Analysis of changes in L2 writing over the time of a short-term academic English programme

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ABSTRACT: The present study investigated what aspects of academic writing improved, if any, at the completion of one semester of studying an EAP course titled Advanced Academic English, which was specifically designed for undergraduate students from the degree in English Studies at a Spanish university. This study aimed to ascertain the nature and extent of the development of the English L2 writing proficiency of 59 college-level EFL learners at an advanced level of English proficiency over the time of a short-term academic English language programme by means of quantitative measures targeting different components of the syntactic complexity of the learners' writing performance (global, clausal and phrasal). Results point to a significant increase in coordination and clausal and phrasal elaboration, at the expense of subordination. Results also suggest a tendency towards greater use of more complex phrasal constructions by more competent writers. Overall, these results underscore the importance of syntactic complexity, particularly nominal complexity in producing successful academic writing, and highlight the pedagogical attention that should be paid to the production and meaning of such structures in EAP courses and in L2 English writing instruction in general.
Key words: L2 writing, academic writing, syntactic complexity, noun phrases, EAP course.

Análisis de los cambios en el corto plazo en la escritura académica en L2 tras un período de instrucción en un programa de escritura académica

RESUMEN: Este estudio investiga los aspectos de la escritura académica que mejoran al final de un semestre de un curso de Inglés para Fines Académicos titulado Inglés Académico Avanzado, diseñado para estudiantes universitarios de un Grado en Estudios Ingleses en una universidad española. El estudio intenta determinar la naturaleza y medida del desarrollo de la competencia escrita en L2 de un grupo de 59 estudiantes universitarios con un nivel avanzado de conocimiento de la lengua inglesa durante el corto período del programa lingüístico por medio de medidas cuantitativas de distintos componentes de la complejidad de la escritura (global, clausal y frasal). Los resultados indican un aumento en la coordinación y la elaboración clausal y frasal, aunque no en la subordinación. Los resultados sugieren además una tendencia hacia un mayor uso de construcciones frasales complejas por parte de escritores más competentes. Estos resultados subrayan la importancia de la complejidad sintáctica, especialmente la complejidad nominal en una buena escritura académica, así como la atención pedagógica que debe darse a la producción y al significado de estas estructuras en los cursos de Inglés para Fines Académicos así como en la enseñanza de la escritura en inglés como lengua extranjera en general.
Palabras clave: Escritura en L2, escritura académica, complejidad sintáctica, frases nominales, curso de IFA

1. INTRODUCTION

Writing is a pervasive feature of academic life. The ability to write an academic text fluently, accurately and using appropriate academic language is a crucial skill in this context. Writing is the primary way in which university students demonstrate and are evaluated on their understanding of their field and is often the principal means of assessing students' progress (Hyland, 2013).

As Jones (2002) points out, the assessment of writing is central to the process of effective teaching and learning of writing. Effective writing assessment is part of the academic growth of students. The evaluation of the students´ writings´ quality is an essential part of the learning and teaching of this skill.

The present study deals with this key role of both writing and the assessment of writing quality in an L2 context. It is intended to increase our understanding of learner choices and practices, which may have important implications for the learning, production, and assessment of L2 writing.

The present study investigated what aspects of academic writing improved, if any, at the completion of one semester of studying an EAP course titled Advanced Academic English, which was specifically designed for undergraduate students from the degree in English Studies at a Spanish university. This course, which is one semester long (14 weeks) aimed to develop the advanced language and skills required for successful use of Academic English. The skills focused on include critical reading, effective research skills, the ability to plan and confidently give an oral presentation on a research topic, and the ability to write an essay and a research proposal fluently, accurately and using appropriate academic language.

In this study we focused on complexity aspects of writing; that is, we investigated whether over the semester, learners' writing became more complex. This paper approached the possibility of measuring short-term gains in L2 writing proficiency by instructed advanced learners of English by means of a range of quantitative metrics of syntactic complexity and examined the adequacy of selected quantitative complexity measures as indicators of writing quality.

The research carried out in the present paper aimed to better understand the extent to which syntactic development leads to better writing. While studies into the relationship between syntactic complexity and L2 writing quality exist, limited scholarship has been dedicated to L2 writing development in the context of advanced L2 writers. To address the limited research in this area, this study focused on the development of the English L2 writing proficiency of college-level EFL learners at an advanced level of English proficiency over the time of a short-term academic English language programme.

2. L2 COMPLEXITY

In recent years, complexity has emerged as a major dimension along which L2 writing performance, proficiency, and development can be assessed and investigated. Bulté and Housen (2012, cited in Bulté & Housen, 2014) distinguish between three components of L2 complexity: propositional complexity, discourse-interactional complexity and linguistic complexity, the focus of the present study.

Linguistic complexity is defined as the capacity to use more advanced linguistic forms and functions, which are typically acquired later in second or foreign language development (Ellis, 2009; Pallotti, 2015).

In the context of SLA, the complexity of L2 production can be studied across several domains of language, being the lexical, syntactic, and to a lesser extent, the morphological dimensions the most commonly studied (e.g. Jarvis, 2013; Norris & Ortega, 2009; Pallotti, 2015; Wolfe-Quintero et al., 1998). The present study focuses on syntactic complexity, which can be defined as "the range and the sophistication of grammatical resources exhibited in language production" (Ortega, 2015, p.82).

Syntactic complexity studies are increasingly adopting Norris and Ortega´s (2009) view that syntactic complexity should be operationalized as a multidimensional construct, encompassing global (e.g., mean length of sentence), clausal (e.g., coordinated clauses per sentence and subordinated clauses per clause) and phrasal (e.g., mean length of noun phrase and complex nominals per clause) sub-constructs (e.g., Bulté & Housen, 2014, 2018; Casal & Lee, 2019; Lu, 2011, 2017).

This extension in how complexity is conceptualized "highlights the capacity syntactically complex structures have to construct various meanings" (Casal & Lee, 2019, p. 51). In this respect, syntactic complexity can be defined as the use of structures that make it possible to expand "the capacity to use the additional language in ever more mature and skilful ways, tapping the full range of linguistic resources offered by the given grammar in order to fulfil various communicative goals successfully" (Ortega, 2015, p. 82).

While clausal and global dimensions of syntactic complexity have been the subject of numerous research works in applied linguistics, Biber and Gray (2010) and Biber et al. (2011) have helped recognise the importance of considering phrasal complexity structures, which did not feature prominently in many syntactic complexity approaches previously, and which is now seen to have "stronger discriminative power" (Lu, 2011, p. 57) at certain proficiency levels and in certain contexts.

Based on the register differences observed between L1 spoken and written language, Biber et al. (2011) hypothesized a series of developmental stages for both L1 and L2 writers of academic English. This development begins with speech (and a reliance on finite dependent clause manipulation) and progresses through five stages of increased phrasal complexity, particularly those involved in noun modification, which are produced in "only the more specialized circumstances of formal writing" (p. 29).

The first stage does not involve complexity in noun phrase constructions. "This stage includes finite complement clauses (that and WH) controlled by extremely common verbs (e.g., think, know, say)" (Biber et al., 2011, p. 30). The second stage includes only noun modification features starting with simple modification through attributive adjectives pre-modifiers. The third stage proceeds to more complex noun modification patterns (i.e., nouns as pre-modifiers, prepositional phrases as noun post-modifiers with concrete meaning and relative clauses). In the fourth stage, the emergence of nouns modified by non-finite clauses as well as modification by prepositional phrases as noun post-modifiers with abstract meaning and combined adjective-noun pre-modification (adjective-noun sequences refer to noun phrases that have both an attribute adjective and a noun modifying the head noun) is hypothesized; and the final stage includes appositive noun phrases and complement clauses as noun modifiers in addition to multiple phrasal embeddings.

We believe that the developmental progression proposed by Biber and colleagues represents a useful means of hypothesising the syntactic development of maturing academic writers in English, but that the global and clausal measures may contribute to fully capture the stages of L2 writing development in particular contexts. As such, the present study employs a multidimensional set of complexity measures. These measures reflect both Norris and Ortega's (2009) hypothesised syntactic developmental trend that as proficiency develops, the main source of complexification in learner language moves from coordination to subordination, and then to phrasal-level complexification at the advanced end of the L2 developmental spectrum, and Biber et al.'s (2011) developmental progression from finite dependent clauses to complex noun phrases.

This study aims to ascertain the nature and extent of the development of English L2 writing proficiency of 59 college-level EFL learners at an advanced level of English proficiency over the time of a short-term academic English language programme by means of quantitative measures targeting different components of the syntactic complexity of the learners' writing performance (global, clausal and phrasal).

3. Review of the literature

Studies which have investigated the effects of courses offered in universities on the development of learners' writing skills, specifically on the development of the compositions´ syntactic complexity have produced somewhat mixed results. An early study by Casanave (1994) found a significant relationship between L2 development and increase in the length of clauses as well as in subordination. Casanave (1994) found that over the course of 3 semesters of instruction, a group of intermediate Japanese English learners began to produce longer and more complex syntactic clauses. Similarly, Haswell (2000), who carried out a longitudinal study in a college context, reported that writers, over time, began to produce longer sentences with longer clauses, indicating syntactic growth.

Posterior studies, like Crossley and McNamara (2014) reported significant growth in L2 writers' syntactic complexity as a function of time spent in a writing class. Specifically, L2 writers produced longer noun phrases over the course of a semester. They noted that many learners appear to produce fewer embedded clauses in favour of more complex noun phrases. Similarly, Crossley et al. (2014) found an increase in phrasal complexity (the length of noun phrases) in the data from a group of upper intermediate university EFL writers enrolled in a one-semester of intensive writing programme. Biber et al. (2014) have also shown that phrasal complexity features better characterize academic writing than clausal features. They concluded that phrasal features tend to increase in complexity in the writing of university students as their academic writing skills developed through time.

Bulté and Housen (2014) examined which aspects of the syntactic complexity of the writing of upper-intermediate to advanced adult ESL learners changed over the time of an academic English Language programme. Findings showed that the learners wrote longer sentences and T-units over time. At the level of the clause, there was an increase in mean length of finite clauses. Findings also pointed to a significant increase in both clausal coordination and phrasal elaboration (increased length of the noun phrase), but not in subordination.

Parkinson and Musgrave (2014) designed and conducted a study specifically aimed at observing patterns of complex noun phrase development. They compared the frequencies of the noun modifiers in L2 essays written by EAP students and MA TESOL students. Their findings revealed that the less proficient group of their study (i.e., the EAP group) used attributive adjectives much more frequently compared to their more proficient group (i.e., the MA group) and the reported frequencies for published academic writing. On the other hand, the MA group was found to use other noun modifiers more frequently than the EAP group. In comparison to published frequencies for academic writing, writing by participants in the MA group showed a similar pattern of noun modification in all cases except for the appositive.

Rosmawati (2014) explored complexity development in the academic writing of an advanced learner of English during her postgraduate study in Australia over one semester. Findings showed a significant improvement in sentence composition in terms of clauses as defined by traditional grammars. Thus, there was an increase in compound, complex, and compound-complex sentences over time.

Ahmadi and Meihami (2017) investigated the written development of four ESP university students at an intermediate level of English language proficiency who took part in ten sessions of writing instruction. Results showed an increase in subordination at the end of the program as measured by clause per T-unit and dependent clause percentage.

In a later study, Rosmawati (2020) explored the changes of syntactic complexity at the sentential, clausal, and phrasal level in the academic essays of an L2 graduate student at the advanced level of English proficiency over two academic semesters. Findings showed a decrease of subordination and the increase of phrasal elaboration along with a move from finite-dependent clauses towards non-finite dependent clauses in her student´s writing.

The general findings of the studies reviewed above point to an increase in complexity as L2 competence and writing capacities develop over time and with more instruction. There are, nevertheless, a number of studies that do not show this positive trend. Thus, the study by Shaw and Liu (1998), who used a range of linguistic measures to compare international students' writing before and after they completed a full-time EAP course (prior to university study) in the United Kingdom, reported that the learners' writing became more formal, employing language associated with written rather than spoken register, but showed no significant changes in terms of linguistic complexity and accuracy. Similarly, a small-scale study by Storch (2009), which addressed the writing of international students (undergraduates and postgraduates) at the beginning and end of semester, found that the students' writing showed improvement only on structure and register but not on linguistic complexity or accuracy. A recent study by MacArthur et al. (2019) analyzed pre- and post-test writings for college writers and found no differences in syntactic complexity and accuracy features.

Considering the scope of our study, focused on the development in written syntactic complexity over a short-term period of instruction, we can observe that general findings of the studies reviewed show an increase in complexity as L2 competence and writing capacities increase: there is an increase in sentence, clause and noun phrase length. Findings also point to an increase in coordination and subordination.

Besides writing development, phrasal complexity has also been examined to explore its relationship to writing quality although to a much limited extent. In a study carried out in a college context, Taguchi et al. (2013) reported that noun phrase modification (by attributive adjectives and post-noun modifying prepositional phrases) contributed to essay

quality. A study by Casal and Lee (2019) applied six measures related to noun phrases: a holistic measure (i.e., complex nominal per clause) and five noun modifiers (i.e., attributive adjectives, prepositional phrases, relative clauses, possessive nouns, and participial clauses) to distinguish the writing scores of high, intermediate, and low-rated essays. Results showed that the high-scoring essays included significantly more attributive adjectives, and participial clauses as pre-modifiers and prepositional phrases as post-+modifiers than the other two score levels. Also, the high-scoring essays had the highest number of complex nominals.

In the light of the aim of the present study regarding the existence of differences in the use of noun modification features over a short period of instruction, we observe that previous studies on this topic have shown that noun phrase features contribute to essay quality.

4. STUDY

The review of the literature above shows some unsolved issues that call for further research. First, although a large number of studies show an increase in complexity as L2 learners´ linguistic maturity grows, there are also studies that show no gains in complexity over time.

Secondly, the review of the literature paints an unclear picture regarding which specific aspects of syntactic complexity change over time. Thus, findings by Bulté and Housen (2014) pointed to a significant increase in the writing of advanced EFL students in both clausal coordination and phrasal elaboration (increased length of the noun phrase), but not in subordination. Crossley and McNamara (2014) showed that their upper-intermediate university EFL writers enrolled in a one-semester writing programme, showed phrasal elaboration growth (more complex phrases, with more modifiers per noun phrase) but unchanged subordination. In the same vein, Rosmawati (2020) reports a decrease in subordination and an increase in phrasal elaboration in the writing of an advanced student´s writing over two academic semesters.

On the other hand, Ahmadi and Meihami (2017) showed an increase in subordination at the end of a writing program in the compositions of four ESP university students at an intermediate level of English language proficiency.

Bulté and Housen (2018), with participants at the beginner levels, found from a very early stage in L2 development, an increase of T-unit length and no increase of clause length, but also an increase of subordination and noun phrase length.

The present study tries to clarify these conflicting results exploring the development in the use of prominent syntactic features over time. These syntactic features include holistic measures across three dimensions discussed above: mean length of sentence, dependent clauses per clauses and coordinated clauses per sentence as sentential measures of subordination and coordination, respectively; mean length of finite clause as a clausal measure; and mean length of noun phrase as a phrasal measure.

As recent research claims that academic writing at the advanced level shows characteristics of concise language with high complexity at the phrasal level, particularly in terms of complex nominal structures (Biber & Gray, 2011, 2016; Biber et al., 2011), complex nominal composition is further examined through a number of noun phrase modifiers. Through these analyses and the use of both holistic and fine-grained measures of syntactic complexity, the

study aims to deepen our understanding of how these features develop over time and how they are related to writing quality.

This study intends to make a novel contribution given the paucity of research into the developmental stages of syntactic and specifically phrasal complexity in the writing of advanced EFL students in a college context and into the relationship between the use of noun modifiers and advanced EFL students´ writing quality.

Considering the purposes mentioned above, this study will address the following set of research questions:

Research Question 1: What is the development of advanced L2 learners in written syntactic complexity over a short-term period of instruction in academic English?

Research question 2: Is there a significant difference in the use of noun modification features over a short-term period of instruction in academic English? If so, in which features can these be observed?

Research question 3: What is the relationship between L2 writing quality and the use of noun modifiers?

4.1. Participants and data

Participants were 59 undergraduate students of the Degree in English Studies at the University of Oviedo, Spain. Their age ranged from 21 to 23 and were all native speakers of Spanish. The students´ CEFR level was based on the scores obtained in an Oxford Placement Test: a total of 55 students were at C1 as per the CEFR and the remaining 4 students were at C2 as per the CEFR. This test, which includes a grammar and a listening section, was used in this study to place the participants in the appropriate level according to the Common European Framework of Reference for Languages as a prior step to the research study.

We collected 13 compositions from each participant, one per week until the end of the course. In line with our aims to identify linguistic indicators of progress in EFL writing proficiency over the course of a typical semester-long academic English language programme, we performed our analyses on a subsample of the corpus consisting of the first and the last essays written by the 59 students. The essays were 250-word long expository texts. The topic of essay 1 was "Why did you choose the University of Oviedo to do your degree?" and of essay 2 was "Do you think that international university rankings are useful?" The time interval between the two essays, which were written at the beginning and end of the intensive EAP course, was four months.

4.2. Measures

The essays were evaluated by means of both holistic ratings of writing quality as well as by a selection of quantitative measures gauging different aspects of L2 complexity calculated by the present author.

For the holistic writing, we followed Connor-Linton and Polio (2014) and used five 0-5 scales: Content, Organization, Language Use, Vocabulary and Mechanics. The holistic composition score was arrived at calculating the mean of the five scales. Some of the excerpts from the rubrics used for the rating scales are, for example "thorough and logical development of thesis", "excellent overall organisation", "no major error in word order and

complex structures'', "very sophisticated vocabulary", "no errors that interfere with comprehension", "no spelling errors" (for a detailed description of the scale, see Connor-Linton and Polio, 2014: 8).

Complexity measurement. We calculated a total of six complexity measures targeting different aspects of syntactic complexity.

Syntactic complexity measures. According to Norris and Ortega (2009), L2 learners complexify the sentential, the clausal, and the phrasal levels of syntactic organisation at different stages of development, therefore all three levels must be measured to fully examine L2 development. Nevertheless, the multidimensional construct of complexity (Bulté & Housen, 2012, 2014; Norris & Ortega, 2009) is often reduced to one (or, at best, a few) of its many possible operationalisations. The present study examines L2 writing incorporating measures that capture different aspects of syntactic complexity, following the call by Norris and Ortega (2009) and others (Bulté & Housen, 2014, 2018; Housen, De Clercq, Kuiken and Vedder, 2019; Ortega, 2012; Pallotti, 2009, 2015). Collectively, they cover the sentential or supra-clausal, the clausal and the phrasal level of syntactic analysis.

Table 3 lists the five measures of syntactic complexity chosen adapted from Bulté and Housen (2014, 2018). These measures are based either on the average length (in words) of different linguistic units (sentences, finite clauses, noun phrases) or on a ratio of a specific subtype of a linguistic unit to a more general subtype or a higher-order unit. These five syntactic complexity measures were chosen to gauge complexification at different layers of syntactic organization, to wit the sentential, the clausal, and the phrasal level. Two sets of measures on sentential syntactic complexity were chosen, so that "they represented a different but interrelated aspect of sentence complexity" (Bulté & Housen, 2014, p. 47). The first set targets sentence complexity in terms of the mean length of sentential unit in words: mean length of sentence. The second set captures sentential syntactic complexification in terms of proposition combining and clause integration strategies: the coordinate clause ratio, indicating the number of coordinated clauses per sentence and clausal subordination, showing the number of dependent clauses relative to the total number of clauses. Complexity at the clausal level is measured by calculating the mean length of finite clauses. Finally, complexity at the sub-clausal (or: phrasal) level is obtained by means of mean length of noun phrase, indicating the number of words per noun phrase.

Table 1. *Syntactic complexity measures (adapted from Bulté & Housen, 2014, 2018)*

syntactic sentential complexity	Length of sentential units	Mean length of sentence (words/sentence)
	Proposition combining and clause linking	Clausal coordination (coordinated clauses/sentence)
		Clausal subordination (dependent clauses/clause)
syntactic clausal complexity		Mean length of finite clause (words/finite clauses)
syntactic phrasal complexity		Mean length of noun phrases (words/noun phrases)

The present study further analyses phrasal complexity by means of the study of noun modifiers in academic writing following Biber et al. (2011)'s index of complexity features, which summarizes the lexico-grammatical features that can function as noun premodifiers or postmodifiers. Table 2 lists the noun modifiers analysed according to the hypothesized developmental stages for noun phrase modification proposed by Biber et al. (2011). In terms of the modifying position, two are premodifiers (i.e., attributive adjectives and premodifying nouns), and the remaining nine are postmodifiers. For the grammatical type, six are phrasal modifiers (attributive adjectives, premodifying nouns, prepositional phrases [of], prepositional phrases [other], prepositions followed by -ing clauses, and appositive NPs), and the remaining six modifiers are clausal.

Table 2. *Hypothesized Developmental Stages for Noun phrase modification (from Biber et al., 2011)*

Noun modifiers	Examples
2 attributive adjectives	significant element
3 pre-modifyng nouns possessive noun as pre-modifiers relative clauses	computer science undergraduates' points of view approaches that include only basic factors
4 -ing participles-ed participles. Attributive adjectives/ nouns as pre-modifiers prepositional phrases (of) prepositional phrases (other)	outcomes representing several approaches information obtained from the participants initial music test this list of requirements scores for male and female students in the class
5 prepositions + ing clauses noun complement clauses infinitive clauses appositive noun phrases	the plan of taking an immediate action the fact that performing in public is a difficult task an important plan to complete two Spanish monarchs (Philip II and Philip III)

4.3. Statistical analysis

A statistical analysis was carried out with the programme R Development Core Team 2018, 3.4.4. version. The differences of numerical values between two groups were studied by means of the Student's t-test for independent variables, and the differences of measures in two temporal points were studied using the t test for related samples. The correlations or linear relations were studied by means of the Pearson or Spearman coefficient and test depending on whether the normality hypothesis was fulfilled or not. The significance level used was 0.05.

5. RESULTS

Research Question 1: What is the development of advanced L2 learners in written syntactic complexity over a short-term period of instruction in academic English?

We conducted repeated measure ANOVAs on the selected metrics to examine if significant differences in syntactic features existed between essays written at the beginning of the semester (1st essays) and at the end of the semester (13rd essays). Table 3 shows the mean scores (and standard deviations) at the beginning and at the end of the semester. Of the 3 measures, three demonstrated significant differences between the 1st and 13rd essays: the number of coordinate clauses per sentence, number of words per clause, and number of words per noun phrases. The number of coordinated clauses per sentence increased significantly from T1 (0.640) to T2 (0.738). On the other hand, the proportion of subordinated clauses did not change in a statistically significant way. At the level of the clause, a significant increase in finite clause length is observed (T1: 10.170; T2: 11.302). Also the length of noun phrases increases significantly (T1: 0.931; T2 1.213), pointing to increased use of determiners and modifiers of the Noun Phrase head. The highest effect sizes for the syntactic complexity measures were found for mean length of finite clause and mean length of noun phrase.

Table 3. *Syntactic complexity measures for Time 1 and Time 2*

Variables	M	SD	M	SD	p
Mean length of sentence	25.544	25.228	5052	6456	0.68
Coordinate clause ratio	0.640	0.738	0.257	0.280	0.02
Dependent clause ratio	0.457	0.437	0.099	0.105	0.28
Mean length of finite clause	10.170	11.302	2.078	2.321	<0.001
Mean length of noun phrase	0.931	1.213	0.478	0.521	<0.001

p value: correlation is significant < the 0.05 level

Research question 2: Is there a significant difference in the use of noun modification features over a short-term period of instruction in academic English? If so, in which features can these be observed?

In our analysis of noun phrase modification, we first considered the distributional patterns of different noun modifiers in the two groups of compositions based on their normalized frequency counts per 50 words of text. As shown in Table 4 below, which presents the frequency of each type of noun phrase features in the corpus, the most common types of noun pre-modifiers in Time 1 and Time 2 are attributive adjectives, nouns as pre-modifiers and attributive adjective/noun combinations as pre-modifiers, while prepositional phrases were the most common form of post-modification.

Table 4. *Noun modifiers for Time 1 and Time 2*

Variables	Time	M	SD	p
Attributive adjectives	Time 1	0.050	0.016	0.20
	Time 2	0.047	0.020	
Nouns as pre-modifiers	Time 1	0.014	0.011	<0.001
	Time 2	0.006	0.005	
Possessive nouns as pre-modifiers	Time 1	0.002	0.000	0.17
	Time 2	0.002	0.003	
Relative clauses	Time 1	0.006	0.006	0.48
	Time 2	0.005	0.003	
-ing participle as post-modifiers	Time 1	0.000	0.002	0.16
	Time 2	0.000	0.001	
-ed participle as post-modifiers	Time 1	0.003	0.002	0.15
	Time 2	0.001	0.000	
Attributive adjectives/ nouns as pre-modifiers	Time 1	0.047	0.016	<0.001
	Time 2	0.050	0.008	
Prepositional phrases (of)	Time 1	0.016	0.009	0.01
	Time 2	0.012	0.020	
Prepositional phrases (other)	Time 1	0.007	0.006	0.07
	Time 2	0.005	0.004	
Prepositions + ing clauses	Time 1	0.002	0.003	<0.001
	Time 2	0.004	0.004	
noun complement clauses	Time 1	0.001	0.002	0.05
	Time 2	0.004	0.004	
Infinitive clauses	Time 1	0.002	0.002	<0.001
	Time 2	0.004	0.003	
Appositive noun phrases	Time 1	0.000	0.001	0.19
	Time 2	0.001	0.000	

p value: correlation is significant < the 0.05 level

The comparison of the use of phrasal modification features before and after the period of instruction, which is summarized in Table 4, reveals the extent to which the compositions' use of complex noun phrases develops over the course of the instruction period. We found statistically significant differences in the mean values of six noun modifiers. Thus, nouns as pre-modifiers, attributive adjectives/nouns as pre-modifiers, prepositions + ing clauses, prepositional phrases (of), –ed participle as post-modifiers, and infinitive clauses were found to differ significantly between Time 1 and Time 2.

The first significant difference turned out to be in the use of pre-modifying nouns. A review of the mean scores for this feature shows a significant reduction of pre-modifying nouns at the end of the instruction period (F=0.014, F=0.006; p>0.001). Another grammatical feature, prepositional phrases (of) equally decreased from T1 to Time 2 (F=0.016, F=0.012; p=0.01).

The use of adjective/noun sequences as nouns pre-modifiers included significantly more instances of this feature at the end of the instruction period (F=0.047, F=0.050; p>0.001).

The use of prepositions + ing clauses was another feature to yield statistically significant differences between the two groups (F=0.002, F= 0.004; p<0.001). The mean value for this feature increased from T1 to T2.

The last significant difference between the two groups lies in the use of infinitive clauses (F=0.002, F= 0.004; p<0.001). Students used infinitive clauses significantly more after the period of instruction.

Research question 3: What is the relationship between L2 writing quality and the use of noun modifiers?

Regarding the association between L2 writing quality and the use of noun modifiers, we found a significant relationship between the global quality of the compositions and two grammatical categories: prepositions + ing clauses (coef=0.315, p=0.016), and noun complement clauses (coef=0.412, p=0.001). These categories are found significantly more often in compositions with a higher global score.

6. Discussion

Syntactic complexity development is manifested in our analysis by a significant increase in coordination and clausal and phrasal elaboration as English proficiency increases.

Overall, these findings are in line with much of the previous scholarship on syntactic complexity in L2 English writing. Our results corroborate Bulté and Housen´s (2014) findings that showed a significant increase in the writing of upper-intermediate and advanced L2 learners over the time of a short-term academic English language programme in mean length of finite clauses, coordination and phrasal elaboration, but not in subordination. They also tally with results by Crossley and McNamara (2014), who showed that at the upper-intermediate level, their sample showed phrasal elaboration growth but unchanged subordination; they equally agree with the findings by Staples and Reppen (2016), who found an increase in phrasal complexity in the writing of university students as their academic writing skills develop through time; finally, they corroborate findings by Rosmawati (2020), who showed a decrease of subordination and an increase of phrasal elaboration in advanced student´s writing over time.

Our findings only partially corroborate Norris and Ortega´s (2009) developmental model of syntactic complexity. The pattern of syntactic complexity development that emerges from our analyses does not totally correspond to the three-staged pattern for syntactic complexity development progression proposed by Norris and Ortega (2009) that learners rely syntactically on coordinate clauses, then subordinate clauses, and finally phrasal elaboration. Our results point to a decrease in subordination in favour of greater use of phrasal-level complexification and clausal elaboration over the period of instruction. However, they also point to an increase in coordination.

This finding would suggest that changes in syntactic complexity do not follow the developmental pattern proposed by Norris and Ortega (2009) in any rigid or linear fashion, and that progress in L2 writing beyond the advanced stages of development may also involve syntactic complexification through increased use of clausal coordination, a finding that corroborates Bulté and Housen´s (2014) conclusions.

Regarding the distributional patterns of noun modifiers, our study has shown a preference for attributive adjectives and nouns as noun pre-modifiers, the adjective/noun sequences as pre-modifiers, and prepositional phrases as post-modifiers both before and after the period of instruction.

Biber at al. (1999) argued that noun phrases with nouns and adjectives as phrasal pre-modifiers and prepositional phrases as post-modifiers characterise greatly academic prose. These authors pointed out that adjectives are the most common type of pre-modifiers in expository written texts, as they identify diverse semantic classes such as time, frequency, and affective evaluation. They also noted that nouns are the second most common type of pre-modification and are highly preferred in academic prose for their brevity in condensing a large amount of referential meaning.

Some other studies have also revealed a large dependence on these three kinds of noun modifiers in written academic English. For example, Taguchi et al. (2013) found that the writing of their more proficient group contained a greater number of pre-modifying attributive adjectives and post-modifying prepositional phrases. Staples and Reppen (2016) noted that pre-modifying adjectives and nouns are important features of academic writing associated with higher proficiency and higher writing quality in L2 academic writing. Ansarifar, Shahriari and Pishghadam (2018) reported that the most common types of noun pre-modifiers in three corpora (MA and PhD students and published expert writers) were attributive adjectives and nouns, while prepositional phrases were the most common form of post-modification.

Having identified the most common patterns of phrasal modification before and after the period of instruction, the comparison of their use at both times resulted in significant differences being found in the mean values of six noun modifiers. We found a significant increase in the use of adjective/noun sequences as nouns pre-modifiers, the use of prepositions + ing clauses, and the use of infinitive clauses at the end of the period of instruction. On the other hand, we found a significant reduction of pre-modifying nouns and prepositional phrases (of) at the end of the instruction period.

When viewed through Biber et al.'s (2011) proposed trajectories for syntactic development, our findings corroborate them. We found an increase in the use of three features predicted to emerge in the fourth (adjective/noun sequences as nouns pre-modifiers) and fifth stages (the use of prepositions + ing clauses, noun complement clauses and the use of infinitive clauses) of Biber et al.'s model thus confirming Biber et al.'s (2011) hypothesis that places these three features among the last grammatical features to be acquired.

In addition, this study has shown a significant relationship between two features, predicted to emerge in the fifth stage of Biber et al.'s model (prepositions + ing clauses and noun complement clauses) with high-rated essays, providing further evidence for Biber et al.'s developmental hypothesis.

7. Conclusions and pedagogical implications

This study has examined syntactic development in the academic writing of advanced college students over one semester of instruction. In this study, both holistic and specific measures provided insights into the development of L2 writing complexity and the differences between high-and low-rated papers.

Our results point to a significant increase in coordination, clausal and phrasal elaboration, at the expense of subordination, providing only partial support to Norris and Ortega´s (2009) developmental model of syntactic complexity.

Regarding the distributional patterns of noun modifiers, our study has shown a preference for attributive adjectives and nouns as noun pre-modifiers, the adjective/noun sequences as pre-modifiers, and prepositional phrases as post-modifiers, confirming previous studies` conclusions that these three kinds of noun modifiers greatly characterise written academic English.

The comparison of the use of the most common patterns of phrasal modification before and after the period of instruction confirms Biber et al.'s (2011) hypothesised developmental stages for noun phrase modification. Our findings suggest a tendency towards greater use of more complex phrasal constructions by more experienced writers.

Overall, these results underscore the importance of syntactic complexity, particularly nominal complexity in producing successful academic writing. The measures of linguistic complexity used in this study suggest ways of handling the challenge of measuring short-term improvements in L2 writing proficiency, of interest to teachers interested in identifying appropriate complexity measures for their specific contexts and ends.

Our findings also highlight the pedagogical attention that should be paid to the production and meaning of phrasal structures in EAP courses and in L2 English writing instruction in general. Teachers´ understanding of the developmental stages L2 writers of academic English follow in their learning process may provide them with valuable insight into weak areas and may lead them to design and implement appropriate writing programmes.

We believe that L2 writers are likely to benefit from an increased awareness of the appropriateness and functions of particular complex structures, specifically of noun phrases in academic writing, as this study's findings reveal noun phrase complexity to be a relevant characteristic of English academic writing. In our view such instruction could draw on both explicit instruction of the linguistic options available to learners in constructing noun phrases and, as Casal and Lee (2019: 60) suggest, "discourse-based examination of noun phrases in authentic writing, thus targeting students' ability to produce complex structures as well as raising their awareness of how and why a writer may choose to do so".

While this study sought to pursue a multidimensional approach to syntactic complexity and utilize both holistic and specific measures of syntactic complexity in the analysis of L2 English writing in an EAP course, a few limitations exist. First, the period of instruction was short and second the number of students was small. Future research, therefore, could conduct

similar analyses using a larger corpus over a longer period of time. This may allow us to support the developmental path revealed in this work and contribute to a better understanding of the developmental path L2 writers follow in their search for English writing proficiency.

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