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Syntactic and Semantic Development in Adolescents' Persuasive Discourse

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SYNTACTIC AND SEMANTIC DEVELOPMENT IN ADOLESCENTS’
PERSUASIVE DISCOURSE

By

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ABSTRACT

The purpose of this study was to examine adolescents’ use of persuasive language in both oral and written contexts. Previous authors have noted that persuasive discourse is one of the most difficult language genres to master. The development of this skill follows a gradual progression that extends from childhood to adolescence and into adulthood. The following research question guided the present study: How does syntactic and semantic development differ in oral versus written persuasive discourse for adolescents with typical language development? To address this question, 65 students enrolled in the ninth grade with typical language development were recruited from a public high school. Spoken and written persuasive language samples were gathered from the participants, and compared for level of performance on the dependent variables. Language samples were transcribed and analyzed using the SALT software. With modality (oral vs. written) as the independent variable, and two measures of syntax (e.g., clause density, number of complex sentences) and two measures of semantics (e.g., meta-verbs, lexical density) as the dependent variables, analyses included repeated measures ANOVA. Descriptive and inferential statistics are reported. Results indicated levels of syntax and semantics were greater in the written modality than in oral language, for three of the four dependent variables (clause density, # complex sentences, lexical density). Meta-verb use was consistent across modalities. Implications for further research, and clinical practice are discussed.
Syntactic and Semantic Development in Adolescents’ Persuasive Discourse

Language development in young children is rapid and includes change in each area of language, including: phonology, morphology, syntax, semantics, and pragmatics (Nippold, 1993). However, in adolescents, the rate of language development declines, resulting in slower progression. Adolescence is defined by Nippold (2000) as the period of time between the ages of 12 and 20 years old when a significant amount of language development continues to occur in the areas of syntax and semantics. To clarify, the slowing of language acquisition noticeable between childhood and adolescence should not be mistaken as an indicator that language development in the adolescence stage is less critical. In fact, research suggests that a substantial amount of ‘higher level’ cognitive and linguistic skills, such as syntax and semantics, are not fine-tuned until adolescence.

Later language development, generally apparent by the end of adolescence, is evident when one masters the ability to communicate in a variety of ways for different purposes, and knowing when to use each discourse appropriately (Nippold, Hesketh, Duthie, & Mansfield, 2005). For instance, when trying to convince someone to buy a red car over a blue car, choosing to use persuasive discourse would be more effective than using expository discourse. Effective speaking and writing is accomplished through combining appropriate discourse selection, logical organization of material, clarity, and correct use of sentence structure and grammar. The development of effective language skills is a process that begins in early childhood and with practice/exposure continues to refine itself through adolescence and adulthood (Tower, 2003). Specific language skills, such as syntax and semantics, reveal details, which will later be discussed, relating to linguistic development during this period.
Oral and Written Discourse

Archeological accounts indicate oral language was established before written language. According to Shanahan (2006) this pattern is commonly the same for individual language development; oral language usually develops between 12-18 months while written language discourse generally begins developing around 36 months. Although written language reaches full development much later than oral language, studies suggest that oral language has great influence on written discourse. Shanahan (2006) mentioned that morphemes, lexicon, phonological awareness, semantics, syntax, and other aspects of oral language are used as a foundation in early writing. Though research has established relationships do exist between the oral and written modalities, the extent of the relationships and what the relationships entail are widely unknown. Most studies that investigate the similarities and differences of oral and written language are focused on atypical learning populations or school aged children in grades 3-5, when writing is integrated into school curricula. However, many literate language skills continue to develop well into adolescence. Thus, in order to get a better understanding of the relationship between oral and written language, it is imperative to compare and contrast the discourses beyond the scope of initial development. By analyzing oral and written language in later development, we hope to determine whether oral language structures continue to aid in written language development during adolescence.

Oral and written languages are similar in that both are essential for academic success and many key components, such as syntax and semantics, continue to develop into the adolescent years. One relation between the discourses in the area of semantics is that the development of literate lexicon, or vocabulary, is greatly accelerated through
literate activities such as reading and writing. According to Kamhi, Masterson, and Apel (2007), having a good foundation in literate lexicon leads to a greater understanding of figurative language. Oral language and written language also share some similarities of syntax. For instance, the use of syntactic structures such as subordination and adverbial connectors gradually increase in adolescents spoken and written language (Kamhi et al., 2007). Additionally, the process of analyzing samples of syntax is the same for both oral and written language. The samples were broken down into communication units (C-units) or terminable units (T-units), depending on the discourse.

On the contrary, there are many differences between oral and written language. For starters, according to Kamhi, Masterson, and Apel (2007) in written communication the writer is separated from the reader, thus the information is distributed without face-to-face interaction. Furthermore, literate language only involves more complex and formal grammar while spoken language is comprised of familiar grammar; this is possibly due to spoken language being more on the fly and immediate where writing usually offers time to brainstorm/plan. Moreover, written language offers more opportunities to clarify content than in spoken language. An additional monumental difference between oral and written language is that in written language cohesion is only through words while spoken language consists of cohesion through intonation. These are just a few known similarities and differences between oral and written language. Perhaps the analysis of this study’s results will give more insight to the reciprocal links of the language modalities.

**Syntactic development in adolescence**

Nippold and colleagues conducted several studies on syntactic development throughout the stages of development, including childhood, adolescence, and adulthood.
and across different genres. These previous studies contribute to the bulk of what we know about syntactic developmental patterns in persuasive discourse. While it is difficult to compare results directly across studies, one major recurring theme exists: later syntactic development during adolescence is not primarily a time for obtaining new grammatical structures (Nippold, Ward-Lonergan, & Fanning, 2005; Nippold et al., 2005a). Rather, during adolescent language development, individuals develop an awareness of how to use pre-established grammatical structures with greater proficiency and skill in a way that generates clearer and more concise ideas that lead to informative and complex communication (Nippold et al., 2005a).

Through additional research, it became evident to Nippold (2000) that syntax development during adolescence is gradual and subtle, with changes that are evident when closely examined. Nippold (2000) suggested that if one examines syntactic development in a discourse that is less linguistically demanding or challenging (e.g., conversational) then one could falsely assume there is no syntactic growth in adolescence. Nippold (2000) then claimed by looking at a discourse that is more linguistically demanding, such as the persuasive discourse, syntactic growth becomes more evident. Thus, the more demanding the discourse, the more evident syntactic growth becomes. In order to better understand the amount of syntactic growth during adolescence, the persuasive discourse should be studied.

Nippold et al (2005b) studied syntactic development in the context of persuasive writing in children, adolescence, and adults. Syntax was measured by mean length of utterance in words (MLU-W) and two types of clauses, independent and subordinate (e.g., relative, adverbial, and nominal). Results revealed that MLU-W increased with age
while independent and subordinate clauses did not reveal any significant changes after early adolescence. However, they found that when looking closer into subordinate clauses, specifically relative, adverbial, and nominal, there is a pattern. Adverbial and nominal clauses did not seem to increase with age but an increase in relative clauses was detected.

*Semantic development in adolescence*

Similar to syntax development, semantic development during adolescence is a gradual and subtle process. Also, resembling syntax, an individual’s level of semantic mastery is important in the persuasive discourse. According to Nippold (1993), there are two characteristics of semantics that are potential markers of academic success: figurative expressions and lexical diversity. Scott and Windsor (2000) define lexical diversity as a measure of how many different words are used in a text. Lexical diversity increases when a wide range of vocabulary is used. For the purposes of this study, lexical diversity was measured by comparing content versus function words. Both lexical diversity and figurative expressions require metalinguistic knowledge to gather meaning from contexts. There are verb forms that occur in written discourse that reflect one’s use of metalinguistic knowledge. Nippold (2005b, p. 130) defined metalinguistic verbs as “verbs that refer to the act of speaking” and metacognitive verbs as “verbs that refer to the act of thinking.” These will be referred to as “meta-verbs” in the present study. By taking a look into two semantic features, content versus function words (a measure of lexical diversity) and the use of meta-verbs we hope to gather a more complete understanding of the developmental process of semantics.

Scott and Windsor (2000) specifically measured lexical diversity in the narrative
and expository discourse of children with mean ages of 11.5, 11.6, and 8.11 years old. Scott and Windsor’s purpose was to find similarities and differences between the language performance of students with language learning disabilities (LLD) and their chronological age (CA) and language age matched (LA) peers. Their results indicated that lexical diversity, measured by number of different words (NDW), did not distinguish the LLD group from the CA or LA students. These authors stated that because lexical diversity develops at such a slow rate in older students, NDW may not be the most sensitive measure of lexical diversity. Another challenge in measuring lexical diversity through NDW is controlling for the language sample size (Scott 2009; Scott & Windsor). One solution to this problem is to examine lexical density as a proportion of content words (e.g., nouns, verbs, adjectives) to total words (Hall-Mills, 2010; Scott, 2009).

Nippold et al (2005b) studied semantic development in the context of persuasive writing in children, adolescence, and adults. Semantics were measured by an analysis of three types of literate words (adverbial conjugates, abstract nouns, and meta-verbs). This study showed that adverbial conjugates, abstract nouns, and meta-verbs all increase in production with age. Abstract nouns had the greatest increase while the use of adverbial conjugates and meta-verbs remained low, even in adulthood. This indicates that the literate lexicon is not an “all or none process” but a gradual development. Based on the work of Nippold et al (2005b), we have a better idea of the role of meta-verbs in semantic development.

Persuasive discourse in adolescence

The purpose for utilizing the persuasive discourse when examining syntactic and semantic growth in adolescents is because past research has shown that persuasive
speaking and writing requires the greatest demands both cognitively and linguistically (Beers & Nagy, 2011; Nippold, 2000; & Nippold et al., 2005b). Therefore, the use of persuasive language creates a need for the adolescent to rely more on his or her own linguistic competence than in other discourses because persuasive discourse requires the speaker/writer to not only acknowledge what they know, but to consider what the reader/listener knows in order to make a stronger and more persuasive argument (Nippold, 2000).

An additional advantage of analyzing the persuasive genre is that according to the State Mandated Common Core Standards initiative 2010 (http://www.corestandards.org/assets/Appendix_A.pdf, p. 24): there is a “particular emphasis on students’ ability to write sound arguments on substantive topics and issues, as this ability is critical to college career and readiness.” Persuasive speaking and writing abilities are good indicators of one’s overall linguistic achievements. Since persuasion and academic success are related, it is important to monitor students’ persuasive discourse and could be an effective way of identifying at-risk populations. According to Gerald Graff (2003) an English and education professor, the argumentative discourse is the foundation for all education and is essential to being educated. Graff (2003) states that the university systems are primarily provided with an argument culture, thus from kindergarten to twelfth grade, Graff (2003) believes it should be mandatory to teach the persuasive genre so that students become more skilled at understanding and engaging in both oral and written argument before entering college. Graff (2003) contends that as a result of the persuasive discourse not being taught in a majority of school curricula, only 20% of students that begin college are prepared in this respect. Graff’s claim indicates
that 80% of students who begin college have not mastered one of the most important aspects of later language development, the persuasive discourse.

As many researchers have discovered, persuasive language is one of the most difficult genres to master (Nippold, 2000). Furthermore, persuasive discourse is at the heart of many curricular standards for adolescent students. Yet very little is known about the development of certain linguistic features reflected in persuasive language. The purpose of this project was to expand the knowledge base on language development in the persuasive context. The present study was designed to examine features of syntax (e.g., clause density, number of complex sentences) and semantics (e.g., meta-verbs, lexical density) in two modalities (speaking and writing) of persuasive language in adolescents with typical language development. Specifically, the research question was:

1) How does syntactic and semantic development differ in oral versus written persuasive discourse for adolescents with typical language development?

In the area of syntactic development, I hypothesized that clausal density would be greater in the written modality than in spoken. Additionally, I predicted that there would be a greater number of complex sentences in the written form than in the oral modality. In the area of semantic development, I hypothesized that there would be a greater lexical density in written persuasion than in oral. Lastly, I predicted that meta-verbs would be used more frequently in the written modality.
Method

Participants

Sixty-five high school students enrolled in the 9th grade were recruited to participate in the study. Participants were recruited from a public high school located in a mid-sized city in north Florida, whose study body was reflective of the state. (School-wide demographics are: 50.4% female, 49.6% male; 56.86% White, 24.54% African-American, 10.81% Hispanic, 2.46% Asian, 0.56% Native American Indian, 4.74% Multicultural). The following demographic information was collected for each participant: gender, age, ethnicity, status in exceptional student education (if applicable), and whether the student was a recipient of free/reduced lunch (as a measure of socioeconomic status). Participants were recruited as part of a larger investigation that examined adolescent discourse features across multiple genres and language modalities. Approval was obtained from the Florida State University Institutional Review Board (IRB) for the procedures and consent forms for this study (HSC 2012.8018). Additionally, permission to conduct research was obtained from the school. Consent forms were sent home to all ninth grade students. It was required that each participant was monolingual English-speaking, enrolled in general education, with no history of sensory impairments as determined by school records. Consultation between the primary investigator (PI) and research director at the school helped confirm whether participants with parental consent met the inclusionary criteria.

Recruitment Process. Consent forms were given to the research director at the school, who then provided the consent forms to the participating teachers. The teachers distributed the consent forms to be sent home through their English classes. At this time,
the teachers described the purpose of the consent form and the purpose of the research study to the students in their class. The contact information of the PI was on the consent form for parents who had further questions about the research study. Additionally, the PI followed up with the teachers and answered any remaining questions.

Minimizing Risk of Harm. All procedures we used were tasks that had been used previously with students in high school. Therefore, the procedures did not involve activities that would cause discomfort or put any study at risk in any way. However, if a participant became upset during testing for any reason, she/he could choose to discontinue testing without penalty or risk. Also, at the beginning of the testing sessions, each student was informed that he or she may discontinue testing at any time if he or she felt uncomfortable or did not want to continue testing.

Sample Size. Efforts were made to recruit 65 ninth graders based on an a priori power estimate for planned analyses.

Independent and dependent variables. The language modality (e.g., oral versus written discourse) was the independent variable. The participants’ level of syntax (as measured by number of complex sentences and clause density) and semantics (as measured by number of meta-verbs and lexical density), were the dependent variables. The dependent variables were measured through language sample analysis.

Materials

Dependent measures. Two language samples were collected from each participant. Persuasive writing samples were elicited in group or classroom settings and were part of the regular curriculum of a language arts class. Spoken persuasive language samples were elicited in individual sessions. For both the written and spoken language
activities, participants reviewed a brief presentation via PowerPoint and pre-recorded narration for consistency across groups and individuals. After the presentation, participants reviewed a language prompt selected from a set of standard persuasive writing prompts used in state assessments. Participants had 25 minutes to produce a written composition, and 5 minutes to produce the spoken language sample. Written samples were collected via a paper and pencil task, while spoken samples were audio-recorded on an Olympus Digital Voice Recorder (VN-702PC).

Additional measures. A nonverbal cognitive measure was administered to examine the participants’ broad cognitive skills. The Matrices Subtest of the Kaufman Brief Intelligence Test-2nd edition (KBIT-2; Kaufman & Kaufman, 2004) was administered during the individual testing session. Students viewed a series of wordless pictures and pointed to the answer that completed the sequence. The Matrices Subtest assesses the ability to perceive relationships and complete visual analogies. This measure took about 10 minutes per participant. Participants scored an average of 93. The standard deviation was 10.4 and the range was 80-120, these scores reflect non-verbal cognitive scores within the average range.

Procedures

Instructions for participants. To introduce the research to participants, at the beginning of group and individual measurement sessions, we said:

“Hello! The purpose of this project is to understand more about your oral and written language skills. This will help us understand what skills are needed to support reading and writing activities needed for school.”
Prior to testing, participants’ assent was obtained through a written assent form. The study was explained to them, and they were given time to read through the assent form. Students had time to ask the researchers any questions regarding the research project. We asked the participants a series of questions to assess their understanding of the risks and benefits of participation, after which we asked them to sign if they wish to participate:

“What do you think the purpose of your participation in this research is? How do you think testing your oral and written language will help other students? Do you have any specific questions for me at this time?”

_Eliciting language samples._ The spoken and written language samples were elicited following a brief (5 minute) recorded power point presentation. This method was selected to help maintain consistency in prompting sequence across measurement sessions and examiners. The prompt selected to elicit the spoken and written persuasive discourse was selected from a set of grade-level prompts used in previous state writing assessments. Written language samples were completed via a paper and pencil task, and collected at the end of the group measurement session. Individual spoken language samples were audio-recorded using digital audio recording equipment. Language samples were transcribed in the Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 2005) program, using SALT conventions.

_Coding language samples._ The spoken and written language samples were transcribed at the level of the T-unit to calculate clause density (a syntactic measure). Clause density was calculated by dividing the total number of clauses (main and subordinate) in the sample by the total number of T-units across the sample (Scott &
Windsor, 2000). Transcripts were also coded for sentence type (simple vs. complex, grammatically correct vs. incorrect), and the occurrence of meta-verbs. The proportion of content words for calculation of lexical density was obtained from the language sample text in a separate Word file. Including data collection and coding, the total time commitment per subject was estimated to have been approximately two hours.

Data Analysis

Four dependent measures were analyzed from the spoken and written persuasive language samples to describe syntactic (e.g., clause density, number of complex sentences) and semantic features (e.g., meta-verbs, lexical density). After the language samples were transcribed reliably in SALT, and the reports from SALT were analyzed for scores for the dependent variables, we examined the group means for each using the Predictive Analytics Software for Windows (PASW), version 21.0 (SPSS, 2012). Descriptive statistics are provided on participant demographics and raw scores for dependent measures in Tables 1 and 2, respectively. Inferential statistics are reported in results of four separate one-way repeated measures analysis of variance (RM-ANOVA), one analysis for each of the four dependent variables. Statistically significant differences are indicated within Table 2. With a single independent variable, one-way RM-ANOVA was the preferred method over \( t \)-tests due to the automatic calculation of effect size. Effect size is reported using partial eta squared (partial \( \eta^2 \)), which may range from 0 to 1, and is interpreted as \(<0.10\) = small, \(0.10-0.25\) = medium, and \(>0.25\) = large.

Reliability.

This study employed a single group of participants. Examiners followed the same protocol and prompting hierarchy during measurement sessions across participants.
Therefore, the risk for observer bias in the live assessments was considered to be relatively low. For language sample transcription and analysis, the risk for observer bias may have been higher had the observers been too familiar with the study’s hypothesis. Intra-observer reliability was established through training sessions with the PI in preparation for the data collection period prior to being approved to participate in data collection at the school. The PI was an experienced speech-language pathologist, and was present during the assessment sessions to check for intra-observer and inter-observer consistency.

An undergraduate coder and the researcher listened to and coded the 65 oral samples. The researcher then typed the hand written samples and both the undergraduate coder and the researcher coded the typed written samples. To avoid bias, all coding was sent to the thesis director to calculate inter-rater reliability. Training for coding reliability occurred through multiple meetings with the thesis director. Inter-rater agreement is provided for each unit of analysis in both modalities (oral and written). Inter-rater agreement was calculated by dividing the total number of agreements by the total number of possible agreements. Reliability for content words and meta-verbs was established on a subset (45%) of the overall sample. Reliability for all other units is calculated across the entire sample. The following inter-rater agreements were obtained (oral and written, respectively): T-unit segmentation (90%, 94.5%), clause count (99.5%, 99.4%), number of complex sentences (99.3%, 99%), content words (98%, 98%), and meta-verbs (85%, 90%). Meta-verbs were the most difficult to reliably identify in the oral samples, however, 85% inter-rater agreement was obtained as an adequate level of reliability.
Results

The aim of this research was to examine the oral and written persuasive language of typically developing adolescents on two syntactic variables (e.g., clause density and number of complex sentences) and two semantic variables (e.g., meta-verbs and lexical density). A series of one-way repeated measures ANOVA were used to examine these four variables across the oral and written modalities. Descriptive statistics (e.g., means, standard deviations) for each dependent variable across oral and written modalities is reported in Table 2, while inferential statistics are reported in the text below. Figures 1 through 4 contain boxplots to display the range of scores for each variable.

Syntactic Variables

A one-way RM-ANOVA was conducted to compare levels of clause density across the oral and written persuasive language contexts. Results showed a significant, small effect for modality in favor of written clause density $F(1,64)=4.832, p=.03$, partial $\eta^2=.07$. A second one-way RM-ANOVA was completed to compare the number of complex sentences produced across oral and written persuasive language samples. The results yielded a significant, large effect for modality in favor of complex sentences produced in written language $F(1.64)=26.712, p<.001$, partial $\eta^2=.29$.

Semantic Variables

To answer the question concerning whether the total number of meta-verbs varies with modality (oral vs. written), another one-way RMANOVA was conducted. The results showed there was a non-significant effect for modality for meta-verbs $F(1,64)=1.602, p=.21$, partial $\eta^2=.024$. 

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A final one-way RM-ANOVA was conducted to address whether lexical diversity differed with modality. The results revealed a significant, large effect for modality in favor of written lexical density $F(1,64)=111.56, p<.001$, partial $\eta^2=.64$.

Discussion

The focus of this study was to determine the differences between oral and written syntactic and semantic production in adolescent persuasive language. Two measures of syntax (e.g., clause density and number of complex sentences) and two measures of semantics (e.g., meta-verbs and lexical density) were analyzed and compared across language production modalities (oral and written) in a persuasive discourse context. The implications of the results are discussed below in further detail.

**Oral and Written Language**

Past studies imply that oral language generally develops before spoken language and that oral language aids in written language development (Shanahan, 2006). However, findings of the present study suggest that in the adolescent persuasive discourse, some aspects of written language exceed that of spoken discourse. The results indicate that between the oral and written modality in the persuasive discourse of adolescents, written language appears more robust linguistically. Three of the four linguistic variables (e.g., clause density, # complex sentences, lexical density) revealed greater levels in the written persuasive samples than in the oral persuasive samples. Therefore, written language in a persuasive context seems to be more robust linguistically.

**Syntax**

As predicted of syntactic scores, the written modality elicited greater clause density and a higher number of complex sentences. The average clause density in the oral
modality was $M = 1.99$ (SD = .49) while the average clause density in the written modality was $M = 2.17$ (SD = .38). Furthermore, the average number of complex sentences produced in oral language was $M = 7.03$ (SD = 3.57) while the written language averaged $M = 10.34$ (SD = 4.45) complex sentences per sample.

Nippold (1993) stated that the production of complex sentences is one way in which syntax develops during adolescence; this applies to both the oral and written context. Therefore, number of complex sentences was selected as a measure of syntactic complexity in the current study. The hypothesis was that there would be more complex sentences in the written modality than in the oral context. The reason more complex sentences were expected in the written language is because written language tends to include fewer repetitions, incomplete sentences, and corrections than the oral language, which would directly affect the total number of complex sentences in a sample.

Nippold, Hesketh, Duthie, and Mansfield (2005a) examined clause density in conversation and written expository discourse in adolescents of similar ages. Their participants in the 13 and 17 year-old groups produced average clause density levels of $M = 1.17$ (SD = .09), $M = 1.30$ (SD = .11) for oral expository language, and $M = 1.41$ (SD = .20), $M = 1.56$ (SD = .28) for written expository language. Compared to the participants in the present study, Nippold et al’s participants produced similar levels of oral and written clause density in the expository language contexts. However, visual comparison indicates the present means are a bit higher, and there is a wider range of scores for both oral and written persuasive clause density. This may be due to the fact that we included one group of participants ranging in ages 13-16, or it may be due to the nature of persuasive discourse vs. expository. Nippold, Ward-Lonergan, and Fanning (2005b) did examine
adolescent written persuasive language, but did not report clause density as a measure of syntax, so it is not possible to directly compare our participants’ performance to theirs.

*Semantics*

As predicted of semantic scores, the written modality elicited greater lexical density. However, meta-verb results indicated a similar frequency across the oral and written modality. The average lexical density in the oral modality was $M= .53$ (SD = .04) while the average lexical density in the written modality was $M= .61$ (SD = .05). Furthermore, the average number of meta-verbs produced in oral language was $M=4.92$ (SD = 3.42) while the written language averaged $M=4.26$ (SD = 3.15) meta-verbs per sample.

As a result of there being no previous studies to use in comparison of lexical diversity, the related hypothesis was based on the idea that oral language is more on the fly and immediate than written language. Therefore, it was assumed that more fillers and less content and function words (used to measure lexical diversity) would be present in the oral modality. Meaning, it was expected that the written discourse would consist of more lexical density than the oral discourse. This hypothesis was proven true.

Nippold, Ward-Lonergan, and Fanning (2005b) examined meta-verbs in the written persuasive discourse in adolescents of similar ages. Their participants in the 17 year-old group produced average meta-verbs levels of $M= 1.90$ (SD = 1.43) (Range = 0-5.98). Compared to the participants in the present study, Nippold et al’s participants produced meta-verbs at a significantly lower rate in the written modality. The current study had 5 outliers for written meta-verbs. It was thought that the outliers might have increased the recorded meta-verb measures. Thus, A second calculation was conducted
on meta-verbs, which excluded the outliers. However, excluding the outliers did not have a significant effect on the results.

Although the number of meta-verbs in the current study was similar between modalities, there are still some differences that can be observed by visual analysis of Figure 3. This graph shows that the average number of meta-verbs in the oral and written language were similar. However, it also provides some interesting information regarding the distribution and range of meta-verbs. The graph shows that there is a restricted range of meta-verb usage in the written discourse and it also reveals that there are some distribution differences between the modalities of meta-verbs.

In a post-hoc analysis, we calculated the number of different meta-verbs used in each sample to examine variety of meta-verb use. The results were not statistically significant as the oral modality reflected $M=2.91 (SD = 2.10)$ and the written modality was $M=2.92 (SD = 1.91)$.

**Limitations**

The current research selected all participants from a single high school. It is possible that this method of selection could limit the generalizability of the results to students enrolled in other schools. However, it is important to consider the public high school that the participants were recruited from uses stratified sampling from the broader student population. Thus, by design, the student body is representative of Florida demographics. It is reasonable to expect the results may to a larger portion of the student population.

A second limitation to this study is that only one grade level was assessed, 9th grade. This means that the results can be generalized and compared to other 9th graders
but should be considered for older and younger students with caution. In future studies, assessing multiple grades for comparison would be ideal to detect developmental changes and rate of linguistic change occurring before and after the 9th grade.

An additional limitation to this study could be that each assessment was only conducted once. It is possible that assessments conducted at a single point in time may not fully represent a student’s complete range of performance. Collecting multiple oral and written language samples from each participant may reduce some of the potential trait error that can impact results derived from only one sample. With each student being assessed one time, it is impossible to know how much trait error affected the outcome.

Lastly, because the number of complex sentences and other variables are directly related to the overall length of the sample and because sample length was not controlled, it is possible that the results reflected a biased estimate of syntactic and semantic strength across modalities. Based on the work done by previous researchers (e.g., Scott & Windsor, 2000), it is possible to control for sample length. For lexical density, a proportion of content words to total words was used in the present study to help control for overall sample length. Clause density also was calculated as a ratio for this purpose. However, other variables may have been impacted by the overall sample length (e.g., # meta-verbs, # complex sentences). To reduce the measurement threat to internal validity, in future research, the length of the elicited language samples should be controlled across all variables. For example, the proportion of meta-verbs and proportion of complex sentences may be less sensitive to overall sample length.
Future Directions

Many ideas for future studies can be drawn from the limitations of this project. For instance, having access to schools across multiple districts and states, as well as comparing multiple grades, could be advantageous in making the results more applicable to a broader population. Other ideas for future projects include analyzing multiple language discourse styles within a single study (e.g., persuasive and expository). Comparing and contrasting different discourses using the same tools and assessments could be instrumental in learning more precisely the stages of language development. This procedure could offer further insight into developmental expectations during adolescent language development. Additionally, studies that compare results from samples of students exhibiting typical development to those with identified language impairment would also be of interest. Lastly, measuring fluency of oration and writing (e.g., # of words or other linguistic unit per unit of time) may offer unique insight to the differences between adolescents’ use of spoken and written language.

Implications

This study examined various syntactic and semantic structures in the persuasive oral and written language of adolescents who exhibit typical language development. Studying the persuasive discourse is beneficial because it requires the greatest cognitive and linguistic demands for students (Beers & Nagy, 2011; Nippold, 2000; & Nippold et al., 2005b). Additionally, these results are significant because there is a known link between persuasive discourse skills and success on academic measures, including the 10th grade state assessment for writing (FCAT).
Table 1: Descriptive Statistics of Participant Demographics

<table>
<thead>
<tr>
<th>Participant Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
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<td></td>
</tr>
<tr>
<td>Males</td>
<td>29</td>
<td>43.3</td>
</tr>
<tr>
<td>Females</td>
<td>36</td>
<td>53.7</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td></td>
</tr>
<tr>
<td>Caucasian</td>
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<td>50.7</td>
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<tr>
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<td>32.8</td>
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<tr>
<td>Latino/Hispanic</td>
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</tr>
<tr>
<td>ESE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not ESE</td>
<td>56</td>
<td>83.6</td>
</tr>
<tr>
<td>ESE</td>
<td>9</td>
<td>13.4</td>
</tr>
<tr>
<td>SES</td>
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<td></td>
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<tr>
<td>No for FRL</td>
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<td>65.7</td>
</tr>
<tr>
<td>Yes for FRL</td>
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<td>31.3</td>
</tr>
<tr>
<td>8th grade FCAT reading score</td>
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<td></td>
</tr>
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<td>1.5</td>
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<td>7.5</td>
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<td>8th grade FCAT writing score</td>
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<tr>
<td>4.00</td>
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<td>7.5</td>
</tr>
<tr>
<td>5.00</td>
<td>3</td>
<td>4.5</td>
</tr>
</tbody>
</table>

*Note.* ESE= exceptional student education identification; SES= Socioeconomic status, which was based on whether the participant received free or reduced lunches. FRL= Free or reduced lunches. FCAT= Florida Comprehensive Assessment Test (a student must earn a 3 or higher on the 10th grade FCAT to earn a standard high school diploma). The average age of participants was 14 years, 10 months. Ages ranged from 13:10 to 16:5.
Table 2: Descriptive Statistics of Dependent Measures

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>S.D.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clause Density- Oral</td>
<td>1.99</td>
<td>.49</td>
<td>1.13-3.75</td>
</tr>
<tr>
<td>*Clause Density- Written</td>
<td>2.17</td>
<td>.38</td>
<td>1.33-3.21</td>
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<tr>
<td># Complex Sentences- Oral</td>
<td>7.03</td>
<td>3.57</td>
<td>1-20</td>
</tr>
<tr>
<td>*# Complex Sentences- Written</td>
<td>10.34</td>
<td>4.45</td>
<td>4-26</td>
</tr>
<tr>
<td>Total # Meta-verbs- Oral</td>
<td>4.92</td>
<td>3.42</td>
<td>.00-16</td>
</tr>
<tr>
<td>Total # Meta-verbs- Written</td>
<td>4.26</td>
<td>3.15</td>
<td>.00-20</td>
</tr>
<tr>
<td># Of different Meta-verbs-Oral</td>
<td>2.91</td>
<td>2.10</td>
<td>.00-8</td>
</tr>
<tr>
<td># Of different Meta-verbs-Written</td>
<td>2.92</td>
<td>1.91</td>
<td>.00-10</td>
</tr>
<tr>
<td>Lexical Density- Oral</td>
<td>.53</td>
<td>.04</td>
<td>.43-.66</td>
</tr>
<tr>
<td>*Lexical Density- Written</td>
<td>.61</td>
<td>.05</td>
<td>.51-.73</td>
</tr>
</tbody>
</table>

*Significant differences were detected between modalities in favor of the written modality, $p<.05$. 
Figure 1: Syntactic Variable: Clause Density (RM-ANOVA)

Note. Clause density: significant, small effect for modality in favor of written clause density $F(1,64)=4.832$, $p=.03$, partial $\eta^2=.07$. 
Figure 2: Syntactic Variable: Number of Complex Sentences (RM-ANOVA)

Note. # Complex sentences: significant large effect for modality in favor of written language $F(1.64)=26.712$, $p<.001$, partial $\eta^2=.29$. 
Figure 3: Semantic Variable: Meta-verbs (RM-ANOVA)

Note. Meta-verbs: non-significant effect for modality, $F(1,64)=1.602$, $p=.21$, partial $\eta^2=.024$. 
Figure 4: Semantic Variable: Lexical Density (RM-ANOVA)

Note. Lexical density: significant large effect for modality in favor of written lexical density $F(1,64)=111.56$, $p<.001$, partial $\eta^2 = .64$. 
Appendix

SALT Transcript Examples – One oral and one written language transcript.

$ Child, Examiner
+ Language: English
+ Name: 1212
+ Context: Oral, Persuasive
- 0:00
+ [0CL]: 0 clauses
+ [1CL]: 1 clause
+ [2CL]: 2 clauses
+ [3CL]: 3 clauses
+ [4CL]: 4 clauses
+ [CS]: complex sentence
+ [SS]: simple sentence

C Um I think that students, high school students should have part time jobs[2CL].
C cause not a lot of people want to depend on their parents for stuff[1CL].
C and you feel good when you buy stuff on your own[2CL][CS].
C Um, I think that's about it[2CL][CS].
C Well I mean if you play sports then I don't think so[3CL].
C cause then you worry about your job more than your sports[1CL].
C and then you become not committed[1CL][CS].
C Um, well some could be lazy too[1CL].
C cause yea I think that is why too[2CL][CS].
C If you want to support yourself in school[1CL][SS].
C Wait is this just for high school, okay college too[2CL][CS].
C Um, if you're in college it can help a lot[2CL].
C so you can pay for your books and all your materials and stuff[1CL][CS].
Students with part-time jobs can go different ways. My personal response actually goes both ways as an athlete; a part-time job is unimportant because sports can get you a fully paid scholarship for college. I am a fully dedicated athlete and wouldn't have any time to get a job. Students who are athletes play sports almost all the time and rarely even get free time. Less free time means definitely no job time. I say students shouldn't have a job in high school if you're a year-round athlete.

If you have no time, then don't do it. Over this upcoming summertime of 2013, I plan to get a part-time job as a camp counselor for the summer. Because this year I retired from playing football. Over the summer I had football workouts all throughout the summer. Now that I am no longer playing.

Students who drive have their own gas money and can buy anything with their money. Students feel successful when having their own money. They can get ready for college and it helps them to get ready for the real world.

My opinion is, if you're an all-around athlete then don't do it if you play sports. It should be time to get a job in a season you're not playing in. Local athletes more than likely don't have job because of commitment.

Jobs is a big responsibility. If you have a job, you play sports year round and still have to help financially then hats off to you.
References


State Mandated Common Core Standards initiative 2010: (http://www.corestandards.org/assets/Appendix_A.pdf, p. 24)


