. The participants in this study fall either in this category or are younger than the participants in the Yale study so results may be less sensitive for that reason. When compared with the cut scores from the Simmons et al. (2014) article, a total error score  $\geq 0.83$  and a total cue score  $\geq 5.31$ , the participants of this study had varied scores. In regard to error scores, all participants scored within typical range with the exception of participant PRAG04 whose score of 0.9 put him/her over the total error cut score. As far as cue score, the article identifies that adolescents with ASD typically require



more cues than peers to elicit pragmatically appropriate answers, therefore their cue scores would be lower than their peers (Simmons et al., 2014). The participants in this study did not adhere to that standard however, the participants in this study were younger than the participants in the Yale study and no participants had a formal diagnosis of ASD. Notable scores included participant PRAG03 with the highest cue score of 5.55 meaning that he/she needed the least number of cues to provide the appropriate pragmatic response to the probes. According to the cut scores however, this score would be classified as HFA though the participant’s caregiver had minimal pragmatic concerns and the participant participated as an age-matched peer not a focus participant.

As a measure of sensitivity, the cue score did not accurately identify the participants in this study whose caregivers identified pragmatic concerns in their CCC-2. As a measure of specificity, the error score did identify the participants who participated as age-matched peers as typical and identified one participant with pragmatic concerns (PRAG04) but did not identify participants PRAG05 and PRAG06 as such.

Table 8: YiPP E1

Participant	Error Score					Cue Score				
	Disc. Mgmt.	Comm. Funct.	Conv. Repair	Presupp.	Total	Disc. Mgmt.	Comm. Funct.	Conv. Repair	Presupp.	Total
PRAG01	0.4	0.5	0.75	0.6	0.56	5.8	3	2.25	3.8	3.71
PRAG02	0.2	1	0.25	0.6	0.51	5.8	4	4.75	4.8	4.83
PRAG03	0.2	0.5	0.5*	0.4	0.4	5.8	5.5	5.3*	5.6	5.55
PRAG04	1	1	1*	0.8	0.95	4.25	4	5*	5.25	4.6
PRAG05	0.5	0.75	0.5	0.75*	0.62	5.5	3	5.5	3.25*	4.31
PRAG06	0.4	0.5	0.33*	0.6	0.45	5	4.5	5.6*	4.8	4.97

Table 9: YiPP E2

Participant	Error Score					Cue Score				
	Disc. Mgmt.	Comm. Funct.	Conv. Repair	Presupp.	Total	Disc. Mgmt.	Comm. Funct.	Conv. Repair	Presupp.	Total
PRAG01	0.2	1	0.75	0.4	0.58	5.8	3.25	2.25	4	3.82
PRAG02	0.2	1	0.5	0.4	0.52	5.8	4	4.5	3.8	4.52
PRAG03	0.2	0.25	0.66*	0.4	0.37	5.8	5.75	5.3*	5.6	5.6
PRAG04	1	1	1*	0.6	0.9	6	3	3.6*	4.6	4.3
PRAG05	0	0.75	0.75	0.8*	0.57	6	4.25	4.25	3*	4.37
PRAG06	0.4	0.5	0*	0.6	0.37	5.6	4.25	6*	5.4	5.3

## Discussion

This pilot study examined two research questions 1.) Which of the two naturalistic assessments, the CELF-5 or the YiPP, yielded more child utterances, response to questions, and longer mean turn length? and 2.) Did these naturalistic assessments identify the pragmatic concerns reported by caregivers?

This study found that the number of child utterances, response to questions, and mean turn length varied greatly across participants although subtle differences emerged across activities. On average, the Yale in Vivo Pragmatic Protocol (YiPP) elicited a longer mean turn length and a higher number of utterances per minute. There were no consistent patterns to indicate that any one pragmatic activity from the CELF-5 elicited more child utterances, response to questions, or mean turn length. Results varied across participants. However, the student researcher observed that participants enjoyed the “Recommend a Gift” activity and appeared more engaged in the activity than in other activities. It is likely that the increased engagement was due to looking through a preferred catalog from Toys R Us and talking about fun special occasions such as birthdays and Christmas. The “Make a Paper Plane” activity offered a break from sitting by engaging the participants in the motor task of throwing the plane and retrieving it. This task therefore could be a useful activity for a student who enjoys motor activities or struggles to sit still for long periods of time. Finally, the “Teach and Play a Game” activity seemed to be least popular and engaging. The participants were either too focused on the cards to want to talk or were distracted by the attentional demands of the game and it therefore decreased communication instead of promoting it. The student researcher also notes the participants seemed to enjoy the conversational topics in the YiPP and had no problem talking for 30-minutes or longer with the student researcher.

In regard to the second research question, the CELF-5 pragmatic activities checklist matched up more closely with the pragmatic concerns identified by caregivers than the YiPP error/cue scores did. However, this could be due to the fact that the CELF-5 checklist and the CCC-2 are both checklists separated into similar domains whereas the YiPP looks at broader categories of specific pragmatic

functions that children with HFA struggle with more frequently. It is also worth noting that the CELF-5 checklist score results either in a recommendation for further pragmatic evaluation or no further evaluation whereas the YiPP is an identifier of a specific group (HFA).

Limitations of this preliminary study included a small sample size ( $n=6$ ), therefore, results are not generalizable to all school-age children. In addition, there were no confirmed diagnoses of pragmatic language disorders in any of the participants. In spite of these limitations, an important clinical implication was found. The results support use of the Pragmatic Activities Checklist as one assessment tool to confirm parent-identified pragmatic concerns in school-age children.

One future direction for this finding is to conduct a deeper analysis of the types of communication acts that occur in each of the CELF-5 Pragmatic Activities. For example, the “Make a Paper Plane Activity” requires the child to hypothesize about traveling on an airplane or describe a past trip that they or a family member has gone on. This activity can therefore be used to look at narrative cohesion and a child’s ability to theorize about an event that has not happened. The “Teach and Play a Game” activity requires the child to learn and follow rules of a novel game. Deeper analysis of this activity could be used to determine if the child can adhere to learned rules and conventions and note how they react to a violation of those rules. The activity “Recommend a Gift” requires the child to use Theory of Mind to take on another person’s perspective and choose a gift that they think the person would like. Theory of Mind is a crucial social skill that can often be impaired in children and adolescents with ASD, so an investigation into this activity’s ability to identify these challenges with Theory of Mind could yield clinically useful results. The results from this study support the use of the CELF-5 Pragmatic Activities as a tool to confirm parent-identified pragmatic concerns, however a deeper analysis of the specific communication acts that are required for successful completion of each activity could provide an even more detailed picture of the child’s pragmatic difficulties and offer more specific treatment directions.

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## Appendices

### Appendix A- Recruitment Flier

#### Let's Talk: A Social Communication Research Study



**Who can participate?** Children and teenagers, ages 8 to 16 years, who are willing to participate in activities regarding their social skills.

**What will my child do?** Participation in the study requires one 90-minute appointment. Appointments can be scheduled after school or on Saturdays and will take place in the Social Communication Lab at James Madison University or an alternative location of your choice, such as your home. We will make a video and audio recording of your child's session.

**What about parent involvement?** Parents will be asked to complete questionnaires about their child's medical, developmental, and educational history and to rate their communication skills.

**What will my family receive?** Children will receive a \$10.00 gift card from a local store. Free parking passes will be provided if needed.

**Contact:**

Geralyn Timler, Ph.D., CCC-SLP  
Communication Sciences and Disorders  
Phone: 540-568-3541  
OR Email: [timlergr@jmu.edu](mailto:timlergr@jmu.edu)

JMU-IRB Approval# 18-0121

Appendix B- CELF-5 Pragmatic Activities Checklist

## Pragmatics Activities Checklist

Complete the Pragmatics Activities Checklist after you have completed three activities with the student (see Examiner's Manual chapter 3).

**Check the three activities you selected for this student's participation:**

<input type="checkbox"/> Teach and play a game <input type="checkbox"/> Make a paper airplane/Build a simple figure out of blocks/ Put together a puzzle <input type="checkbox"/> Make a card or gift wrap	<input type="checkbox"/> Recommend a gift of toys/electronics/clothing/etc. from a catalog/advertisement <input type="checkbox"/> Have a snack <input type="checkbox"/> Recommend a movie from a newspaper
---	---

Check each behavior you observed. Your observations should include ALL of the time you have worked with this student in addition to the time spent participating in these Pragmatics Activities.

---

**NONVERBAL: Gaze, Gesture, Expression, and Body Language**

**The student**

- 1. did not maintain culturally-appropriate eye contact with speaker
- 2. did not look where speaker pointed
- 3. did not look at object/person named by speaker
- 4. did not coordinate gaze with speaker's gaze and ongoing talk
- 5. did not use gestures to identify person or object (e.g., pointing, head nodding, smiling, waving)
- 6. did not point to nearby object/person when appropriate
- 7. did not point to distant object/person when appropriate
- 8. did not use representational gestures (mimicked actions) to direct other's attention (e.g., fingers to lips to mean *quiet*, crooking index finger to mean *come here*, holding thumb and little finger up to your face to mean *call me*).
- 9. did not coordinate gestures and ideas to direct attention
- 10. did not respect the personal space of others when communicating

**VERBAL: Manner of Communication**

**The student**

- 11. spoke too fast to be understood
- 12. said things that didn't seem to relate to topic or make sense logically
- 13. had revisions, false starts, repetitions that made understanding his or her conversations/stories difficult
- 14. used too much non-specific language (e.g., he, she, this, stuff) to enable understanding of what he/she was trying to communicate
- 15. repeated information that did not clarify directions, explanations, stories
- 16. did not understand literal meanings
- 17. did not understand figurative meanings

**VERBAL: Relevance of Communication**

**The student**

- 18. appeared to misunderstand speaker because he/she did not consider the context (situation, event, participants) of the message
- 19. said things that were not relevant to the current situation, topic, event, or participants
- 20. repeated things that listeners were already aware of
- 21. asked the same questions repeatedly
- 22. talked repeatedly about topics he/she was interested in but others were not interested in
- 23. talked even when no one was listening

**VERBAL: Quality and Quantity of Communication**

**The student**

- 24. talked too much
- 25. talked to anyone, whether he/she knew the person or not
- 26. provided too much information
- 27. provided redundant information
- 28. responded but did not extend the conversation or offer further information
- 29. made comments that were either implausible, unrealistic, or meaningless given the context in which they were used
- 30. interrupted speaker
- 31. talked while others were talking
- 32. did not pass the conversational turn

Total observations checked

CELF5 ■ Record Form 1 ■ Ages 5-8 23

**Appendix C- Form C from the Yale in Vivo Pragmatic Protocol**

Online supplemental materials, Simmons et al., "Assessing Pragmatic Language in Autism Spectrum Disorder: The Yale *in vivo* Pragmatic Protocol," *JSLHR*, doi:10.1044/2014\_JSLHR-L-14-0040

**Coding Rubric – Form C**

<b>Student's Name:</b> _____			<b>Examiner's Name:</b> _____		
<b>Date of Assessment:</b> _____					
	<b>Behavior<sup>1</sup></b>	<b>Pragmatic Domain*</b>	<b>Description</b>	<b>Error Score</b>	<b>Cue Score</b>
1.	Initiation	DM	Appropriately starts talking when adult does not.		
2.	Request Information	DM	Asks examiner for additional information		
3.	Hypothesizing	CF	Offer help or give a reason why the tape recorder is not working.		
4.	Request Clarification: muffled speech	CR	Appropriately asks for repetition or indicate misinterpretation verbally.		
5.	Background information	DM	Provides relevant background information to assist examiner's understanding		
6.	Comment Contingently	P	Provides comments relevant to the topic.		
7.	Request clarification: decreased volume	CR	Appropriately ask for repetition or indicate misinterpretation verbally.		
8.	Request Clarification: unfamiliar acronym	CR	Appropriately indicate misunderstanding verbally		
9.	Presupposition (statement with incorrect article)	P	Indicates confusion because the information (article) contained in the sentence is not known and, therefore, the sentence does not make sense to the subject.		
10.	Presupposition (need additional information)	P	Indicates confusion because the information (noun) contained in the sentence is not known and, therefore, the sentence does not make sense to the subject.		
11.	Presupposition (statement with ambiguous pronoun)	P	Indicates confusion because the information (pronoun) contained in the sentence is not known and, therefore, the sentence does not make sense to the subject.		
12.	Request Clarification	CR	Appropriately indicate misunderstanding verbally		

Online supplemental materials, Simmons et al., "Assessing Pragmatic Language in Autism Spectrum Disorder: The Yale *in vivo* Pragmatic Protocol," *JSLHR*, doi:10.1044/2014\_JSLHR-L-14-0040

13.	Termination	DM	End conversation appropriately when indicated		
14.	Response to cues to change speakers	DM	Stop talking when the conversational partner attempts to take the floor		
15.	Topic Maintenance	DM	Ability to respond to the conversational partner's bids and add to the topic (for three turns)		
16.	Comment/Notice	CF	A look, sound, or comment that acknowledges the event (event marked by bell or falling blocks sound).		
17.	Request Object	CF	Appropriately requests an object needed to complete the task		
18.	Express Denial /Comment on Object	CF	Comment or deny wrong object than one requested		
19.	Insufficient Information	P	Appropriately asks for clarification of missing information on the questionnaire.		