Comparing the Linguistic Complexity in Receptive and Productive Modes

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ABSTRACT

Several studies have investigated linguistic complexity as an index of proficiency and across genres. However, very little research has been conducted in determining the difference between the linguistic complexity during receptive and productive modes. This study, therefore, attempts to fill in such a gap by providing evidence on whether the linguistic complexity that pupils can process during receptive mode is higher than what they can utilize during productive mode. Specifically, this study sought to determine the linguistic complexity level of learners' written narratives (i.e. productive mode) and reading passages most comprehensible to them (MCRPs) (i.e. receptive mode) and whether all linguistic complexity indices in MCRPs are higher than the linguistic complexity indices in written narratives. To address these objectives, this study used a narrative film to elicit the written narratives from the participants via story reconstruction. Eight graded narrative reading passages were also used to determine the most comprehensible reading passage via multiple-choice test. Using a microstructure analysis tool, the findings suggest that while the overall receptive linguistic complexity of Grades 2, 4, and 6 pupils is higher than their productive linguistic complexity, interestingly, not all indices of linguistic complexity are higher during productive mode. The implications of these findings for classroom teaching are considered more particularly in the selection of reading materials and the aspect of linguistic complexity that needs to be adjusted to facilitate comprehension. This paper, then, concludes with some research directions that would shed light on the receptive-productive dimensions of linguistic complexity.

Keywords: text complexity; receptive linguistic complexity; productive linguistic complexity; microstructure analysis; narrative texts

INTRODUCTION

Though our understanding of complexity has shifted from a text-centered to a complex view, linguistic complexity still stands as a fundamental component of literacy. It should be noted, however, that the level of linguistic complexity that a learner can process is heavily influenced by mode of processing—receptive (i.e. reading and listening) and productive (i.e. speaking and writing) modes. These two modes, according to Coulson and Drier (2002), may complement and reinforce each other. In fact, researchers agree that a receptive-productive dimension exists (Pignot-Shahov, 2012; Henriksen, 1999), both in the area of vocabulary development (e.g. Celce-Murcia & Olshtain, 2000; Groot, 2000; Henriksen, 1999) and overall language acquisition (e.g. Ellis, 2006).

It has been observed as well that receptive and productive knowledge do not develop at the same rate (Spada & Lightbown, 2008). It can, therefore, be hypothesized that learners' receptive capacity for linguistic processing is always greater than their productive capacity (de Hoop & Kramer, 2006; Coulson & Drier, 2002). Scholars (e.g. Henriksen, 1999; Melka, 1997) further argued that these two processing forms run in a continuum where there is an increasing degree of control from receptive to productive knowledge. This means that writing demands greater control than reading because writing relies deeply on the integration of perceptual, cognitive, and motor skills (Mirahmadi, Jalilzadeh, & Nosratzadeh, 2011).

To this end, it can be hypothesized that the linguistic complexity that learners can process during a receptive communicative act (e.g. reading) is higher than the linguistic complexity that they can construct during a productive communicative act (e.g. writing); however, very little research (e.g. Coulson & Drier, 2002; de Hoop & Kramer, 2006, McNamara, Crossley, & McCarthy, 2009) has attempted to provide empirical data that such a phenomenon exists. It is from this notion that the present study is anchored. Hence, this paper addressed the following research questions: (1) What is the linguistic complexity level of learners' written narratives (i.e., productive mode) and most comprehensible reading passages (MCRPs) to them (i.e., receptive mode)? (2) Are all linguistic complexity indices in MCRPs higher than the linguistic complexity indices in written narratives?

LINGUISTIC COMPLEXITY

Linguistic complexity, according to Housen and Kuiken (2009), refers to specific properties of language systems and the rules that govern those systems. However, it is the definition of Justice et al. (2006), which guided the conduct of the present study. According to them, linguistic complexity has two major components: productivity and structural/syntactic complexity. Productivity refers to word output (i.e. total number of words and total number of T-units) and diversity (i.e. number of different words) while structural/syntactic complexity refers to syntactic organization and use of subordinating conjunctions. Syntactic complexity also refers to "the range of forms that surface in language production and the degree of sophistication of such forms" (Ortega, 2003, p. 492). It is generally measured by the number of subordination (i.e. use of subordinating conjunctions when used to coordinate independent clauses) or the mean number of clauses per T-unit or terminable units (Ellis, 2009). A T-unit is the shortest unit of a particular passage that contains one independent clause with its dependent clause/s and can be segmented without 'leaving any sentence fragments as residue' (Hunt, 1970, p.189). Given these definitions, it can be summed up that linguistic complexity refers to both lexical and syntactic features of a language.

STUDIES IN LINGUISTIC COMPLEXITY

Many recent studies focused on analyzing the linguistic complexity of writing samples as an index of proficiency (e.g. Becker, 2010; Hinkel, 2003; Iwashita, Brown, McNamara, & O'Hagan, 2008; Lu, 2011; Taguchi, Crawford, & Wetzel, 2013) and on differentiating linguistic complexity of writing samples across age or grade levels (e.g. Crowhurst, 1983; Hall-Mills, 2009; Hunt, 1970; Perrera, 1984). Other researchers, however, focused on analyzing the linguistic complexity of reading texts as an index of text readability (Crossley, Louwerse, McCarthy, & McNamara, 2007; To, Fan, & Thomas, 2013) and comparing basal reading texts to children's written samples (Brown & Briggs, 1986; Eckoff, 1983).

While it is true that many studies have already investigated linguistic complexity in the context of writing, reading and speaking, none of these studies have explored linguistic complexity in the context of receptive-productive continuum. More specifically, so far very little research has been conducted in determining the difference between the linguistic complexity during receptive and productive modes.

LINGUISTIC COMPLEXITY AS AN INDEX OF PROFICIENCY

Lu (2011) analyzed large-scale college level ESL writing data using a computational system designed to automate the measurement of syntactic complexity of the writing samples. Her findings revealed that genre, timing condition, and school where students study significantly affected the relationship between proficiency and syntactic complexity. He further concluded

that the best measures for developmental indices are complex nominals per clause and mean length of clause.

Taguchi, Crawford and Wetzel (2013) analyzed the linguistic features that distinguish proficient from less proficient essays produced by non-native speakers of English. Their findings indicated that high-rated essays do not necessarily employ more complex language at the clausal level than low-rated essays. With this, they concluded that subordination is not the sole predictor of complexity.

Iwashita, Brown, McNamara and O'Hagan (2008), on the other hand, attempted to examine the nature of speaking proficiency of test-takers in ESL context. Different tasks and proficiency levels were analyzed using grammatical accuracy and complexity, vocabulary, fluency, and pronunciation. Their findings revealed that tokens (number of all words produced) and types (number of different words produced), as well as syntactic complexity increase with proficiency level. They also discovered that simpler and shorter sentences with minimal subordination are more frequent at lower levels.

LINGUISTIC COMPLEXITY IN BASAL READING

Despite the acknowledged relevance of text difficulty in reading (Droop & Verhoeven, 1998; Jafarigohar & Khanjani, 2014), very little research has been conducted that analyze the linguistic complexity in reading materials and texts. One of these was Brown and Briggs's (1986) commentary article which articulated that children's language should be used as a guide in developing reading texts. They cited Morrow's (1978) study which concluded that syntactic complexity of reading texts should not exceed the syntactic complexity exhibited by children's language. Brown and Briggs (1986) further concluded that the syntactic structures of children's writing develop as they progress to more difficult basal reading texts. This claim was similar to the study of Eckoff (1983) who analyzed the reading texts and writing samples of grade 2 pupils. He found that a strong similarity existed in the syntactic features between the pupils' basal reading texts and their written outputs.

More recently, Crossley, Louwerse, McCarthy and McNamara (2007) explored the difference between the linguistic structures of simplified and authentic texts using Coh-Metrix. Their aim was to help material developers, publishers, and classroom teachers to accurately judge the value of these two types of text. Based on their analysis, the findings revealed that the syntactic complexity of simplified texts appeared to be higher than that of authentic texts. Unlike Crossley et al. (2007), To, Fan and Thomas (2013) examined the lexical density and readability of texts from an English textbook series at four different levels: elementary, pre-intermediate, intermediate, and upper intermediate. The findings revealed that the texts from the first three levels were of high lexical density except the text for upper intermediate level. Moreover, results revealed that text levels corresponded to readability levels. However, no correlation was observed among text levels, lexical density, and readability.

LINGUISTIC COMPLEXITY ACROSS AGE AND GRADE LEVELS

One of the earliest scholars who investigated the syntactic complexity in written outputs was Hunt (1970) who examined the syntactic complexity of schoolchildren and adults. His findings revealed that as children progress from grades 4 to 12, they write more words per clause and more clauses per T-unit. Based on the findings, he claimed that syntactic complexity increased with age. Similar findings were obtained by Crowhurst (1983) who claimed that there were significant differences in the syntactic complexity of pupils' essays from grade to grade. Also, Hudson (2009) posited that older learners tend to use more words per T-unit. Perera (1984) confirmed that mature writing generally uses a T-unit of basic

sentence type while immature writing displays excessive use of coordination (i.e. two or more units of the same type are merged into a larger unit) in main clauses. With these, it can be conjectured that one possible manifestation of linguistic maturity (i.e. maturity in the linguistic features exhibited by learners) or proficiency is a decrease in coordination and an increase in subordination (Perera, 1984).

More recently, Hall-Mills (2009) examined the multiple dimensions of essays written by 89 children in grades 2, 3 and 4. Specifically, one narrative (i.e. a text type that tells past events) and one expository (i.e. a text that describes or explains) essay were collected from each student via scripted, generated elicitation method. Her findings showed a significant difference in the grammatical complexity between grade levels for expository texts but not for narrative texts. Interestingly, the grammatical complexity of grade 3 and 4 students' written output is lower than that of grade 2 students.

Similarly, Houck and Billingsley (1989) analyzed the measures of productivity, grammatical complexity, and lexical diversity of the narrative samples of 16 students from grades 4, 8 and 11. From the findings, they concluded that productivity, lexical diversity, and spelling proficiency increased among the three selected grade levels. Justice et al. (2006), on the one hand, conducted a study to develop a clinical tool that took into account the microstructure (i.e. internal linguistic structure of narrative texts) aspects of school-age children's narrative production. Upon completion of their study, they were able to provide a method for calculating the index of narrative microstructure or INMIS (see Appendix C) of the participants' narrative production. Furthermore, their data showed that complexity increases linearly with age from 5 to 10 years old but older children (i.e. 11 and 12 years old) produce narratives that are structurally similar to those of younger children.

Prompted by the available literature and studies on linguistic complexity, the research reported here sought to determine whether the linguistic complexity that learners can process receptively is higher than what they can process productively through microstructure analysis.

METHODOLOGY

PARTICIPANTS

Sixty (60) participants were randomly selected from two private elementary schools (i.e. one accredited and one non-accredited) in Metro Manila. Getting participants from both the accredited and non-accredited schools would provide a wider range of participants who possess different social and linguistic backgrounds. They were randomly selected (i.e. to eliminate systematic bias and effects of unobserved factors) from three grade levels: Grade 2 pupils (n = 20) with a mean age of 7.75, Grade 4 pupils (n = 20) with a mean age of 9.65, and Grade 6 (n = 20) pupils with a mean age of 11.85. Only Grades 2, 4, and 6 were selected because they are assumed to bear similar linguistic complexity with Grades 1, 3, and 5, respectively (Mendiola, 1978; Hall-Mills, 2009). Because of the exploratory nature of this initial study, I did not intend to target a larger sample size for investigation. In fact, many other studies have used samples of 60 or less such as Bardovi-Harlig and Bofman (1989), Casanave (1994), and Ishikawa (1995). As regards the selection of even academic grade levels, it was based on the Common Core grade band for English language arts (CCSSO, 2010) which is classified into five band levels: Grades 2–3, 4–5, 6–8, 9–10, and 11–12. Common Core grade band is a system established by expert instructors and classifies learners based on their ability to process texts (Nelson, Perfetti, Liben, & Liben, 2012).

INSTRUMENTS

The narrative film, "Papa, Please Get the Moon for Me" by Eric Carle was used as a prompt to elicit the written narratives from the participants. It was chosen after careful scrutiny of

two expert reviewers (both with relevant teaching experience at the target grade levels and necessary doctoral degree). First, the expert reviewers evaluated five narrative films in terms of content, participants' background knowledge, textual schema, topic familiarity, and language used. Then, they chose the best narrative film which exemplifies the qualities that match the target viewers. The chosen narrative film was further reviewed to ensure that it would be appropriate for the target participants. As Armbruster (1986) pointed out, linguistic and discourse perspectives are not enough to ensure full understanding of the text; it is also the content and textual schema that are essential to facilitate comprehension. A survey was also conducted prior to the narrative elicitation to ensure that the selected film has not been viewed by any participants; this is to level off potential familiarity with the film. This was done through a questionnaire that asked students to tick the title of the ten videos that they have already watched. A yes-no question was not used in determining whether they have watched "Papa, Please Get the Moon for Me" so as not to lead the participants in answering yes.

Notably, a narrative film was chosen because most children have developed their textual schema for the organization of narratives even before they enter their first grade (Berman & Verhoeven, 2002; Graves, Juel, & Graves, 1998). Peterson and McCabe (1983), and Berman and Verhoeven (2002) even argued that children are capable of producing complex and complete narratives as soon as they enter first grade. To verify such claims and ensure that grade 2 pupils can truly write complete and probably complex narratives, a pilot study was conducted two weeks prior to the actual data gathering. The pilot test is composed of two general tasks: film viewing and reading test. The film viewing lasted for about 15 minutes. Thereafter, the pupils were tasked to write a narrative for about 45 minutes. The reading test, on the one hand, lasted for about an hour for the pupils to answer. The gathered data were subjected to analysis which provided insights into the conduct of the actual data gathering. Results revealed that grade 2 pupils can, indeed, weave their own stories using complete sentences. Moreover, the problems that were encountered helped the researcher to make the necessary adjustments that is deemed valuable for the viability of the research. These include the length of the viewing, the details of the instructions, venue management, and length of writing and reading tasks.

Another set of instrument used were the eight graded (i.e. reading passages of different complexity level) narrative reading passages. These graded reading passages were obtained from more than 60 collected texts which were subjected to preliminary screening as to topic and cultural content. The preliminary screening was done by eliminating the passages that contain topics that are beyond the social realities, i.e. topics that are within the experience of the learners. For example, a text dealing with bank transactions were excluded because elementary pupils do not generally do bank transactions. The remaining texts were then further evaluated on whether the pupils can relate to them culturally. For example, a text that deals with Thanksgiving Day was excluded from the study because not all pupils are aware of this festival and had no direct experience of such a tradition. The passages deemed appropriate to target participants were then subjected to TextEvaluator. TextEvaluator is a fully automated text analysis tool that provides a reliable and valid feedback on text complexity. Its analysis highly correlates with human ratings: 0.78 for literary texts and 0.81 for informational texts (Sheehan, Kostin, Futagi, & Flor, 2010). This text complexity analyzer considers multiple factors in determining text complexity such as sentence structure (i.e. syntactic complexity), vocabulary difficulty (i.e. academic vocabulary, word unfamiliarity, concreteness), connections across ideas (i.e. lexical cohesion, interactive/conversational style, and level of argumentation), and organization (degree of narrativity) (see Appendix B).

Using the above-mentioned selection process, only eight reading passages were selected, one for each grade level. Note that passages 1 and 2 have the same text complexity level because the lowest text complexity that TextEvaluator permits is at level 2. However, when subjected to Flesch-Kincaid grade level prediction, passage 1 obtained a 1.36 complexity score (i.e. level 1) while passage 2 posted a complexity score of 2.28 (i.e. level 2).

Anchored on the suggestion of Alderson (2000), the comprehension level of the participants on the selected passages was tested using multiple-choice test. The options per item include one correct answer and three plausible distracters. Moreover, these graded passages and their corresponding questions were written in English and underwent further validation to ensure that they are within the schema and interest of the participants and do not contain any cultural biases (see Appendix A for the sample reading test).

TABLE 1. Selected reading passages for grade school pupils

Reading Passage	Complexity Score
Passage 1	6.3
Passage 2	6.3
Passage 3	12.5
Passage 4	23.0
Passage 5	31.3
Passage 6	37.5
Passage 7	50.0
Passage 8	62.5

PROCEDURE

The first task involved film viewing (without audio and subtitle) which was done twice to promote more retention and comprehension (Webb, 2007). The first viewing took 7 minutes and 15 seconds; thus, watching the film twice took 14 minutes and 30 seconds. After viewing the film, the participants were asked to reconstruct the story through a written narrative. First, the participants were asked to recall the individual story events and sequence. Then, they were instructed to retell the story in English using their own words. They were not given limits as to the time and number of words for them not to be pressured during narrative writing. The elicited written narratives were then subjected to linguistic complexity analysis.

The second task involved reading in which the same groups of participants were asked to read each of the four different reading passages assigned to them. These reading passages were fielded to the participants at an overlapping distribution: passages 1 to 4 for the Grade 2 pupils, passages 2 to 5 for the Grade 4 pupils, and passages 5 to 8 for the Grade 6 pupils. The participants were given an hour to finish the reading test, and they were able to finish the task in the allotted time because the videos, as mentioned earlier, were subjected to evaluation of experts as regards to length and difficulty level. The results of the reading test for four selected reading passages per grade level were subjected to distributional statistics to determine the MCRP per grade level. The results revealed that passages 3, 2, and 4 were found most comprehensible for grades 2, 4, and 6, respectively. After the MCRPs had been identified, these passages were subjected to linguistic complexity analysis.

DATA ANALYSIS

Both the written narratives and MCRPs were subjected to linguistic complexity analysis adopted from Justice et al. (2006) known as Index of Narrative Microstructure or INMIS. It is a new metric for analyzing the microstructure elements of school-age children's narrative performances. Using Grice's (2001) procedure, the determinancy index for complexity was .903 which indicates good factor determinancy. Its validity coefficient was at .902 which

is above Gorsuch's (1983) .80 cut off. Given this, Justice et al. (2006) concluded that the factor score formula provided valid estimates of the true factor scores.

Though the computation used by Justice et al. (2006) was originally intended to measure oral narratives, a number of studies have used indices (e.g. syntactic complexity) to examine both oral and written narratives simultaneously (e.g. Purcell-Gates, 1986), supporting that the same set of measures can be used with both oral and written narratives. Additionally, a number of papers have examined oral narratives using indices often applied to written narratives (see Hughes, McGillivray & Schmidek, 1997). Given that indices embedded in the INMIS are often used by researchers to examine written narratives (Hughes et al., 1997), the application of INMIS to written narratives is deemed acceptable.

Using INMIS, the linguistic complexity of both the pupils' written narratives and MCRPs was measured using two factors: productivity and structural/syntactic (hereafter structural complexity). Productivity is quantitatively measured in terms of total number of words (TNW), total number of different words (NDW), and total number of T-units (LENGTH). To measure structural complexity, the following indices were used: the mean length of T-units in words (MLT-W), the total number of complex T-units (COMPLEX), the total number of coordinating conjunctions (COORD), the total number of subordinating conjunctions (SUBORD), and the proportion of complex T-units (PROPCOMPLEX). Notably, T-units-based measures were used because they have been accepted widely as a measure of syntactic complexity (Larsen-Freeman, 2009; Ortega, 2003; Wolfe-Quintero et al., 1998). However, a modification on Justice's et al. (2006) concept of COORD and SUBORD was undertaken to allow such generic idea on conjunctive adverbs (Celce-Murcia & Larsen-Freeman, 1999).

The factor score estimates for overall linguistic complexity were as follows:

Linguistic Complexity = -2.84 + (0.27 x MLT-W) + (0.85 x PROPCOMPLEX) + (0.012 x NDW) + (-0.0027 x TNW) + (0.028 x COORD) + (0.026 x SUBORD) + (-0.085 x LENGTH) + (0.14 x COMPLEX)

RESULTS

Descriptive statistics were employed to determine the linguistic complexity of pupils' written narratives and of the MCRPs. Note that the difference between the linguistic complexity of MCRPs and written narratives were not subjected to test of significance because there were only three passages used for the analysis; that is, one MCRP for each grade level.

TABLE 2. Overall linguistic complexity of written narratives and MCRPs

Grade Level	**Complexity Level**	
	Written Narratives	***MCRPs***
Grade 2	-2.49	-1.96
Grade 4	-2.49	-2.08
Grade 6	-2.35	-2.19

Table 2 shows that the linguistic complexity that pupils can handle receptively is higher than what they can produce. The findings further show that the linguistic complexity of the written narratives remains unchanged between grade 2 and grade 4 but relatively increases in Grade 6. These unexpected results were heavily influenced by the variability in structural complexity. Interestingly, while the linguistic complexity of written narratives progresses with grade level, linguistic complexity in MCRPs shows otherwise. Because of this, the difference in value in the linguistic complexity between written narratives and MCRPs decreases constantly as grade level advances (grade 2 = -0.53, grade 4 = -0.41, grade 6 = -0.16). This suggests that

the gap between receptive and productive linguistic complexity is widest at lower grade levels and narrow in high grade levels.

TABLE 3. Linguistic complexity of pupils' written narratives

Grade Level	TNW (*Token*)		NDW (*Type*)		LENGTH		MLT-W		COMPLEX		COORD		SUBORD		PROP COMPLEX		Complexity Level	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
2	83.05	32.78	43.05	15.53	22.37	7.62	3.75	0.87	3.68	2.74	6.74	5.09	3.95	3.08	0.17	0.11	-2.49	0.81
4	99.21	20.88	49.47	9.17	26.05	7.43	3.95	0.88	4.58	2.11	8.26	5.47	5.11	2.52	0.19	0.13	-2.49	0.94
6	141.68	43.46	77.21	23.69	32.89	9.35	4.31	0.56	7.21	3.93	6.11	3.65	8.00	4.55	0.22	0.10	-2.35	0.82

As shown in Table 3, all indices of productivity increase with grade level, where data for the mean is concerned (e.g. NDW, grade 2-15.53, grade 4 – 49.47 and grade 6, 77.21). The same linear progress was observed in the structural complexity of the written narratives except COORD. Findings show that written narratives of grade 4 pupils posted the highest mean in COORD while grade 6 written narratives posted the lowest. This means that grade 4 pupils use more coordination in their sentences compared to other grade levels. It is also important to note that the decrease in COORD (particularly between grade 4 and grade 6 written narratives) may be attributed to the increase in SUBORD. This implies that when grade 6 pupils use more subordination, they tend to reduce their use of coordination.

TABLE 4. Linguistic complexity of MCRPs

Grade	Passage	TNW (*Token*)	NDW (*Type*)	LENGTH	MLT-W	COMPLEX	COORD	SUBORD	PROP COMPLEX	Complexity Level
Grade 2	3	77	62	21.00	3.67	5.00	4.00	5.00	.24	-1.96
Grade 4	2	133	90	37.00	3.59	11.00	3.00	13.00	.30	-2.08
Grade 6	4	176	120	37.00	4.76	8.00	1.00	8.00	.22	-2.19

As regards to MCRPs, Table 4 reveals a decreasing complexity level as grade level advances. Again, the continued decrease was heavily influenced by the structural components of the linguistic complexity. These findings suggest that it is not always true that higher grade levels can better process more structurally complex texts than those in lower levels. However, the findings reveal that all productivity indices (i.e. TNW, NDW, and LENGTH) of MCRPs progress with grade level. This means that learners can process longer texts as they advance in their grade level. Note that higher TNW implies that learners can process longer texts while higher NDW suggests that learners can process more diverse lexical items.

A close observation of the findings indicates that not all productivity and structural complexity indices in MCRP are higher than the indices in written narratives. For instance, while TNW, NDW, and LENGTH of MCRPs are higher than their counterpart in written narratives in Grade 4 and Grade 6 level, only the NDW of MCRP remains to be higher in Grade 2 level, compared to productivity indices in written narratives. Similar variability occurs in structural complexity. Contrary to what is expected, results reveal that MLT-W is lower in MCRP in lower levels (Grades 2 and 4) compared to MLT-W in written narratives. More surprising is that the COORD in all grade levels in MCRP is lower compared to the COORD in written narratives. As expected, COMPLEX, SUBORD and PROPCOMPLEX in MCRPs are higher compared to their written narratives counterpart.

DISCUSSION

The present study investigated whether the linguistic complexity that learners can process receptively is higher than what they can process productively. The results, although limited by the sample size, suggest that pupils' can process more complex linguistic features during receptive mode than during productive mode. These findings concur with Celce-Murcia and

Olshtain (2000), and Henriksen (1999), that receptive knowledge is greater than productive knowledge. The findings also concur with Coulson and Drier (2002), and de Hoop and Kramer (2006), that receptive linguistic processing capacity is greater than that of productive capacity. This can be attributed to the fact that productive processing simultaneously requires the practice of perceptual, cognitive, and motor ability and that the degree of control increases from receptive to productive dimensions as what Henriksen (1999), Melka (1997), and Read (2000) contended.

Though the overall linguistic complexity of MCRPs is higher than that of written narratives, various linguistic complexity indices show variability. For instance, COORD in MCRPs is lower than the COORD in written narratives. This confirms the argument of Perera (1984) that the number of coordinations may not be a good indicator of linguistic maturity, proficiency, and complexity since excessive coordination is a manifestation of immature writing.

Of all the indices, SUBORD and COMPLEX appear to be the strongest and more reliable indicator of complexity because these two indices are highest during receptive mode in higher grade levels and lowest in lower grade levels particularly during productive mode. Hence, the findings lend support for the contention of Iwashita et al. (2008) that minimal subordination is an indicator of less complex text. Moreover, these findings partly support the contention of Cooper (1976) and Wolfe-Quintero et al. (1998) that a non-linear complexification in subordination exists. It can be observed as well that the structural complexity of MCRPs shows variability. This variability can be explained by the text type which the participants have produced and read, because according to Lu (2011), genre influences structural complexity. It can be further argued that the cause of syntactic variability is that the pupils' interlanguage is not yet stable or permanent during primary grade levels (grades 1 to 6) since they were widely exposed to narratives which, as stated earlier, shows variability in syntactic features. Of course, the type of input they receive influences the interlanguage they develop as explained by the transfer appropriate process (TAP) theory which claims that learners access knowledge best in a condition similar to how this knowledge was inputted or learned (Franks, Bilbrey, Lien & McNamara, 2000). Individual differences may have also played a crucial role in this variability. The field of language acquisition, and of lexical and syntactic development more specifically, has documented substantial variability in vocabulary and syntactic development across children of similar ages. Analogously, literacy research has documented individual differences in reading development that can span three grade levels within a single classroom. Finally, the observed variability may be attributed to the cognitive variability and consolidation of earlier skills that happen within and across individuals as explained by Siegler's Overlapping Waves theory (Siegler, 2000).

Another constituent of linguistic complexity that deserves attention is the productivity which is higher in MCRP than that of the written narratives. The findings support the argument of Celce-Murcia and Olshtain (2000), Groot (2000), and Henriksen (1999) and provided evidence that pupils can process more diverse vocabulary during receptive mode than what they can utilize for production. As regards TNW and LENGTH, the present study supports the findings of Hunt (1970), Crowhurst (1983), and Hudson (2009) that pupils tend to use more t-units as they advance in grade level, of Houck and Billingsley (1989) that pupils' productivity increases as they move up to the next grade levels, and of San Phoon and Abdullah (2014), that pupils' vocabulary expand as they progress by age. However, this may not be true when comparing TNW and LENGTH during receptive and productive modes particularly in lower levels. Surprisingly, LENGTH and TNW appear to be higher during productive mode than during receptive mode for lower level (i.e. Grade 2). This result can be

attributed to the fact that pupils were not given any time limit nor specific length of texts that they would be writing.

As regards the increase of coordination among grade 4 pupils, this implies that grade 4 pupils display a relatively immature writing compared to that of grade 6 and grade 2, syntactically speaking. As what Crowhurst (1983) and Perera (1984) claimed, the use of too many coordination in main clauses is an indicator of immature writing. This supports the previous argument that a 'grade 4 regression' exists. Again, the reason for such regression may be the limited exposure of pupils to other text types other than narratives (Geva & Ryan, 1985). This pattern exhibited by COORD, as well as SUBORD, contradicts Perrera's (1984) conclusion that a decrease in coordination and increase subordination manifest linguistic maturity and proficiency.

While addressing the research questions at hand, two interesting findings warrant some attention. First, the findings show that no significant difference (computed *p* of 0.87 at $p<0.05$) exists in the linguistic complexity of written narratives between grade levels which concurs with the findings of Hall-Mills (2009). Such findings suggest that the linguistic complexity level that Grade 6 pupils can process productively does not differ from the linguistic complexity level that other grade levels can process. Second, it appears that token-type ratio exhibits a U-shaped pattern (i.e. a pattern wherein linguistic complexity starts off high at the beginning stage, then regress and eventually bounce back up again) in both the written narratives and MCRPs. That is, the token-type ratio is lowest in grade 4 written narratives and MCRPs (49. 86 and 67.67, respectively) but higher in grade 2 (51.84 and 80.52) and grade 6 written narratives and MCRPs (54.50 and 68.18). These findings were concurred by the findings of Justice et al. (2006) that if token-type ratio would be computed, the same pattern would be revealed (i.e. 8 year-olds= 50.36, 10 year-olds = 42.61, 12 year-olds = 45.27). Both of these findings may suggest a possible "grade 4 regression."

CONCLUSION

This paper analyzed the linguistic complexity of both the written narratives and MCRPs of grades 2, 4, and 6 pupils for the purpose of providing evidence that linguistic complexity during receptive mode is higher than the linguistic complexity that pupils can utilize during productive mode. The findings provided some evidence that such a phenomenon exists as what Celce-Murcia and Olshtain (2000) and Henriksen (1999) argued. However, not all indices of linguistic complexity show the same pattern, more particularly COORD and MLT-W. This variability can be attributed to several factors such as individual differences, type of input pupils receive (Franks et al., 2000), and cognitive variability (Siegler, 2000) that occurs within and among learners.

As a final thought, this exploratory paper on the linguistic complexity of the selected texts has substantially enhanced our understanding of the topic at hand. Hence, the findings obtained from this study are suggestive and may be useful only as guiding hypothesis for further investigations. They should be applied with caution as these findings are only limited to narrative texts from a relatively small sample size. Further studies are needed using other text types and larger scope in terms of participants and text samples for more conclusive findings.

Pedagogically speaking, the findings obtained from this study would be useful in determining the reading materials appropriate to a specific group of learners particularly in term of linguistic complexity. The present study also provided some insights as to how text readability can be measured more scientifically instead of relying on common sense intuitions. In this way, there would be a higher probability of facilitating comprehension among pupils. Finally, the findings of the present study could provide some insights on how text readability

can be incorporated in curriculum/syllabus development for literacy and English language arts.

Although the present study has some limitations, its findings offer a promising future research direction in the area of understanding the gap between the receptive and productive linguistic complexity. First, this study provided some insights on exploring the possibility of setting a linguistic complexity range per grade level, namely using the receptive linguistic complexity as the upper limit and productive linguistic complexity as the lower limit of the range. Further longitudinal investigations can also be conducted to argue a developmental trajectory of linguistic complexity and all of its indices across grade levels. Consequently, these longitudinal investigations could prove or disprove the presence of 'grade 4 regression' phenomenon. Finally, future studies can be explored as to whether the gap between receptive and productive linguistic complexity gets narrower as grade level advances.

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APPENDIX A

Sample Reading Test for Grade 6 Pupils
Taken from TAKS Released Tests
http://www.tea.state.tx.us/student.assessment/taks/released-tests/

Directions: Read the following text then answer the questions that follow each one of them. Encircle the letter of your answer.

Text 1:

Saddle Up!
by Mark Samson

Two years ago Claire was scared of horses. Now she looks forward to her riding lessons on Star. Claire was born with an illness that made her muscles weak and left her with poor balance. Riding Star has helped Claire's muscles become stronger. Her balance has also improved.

Claire and Star are part of a program called hippotherapy. The Greek word *hippos* means "horse." Since the 1960s hippotherapy has been used to help disabled children. The rolling gait, or walk, of a horse can help a rider's muscles develop. A trainer walks beside the horse to keep the rider safe.

Hippotherapy came about because of a woman named Lis Hartel, who loved riding horses. Hartel became ill with polio, a disease that made her unable to move her legs. Although she used a wheelchair, Hartel resolved to get back on her horse Jubilee. She made up her mind that she would ride again. She had to be lifted into the saddle, but the more she rode, the stronger she became. In 1952 and 1956 Hartel won Olympic silver medals for riding. Her success gave doctors the idea to put disabled people on horses.

Every Wednesday Claire heads out to the stable where Star lives. After putting on her helmet, Claire is helped onto Star by Annie, the trainer. Annie leads Claire and Star around the ring several times. Then they move to the trails near the stable. This is Claire's favorite part of the ride. She loves the feeling of being tall in the saddle. She feels as if she's walking easily through the woods.

When the lesson is over, Claire receives **assistance** from Annie in getting down from the horse. Then Claire and Annie brush Star. Finally Claire gives her horse and trainer big hugs. Claire's balance is so good now that she usually hops on one foot out of the barn. Sometimes she even jumps rope for Annie and Star. Last year Claire wasn't able to do either of those things.

Riding horses is also a great way to build self-confidence. Claire has learned how to control Star's movements and her own as well. She's also built a trusting relationship with the horse. One of Claire's dreams is to ride in the Olympics. Annie thinks she just might make it.

Questions:

1. What do people benefit most from horse riding?
   A. a great way to make our muscles become stronger
   B. a means of talking to horses
   C. a way of making us famous
   D. a means of building friendship with horses
2. What does the Greek word *hippos* mean?
   A. hippotherapy
   B. horse
   C. saddle
   D. stable
3. Hippotherapy is used to help people learn to —
   A. compete in the Olympics
   B. take care of horses
   C. use their muscles more
   D. hop and jump rope
4. What do you call the disease that make Lis Hartel unable to move her legs?
   A. rheuma
   B. malaria
   C. arthritis
   D. polio

5. After she got sick, Lis Hartel's first goal was to —
    A. help others
    B. continue riding
    C. learn to walk again
    D. win an Olympic medal
6. Who is the trainer of Claire?
    A. Riding Star
    B. Annie
    C. Jubilee
    D. Lis Hartel
7. In paragraph 5, what does the word **assistance** mean?
    A. praise
    B. help
    C. favor
    D. honor
8. Doctors first thought of putting disabled people on horses after Lis Hartel —
    A. got sick with polio
    B. lost the use of her legs
    C. began riding again
    D. won medals in the Olympics
9. One idea present in this selection is —
    A. getting healthy
    B. becoming the best
    C. obeying commands
    D. learning new things
10. Which is the best summary of the selection?
    A. Hippotherapy helps disabled people get stronger by riding horses. It has helped a girl named Claire get stronger and improve her balance.
    B. A girl named Claire was scared of horses before she started taking riding lessons. Now she wants to ride in the Olympics.
    C. A woman named Lis Hartel kept riding her horse even after she became ill with polio. This led to a program called hippotherapy.
    D. Riding horses is a great way to build confidence and get stronger. The rolling gait of a horse can help a rider's muscles develop.

APPENDIX B

Text Evaluator Analysis Indicators
https://texteval-pilot.ets.org/TextEvaluator/Info.aspx

Dimension of Variation/Component Score
Sentence Structure
Syntactic Complexity
Vocabulary Difficulty
Academic Vocabulary
Word Unfamiliarity
Concreteness
Connections Across Ideas
Lexical Cohesion
Interactive/Conversational Style
Level of Argumentation
Organization
Degree of Narrativity

Common Core Grade Level	**TextEvaluator℠ Score Range (1 – 100 Scale)**
2	2-22
3	12-35
4	23-43
5	31-51
6	36-57
7	40-62
8	44-64
9	52-70
10	58-74
11 - CCR	59-86

APPENDIX C

Justice, L. et al. (2006). The index of narrative microstructure: A clinical tool for analyzing school-age children's narrative performances. *American Journal of Speech-Language Pathology, 15*, 177–191.

Productivity:

- Total number of words (TNW)
- Total number of different words (NDW)
- Total number of T-units (LENGTH)

Complexity:

- Mean length of T-units in words (MLT-W)
- Total number of complex T-units (COMPLEX)
- Total number of coordinating conjunctions (COORD)
- Total number of subordinating conjunctions (SUBORD)
- Proportion of complex T-units (PROPCOMPLEX)

$$\begin{aligned}\text{Productivity} = {} & -1.60 + (-0.0010 \times \text{MLT-W}) \\ & + (-0.21 \times \text{PROPCOMPLEX}) + (0.017 \times \text{NDW}) \\ & + (-0.00054 \times \text{TNW}) + (0.014 \times \text{COORD}) \\ & + (0.0072 \times \text{SUBORD}) + (0.0094 \times \text{LENGTH}) \\ & + (0.068 \times \text{COMPLEX}).\end{aligned}$$

$$\begin{aligned}\text{Complexity} = {} & -2.84 + (0.27 \times \text{MLT-W}) \\ & + (0.85 \times \text{PROPCOMPLEX}) + (0.012 \times \text{NDW}) \\ & + (-0.0027 \times \text{TNW}) + (0.028 \times \text{COORD}) \\ & + (0.026 \times \text{SUBORD}) + (-0.085 \times \text{LENGTH}) \\ & + (0.14 \times \text{COMPLEX}).\end{aligned}$$

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