Fluency and complexity as coupled growers in speaking English at secondary school – A case study of a good, average, and poor language learner

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Abstract

One of the main assumptions of Complex Dynamic Systems Theory (CDST) is that internally complex language subsystems develop non-linearly while entering different kinds of supportive, competitive, conditional, or dual relationships which are characterised by trade-offs caused by learners' restricted cognitive processing, especially in foreign language speech. The present paper belongs to a short series of articles which examines various aspects of the development of L2 English speech at secondary school on basis of the same longitudinal, exploratory, and corpus-based case study. The aim of this paper is to investigate the dynamics of the relationships between fluency and both syntactic and lexical complexity in the speech of a good, average, and poor language learner at the level of secondary school. Syntactic complexity was investigated in terms of general sentence complexity, subordination, coordination, and nominalisation, whereas lexical complexity was construed in terms of lexical density, sophistication, and variation. In general, the results indicated predominantly supportive relationships between fluency and different measures of syntactic complexity but competitive or dual relationships between fluency and lexical complexity. However, the relationships between the selected variables fluctuated over time and often differed in the case of a good, average, and poor language learner.

Keywords: Complex Dynamic Systems Theory, syntactic and lexical complexity, fluency, L2 speech, secondary school

1. Introduction

Complex Dynamic Systems Theory (CDST) constitutes one of alternative approaches to second language acquisition (Atkinson 2011). Following de Bot (2017), the name is used here to refer to both Complexity Theory (CT) (Larsen-Freeman and Cameron 2008) and Dynamic Systems Theory (DST) (Verspoor, de Bot and Lowie 2011) which were developed in different academic centres but share common linguistic and methodological assumptions as well as offer practical instruments to study second language development (SLD). Rooted in a general theory of change, CDST advocates the analysis of changes that take place within the dynamics of this emergent, variable, and self-organising process. The main aim of CDST is to "discover when

and how changes take place in the process of development, how different subsystems develop and interact, and how different learners may have different developmental patterns" (van Dijk, Verspoor and Lowie 2011: 59–60). One of the main assumptions of Complex Dynamic Systems Theory (CDST) is that internally complex language subsystems develop non-linearly while entering different kinds of relationships which may be supportive, competitive, conditional, or dual. What is more, these subsystems remain in the state of competition for learners' limited linguistic and cognitive resources, which leads to trade-offs between them in that progress in the development of one subsystem may cause some regress in the development of the other subsystem. Such trade-offs are likely to characterise the development of complexity, accuracy, and fluency, especially in spontaneous speech in a foreign language. Indeed, many researchers point out that these three aspects of language proficiency are complex and inter-related phenomena which develop in non-linear ways (Michel 2017).

In general, the present case study focused on two constructs, namely intra-individual variability and dynamic relationships. Intra-individual variability, defined as changes in a given language area on repeated measurements within an individual learner (van Geert and van Dijk 2002), was examined in terms of general and specific measures of language development. The general measures referred to complexity, accuracy, and fluency (Rokoszewska 2019a), while the specific measures to syntactic complexity, defined in terms of subordination, coordination, and nominalisation (Rokoszewska 2019b), and lexical complexity, understood in terms of density, sophistication, variation, and frequency (Rokoszewska 2020a). Dynamic relationships were investigated between the general and specific indices (Rokoszewska 2019a, 2019b) as well as between the general measure of accuracy and the specific indices of syntactic and lexical complexity (Rokoszewska 2020b). Thus, the present part of the case study, i.e. the fifth part, will examine the relationships between another general measure, namely fluency and the specific measures of syntactic and lexical complexity.

2. Language fluency and complexity in CDST

Language fluency and complexity form an inherent part of the so-called CALF construct, which in contrast to the so-called CAF triad, refers not only to complexity, accuracy, and fluency, it but differentiates between syntactic and lexical complexity as well. Thus, the acronym CALF stands for syntactic complexity (C), accuracy (A), lexical complexity (L), and fluency (F). Having examined the relationships between these two types of complexity and accuracy, the present part of the case study focuses on such relationships with respect to fluency.

With respect to L2 speech, fluency is defined construed in terms of speed, silence, and repair (Tavakoli and Skehan 2005). Speed or rate is determined by one's access to and control of proceduralized knowledge during language processing. It may be measured in terms of speech rate (SR), i.e. the number of syllables per second, articulation rate (AR), i.e. the number of syllables divided by total speech time excluding corrections, repetitions, false starts, and pauses, and the mean length of run (MLR), i.e. the number of syllables divided by the number of utterances between pauses (Kormos and Denes 2004, Taylor 2018). Silence or breakdown reflects the stages of conceptualisation and planning in language production (Levelt 1989, de Bot 1992). It is usually described by the number, duration, and location of pauses which may

appear in the middle of clauses or at their boundaries. Alternatively, phonation time ratio, i.e. "the percentage of time spent speaking as a percentage proportion of the time taken to produce the speech sample", can be computed (Kormos and Denes 2004: 148). Repair reflects pre-articulatory and post-articulatory monitoring and may be measured by the number of false-starts, repetitions, and self-corrections per one hundred words. With respect to L2 writing, fluency may be measured in terms of rate, i.e. the number of words produced per minute calculated on the basis of the final version of the text, or in terms of length, i.e. the number of words per utterance (Michel 2017). It is important to add that the use of keystroke logging software enables the analysis of the writing process in that it is possible to calculate the number of characters written between the pauses or the ratio of characters produced during writing per characters included in the final version of the text (Leijten and van Waes 2013).

Complexity is construed in cognitive terms as "the number of discrete components that a language feature or a language system consists of, and the number of connections between the different components" (Bulte and Housen 2012: 24). It is usually divided into grammatical and lexical complexity. The analysis of grammatical complexity may involve the analysis of syntax, morphology, and phonology with respect to the length of the production unit, e.g. the number of words per clause, sentence or T-unit, the variety of units, e.g. the number of different morphemes, and the interdependence between the units, e.g. coordination vs. subordination (Bulte and Housen 2012; Michel 2017). The analysis of syntactic complexity in a time developmental series should be based on measuring coordination, subordination, and nominalisation since they are good indicators of language complexification at lower, intermediate, and higher levels, respectively (Norris and Ortega 2009). The analysis of lexical complexity or richness may involve the analysis of lexical variation, i.e. the use of different words in a text, lexical density, i.e. the use of lexical items in a text, lexical sophistication, i.e. the use of advanced words, and lexical accuracy, i.e. the types and number of lexical errors (Read 2000).

According to Complex Dynamic Systems Theory (CDST), complexity, accuracy and fluency function as the so-called coupled or connected growers which create supportive, competitive, or conditional relationships in the course of language development (van Dijk *et al.* 2011). Supportive growers develop hand in hand, both either increasing or decreasing. Competitive growers or competitors alternate so that if one variable goes up, the other goes down and vice versa. Conditional growers or precursors develop in such a way that the development of one grower is a pre-condition for another grower to be developed later. Such relationships may be observed in non-linear development of complex language subsystems because these subsystems compete for the learner's limited cognitive and linguistic resources giving rise to trade-offs between them, especially in speech. Such relationships may not be smooth, static, and similar for all learners but fluctuant, dynamic, and different for individual learners (van Dijk *et al.* 2011).

The present case study was divided into several parts. The primary aim of the whole case study was to examine the phenomenon of intra-individual variability in the emergence of general measures of language development, i.e. complexity, accuracy, and fluency, as well as specific measures of syntactic complexity, i.e. subordination, coordination, and nominalisation, and lexical complexity, i.e. lexical density, sophistication, and variation in speaking English as

a foreign language at secondary school in the case of a good, average, and poor language learner. In general, the results indicated that there were no statistically significant differences between the patterns of intra-individual variability in the development of these measures but the relationship between the learners' level of intra-individual variability and the rate of development of these variables was positive (Rokoszewska 2019a, 2019b, 2020a). The secondary aim was to investigate dynamic relationships which take place between the general and specific measures in a time series. So far the relationships between complexity, accuracy, and fluency (Rokoszewska 2019a), including the relationships between specific measures of syntactic complexity (Rokoszewska 2019b), have been analysed. In addition, the influence of specific measures of syntactic and lexical complexity on accuracy has been examined (Rokoszewska 2020b). In general, the results indicated that the development of language subsystems, the trajectories of the learning paths, and the types of relationships between different language variables were non-linear, dynamic, and learner-specific. This analysis, however, needs to be completed by the examination of the relationships between specific measures of syntactic and lexical complexity, on the one hand, and fluency on the other.

3. Research design

The aim of the present part of the case study was to examine the role of lexical and syntactic complexity in the development of fluency in speaking English as a foreign language at secondary school in the case of a good, average, and poor language learner. More precisely, the goal was to identify different types of moving correlations between these variables which might develop as supportive, competitive, pre-conditional, or dual growers in the case of the selected learners. Hence, the following research questions were formulated:

1. What are the results of a good, average, and poor learner in fluency, lexical complexity, and syntactic complexity in the development of L2 English speech at secondary school?
2. What types of relationships are formed between fluency and lexical complexity, i.e. lexical density, sophistication, and variation, in the development of L2 English speech during secondary school in the case of a good, average, and poor language learner?
3. What types of relationships are created between fluency and syntactic complexity, i.e. general syntactic complexity, subordination, coordination, and nominalisation, in the development of L2 English speech at the level of secondary school in the case of a good, average, and poor language learner?

The research method was an exploratory case study which was based on selected data from The Spoken English Developmental Corpus of Polish Learners (SEDCPL). The corpus, which consists of around 2100 recorded interviews, was created on the basis of the study conducted by means of repeated measurements among 106 learners at one of secondary schools in Poland in 2014–2017 (Table 1). Thus, the case study belongs to a long-term quantitative and qualitative research project. It was exploratory in the sense that it investigated selected phenomena within the CDST framework on the basis of speech samples taken from single learners, which will be followed by a statistical study of the whole research sample. In line with the CDST principles, the study provided dense, longitudinal, and individual data (van Dijk *et al.* 2011). It was based

on three mini-corpora which traced the emergence of language in oral production in English as a foreign language in the case of a good, average, and poor language learner throughout secondary school[1]. Each mini-corpus included 21 semi-structured interviews on different topics carried out every month during the whole learning period at secondary school. Thus, the case study was based on the analysis of 63 conversations. The procedure of building the mini-corpora involved interviewing the learners, providing feedback on their speech, preparing verified transcripts of the recorded conversations, and analysing the samples of the learners' speech which were around 200 words long.

Table 1: *The procedure of building The Spoken English Developmental Corpus of Polish Learners (SEDCPL)*

THE PROCEDURE OF BUILDING THE SPOKEN CORPUS OF LEARNER ENGLISH									
DATA	SEMESTER 1					SEMESTER 2			
	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
GRADE 1	Org.	Test 1 Fashion	Test 2 Internet	Test 3 Music	Test 4 Education	Winter break	Test 5 Ecology	Test 6 Pets	Test 7 Work	Test 8 Holidays
GRADE 2	Org.	Test 9 Books & films	Test 10 Shopping	Test 11 Friendship	Test 12 Christmas	Winter break	Test 13 Family	Test 14 Health	Test 15 Fame	Test 16 Home & living
GRADE 3	Org.	Test 17 Love	Test 18 TV	Test 19 Crime	Winter break	Test 20 Terrorism	Test 21 Tolerance	End of school-year	Matura exam	-

In the present part of the case study, a number of variables were identified. All variables were operationalised on the basis of the so-called minimal terminal unit (T-unit) defined as an independent clause with all dependent clauses embedded in it (Hunt 1965). This kind of unit, next to AS unit, i.e. Analysis of Speech Unit (Foster, Tonkyn and Wigglesworth 2000), is claimed to be more reliable than a sentence in speech analysis (Larsen-Freeman 2006). However, it was T-unit, as opposed to AS unit, that was selected for the analysis since the whole research project involves not only learner spoken but also written corpus, and T-unit is suitable for the analysis of both speech and writing (Larsen-Freeman 2006). Similarly, language fluency was operationalised in terms of the measure which can be applied to both oral and written production, namely the length-based measure. More precisely, this dependent variable was operationalised as the average number of words per T-unit in a given speech sample (Larsen-Freeman 2006). The scale for this variable was interval. The independent variable referred to syntactic and lexical complexity, the scale being interval. Syntactic complexity was measured in terms of general syntactic complexity, i.e. the number of clauses per T-unit (C/T) (Ellis and Barkhuizen 2006), subordination, i.e. the number of subordinated clauses per T-unit (DC/T) (Lu 2010), coordination, i.e. the number of coordinated phrases per T-unit (CP/T), and nominalisation, i.e. the number of complex nominal phrases per T-unit (CN/T) (Lu 2010). Lexical complexity was measured in terms of lexical density (LD), i.e. the number of lexical words per all words, lexical sophistication (LS), i.e. the number of words beyond the first 2000 words in The British National Corpus (BNC) per all words, and lexical variation (LV), i.e. a complex ratio of types to tokens (CTTR) which takes into account the length of the text (Ellis

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[1] At the time of the research project, secondary school in Poland included 3 grades consisting of learners at the age of 16–19. Since the 1st of September 2019 it will include 4 grades consisting of learners at the age 15–18.

and Barkhuizen 2005; Larsen-Freeman 2006). The intervening variable, expressed on the interval scale, was construed as the impact of language complexity on the development of fluency in speaking English as a foreign language at secondary school. The moderator variable, i.e. learners' age, was established on the basis of the nominal scale. The control variables, expressed on the basis of the nominal scale, referred to the same nationality, student's book, number of English classes per week as well as no longer visit in the target-language country.

The data were analysed by such computer programmes as Syntactic Complexity Analyser (Lu 2010) and Lexical Complexity Analyser (Ai and Lu 2010; Lu, 2012). In addition, some CDST procedures (Verspoor, Lowie, van Geert, van Dijk and Schmid 2011) were used to examine the so-called moving correlations which illustrate how the relationship between selected variables developed over a longer period of time. The correlations were calculated on the basis of normalised and detrended data and plotted by means of the so-called moving window of correlations in which each measurement point takes into account the previous measurement point.

The subjects in the present case study were 16-year-old secondary school learners who followed an extended programme with 4–6 English lessons per week. The subjects were selected as representatives of good, average, and poor learners on the basis of the results they obtained for three assignments: the placement test, a written essay, and an oral interview. The good learner (GL) gained 5.5 points, the average learner (AL) – 3.45 points and the poor learner (PL) – 2.17. The learners' family background and learning results are presented in Table 2.

Table 2: *The subjects in the present study*

DATA	GOOD LEARNER			AVERAGE LEARNER			POOR LEARNER		
GENDER	female			male			male		
AGE	16–19 (grades 1–3)								
EXPOSURE TO L2	10 years (grade 1); 4–6 lessons (1–3 grades) – extended English programme								
	no extra classes, no longer stay in an L2 country								
RESIDENCE	city			village			city		
EDUCATION (F/M)[2]	higher / higher			secondary / higher			higher / higher		
EMPLOYMENT (F/M)	white collar worker /			blue collar worker /			white collar worker /		
	white collar worker			white collar worker			white collar worker		
ENGLISH (F/M)[3]	very good / basic			basic / average			very good / basic		
GPA	5.01			4.25			3.54		
GRADES IN ENG.	5.17			3.92			2.67		
FINAL EXAM (%)	Basic	Extended	Oral	Basic	Extended	Oral	Basic	Extended	Oral
	100.0	98.0	100.0	70.0	66.0	77.0	98.0	-	96.0
CLASSIFICATION (pts./ grades)	Test	Speak.	Writ.	Test	Speak.	Writ.	Test	Speak.	Writ.
	6.0	5.0	5.5	3.0	3.75	3.5	1.0	2.0	3.5
	(93pts.)			(61pts.)			(36pts.)		
	Total – 5.5 pts.			Total – 3.42 pts.			Total – 2.17 pts.		

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[2] F/M – father/ mother
[3] The students' opinions about their parents' knowledge of English.

4. Research results

4.1. Fluency and complexity – general results

With respect to language fluency (Table 3), it was found out that the good learner, on average, produced 11.30 (SD=2.10), the average learner – 10.10 (SD=1.79), and the poor learner – 9.45 (SD=2.22) words per T-unit in speaking English as a foreign language at the level of secondary school. The comparison of the learners' scores carried out with the use of one-way ANOVA (p=0.05) and Tukey-Kramer Test, i.e. a means differentiation test, showed that only the difference between the good and poor learner was statistically significant.

With respect to lexical complexity (Table 3), it was established that the good learner, on average, produced around 46.0% (SD=0.04) of lexical tokens and 18.0% (SD=0.07) of sophisticated lexical tokens per all tokens in a speech on a given topic, with the score for the varied use of tokens being equal to 4.40 (SD=0.39). The average learner used 48.0% (SD=0.04) of lexical items, 18.0% (SD=0.06) of which were sophisticated, while his score on lexical variation was 4.04. The poor learner obtained 48.0% (SD=0.06) for lexical density, 21.0% (SD=0.07) for lexical sophistication, and 3.91 (SD=0.33) for lexical variation. In general, the differences between the learners' scores (Table 3) were statistically significant only in lexical variation, except the difference between the average and poor learner.

Table 3: *The development of fluency and lexical complexity – average results*

THE DEVELOPMENT OF FLUENCY AND LEXICAL COMPLEXITY – AVERAGE RESULTS												
DATA	FLUENCY			LEX. DENSITY			LEX. SOPHISTICATION			LEX. VARIATION		
	GL	AL	PL	GL	AL	PL	GL	AL	PL	GL	AL	PL
MEAN	11.30	10.10	9.45	0.46	0.48	0.48	0.18	0.18	0.21	4.40	4.04	3.91
SD	2.10	1.79	2.22	0.04	0.04	0.06	0.07	0.06	0.07	0.39	0.47	0.33
MIN	8.42	7.19	6.34	0.12	0.40	0.36	0.03	0.10	0.12	3.76	3.14	3.27
MAX	14.29	13.71	14.20	0.35	0.56	0.60	0.31	0.26	0.35	5.02	5.15	4.41
ANOVA	0.018			0.505			0.505			0.001		
TUKEY-KRAMER TEST[4]	GL=AL GL≠PL AL=PL			-			-			GL≠AL GL≠PL AL=PL		

With respect to syntactic complexity (Table 4), it was found out that the good learner, on average, produced 2.30 (SD=0.92) clauses, 1.00 (SD=0.61) subordinated clauses, 0.40 (SD=0.33) coordinated phrases, and 1.70 (SD=1.00) complex nominal phrases per T-unit in speaking English at secondary school. The average learner used 1.47 (SD=0.21) clauses, 0.47 (SD=0.19) subordinated clauses, 0.24 (SD=0.14) coordinated phrases, and 0.80 (SD=0.20) complex nominals per T-unit. The poor learner built 1.51 (SD=0.35) clauses, 0.50 (SD=0.27) subordinated clauses, 0.32 (SD=0.11) coordinated phrases, and 0.86 (SD=0.39) complex nominal phrases per T-unit in speaking English at secondary school. The results of the statistical analysis conducted by means of one-way ANOVA (p=0.05) indicated that the differences between the three learners were statistically significant in all measures of syntactic complexity, except coordination (Table 4). However, Tukey-Kramer Test revealed that these differences

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[4]   As this test involves the comparison of absolute difference and critical range, detailed numbers are not provided here.

were significant only between the good and average learner as well as between the good and poor learner (Table 4).

Table 4: The development of syntactic complexity – average results

THE DEVELOPMENT OF SYNTACTIC COMPLEXITY – AVERAGE RESULTS												
DATA	GENERAL SYNTACTIC COMPLEXITY			SUBORDINATION			COORDINATION			NOMINALISATION		
	GL	AL	PL	GL	AL	PL	GL	AL	PL	GL	AL	PL
MEAN	2.30	1.47	1.51	1.00	0.47	0.50	0.40	0.24	0.32	1.70	0.80	0.86
SD	0.92	0.21	0.35	0.61	0.19	0.27	0.33	0.14	0.11	1.00	0.29	0.39
MIN	1.15	1.04	0.90	0.21	0.07	0.07	0.15	0.00	0.16	0.25	0.43	0.19
MAX	4.67	1.87	2.13	2.75	0.93	1.07	1.23	0.53	0.53	4.17	1.67	1.65
ANOVA	0.000			0.000			0.163			0.000		
TUKEY- KRAMER TEST	GL≠AL GL≠PL AL=PL			GL≠AL GL≠PL AL=PL			-			GL≠AL GL≠PL AL=PL		

4.2. Moving correlations between fluency and lexical complexity

Analysing the relationships between fluency and lexical complexity in a time series, it was observed that the correlation between fluency and the first lexical measure, i.e. lexical density, was very weak and negative for the good (−.3130) and poor (−.2192) learner but non-existent for the average learner (−.0166) (Table 5). In the case of the good learner, moving correlation indicated that the relationship between the two variables was predominantly negative, especially in the second part of the observation period (Figure 1). In the case of the average learner, the relationship was pre-conditional in that the two variables first competed but then mainly supported each other (Figure 1). In the case of the poor learner, the relationship was dual, with high competition between the variables in the middle of the learning period and very low support at the beginning and end of this period (Figure 1).

Table 5: Correlations and relationships between accuracy and lexical complexity measures

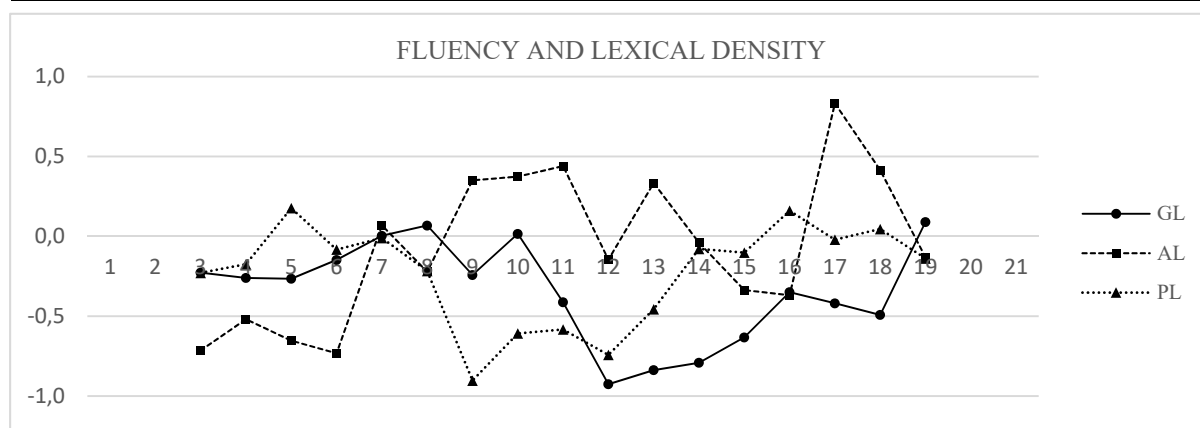| ACCURACY AND LEXICAL COMPLEXITY – CORRELATIONS AND RELATIONSHIPS							
DATA	Ls	LEX. DENSISTY		LEX. SOPHISTICATION		LEX. VARIATION	
		COR.	REL.	COR.	REL.	COR.	REL.
FLUENCY	GL	−0.3130	comp.	−0.2474	pre-cond.	−0.1538	dual
	AL	−0.0166	pre-cond.	−0.0626	dual	0.0717	dual
	PL	−0.2192	dual	−0.0161	dual	0.2306	dual

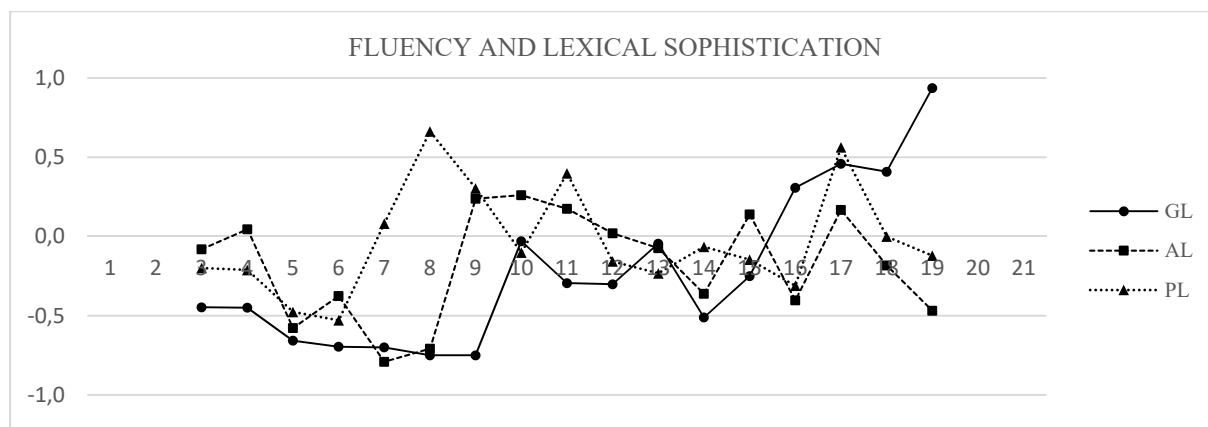*Figure 1: Moving correlations between fluency and lexical density – all learners*

The relationship between fluency and the second measure of lexical complexity, i.e. lexical sophistication, was very weak and negative for the good learner (−.2474) but non-existent for the average (−.0626) and poor learner (−.0161) (Table 5). In the case of the good learner, moving correlation illustrated a pre-conditional relationship (Figure 2). In the case of the average and poor learner, the relationship was dual in that the two variables alternated in moderate support and competition (Figure 2).

Figure 2: *Moving correlations between fluency and lexical sophistication – all learners*

The relationship between fluency and the third measure of lexical complexity, i.e. lexical variation, was weak and positive for the poor learner (.2306) but non-existent for the good (−.1538) and average learner (.0717) (Table 5). In terms of moving correlations, the relationship between the two factors was best described as dual in the case of all three learners (Figure 3) in that the variables functioned as intermittent supporters and competitors.
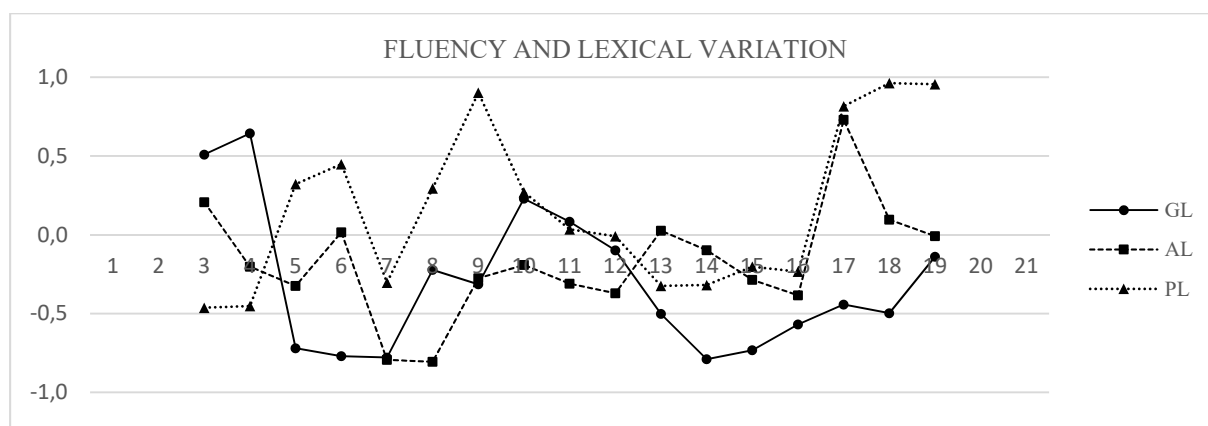

Figure 3: *Moving correlations between fluency and lexical variation – all learners*

4.3. *Moving correlations between fluency and syntactic complexity*

Analysing the relationships between fluency and syntactic complexity in a time series, it was established that the correlation between fluency and general syntactic complexity indicated a weak, positive relationship for the good learner (.3742) and a strong, positive relationship for the average (.8881) and poor (.8238) learner (Table 6). This was confirmed by the so-called moving correlations which illustrated how the relationship between the two variables changed

over the period of three years. In other words, these correlations indicated that fluency and general syntactic complexity developed as the so-called supportive growers in the case of all three learners, though in the case of the good learner some decrease in this support could be observed between data collection points 12–16 (Figure 4).

Table 6: *Correlations and relationships between fluency and syntactic complexity measures*

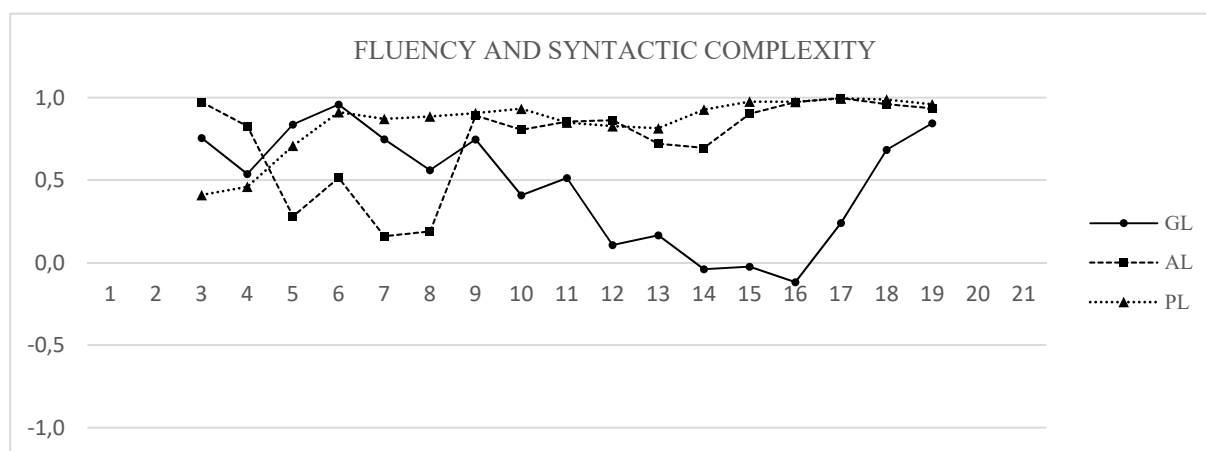| FLUENCY AND SYNTACTIC COMPLEXITY – CORRELATIONS AND RELATIONSHIPS									
DATA	Ls	GEN. SYNTACTIC COMPLEXITY		SUBORDINATION		COORDINATION		NOMINALISATION	
		COR.	REL.	COR.	REL.	COR.	REL.	COR.	REL.
FLUENCY	GL	0.3742	supportive	0.5999	supportive	0.4607	supportive	0.4610	supportive
	AL	0.8881	supportive	0.9168	supportive	0.5497	supportive	0.6935	supportive
	PL	0.8238	supportive	0.8420	supportive	0.2551	supportive	0.4653	supportive

Figure 4: *Moving correlations between fluency and general syntactic complexity – all learners*

With respect to more specific measures of syntactic complexity (Table 6), it was observed that there was a positive relationship between fluency and subordination in the case of all three learners. This relationship was very strong for the average (.9168) and poor (.8420) learner but moderate for the good learner (.5999). In congruence with these findings, moving correlations revealed consistent patterns of mutual support between the two variables in a time series in the case of the average and poor learner. In the case of the good learner, the pattern was less stable as it involved some decrease in the supportive relationship between data points 12–16 (Figure 5).
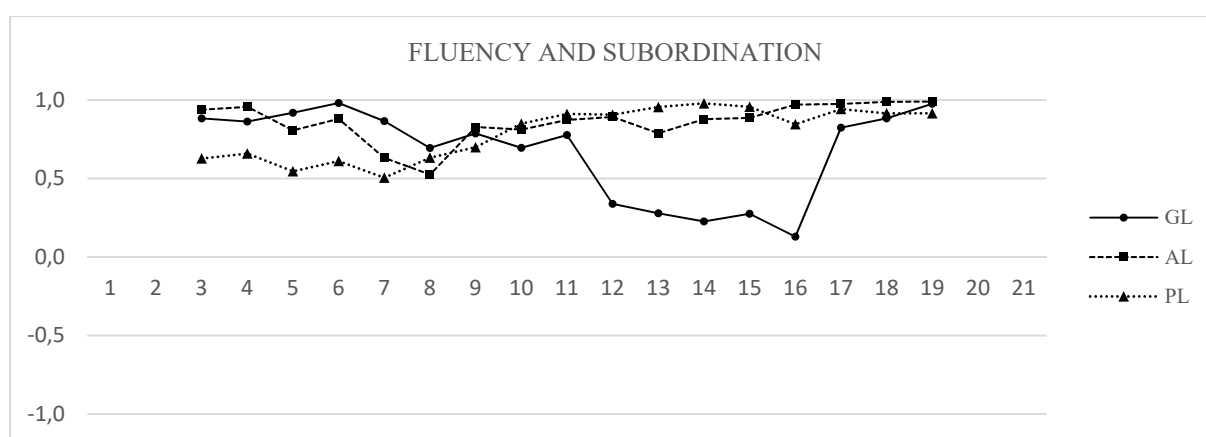

Figure 5: *Moving correlations between fluency and subordination – all learners*

With respect to fluency and phrasal coordination, standard correlations indicated a positive relationship between the two variables, which was moderate for the good (.4607) and average (.5497) learner but weak for the poor learner (.2551) (Table 6). The visual analysis of moving correlations confirmed that the relationship in question was supportive for the good and average learner (Figure 6). However, in the case of the former, some pre-conditioning could be observed at the beginning of the observation period. In the case of the latter, support dropped twice during the observation period, namely between data points 5–7 and 16–17, which indicated some duality in the course of development. Furthermore, in the case of the poor learner, the relationship was clearly pre-conditional because first it was predominantly competitive, except two outliers at the beginning, and then it became more supportive at the end (Figure 6).
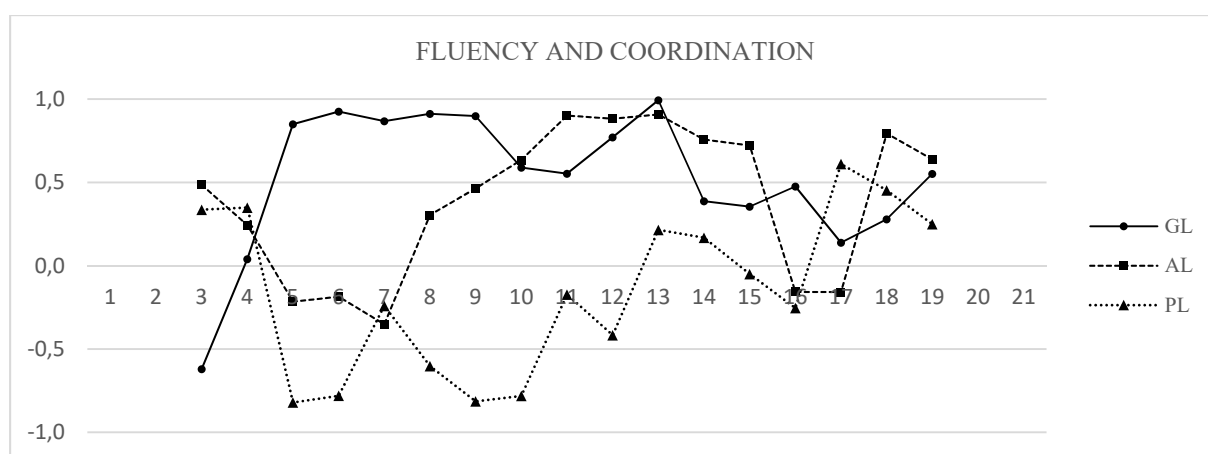

Figure 6: *Moving correlations between fluency and coordination – all learners*

With respect to fluency and nominalisation, it was found out that the relationship between the two factors was moderate and positive for all three learners (GL – .4610; AL – .6935; PL – 4653) (Table 6). However, moving correlations indicated that this support was not fixed and stable. In the case of the good learner, such support, high at the beginning of the observation period, decreased in the second part of this period but became stronger at the end (Figure 7). In the case of the average learner, such support dropped twice (data points 5–7 and 14–15), whereas, in the case of the poor learner, it went down once (data points 11–12) (Figure 7).
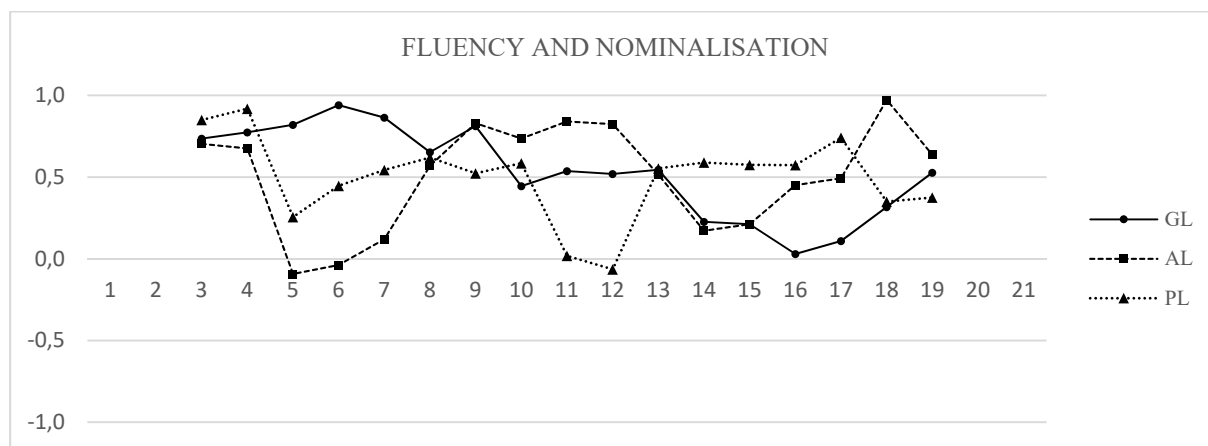

Figure 7: *Moving correlations between fluency and nominalisation – all learners*

5. Discussion

The aim of the present paper, which presents the fifth part of the case study, was to explore the influence of lexical and syntactic complexity on the development of fluency in speaking English as a foreign language at secondary school on the example of a good, average, and poor language learner. With respect to the first research question, which referred to the learners' results on fluency and complexity in L2 English speech, it was found out that the good learner's speech was more fluent than the speech of the poor but not average learner (Rokoszewska 2019a). The good learner's speech was also more syntactically complex than the speech of the average and poor learner in terms of all syntactic measures, such as general sentence complexity, subordination, and nominalisation, but not phrasal coordination (Rokoszewska 2019b). What is more, this learner's speech was more lexically complex than the speech of the other two learners only in terms of lexical variation as opposed to density and sophistication (Rokoszewska 2020a).

With respect to the second research question, which focused on the relationships between fluency and lexical complexity in L2 English speech, it was observed that these relationships were characterised with greater competition. Most of the relationships were dual in that fluency, on the one hand, and lexical density, sophistication, and variation on the other hand, developed as intermittent supporters and competitors. Fluctuations in the trajectories of moving correlations between fluency and different measures of lexical complexity might have been related to the learners' ability to use lexis connected with a given topic. It may be assumed that if learners managed to access denser, more sophisticated, and more varied lexis easily in written production, then the length of the production was supported. Conversely, if they struggled to recall such lexis, the length of the production unit was compromised.

With respect to the third research question, which concerned the relationships between fluency and syntactic complexity in L2 English speech, it was established that the relationships between syntactic complexity and fluency were generally positive in the case of all three learners. It may be concluded that fluency and different measures of syntactic complexity developed as the so-called connected supportive growers, which means that the use of complex sentences, subordinated clauses, coordinated phrases, and complex nominal phrases contributed to the length of the production unit, i.e. T-unit, in speech. However, the support between fluency and different measures of syntactic complexity was not constant but changeable over the whole learning period. Lower support in the trajectories of moving relationships between fluency and different measures of syntactic complexity, in particular coordination and nominalisation, may indicate that the learners used coordinated and nominal phrases in simple and coordinated sentences, which affected the length of the T-unit, as producing such phrases in complex subordinated sentences was linguistically and cognitively more demanding.

In addition, it may be also observed that the relationship between fluency and lexical complexity depends to some extent on the relationship between fluency and syntactic complexity. The example of the good learner indicated that the relationship between fluency and different syntactic measures, such as subordination, coordination, and nominalisation, was high in the first part of the observation period, but it became weaker when the pre-conditional relationship between fluency and sophisticated words became positive in the second part of this

period. In other words, the use of sophisticated words led to some trade-off with syntactic complexity. Generally, in the case of the good learner, it may be said that fluency was first supported by syntactic and later by lexical complexity. In the case of the average and poor learner, the patterns were more chaotic.

The present case study provided some insight into language development in oral production in the case of individual learners who differed in terms of success at learning a foreign language at secondary school. Since the study was exploratory in character, it focused only on single representatives of good, average, and poor learners. Hence, it would be useful to examine groups of learners who achieve different success at learning a foreign language in the formal context. Another limitation is that fluency was evaluated by means of the length-based measure which could be used for both speech and writing. Still, however, it is possible to recommend that teachers should focus not only on fluency but also syntactic and lexical complexity of learners' speech in terms of instruction and evaluation, recognizing that the development of language complexity, next to accuracy and fluency, is a complex process and a challenging task.

6. Conclusions

Summing up, it is crucial to highlight the fact that Complex Dynamic Systems Theory is one of alternative approaches to applied linguistics which provides new theoretical principles and methodological procedures to study second or foreign language development. On the basis of the present part of the case study, conducted within the CDST framework, a few conclusions were drawn. First of all, it was observed that fluency, syntactic complexity, and lexical complexity emerged as the so-called coupled or connected growers in various types of relationships in a time developmental series. Second of all, the examined relationships were dynamic and fluctuant, which reflected the complexity, non-linearity, and variability of language development. Third of all, the trajectories of moving correlations between fluency and complexity illustrated substantial support in terms of syntax but equally substantial duality of intermittent support and competition in terms of lexis. Such duality reflected trade-offs between these subsystems which were due to learners' constrained language processing, especially in L2 speech. Last of all, such relationships were characteristic for individual learners as the trajectories of these relationships did not overlap. Nevertheless, it should be pointed out that the above conclusions refer to individual learners selected for the purpose of the present case study. In spite of the fact that CDST researchers advocate they study of individual language development, it is necessary to verify these findings with respect to the whole group of learners and/or the groups representing a given type of learners.

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