Properties of Spoken Persuasive Language Samples from Typically Developing Adolescents

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Abstract

Purpose: Persuasive communication skills are vital for achieving success in school, at work, and in social relationships. To facilitate assessment of persuasive discourse, we developed a clinically feasible persuasive speaking protocol and used it to compile a database of language samples. This database allowed us to describe the properties of adolescents' persuasive speaking skills.

Method: We collected spoken language samples from 179 typically developing students in grades 8 – 12, recruited from the United States and Australia. Participants were asked to persuade an authority figure to make a change in a rule or policy.

Results: Language performance data reflecting both microstructural and macrostructural properties of spoken language were summarized and broken down by grade. We completed a factor analysis that documented three latent variables (syntax, discourse difficulties, and content). To test the validity of the persuasive measures, a subset of the participants completed an additional battery of assessments, which revealed weak to moderate relationships between the persuasive measures, general language ability, and working memory. There was no significant relationship between the persuasive language measures and an assessment of personality.

Conclusions: Our persuasive language sampling protocol facilitated the collection of valid language performance data. The summary data can be used as benchmarks for clinical evaluations of adolescents suspected of having language difficulties.

Keywords: language sample analysis; persuasion; discourse; language assessment; adolescence; high school

Properties of Spoken Persuasive Language Samples of Typically Developing Adolescents

In her seminal work on adolescent language development, Nippold (2007) defined persuasion as "the use of argumentation to convince another person to perform an act or accept the point of view desired by the persuader" (p. 305, Nippold, 2007). Persuasive discourse is a demanding task requiring logical thinking and perspective-taking, with many typically developing adolescents lacking competence with fundamental persuasive strategies (e.g., Felton & Kuhn, 2011). Persuasive proficiency is vital, as competence at persuasion is necessary for success at academics, work, and social relationships (Nippold 2007). Despite the importance of being persuasive, relatively few studies have investigated how to best elicit and analyze the persuasive skills of typically developing adolescents (Nippold, 2014). Considering the value of appraising language skills in a functional context, we aimed to develop a clinically feasible protocol to elicit a representative sample of adolescents' persuasive discourse. In addition, we aimed to use that protocol to establish benchmark data based on a sample of typically developing students.

Persuasion in the Curriculum

In the United States, the Common Core State Standards (CCSS) provide a description and sequence of the expected competencies that will allow public school students to successfully pursue post-secondary education or a career (National Governor's Association, 2010). Currently, the CCSS have been adopted in 42 of the 50 states, plus the District of Columbia (CCSS Initiative, 2019). The CCSS for English Language Arts (ELA) treat persuasion as a distinctive type of discourse, separate in its aims and structure from discussion, narration, and exposition. Because the CCSS uses an integrated model of literacy, standards for persuasion can be found across communication modalities (i.e., speaking, listening, reading, and writing). For example,

according to the 9th- and 10th-grade speaking standards, students are expected to contrast points of agreement and disagreement and justify their own views on an issue (CCSS.ELA-LITERACY.SL.9-10.1.D). The 11th- and 12th-grade reading standards state that students should be able to analyze the arguments presented in seminal U.S. texts (e.g., The Federalist Papers; CCSS.ELA-LITERACY.S.11-12.9.B), whereas the 11th- and 12th-grade science standards require students to evaluate the results of scientific texts, then corroborate or challenge the author's conclusions (CCSS.ELA-LITERACY.RST.11-12.8). The 11th- and 12th-grade writing standards state that students are expected to take their audience's perspective to develop both claims and counterclaims in written arguments (CCSS.ELA-LITERACY.W.11-12.1).

Persuasive standards are not exclusive to the United States. Australia has implemented a national K-12 curriculum that outlines the expected academic competencies, including those for persuasive discourse (Australian Curriculum, Assessment and Reporting Authority, 2014). For example, in grade 8 students are expected to "create imaginative, informative and persuasive texts that raise issues, report events and advance opinions, using deliberate language and textual choices." In level four of the senior secondary standards (roughly equivalent to grade 12 in the United States), students are expected to "challenge perspectives, values, and attitudes in literary and non-literary texts, developing and testing their own interpretations through debate and argument."

Although expectations for persuasion can be found across all grade levels in both the U.S. and Australian standards, assessing and treating persuasive discourse takes on a particular significance for speech-language pathologists (SLPs) working with adolescents with language disorders. In the United States, the Individuals with Disabilities Education Act (2004) requires planning for special education students who are 16 years and older to help them transition from

high school to postsecondary education or employment, and (whenever possible) to independent living. Some states require the planning to begin earlier. For example, Wisconsin mandates that transition planning be part of the first individualized education program that will be in effect when the child turns 14. (Wisconsin Statute 115.787(2)(g)1).

In crafting transition plans for their students, persuasive discourse is an excellent skill for SLPs to consider addressing. In Appendix A of the CCSS-ELA, persuasion is elevated in importance over narration and exposition because it is regarded as critical for college and career readiness (CCSS, 2019). Highlighting the importance of persuasion is supported by the literature, since being persuasive is essential for meeting the demands of post-secondary education (e.g., Osana & Seymour, 2004) and the workforce (e.g., Soresi, Nota, Ferrari, & Solberg, 2008). In addition, persuasive skills are a strong predictor of successful independent/community living (Wehmeyer & Schwartz, 1997). To determine the need for and the scope of treatment of a student's persuasive discourse, SLPs must undertake a valid and authentic assessment.

Barriers to Assessing Persuasive Language

Analysis of spoken discourse is traditionally completed using language sample analysis (LSA), where an examiner collects a sample of the child's language used in a meaningful context and then completes a thorough analysis to gauge linguistic strengths and weaknesses. Nippold (2014) provided a summary of the literature supporting the use of LSA as a valid assessment for adolescents. However, a recent nation-wide survey of school-based SLPs in the United States found that less than half of SLPs serving middle and high school students used any type of LSA over the course of an entire school year, even though most SLPs held a favorable view of language sampling (Pavelko, Owens, Ireland, & Hahs-Vaughn, 2016). Even more alarming was the finding that SLPs working with middle and/or high school students were the least likely

group to use LSA. Those who did collect samples relied principally on conversation and picture description to elicit them; such tasks, as Pavelko et al. point out, may not be age-appropriate for adolescents. Elicitation using a persuasive task, if done at all, was not frequent enough to be reported. Across all SLPs, the most cited reason for not using LSA was that it is too time-consuming. Non-users also cited "limited training/expertise" in knowing how to collect and analyze samples. Similar results were obtained from a survey of the LSA practices of Australian SLPs working with children and adolescents (Westerveld & Claessen, 2014). Westerveld and Claessen further identified that most SLPs rely on normative data to interpret student performance on LSA tasks and highlighted how language sample measures are difficult to interpret when normative data is not available.

Faced with a paucity of normative data on persuasion and a lack of clinically feasible assessment tasks, it is understandable why few SLPs have elected to collect persuasive samples from their older students. Early studies of persuasive speaking had a limited focus on the acquisition of global argumentative and negotiation skills and provided no data on the linguistic growth associated with persuasion (e.g., Clark & Delia, 1976; Clark, O'Dell, & Willihnganz, 1986; Flavell, 1968; Kline & Clinton, 1998). Several studies documented the persuasive difficulties of individuals with communication disorders, including adolescents and adults with traumatic brain injury (Ghayoumi, Yadegari, Mahmoodi-Bakhtiari, Fakharian, Rahgozar, & Rasouli, 2015; Moran, Kirk, & Powell, 2012), children with autism (To, Yim, Lam, & Ioa, 2016), and children with language disorders (Brinton, Fujiki, & McKee, 1998; Stevens & Bliss, 1995), yet these studies provided minimal benchmark data from typically developing speakers. Nippold, Ward-Lonergan, and Fanning's (2005) data were limited to writing, whereas Brimo and Hall-Mills (2019) analyzed spoken and written persuasion in a group of 64 ninth graders and

reported only on the students' use of complex syntax. While these studies provide an emerging

evidence-base to motivate the clinical adoption of persuasive language sampling, there continues

to be a lack of published protocols with affiliated normative database to use in clinical

assessments. Thus, we set out to provide SLPs with comprehensive benchmark data for

adolescents' spoken persuasion at both the macrostructure level (i.e., broad discourse

organization skills) and microstructure level (i.e., syntax, vocabulary, and speaking fluency;

Miller, Andriacchi, & Nockerts, 2016). Our first step was to develop a functional and efficient

elicitation protocol.

　　　Previous studies of persuasive discourse have required participants to respond to a single

persuasive issue selected by the researchers, such as seeking parental permission to host a large

sleepover (Clark & Delia, 1976), arguing for or against training animals to perform in a circus

(Nippold et al., 2005), and asserting whether or not high school students should hold part-time

jobs after school (Brimo & Hall-Mills, 2019). Because speakers tend to perform best when

allowed to discuss what they know and care about (Nippold, 2014), we elected to allow our

participants to choose their own issue. They were asked to argue for a change in their school,

workplace, or community since these settings are relevant for transition planning and since at

least one should be highly meaningful to all adolescents. This preference for self-selected issues

was reinforced by our prior research on exposition, where we found that students in grades five

through nine enjoyed the opportunity to self-select a favorite game or sport to explain (Heilmann

& Malone, 2014; Westerveld & Moran, 2011).

Testing the Properties of Discourse Measures

　　　Implementing an assessment protocol with a large of group participants affords the

opportunity to examine the properties of the protocol and resulting measures. The research team

can test if there is sufficient documentation and training so that multiple examiners can

implement the assessment with a high level of fidelity (e.g., Kaderavek & Justice, 2010). At the

same time, protocols that allow participants the freedom to align their productions to their own

personal interests could introduce unwanted variability across the speakers. Our prior research on

expository discourse identified that there were no significant differences based on the type of

contest that the students selected (Heilmann & Malone, 2014). It is unknown if allowing

adolescents the freedom to choose their own controversial issue and target audience has a

sizeable impact on the quality of their persuasive productions.

Having a database of typically developing speakers further allows testing of the

properties of the persuasive measures. When assessing the language of children and adolescents,

one consideration is determining if the measures are sensitive to development. Language sample

measures tend to show rapid growth in preschool- and elementary-age children (e.g., Leadholm

& Miller, 1992), with more modest growth from middle school into adulthood (e.g., Heilmann &

Malone, 2014; Nippold, 2014). A further consideration when completing LSA is understanding

the relationship between the dozens of measures that are available to describe a student's

language ability (see Miller et al., 2016). Our prior work has documented that LSA can be

effective at describing multiple dimensions of language in narrative and expository discourse

(e.g., Heilmann & Malone, 2014; Westerveld & Gillon, 2010), but it remains unknown if

persuasive measures can truly capture multiple dimensions of language ability.

Testing the Validity of Discourse Measures

To better understand the nature of persuasive discourse measures, we tested the

relationship between the persuasive measures and measures of general language, working

memory, and personality.

General language ability. Prior studies have found weak to moderate positive correlations between omnibus norm-referenced language assessments and language sample measures from conversations (e.g., Ukrainetz & Blomquist, 2002), narratives (e.g., Ebert & Scott, 2014), and expositives (e.g., Nippold, Mansfield, Billow, & Tomblin, 2009). These results suggest that the two types of measures may be assessing similar underlying ability (i.e., language ability), yet somewhat distinct aspects of that ability (i.e., decontextualized language versus functional language). To our knowledge, the relationships between general language measures and persuasive discourse has not been investigated.

Working memory. Several studies have shown that working memory skills play a key role in an individual's ability to use spoken discourse (Chapman, Gamino, Cook, Hanten, Li, & Levin, 2006; Hay & Moran, 2005). For example, Chapman et al. found a significant relationship between working memory, as measured by children's performance on an n-back task, and the ability to process the central themes of stories in adolescents with and without brain injury. Hay and Moran documented a significant relationship between children's performance on two assessments of working memory (nonword repetition and the Competing Language Processing Task; Gaulin & Campbell, 1994) and macrostructure measures derived from narrative and expository language samples in 9 – 15-year-old students with and without TBI.

Personality. Multiple studies have documented a robust relationship between extroversion and effective persuasion (e.g., Nussbaum & Bendixen, 2003; Oreg & Sverdlik, 2014). For instance, Oreg and Sverdlik found that young adults who rated themselves as being extroverts and/or having an openness towards experiences were more likely to engage in debates that were more persuasive than their peers with high ratings of neuroticism.

Summary and Rationale

Adolescents' competence at persuasion is vital to academic success and to readiness for post-secondary education and/or employment. However, recommendations that SLPs collect and analyze persuasive language samples from their adolescent students have not been followed, perhaps in part due to the lack of a clinically feasible protocol and a paucity of normative benchmarks for persuasion. To fill this gap, we set out to create an elicitation protocol that would allow examiners to quickly and accurately capture adolescents' spoken persuasion in a replicable manner. By collecting samples from typically developing speakers using a standardized protocol, we had the opportunity to compile a database and establish benchmark expectations across grade levels for multiple measures of persuasive discourse. Once we assembled the normative data, we were in a position to complete analyses of its psychometric properties by addressing the following aims:

1) To test whether differences in persuasive issue and intended audience had a sizable impact on the resulting language measures;

2) To describe the properties of persuasive discourse in adolescents by summarizing performance across macro- and microstructure measures and to test for significant grade-related changes;

3) To complete a factor analysis to determine whether persuasive measures capture multiple dimensions of language;

4) To test whether standardized measures of general language ability, working memory, and personality significantly correlate with persuasive language sample measures.

Method

Participants

Prior to initiating this study, we acquired Institutional Review Board (or equivalent)

permission from the two participating universities and each participating school district. There

were 179 adolescents who participated in this study, recruited from sites in the United States (N

= 113) and Australia (N = 66). All participants received a $10 gift card for participating in the

study. We chose to develop a database of typically developing speakers, as normative data are

most sensitive when the database does not include individuals with disabilities (Peña, Spaulding,

& Plante, 2006). Therefore, we verified that participants were not receiving any special

education services and were not being evaluated for such services. For the U.S. samples, 24

school-based SLPs volunteered to elicit language samples from high school students (grades 9,

10, 11, and 12) from two major metropolitan areas in Wisconsin. To ensure a representative

group of participants, we mailed over 1,000 consent forms to high school students in

participating districts. Each school district provided data on the consenting students'

race/ethnicity, free/reduced lunch status, and overall GPA. We then selected students to roughly

match the racial/ethnic makeup of the broader United States at the time of sampling (see Humes,

Jones, & Ramirez, 2011). The racial/ethnic distribution of the U.S. sample was as follows: 63%

white, 17% African American, 8% Hispanic/Latino, 8% Asian/Pacific Islander, and 4% not

reported. For the U.S. sample, 25% of the students qualified for free/reduced lunch. The samples

were approximately equated on gender (48% female; 52% male). Academic performance was

defined as high (90% GPA or higher; 72% of the sample), average (80 – 90% GPA; 25% of the

sample) and low (70 – 80% GPA; 3% of the sample). Selected students were assigned to a

participating SLP, and each SLP collected samples from one to four students.

For the Australian sample, 66 students were recruited from grades 8, 10, and 12. A total

of 15 SLPs working for the Department of Education and Training in Queensland organized the

distribution of information sheets and collection of the parent/student consent forms. Students

were from metropolitan, regional, and remote areas in Queensland. The majority of the students

were white (originating from Australia, New Zealand, and Europe; 76%); additional ethnicities

included students from indigenous backgrounds (3%), Pacific Islander (2%), other (9%), and not

reported (10%). The sample was somewhat more weighted with female students (67%) than male

students (33%).

Data Collection

  Persuasive Language Sampling Protocol. A central goal in developing our persuasive

task was to set clear expectations for detailed and comprehensive persuasive samples. In most

studies in the developmental and clinical literatures, researchers simply provided participants

with a persuasive issue and then prompted them to immediately begin talking about it. We chose

instead to make our expectations explicit by giving participants a planning sheet with a list of the

components of an argument we expected them to cover (see Appendix A) and time to plan. We

modeled the format of the sheet on the expository planning sheet in our favorite game or sport

study (Heilmann & Malone, 2014), where it facilitated complete and lengthy explanations. With

these design choices, our intent was to make the task more authentically resemble the persuasive

situations adolescents typically encounter, both in and out of the classroom.

  To identify which aspects of persuasion to include on the planning sheet, we drew from

the Common Core State Standards for written persuasion at grades 11 and 12, as these standards

provided the most in-depth description of expected persuasive competencies. We also reviewed

the literature and identified three major features of persuasive discourse that had been shown to

improve with age. First, older children (who were more effective persuaders) provided more

arguments supporting their position, and the quality of the arguments were judged superior to

their younger peers (Clark & Delia, 1976; Flavell, 1968; Kline & Clinton, 1998). To encourage the students to formulate a well-defined position on an issue, along with a strong rationale for that position, we asked participants to include *a) Issue Identification and Desired Change* and *b) Supporting Reasons* on their planning sheet. Second, older children were better able to anticipate counterarguments, address those counterarguments, and offer consensus solutions (Clark & Delia, 1976; Clark et al., 1986; Felton & Kuhn, 2011; Kline & Clinton, 1998), motivating us to ask participants to include *c) Counterarguments/Other Point of View, d) Response to Counterarguments,* and *e) Compromises*. In addition, because of the power imbalance inherent in an adolescent making a request of an adult authority figure, it is natural to expect that the student would be the one to offer a compromise. Finally, following the CCSS-ELA, we asked participants to summarize their argument with an *f) Conclusion* statement.

Collection of Persuasive Language Samples. SLPs in both the United States and Australia followed the same protocol for collecting the persuasive samples. All SLPs viewed a short training video describing the protocol and were instructed to review the elicitation materials prior to seeing their first participant. The SLPs brought participants to a quiet location in the school and explained the task by reading from a script (see protocol in Appendix B). Participants were instructed to direct their arguments to a principal, boss, or government official. Pilot testing revealed that some adolescents had difficulty generating a persuasive issue on their own. In response, we consulted with experts in language sample analysis and participating SLPs to develop a list of 20 issues from which participants could select (see Appendix C). Participants were also given the option of generating their own persuasive issue.

We directed the examiners to insist that participants spend time planning what they wanted to say before beginning to speak. Examiners first instructed participants to talk "for at

least a few minutes" and later for "as long as possible." To help them achieve this, participants

were instructed to make brief notes for each point listed on the planning sheet (Appendix A).

They were asked to refrain from writing in full sentences so that the task would not turn into a

writing assessment. In lieu of or in addition to taking notes, students were given the option of

using the back of their planning sheet to draw a diagram or graphic organizer. Once planning

was complete, the students were reminded to give a complete argument and were encouraged to

refer to their planning sheet while speaking. Once the student completed the planning sheet, the

examiner turned on a digital audio recorder and directed the student to begin speaking. As noted

in Appendix B, examiners were instructed to limit their talking to basic affirmations (e.g.,

Uhhuh) while the participants produced their samples. If a participant produced a very short

sample or did not include a point from the planning sheet, the examiner was instructed to probe

for more information with a general point (e.g., "Is there anything else you can tell me?") or a

specific request to address an omitted point.

        Additional Data Collection. In addition to collecting the persuasive samples, both the

U.S. and Australian groups completed further testing to meet additional research goals. The U.S.

students completed an expository language sample; reporting the expository data was beyond the

scope of the present study. The Australian students completed a battery of language, working

memory, and personality testing, which were included in the present study to address our fourth

research aim.

        To capture the Australian participants' overall language ability, we administered the

Recalling Sentences subtest of the Clinical Evaluation of Language Fundamentals – 4th edition

(CELF-4; Semel, Wiig, & Secord, 2003). The performance young adults on a sentence repetition

task was shown to be a quick and accurate method of assessing language ability (e.g., Poll, Betz,

& Miller, 2010). To document the participants' working memory skills, we administered the

Competing Language Processing Task (CLPT; Gaulin & Campbell, 1994), which cued the

students to judge the truthfulness of a statement (e.g., "babies can drive trucks") while holding

the last word of each statement in the working memory (e.g., "trucks"). Ellis Weismer, Evans,

and Hesketh (1999) demonstrated that the word recall component of the CLPT was sensitive to

differences between children with language disorders and their typically developing peers. While

it may appear that the Recalling Sentences task and the CLPT both capture a combination of

language and working memory ability, Klem, Melby-Lervåg, Hagtvet, Lyster, Gustafsson, and

Hulme (2015) documented that sentence repetition is a relatively "pure" method of assessing oral

language skill, while Gaulin and Campbell (1994) showed that performance on the CLPT is

predominantly influenced by children's working memory ability. In addition, we acquired the

students' self-reported personality descriptions with the Ten-Item Personality Inventory (TIPI;

Gosling, Rentfrow, & Swann, 2003), a brief measure of the Big Five Personality domains. The

Big Five Personality framework posits that there are five dimensions of personality that vary in

composure and intensity: extroversion (how an individual seeks out interactions with others),

agreeableness (quality of interactions with others), conscientiousness (ability to control impulses

and conform to social norms), neuroticism (emotional stability), and openness to experiences

(willingness to try new things).

Administration Fidelity

To determine the SLPs' fidelity to the elicitation protocol, we reviewed every examiner

utterance. Across all transcripts, the examiners produced 522 utterances. Most utterances ($n =$

443; 84.8%) were affirmations (e.g., "mhm," "OK," "alright"), which was encouraged in the

elicitation protocol (see Appendix B). Seventy (13.4%) of the utterances were requests for

additional information (e.g., "Can you tell me anything else?"), which were also consistent with the protocol. Six (1.1%) utterances were used to clarify the elicitation process to the child (e.g., "Yes, the recorder is still on"), which were not part of the protocol, yet were reasonable and likely had minimal impact on child performance. Three (0.6%) utterances were cues not allowed via the protocol and may have influenced those participants' performance. One SLP produced two utterances that explained what compromises were ("What's the opposite of your argument?" and "The other person who might argue against your point."). One SLP reminded the child to pretend that he was talking to his chosen authority figure.

Transcription and Coding of Persuasive Samples

The samples were transcribed using the Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2018). Utterances were segmented using communication units (C-units), which consisted of an independent clause and all associated dependent finite clauses (Loban, 1976). Utterances that were incomplete or contained unintelligible segments were excluded from the analyses. To capture multiple aspects of discourse, we selected eight language measures that have been shown to be sensitive to differences across ages and language ability in school-age children and adolescents. Seven of these measures were microstructural and were automatically generated by SALT:

- Mean length of C-unit in words (MLCU) was calculated by dividing the total number of words by the total number of C-units. MLCU has been shown to be sensitive to differences in adolescents with and without language disorders (Nippold et al., 2008), and is closely related to other measures of syntactic complexity (Heilmann & Malone, 2014; Westerveld & Moran, 2013).

- Clausal Density (also termed subordination index) is a measure of syntactic complexity calculated by dividing the total number of finite independent and dependent clauses by the total number of C-units. Nippold, Hesketh, Duthie, and Mansfield (2005) observed that Clausal Density slowly increased with age in both conversational and expository discourse, whereas Nippold et al. (2008) showed that adolescents with language disorders produced expository samples with lower Clausal Density values compared to their typically developing peers.

- Moving Average Type-Token Ratio (MATTR) is a method of calculating type-token ratio (TTR) (i.e., the ratio of different word roots to total word roots) that controls for variations in the length a sample (Covington & McFall, 2010). The software selected the default window (i.e., 100 words), calculated the TTR for multiple windows throughout the sample, and then calculated a TRR for the entire sample by averaging all the 100-word TTRs. MATTR is a measure of lexical diversity.

- Number of Total Words (Total Words) was calculated by summing the total number of word roots, which provided an index of sample length.

- Number of Total C-units (Total C-units) was calculated by summing the total number of C-units and provided another index of sample length. Heilmann and Malone (2014) found that Total Words and Total C-units captured a unique dimension of productivity in pre-adolescents' expository discourse.

- Percentage of Maze Words (Mazes) was calculated by summing the total number of words produced as mazes, defined as false starts, repetitions, and reformulations, then dividing that value by the total number of words in the sample. Thordardottir and Ellis Weismer (2002)

documented that children with language disorders used significantly more mazes than their

typically developing peers.

- Percentage of C-units with Errors and Omissions (% Errors) was calculated by first hand

  coding all errors (syntactic and lexical) and omissions (both words and bound morphemes).

  The software then calculated the percentage of C-units that contain at least one error or

  omission. This coding method is equivalent to the percentage of grammatical C-units, which

  Eisenberg and Guo (2013) found to be sensitive to differences between children with and

  without language disorders.

In addition to these seven microstructure measures, we developed a rubric to measure

persuasive macrostructure, termed the Persuasive Scoring Scheme (PSS; see Appendix D). Five

characteristics of persuasive discourse were taken directly from the planning sheet. There were

two additional characteristics: *Cohesion,* a rating of how successful students were at providing

clear referents and smooth transitions, and *Effectiveness,* a global rating of how convincing the

speaker was in making the listener accept his/her argument. The format of the PSS was modeled

on our previous work on narrative (Heilmann, Miller, Nockerts, & Dunaway, 2010) and

expository (Heilmann & Malone, 2014) rubrics. Each of the seven major characteristics of

persuasive discourse was rated on a 1 – 5 scale, with three distinct anchor points:

minimal/immature (1 point), satisfactory/adequate (3 points), and proficient/advanced (5 points).

Transcribers assigned codes of one through five based on the students' performance, with scores

of two and four given if the student's sample was judged to be between the anchored reference

points.

Transcription and Coding Accuracy

All recorded samples were transcribed and coded by the team at the SALT Transcription Lab, which is a professional transcription service that provides fee-based language transcription services for clinicians and researchers. All transcribers in the SALT lab completed at least 10 hours of training and had to achieve at least 90% agreement on practice transcripts before being assigned their own transcripts. Each sample was transcribed using the consensus transcription and coding procedure, where one transcriber completed an initial transcription of the sample, which was later checked by a second transcriber (who listened to the sample while reviewing the transcript). The two transcribers discussed any discrepancies, with the first transcriber responsible for making final decisions regarding the transcript. The lab manager completed fidelity checks for approximately 10% of the transcripts from the lab.

To document the accuracy of coding, two research assistants from the first author's lab completed consensus coding for Clausal Density and PSS for 20 transcripts. The Clausal Density and PSS codes completed by this second team of coders was compared to the coding completed by the SALT Transcription Lab. For Clausal Density, there was 92.5% agreement between the two teams of transcribers; of the 803 C-units recoded, there was agreement for 743 C-units. We used Krippendorff's alpha to document agreement in PSS coding; alpha provides stronger agreement when coders give the same score or when differences are close (e.g., 24 versus 25) and penalizes with weaker agreement for scores with larger discrepancies (e.g., 10 versus 25; see Krippendorff, 2011). For our evaluation of the PSS, alpha = .79, indicating good agreement across coders.

Results

Preliminary Analyses

Though all participants were fluent English speakers and living in industrialized countries, subtle differences in culture and/or educational practices could result in differences in measures across the two countries. We first wanted to ensure that there were minimal differences in the measures across the two countries to confirm that all samples could be used within a single database. Given the differences in grades sampled across the two countries, it was not surprising that the participants from the Australian group (Mage = 15;1, SD = 1;8) were considerably younger than those in the U.S. group (Mage = 16;7, SD = 1;2). Thus, we controlled for age by completing a series of Analysis of Covariance equations with each respective measure as the dependent variable (i.e., MLCU, MATTR, etc.), country as the between groups variable (United States versus Australia), and age as the covariate. We documented the amount of variability explained by country for each variable using eta squared (η^2) and determined if it met the threshold for clinical significance. Ferguson (2009) provided guidelines for interpreting the clinical significance of η^2, with a cutoff of .04 as the minimum effect that may be of clinical significance. He further proposed that effect sizes of .25 - .64 have a moderate clinical effect, and effect sizes > .64 have a strong clinical effect.

We observed significant differences across countries for two of the nine measures, including Total Words ($F(1, 176) = 14.6$, $p < .001$, $\eta^2 = .08$) and Total C-units ($F(1, 176) = 13.6$, $p < .001$, $\eta^2 = .13$), with effect sizes exceeding Ferguson's (2009) proposed threshold for clinical significance. To illustrate the differences across the U.S. and Australian participants, we calculated the estimated marginal mean (EMM) for each measure, which accounted for the age differences across the groups. The Australian participants produced samples that were significantly shorter than participants from the United States, as reflected by lower Total Words ($EMM_{Aus} = 354.9$; $EMM_{US} = 504.7$) and Total C-units ($EMM_{Aus} = 22.7$; $EMM_{US} = 32.2$). No

clinically significant differences were observed for the other seven measures: (F(1, 176) = 0.31 –

4.04, p = .06 - .31, $\eta^2 \leq .02$).

Further analysis of the length of the samples was conducted given the clinically

significant differences between the two countries for these two measures of sample length. We

found a small and non-significant correlation between the PSS and Total Words (r = .21) and

Total C-units (r = .11), demonstrating that the length of the persuasive samples in the current

study had a weak relationship with overall sample quality. Given that the measures of length

appeared to provide minimal description of linguistic ability when completing persuasive

language sampling using our protocol, we elected to remove the two measures of length from all

further analyses.

Research Aim 1: Testing for Differences across Persuasive Issue and Target Audience

To determine if the participants' freedom in tailoring their persuasive samples to their

own interests introduced substantial variability in the measures, we first tested for differences in

measures based on whether the participants used one of the 20 issues that we provided or chose

an issue of their own. Many participants (*N* = 122; 68%) selected one of the issues provided.

This pattern was consistent across the two countries, with 66% of the U.S. participants and 73%

of the Australian participants selecting a provided issue. We completed a series of one-way

analysis of variance equations (ANOVAs), with each of the six language measures as the

dependent variable and issue source (provided versus self-generated) as the between groups

variable. No clinically significant differences were observed for any of the six measures (F(1,

177) = 0.01 – 1.99, $p \geq .16$, $\eta^2 \leq .01$).

In choosing an issue, the students were instructed to choose one of three different target

audience members for their persuasive language sample. Most participants chose School Official

as the target audience (N = 126; 70%), followed by Government Official (N = 50; 29%) and

Employer (N = 3; 1%). Again, target audience selection was similar across both countries (U.S.:

School Official = 69%, Government Official = 29%, Employer = 2%; Australian: School Official

= 73%, Government Official = 26%, Employer = 1%). A series of ANOVAs were completed

with each measure and revealed that there were no clinically significant differences across the

three target audience groups for each of the seven measures evaluated in this study (F(2, 176) =

0.03 – 2.94, p = .06 - .97, $\eta^2 \le .03$).

Research Aim 2: Summary of Student Performance on the Database

Given that there were minimal differences across location, issue, and audience, we

compiled all samples into a single database. We first summarized descriptive data (means and

standard deviations) broken down by grade, which are available in table 1. We next examined

grade-related differences for each persuasive measure. A series of one-way ANOVAs were

completed using each respective language measure as the dependent variable and grade (8, 9, 10,

11, and 12) and the independent variable. For measures where we observed a significant

difference across grade, we completed Scheffé post hoc tests. The bottom rows of table 1

summarize the results of the significance testing and provide a summary of the resulting effect

sizes for these comparisons. We observed significant grade-level differences for Clausal Density,

Mazes, % Errors, and PSS. These grade-level differences had effect sizes that were clinically

significant (i.e., $\eta^2 \ge .04$; Ferguson, 2009), but low in strength η^2 = .05 - .06). Sheffé post hoc

tests revealed significant differences for mazes only, which identified that the eighth-grade

students produced significantly fewer words in mazes than those in tenth grade. There were no

significant grade-level differences for MLCU and MATTR.

Research Aim 3: What Aspects of Language does Persuasive Discourse Capture?

One of the strengths of LSA is that the examiner can document performance across multiple dimensions of language using one single sample. To test whether the persuasive measures captured distinct dimensions of language (i.e., latent variables) or were unidimensional, we completed an exploratory factor analysis with varimax rotation. Factors with eigenvalues > 1 were retained in the final model. A total of four rotations were used to generate the final estimates, which resulted in a model with three distinct latent variables. The loadings for each of the persuasive measures relative to the three latent variables are summarized in table 2. We reviewed the factor loadings and identified which measures had the strongest unique loadings onto each latent variable (in bold in table 2). We concluded that the three latent variables captured aspects of a) syntax (MLCU and Clausal Density; eigenvalue = 1.8, explaining 29.8% of the variance), b) discourse difficulties (Mazes and % Errors; eigenvalue = 1.3, explaining 22.0% of the variance), and c) content (MATTR and PSS; eigenvalue = 1.0, explaining 17.2% of the variance).

Research Aim 4: Validity of Persuasive Measures

To test the validity of the persuasive measures, we completed a series of analyses to document the relationship between the persuasive language sample measures and additional measures of general language, working memory, and personality from the 66 Australian students recruited for this study.

Relationship between Persuasive Language, General Language Ability, and Working Memory. Two sets of Pearson correlation coefficients were calculated to document the relationship between the persuasive language sample measures and the measures of general language ability (raw score on Recalling Sentences from the CELF-4) and working memory (total number of words recalled correctly on the CLPT). We used raw scores from the CELF-4

and CLPT to achieve consistency with the persuasive language measures, which were not

adjusted for age. The summary of these correlations is presented in table 3. Significant

correlations were observed between Recalling Sentences and two persuasive measures (PSS and

% Errors); there were no significant correlations between Recalling Sentences and the four other

persuasive measures. Significant correlations were also observed between the CLPT and two

persuasive measures (MATTR and PSS); there were no significant correlations between the

CLPT and the four remaining narrative measures.

   Relationship between Persuasive Language and Personality. We next tested the

relationship between the adolescents' persuasive language use and their self-rated personality

descriptions from the Ten Item Personality Inventory (Gosling et al., 2003). Because the

personality ratings used ordinal data (i.e., rankings of one to seven), we completed

nonparametric Spearman's rho correlations between the measures. No significant correlations

were observed between any of the five personality domains and the six persuasive language

sample measures (r = -.24 – .23, p = .06 - .98).

<p align="center">**Discussion**</p>

   There is a need for SLPs to have access to functional, authentic assessments to describe

the nature of their adolescent students' spoken language skills. Given that persuasive ability

contributes to academic success and social well-being, analysis of persuasive discourse has the

potential to fill that need. We developed a task to sample students' persuasive discourse and

collected benchmark data from typically developing adolescents (grades 8 – 12). Thirty-nine

SLPs volunteered their time to collect the data reported in this study. These SLPs reported that

the protocol was easy to administer and took roughly 20 minutes to complete, consisting of

instructions, planning, and the sample itself. Despite having dozens of SLPs collecting data

across multiple schools and spanning two countries, remarkably stable data were collected. The

brief training and detailed protocol were sufficient to guide the SLPs to elicit data with high

fidelity – the protocol was correctly executed for 177 of the 179 samples. The two instances that

deviated from the protocol were minor and likely had minimal impact on the participants'

productions. In addition, our standardized protocol afforded students the ability to individualize

their productions to their interests, with minimal impact on the resulting measures. The

persuasive issue and target audience chosen did not affect the persuasive measures for the

students' samples, which was consistent with our prior research on expository discourse

(Heilmann & Malone, 2014).

Properties of Persuasive Measures

The students produced relatively short samples, averaging 29 C-units produced in 3.4

minutes (SD = 1.7 minutes). Despite the brevity of the samples, students displayed sophisticated

levels of language production. Values for Clausal Density were impressive, with a mean of 2.0

(SD = 0.4), as were those for MLCU, with a mean of 16.3 (SD = 3.7). On average, our students

were using at least one dependent clause per C-unit. The syntactic complexity of our spoken

persuasive samples was comparable to that of the written persuasive samples described in

Nippold et al. (2005), who found that typically developing college students had a mean MLCU

of 16 words. The typically developing students in Moran et al.'s (2012) study had an average

MLCU of 13.2 and a Clausal Density of 1.8, which were nearly one standard deviation lower

than the students in our study. One reason for the difference could simply be the sample size.

Because Moran et al. only sampled eight typically developing students, a more representative

sample might have demonstrated a different pattern of performance. Another potential

explanation is the availability of the planning sheet in the present study. By having the

opportunity to plan the components of the persuasive sample and use the planning notes to

scaffold their production, students may have been supported in producing longer and more

complex utterances.

One surprising finding was the relatively high frequency of errors and omissions. On

average, approximately 20% of the adolescents' C-units contained at least one error or omission,

which was notably higher than Heilmann and Malone's (2014) examination of expository

discourse in somewhat younger children, where 11% of C-units contained an error, on average.

Further analysis of the students' performance revealed that most mistakes students made were

lexical in nature: 60% were word-level errors, 27% were omissions of words, 9% were utterance-

level errors, and 4% were omissions of bound morphemes. We further observed that longer

utterances were more likely to contain errors. Of the 3,338 C-units that were ≥ 15 words in

length, 24% contained at least one word-level error. Conversely, only 5% of the 2,248 C-units

that were less than 15 words in length contained at least one error.

The demands of producing very long utterances, common in these persuasive samples,

may have had an impact on students' accurate use of vocabulary and at times grammar.

Consider, for example, the following complex utterance on raising the minimum wage, which

comprises 37 words and six finite clauses:

> And so I guess
> some[EW:one] of the first steps would be
> what I'm trying to do to you right now,
> *which is make you aware of it,
> even though you probably are aware
> because you're a government official.

Despite the strong language ability on display, this student omitted an obligatory word,

which (indicated with an asterisk). In addition, the speaker made a word-level error involving

one (some[EW:one], which is SALT's coding convention for the substitution of *some* for *one*), which was incorrect because the speaker offered only a single step.

Across all of the measures, we observed relatively small grade-related changes in measures. There were statistically significant grade-level changes observed for four of the six measures studied, but grade only accounted for 4 - 6% of the variance in the measures. The relatively small grade-related differences observed in the present study were consistent with previous studies examining expository discourse, which found that discourse measures underwent slow and steady increases from the middle-school years through adulthood (e.g., Heilmann & Malone, 2014; Nippold, 2016). Upon completing our exploratory factor analysis, we observed a parsimonious explanation of the variability that resulted in three latent variables, which captured the participants' syntax skills, discourse difficulties, and content. This analysis was largely consistent with our prior work showing that LSA can capture multiple aspects of both expository discourse (Heilmann & Malone, 2014) and narrative discourse (Westerveld & Gillon, 2010).

Validity of Persuasive Measures

The 66 adolescents who completed additional language, working memory, and personality testing afforded the opportunity to identify which of these measures were related to our persuasive measures (convergent validity) and which were not related (divergent validity). We first examined the relationship between the persuasive measures and the general language and working memory measures, summarized in table 3. One clear result was the significant positive correlation between the PSS and both the Recalling Sentences and CLPT scores, which demonstrated the importance of language and working memory for overall discourse organization skills. This result was consistent with prior research demonstrating that working

memory skills are related to adolescent and adult discourse organization skills (Chapman et al., 2006; Hay & Moran, 2006). A second clear pattern was the modest relationship between Recalling Sentences, CLPT scores, and three of the persuasive measures: MLCU, Clausal Density, and %Mazes. These inconsistent patterns of relationships between microstructural discourse measures and decontextualized assessments of language and working memory were consistent with prior studies (e.g., Ebert & Scott, 2014; Nippold et al., 2009; Ukrainetz & Blomquist, 2002) and were likely because the different tasks captured unique features of the language system.

While there is some evidence that an individual's personality is predictive of their persuasive skills (e.g., Nussbaum & Bendixen, 2003; Oreg & Sverdlik, 2014), we found no such relationship. The limited relationship was likely a function of the task and/or coding protocols employed in this study. The majority of studies that examined the development of argumentative skill came out of social psychology, where the goal was not to document linguistic ability, but rather to document a speaker's overall effectiveness. Our one macrostructure measure, the PSS, may not have captured some of the nuances of persuasive skill that are influenced by personality. Alternatively, Oreg and Sverdlik (2014) demonstrated that personality had minimal influence on persuasive ability when speakers discussed high-interest issues. We strategically designed our study so that the persuasive issue would be highly relevant to the speaker. The students' high interest in the task may have offset any impact of personality on the persuasive productions.

In sum, the results of the correlation analyses between Recalling Sentences, CLPT, and the six persuasive discourse measures confirmed that there is some overlap between persuasive measures and standardized, decontextualized language and working memory measures. This result demonstrates some level of convergent validity, while further illustrating that the two types

of measures capture unique aspects of adolescents' language ability. In addition, we were

pleased to find that personality did not have an overly large impact on the persuasive measures

described in this study. Given that our goal in developing the persuasive assessment protocol was

to documents students' language ability, this lack of a relationship between personality and

persuasive measures documents the divergent validity of the assessment.

Study Limitations

We strategically recruited students from a variety of racial/ethnic and SES backgrounds

that mirrored the broader Australian and U.S. populations, which by definition resulted in a

sample that predominantly consisted of adolescents from mainstream backgrounds. Furthermore,

the study was limited to fluent English speakers. Therefore, we do not know if the trends

observed in the present study generalize to students whose cultural, economic, and/or linguistic

characteristics substantially differ from the students in the sample.

Future Research

Our ultimate goal is to develop a validated language sampling protocol that can be used

clinically to assess the functional persuasive discourse of adolescents. In this study, we took the

first steps toward this goal by developing a persuasive protocol and then using it to establish

benchmark data on typically developing adolescents. Given the documented difficulties that

persuasion poses for individuals with communication problems, we would expect that

adolescents with language disorders would find our persuasive protocol challenging and that

their pattern of performance would differ significantly from the benchmark data. Future research

will test the efficacy of our protocol and the benchmark data when used to assess adolescents

who are identified with or are suspected of having language disorders.

Clinical Implications

SLPs should feel confident that they can quickly and accurately elicit persuasive discourse in accordance with our established protocol. Our study was executed with a high degree of fidelity by school-based SLPs, with no special research training. Less than 1% of the samples had a minor deviation from the protocol, which demonstrated how easily this protocol can be used in clinical practice. Our summary of persuasive discourse measures can be used as benchmarks for clinical evaluations, which will assist with interpreting a student's functional language skills. We shared these data with the SALT Software team, who embedded the normative data within the software to assist with interpreting individual students' persuasive measures. Our factor analysis provided an evidence-base supporting the use of individual persuasive language samples to describe multiple dimensions of language ability. By capturing these distinct dimensions within a functional task, SLPs have the potential to identify relative strengths and weaknesses across multiple aspects of persuasive discourse, including both microstructural and macrostructural features of language. Together, these data and resources can improve the feasibility of assessing adolescent's persuasive discourse skills.

Since there are not yet published data on children with communication disorders, SLPs must use their clinical expertise to judge when to make adaptations to the elicitation protocol. For example, students with written language difficulties may struggle to complete the planning sheet. Allowing additional time or alternate forms of planning (e.g., scribing by the examiner or allowing the student to use a word processor) should be considered. Because the samples produced by the typically developing students were relatively short, we anticipate that students with language disorders will produce even shorter samples, which may in itself be diagnostic. However, if the SLP desires greater productivity to ensure a representative corpus, we

recommend elicitation of multiple persuasive samples (e.g., one on a school issue and another on a work issue).

In sum, SLPs know that functional assessments, such as LSA, are critically important to school-based practice, yet most SLPs working with adolescents are not regularly using these types of evidence-based assessments or are not systematically recording and analyzing their samples (e.g., Pavelko et al., 2016; Westerveld & Claessen, 2014). We recognized that there were not many published assessments for older students, so we completed this research to provide a tool to quickly and easily assess the functional communication skills of older students. More widespread adoption of ecologically valid assessment tools, such as our persuasive protocol, will help SLPs to document the strengths and weaknesses of their students' functional communication skills. This, in turn, will lead directly to developing functional treatment objectives and, through repeated language sampling, monitoring progress toward achieving those objectives.

Acknowledgments

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Appendix A: Persuasion Planning Sheet

Student Id _____   Date _____

I am talking to my _____   *i.e., principal, boss, government official*

What to Talk about When Trying to Persuade Someone

Points	What's Covered?	Notes
1. Issue Identification	What rule or situation do you want changed? What would you change it to?	
2. Supporting Reasons	What facts or values or evidence helps your side? Be sure to include how your change would help or benefit the listener or people the listener cares about.	
3. Counter Arguments	What are some good reasons on the other side?	
4. Response to Counter Arguments	What can you say to knock down or weaken the reasons on the other side? What reasons on the other side can you agree with, either in whole or in part?	
5. Compromises	If you can't get your way 100%, what deals would be acceptable so each side wins a little?	
6. Conclusion	Briefly sum up your position: What do you want? Why do you want it? What are the first steps needed to make the change happen?	

Please use the reverse of this page for an optional diagram or graphic organizer, or for additional notes.

Appendix B: Persuasive Protocol

Protocol for Eliciting a Persuasive Language Sample

Today I want to find out how well you can persuade. That's when you talk people into changing their mind and doing something you want. I'm going to make a recording. If you want, you can listen to it when we're finished.

I would like you to pick a rule or situation you would like to see changed in your school, job, or community. Imagine that I am an adult who has the power to make the change that you want. Here are a few examples:

1. Pretend I'm the principal of your school and you want to persuade me to provide money for a special event; OR
2. Pretend I'm your boss and you want to persuade me to change your hours or work schedule; OR
3. Pretend I'm a government official and you want me to change the law so that taxes are raised or lowered for a specific purpose.

I expect you to talk for at least a few minutes, so be sure to pick an issue you know and care about. You can choose an issue from this list [*hand list to student***] or else pick one of your own.**

Allow the student time to review the suggested issues before asking: **What issue have you picked?**

If the student has difficulty choosing an issue, offer assistance. Review the list together. If a proposed topic is not an arguable issue (e.g., strawberry ice cream is better than chocolate), encourage the student to pick a different issue. If a proposed issue is too narrow, encourage the student to modify it. For example, if the student wants to argue for a change to his or her individual grade in a particular class, suggest that the issue be broadened into an argument for a school-wide change to grading policy.

Once an appropriate issue has been selected, clarify the intended target of the persuasion, e.g., principal, boss, government official, by asking, **"Who will you be trying to persuade?"**
If there is a mismatch between the issue and the authority figure, help the student to resolve the problem. For example, if a student wishes to convince a boss to raise the minimum wage, help the student understand that this argument is best directed toward a government official.
Once a match has been established between issue and authority figure, proceed to the planning directions:

Talk to me as if I'm your [name the appropriate authority, e.g., principal, boss, senator] and tell me everything you can to persuade me. To do your best job, you'll first need to organize your thoughts. Here's a list of points you'll need to cover to make a complete argument [*hand the student a copy of the planning sheet***]. Please take the next few minutes to**

plan by taking notes in these blank spaces [*point to the empty boxes in the column on the right***]. But don't waste time writing sentences. Just jot down some key words to remind you of what you want to say. If you don't want to take notes, you can use the reverse side to draw a diagram or make a graphic organizer. Do you have any questions? Go ahead and start planning.**

Skill at reading is not being assessed. Therefore, if the student appears to be having any difficulty understanding the planning sheet, read the text aloud to the student.
Allow enough time for the student to write something for each point on the planning sheet or to create a diagram or graphic organizer. Verify that the student has done some planning for each point. If not, prompt with, **"Please do some planning for [name(s) of omitted point(s)]." When I turn on the recorder, you will be doing all the talking. I'm going to listen to what you have to say. Tell me everything you can think of. It's OK to look at your planning sheet to remind yourself of what you want to say. Feel free to add to what you've written. Remember: I expect you to talk for as long as you can.**

Turn on recording device and have the student begin speaking. Do not engage the student in a debate. Instead, limit your encouragement to affirmations such as: **Uhhuh, mhm, I see, OK, ah***, etc.*

If the student finishes speaking before several minutes has elapsed or has not discussed one or more points on the planning sheet, prompt with:
Is there anything else you can tell me?

If the student still has not addressed all the points on the planning sheet, prompt with:
"What about [name(s) of omitted point(s)]?"

When the student has finished speaking, turn off the recorder. Review the recording for quality before releasing the student. If there's time, offer to let the student listen to the recording.

Appendix C: Suggested Topics List

Changing the time school starts in the morning
Allowing students to leave campus during the school day without special permission
Requiring students to do graded homework
Requiring students to take foreign language classes
Allowing teachers to socialize with students on social networks such as Facebook, Twitter, Snap Chat, Instagram, etc…
Including grades in physical education classes in students' grade point average
Allowing students to listen to their music using headphones during free periods
Changing the access teenagers have to entertainment that is violent or sexually suggestive; entertainment includes movies, music, and video games
Requiring school uniforms or a dress code for students
Awarding cash or other incentives to students who earn good grades
Replacing traditional textbooks with notebook computers or digital materials
Requiring cities to provide free wireless Internet access in public spaces
Requiring people to get a license in order to become parents
Allowing alternatives to jail, such as counseling or public service, for convicted criminals
Requiring colleges to pay their student athletes a salary for playing
Requiring drug tests for professional athletes
Allowing employers to require drug tests as part of their hiring procedure
Requiring workers to pay for their own work uniforms or equipment
Raising the minimum wage
Changing the minimum age for voting, drinking, driving, or holding a job
Other: Topic of your choice