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Lexical complexity of academic presentations

Similarities despite situational differences

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The present study examined the lexical complexity profiles of academic presentations of three groups of university students ($N=93$) – native English speaking, English as a second language, and English as a lingua franca users. It adopted a notion of lexical complexity which includes lexical diversity, lexical density, and lexical sophistication as main dimensions of the framework. The study aimed at finding out how the three academically similar groups of presenters compared on their lexical complexity choices, what the lexical complexity profiles of high quality students' academic presentations looked like, and whether we can identify variables that contribute to the overall lexical complexity of presentations given by each group in a unique way. The findings revealed overwhelming similarities across the three groups of presenters and also suggested that the three dimensional framework provides a holistic picture of the lexical complexity for various groups of English for academic purposes presenters.

Keywords: academic presentations, ELF in academic settings, oral academic discourse, EAP, lexical complexity, lexical richness

1. Introduction

Higher education has become more internationalized than ever before. The increased availability, desirability, and opportunities for students to travel, study abroad, experience different academic cultures, and complete their education in international settings have attracted a large number of degree seeking students worldwide. For instance, according to the annual report of the Institute of International Education (Open Doors, 2017), the number of foreign students in U.S. colleges and universities has increased from 564,766 during 2005–2006 academic year to 1,078,822 in 2016–2017. Nine of the top eleven countries which contributed

the most to the U.S. international student enrollment in 2016–2017 were countries where English is not one of the national or official languages (i.e., China [32.5%], South Korea [5.4%], Saudi Arabia [4.9%], Vietnam [2.1%], Taiwan [2%], Japan [1.7%], Mexico [1.6%], Brazil [1.2%], Iran [1.2%]). As far as the choice of educational level is concerned, 2016 report of the Organisation for Economic Co-operation and Development (OECD) reveals that the proportion of international students at the highest levels of education (Master's and Doctoral level programs) is the highest. Among the OECD countries, the United States hosts the largest number of international graduate students (26% of the total), followed by the United Kingdom (15%), France (10%), Germany (10%) and Australia (8%). There are multitude of factors promoting this unprecedented increase in the global demand for tertiary education such as increased mobility, a variety of effective communication modalities, better academic, cultural, economic, and political ties between countries, transferability of degrees, affordability of tuition fees, etc. However, one of the leading motivations behind students' choices of educational destinations is the availability of a global language as the language of instruction.

Among the languages used as *lingua francas* today, English has established itself as more widely used than any other language, especially as the *lingua franca* of academia (Jenkins, 2011; Mauranen, 2012; Seidlhofer, 2011). The notion of English as a *lingua franca* (ELF) in general and its specialized uses in academic contexts have been the topic of research, discussion, and elaboration in a number of book-long publications in the last couple of decades (for more details, see Jenkins, 2007, 2014; Mauranen, 2012; Seidlhofer, 2011). Collectively, the research in this area has contributed to applied linguistics not only with raising interesting ideological, pedagogical, linguistic, and empirical questions about ELF, but also with sending an important message about its noticeable presence in today's academic world. It also seems that, over the years, the research on English as an academic *lingua franca* (EALF) has started to take a more inclusive approach towards the notion of who the EALF users are by showing interest in the native English speakers (NESs) along with the non-native English speakers (NNESs) who are using the language as a *lingua franca* in academia. Consequently, this approach gave the field a fruitful direction of exploration to uncover common features of language use across the board of speakers and environments (Mauranen, 2012).

One such useful line of research is the lexical composition of graduate students' academic presentations, specifically the aspect that Bulté and Housen (2012) refer to as lexical complexity. What places the graduate student presentation among the important and research-worthy academic genres is its central place in the network of professional development genres that students have to master during their graduate studies (Zareva, 2009a). Swales (2004) has defined this network of academic genres as 'the totality of genres available for a particular sector' (p. 22).

and the presentation plays a key role in it. For instance, students may carry out library research on a topic of interest as part of a course assignment and give a presentation to share their findings with the rest of the class. These may lead to a research proposal for a study which, later on, may form the basis of a thesis or dissertation which may further lead to a conference presentation, job talk, etc. In other words, the connections between the academic genres is intricate and multilayered and so are their linguistic features. Unfortunately, we still do not have a systematic description of EALF across various genres in terms of lexis, lexicogrammatical, phraseological, and other features to determine what the commonalities and differences are across various users of English for academic purposes (EAP) in different contexts so that, at the very least, we can appropriately address them theoretically, empirically, and pedagogically.

What makes lexical complexity of academic presentations an interesting and research-worthy aspect of investigation is its significant contribution to the informational packaging of the presentation content, the discipline-specific appropriateness of the speech act as well as the specificities of the spoken mode of delivery of academic content. That is, on the one hand, in terms of mode of delivery, the academic presentation is a largely monologic speech act. On the other hand, in terms of information background, its informational content is mostly derived from written discipline- and topic-specific academic sources. Thus, we should expect that, lexically, the presentation will share features that are both specific to written academic prose as well as to oral academic discourse. However, we know little about the extent to which these two competing driving forces (mode of delivery and information sources) influence the lexical complexity of academic presentations in general. Much less do we know about how EALF students across a variety of academic contexts reconcile them in the lexical choices of their presentations. Such an investigation will give us a glimpse into both the common lexical core as well as the lexical complexity features EAP users employ in order to display their depth of research, topic knowledge, level of professional expertise, sense of appropriateness, speaker sense of audience, etc. (McCarthy & Jarvis, 2007; Zareva, 2009b, 2012). It will also give us a better understanding of the extent to which educational context (e.g., NES dominated and ELF dominated EAP classrooms) may or may not have a specific impact on the lexical complexity of students' academic presentations.

In the rest of the paper, I will briefly discuss the notion of the EALF user based on the three-dimensional framework proposed by Mauranen (2012) to highlight the inclusive approach this line of research has taken in recent years. Next, I will elaborate on the notion of lexical complexity (Bulté & Housen, 2012) adopted in this study to bring to the fore the multifaceted nature of the concept from a theoretical, observational, and operational points of view. I will also address the main

considerations that were kept in mind in the choice of different measures used in the study to capture each of the dimensions of lexical complexity. Finally, the study itself will look comparatively into the lexical complexity of the presentations of three groups of graduate students (NES, ESL, and ELF) with an eye on the similarities they shared as well as whether or not each of the dimensions contributes to the overall lexical complexity profile of their presentations in a unique way.

2. Perspectives on the EALF user

To date, Mauranen (2012) has offered the most elaborate descriptions of ELF in academic contexts from three perspectives – the cognitive, macrosocial, and microsocial – which she sees as interconnected. From a cognitive perspective, ‘the individual takes center stage, along with some basic issues of online processing’ (Mauranen, 2012, p.36) concerning main usage-related processes such as entrenchment and abstraction, which are cumulative and deeply engrained in one’s experience with languages. In discipline-specific contexts, bilingual or multilingual language users usually share the majority of their conceptual representations across their language repertoires. However, there may also be instances that may be specific to only one of their languages and not used as input to generate messages in any of the other language/s. For instance, let’s consider a scenario where an L1 user of Ukrainian had studied statistics only in English (as one of her subsequent languages) but has to discuss a complex statistical analysis in Ukrainian at a research symposium. In such a scenario, chances are that she may not be completely discipline-appropriate in terms of her L1 lexical choices without having, at minimum, acquainted herself with statistics-specific vocabulary in Ukrainian as her conceptual and/or discipline-specific lexical representations may not be shared across her language repertoires. Needless to say, it is more complicated than that but, keeping in mind that language users’ repertoires are dynamic, cumulative, and changing, it would be valuable to try to disentangle the situational effects (i.e. NES or ELF dominated contexts) from the discipline-specific ones and their impact on academic speech and/or writing. Such line of inquiry will give us a better sense of whether these effects are in competition or whether they contribute to the success of EALF usage in certain ways.

From a macrosocial perspective, international higher education programs are communities of practice where international and local students and instructors communicate, collaborate, and work together in shared disciplinary spaces, discourses, and networks that are not only multilingual in terms of membership but are also multilingual in terms of professional resources and expertise. In other words, in higher education, not only do students, instructors, and other

community of practice members with different L1 backgrounds use EALF to accomplish common goals but they also draw from increasingly internationalized publication and scholarship databases, academic sources and resources to shape their professional outlook and growth. In this regard, several scholars (e.g., Mauranen, 2012; Mauranen, Hynninen, & Ranta, 2010) have rightly advocated for a broader understanding of EALF as one that includes NESs as participants in EALF communication not only because all novices in higher education 'undergo secondary socialization into academic discourses, regardless of their linguistic background' (Mauranen et al., 2010, p.184), but also because contemporary discipline-specific discourse communities are inherently driven by the networks of speakers involved in joint activities, including NES. Thus, the macrosocial perspective on EALF affords us an opportunity to find out whether various aspects of speakers' otherwise linguistically hybrid repertoires tend to diverge or converge in various EALF settings.

The third angle to the analysis and description of ELF, and EALF in particular, proposed by Mauranen (2012) is the microsocial perspective – i.e. the immediate environment where meaning is constructed, knowledge is shared, linguistic influences are commonly experienced and passed on while complex academic tasks are accomplished. Higher education classrooms, especially post-graduate education in internationalized programs worldwide, are prime examples of the value of having a lingua franca that allows skilled individuals to experience academic knowledge, new disciplines, different schools of thought, and professional enrichment on an unprecedented scale. They are also prime examples of microsocial contexts that are organized around disciplinary knowledge and ways of constructing and disseminating that knowledge where EALF users have to attend simultaneously to a complex web of events.

Surprisingly, though, the stance towards who can and cannot be considered a "legitimate" EALF user still seems to be somewhat ambivalent. On the one hand, the idea that 'there are no native speakers of *academic* language' (Mauranen et al., 2010, p. 184, emphasis in original; Mauranen, 2012, p. 69, emphasis in original) has strongly resonated with many researchers, especially with those interested in language use for academic purposes. On the other hand, in situations where ELF students are described as proficient users of English in academic contexts based on a proficiency test (requiring a proficiency test is a common admission practice of many English-based degree programs worldwide not just in English speaking countries), the attitude seems to be that there is hardly 'anything about their use of English that reflects "ELFness"' (Jenkins, 2014, p. 53). Or, if NES users form the majority of a group, these cases are considered to be of 'marginal interest' to EALF 'although there is no principled basis for rejecting such instances' (Mauranen, 2012, p. 9). Even though, much work has been done on operationalizing the

notion of the ELF user to date, it will be equally important to also operationalize theoretically and empirically the notion of the EALF user as a 'competent' and 'fluent' user (Prodromou, 2008, p.35). At minimum, such a notional clarification will help establish common ground for comparison of results across studies in this new and fast growing area of inquiry.

The position taken in this paper is the one that EALF research has currently seemed to support – i.e. EALF is a mode of communication in academic settings in which all users of English, participating in a joint academic activity, can engage regardless of L1 background or location. In the absence of much EALF research, this largely theoretical assumption will be used as a stepping stone to look comparatively at the lexical complexity features of three groups of participants' academic presentations – NES, ESL, and ELF students at several U.S. universities. The data were controlled for some influential variables that few studies take into account in their methodologies such as discipline, presentation topics, time limit, presentation word length, reported type of research, type of audience, etc. In addition to determining what the participants' lexical complexity profiles looked like, the study also aimed at identifying lexical complexity variables that would work equally consistently with groups that share disciplinary knowledge but are otherwise different in certain ways.

3. Lexical complexity: Operationalization and measurement

By and large, discussions about lexical richness commonly highlight the value of knowing more about the extent to which language users employ vocabulary that is beyond the first 2,000 most frequent words in the English language. That becomes particularly important in academic contexts where the demands for precision and disciplinary relevance are greater and more heightened than in other speaking contexts. Overall, lexical researchers unanimously agree that the first 2,000 most frequent English words, indeed, constitute the highest percentage of vocabulary used in speech and writing (e.g. Laufer & Nation, 1995; Morris & Cobb, 2004; Nation, 2001; Zareva, 2012). However, mastering several other lexical layers, including lower frequency, academic, and specialized/technical vocabulary becomes a pre-requisite for English language users to be able to put their academic knowledge on display (Nation, 2001). This realization is probably one of the main reasons why the lexical richness of students' productively used vocabulary has become an area of considerable research interest in recent years. That is, on the one hand, it indicates exposure to linguistically rich environments and, on the other, it is associated with enhanced overall language ability and literacy skills as

well as richer educational experience (Laufer & Nation, 1995; Malvern, Richards, Chipere, & Durán, 2004; Morris & Cobb, 2004).

Like other language phenomena, the notion of lexical richness has been operationalized differently in the literature and, respectively, measured and analyzed in ways that, more often than not, make it difficult to compare results across studies. The consequence of all this is that we have studies on 'lexical richness,' 'lexical variability,' 'lexical diversity,' and "lexical sophistication" with little discussions about whether or not these notions are overlapping, whether or not they represent independent aspects of a single construct, and what measures can be reliably associated with each one of them for various texts. To add to the confusion, some researchers (e.g., Kao & Wang, 2014) equate lexical richness with some of the measurements that Cobb's (2002) VocabProfile program <<http://www.lexutor.ca/vp/eng/>> can generate (e.g., the first one thousand most frequent words [1K], the second one thousand most frequent vocabulary [2K], academic word list vocabulary [AWL], type-token ratio [TTR], etc.). Others argue that the first two thousand most frequent words do not contribute to the sense of lexical richness in texts. Rather, the relative rarity of words in a text should be used as a primary indicator of richness (e.g., Vermeer, 2000). Yet others (e.g., Daller, Van Hout, & Treffers-Daller, 2003) determined the lexical richness of texts with measures such as TTR, advanced TTR, index of Guiraud and advanced index of Guiraud that are, in fact, highly correlated. In effect, these strong correlations mean that the measures are actually identical rather than independent measurements of lexical richness. Finally, some more recent models of lexical richness (e.g., Malvern et al., 2004; Read, 2000) have pointed out that it is multi-dimensional, hence, its measurement should include different lexical measures used in a complementary fashion.

The notion of lexical complexity adopted in this study is based on Bulté and Housen (2012), which largely overlaps with Read's (2000) framework of lexical richness. Bulté and Housen (2012) rightly point out that language-related complexity should be viewed from, at least, three vantage points – at a theoretical level (as a property of the cognitive system), observational level (as manifested in actual language use), and operational level (in terms of specific measures). The authors also strongly emphasized the importance of establishing clearly what complexity entails to make the contrast between complex and not complex texts as transparent as possible, which will also allow research findings across studies to be interpreted comparatively. The model of lexical complexity the researchers proposed in light of how it is manifested in actual language use (i.e. at an observational level) includes three of the subcomponents of Read's (2000) model – i.e. lexical diversity, lexical density, and lexical sophistication. The fourth sub-component Bulté and Housen (2012) suggested to be included in the analysis of lexical complexity is compositionality of words (morpheme and syllable structure) which, perhaps,

will be useful for evaluating texts produced by lower proficiency English learners or younger users but not so much for texts produced by proficient language users. Similarly to Read (2000), the authors argued that each of the sub-components can be captured by various measures some of which more stable for different text samples than others – for instance, lexical diversity can be measured by the number of word types, TTR, Guiraud Index, etc., lexical density – by the proportion of content words relative to function words or total word count, and lexical sophistication – by the proportion of less frequent words.

Over the years, there have been many discussions on concerns raised in the literature in relation to this line of investigation. Due to space constraints, I will not go into the intricate and important details and recommendations that have crystallized from those discussions. Instead, I will only briefly explain the main considerations that were kept in mind in this study with regard to the selection of specific measures to capture each dimension of lexical complexity. Meara and Bell (2001), for instance, brought up the importance of using both intrinsic and extrinsic lexical measures in evaluating the lexical profiles of texts. By and large, the intrinsic measures determine the lexical composition of texts without reference to external to the text criteria (e.g., types, tokens, TTR, etc.) while the extrinsic measures evaluate the lexical content of a text based on frequency data that are independent of the text itself (e.g., the distribution of lexis across different frequency bands, the use of academic vocabulary, etc.). Both types of measures were employed in the data analysis of this study because it was important to obtain results about the lexical complexity of the presentations that were both internal to the texts (e.g., types, tokens, lexical density) as well as results about the lexical choices the presenters made in comparison to data that were external to the texts (e.g., percentage of AWL vocabulary, lower frequency, technical and specialized vocabulary in each presentation).

Another hotly discussed issue in the lexical literature is linked to the question of what measures are more reliable and appropriate for different text lengths. A good number of recent studies (e.g., Malvern et al., 2004; McCarthy & Jarvis, 2007; Meara & Bell, 2001; Read, 2000; TreffersDaller, Parslow, & Williams, 2018) challenged the validity of some of the assumptions behind certain commonly used lexical measures and brought deeper understanding and greater clarity about the way they work on different text lengths. For instance, the lexical profile measurements were found to be stable and reliable when lexical profiling was carried out on longer texts but unstable in short texts (less than 200 words long) (e.g., Laufer & Nation, 1995; Meara & Bell, 2001). Or, as the literature on lexical diversity has pointed out (Malvern et al., 2004; McCarthy & Jarvis, 2007; Treffers-Daller, Parslow, & Williams, 2018), some lexical diversity measures like the type-token ratio (TTR) and its other related transformations critically depend on the length

of the texts included in a data set as the TTR decreases with an increase in the token count of a text. Thus, the TTRs of texts cannot be reliably compared unless the texts are standardized to have the same number of tokens, which usually means discarding data from text samples since naturally produced data never have the same number of words from text to text. Along those lines, the choice of lexical complexity measures in this study was made based on empirical evidence that the measures are stable on longer texts (range 1,000–2,000 words, which is the case in this study) and that they preserve the integrity of texts intact (for a detailed review, see McCarthy & Jarvis, 2010).

As a result of these considerations, several measures were used to capture three of the dimensions of lexical complexity proposed by Bulté and Housen (2012) – i.e. lexical diversity, lexical density, and lexical sophistication. As suggested in the literature (e.g., Bulté & Housen, 2012; Malvern et al., 2004; Read, 2000; Zareva, 2012), each of the dimensions can be evaluated by multiple measures so, for the purposes of this study a couple of measures per dimension were used, whenever possible, to find out how each of them works on the analysis of presentations given by three different groups of participants. Thus, *lexical diversity*, which refers to the variety of different words used in a text to show a range of expression (vs. a limited number of words used repetitively) was measured by (1) the number of different words in a presentation and (2) the Measure of Textual Lexical Diversity (MTLD) (for a detailed review of MTLD and how it is calculated, see McCarthy, 2005). In brief, to obtain an MTLD score, a text is kept completely intact and is evaluated sequentially multiple times as the TTR score reaches a specific default factor value (originally, the default value of .71 was selected based on evidence from the testing of various narratives and expository texts). Thus, the measure determines the number of words it takes for a text to stabilize lexically with no new vocabulary being added afterwards – so, a high MTLD score would indicate a more lexically diverse text and vice versa. *Lexical density*, which is a notion linked to the assumption that a message containing more complex information would require the use of more content words, was captured by the proportion of content words to the total number of words in a presentation. Finally, *lexical sophistication* or the use of lower frequency vocabulary that is appropriate to a discipline, genre, and topic of the produced text was evaluated based on (1) the percentage of word types from the Academic Word List (AWL) and (2) the percentage of specialized and lower frequency vocabulary in the presentations beyond the AWL.

The study investigated the following research questions:

1. How do NES, ESL, and ELF students compare on the lexical complexity of their academic presentations? Do situational differences matter in this regard?

2. Within each group, which variables associated with the three dimensions of lexical complexity describe independent aspects of the lexical complexity of the participants' academic presentations and which may be interconnected?

4. The study

4.1 Participants

This study is based on three corpora of academic presentations delivered by NES, ESL, and ELF students ($N=93$) from different disciplines, who were taking linguistics and applied linguistics courses at the time of data collection. The data were collected at four U.S. universities during regular classes in which the presentations were delivered. To ensure that the participants' welfare and rights were ethically observed, the research went through the approval process of working with human subjects as set by each institution prior to the data collection. All participants provided their informed consent to voluntarily participate in the study. A questionnaire was used to collect their demographic information.

The NES group ($n=31$) consisted of American university students (female = 23; male = 8; $M_{\text{age}} = 24.6$ years old) in Education, Applied Linguistics, and other areas in the Humanities who were seeking degrees in English literature, teacher preparation, social studies, interdisciplinary studies, or applied linguistics. This group was comprised of senior undergraduate and beginning (first term) graduate students who were all taking graduate-level courses. The term NES is used here in reference to the participants in this group to reflect their self-identification, in addition to the fact that they have completed all levels of their education in the U.S. Some of the NES participants reported previous training and/or instruction on giving academic presentations either as a course in high school or in their undergraduate studies. The NES presentations used in this study were given in NES only classes.

The ESL presenters ($n=31$) were also graduate students of both genders (female = 23; male = 8; $M_{\text{age}} = 28.8$ years old) in the same disciplines. They were grouped together because (1) they were L1 speakers of various languages (e.g., Arabic, Chinese, French, German, Japanese, Korean, etc.); (2) Before starting their graduate degrees in the U.S., they had either done most of their previous schooling in an English-speaking country (e.g., Ireland, New Zealand, Australia, USA) or had completed some levels of education in those countries (e.g., high school and/or an undergraduate degree); (3) They had spent on average about a year and a half in the U.S and had already completed between two or three semesters of their studies in their respective programs. (4) At the time of data collection, they were

in the minority (approximately 10% to 15% of all students) in the classes where their presentations were recorded – i.e., two to three students in an average class size of 19. Thus, by traditional definitions of ESL in the second language acquisition literature (e.g., Brown, 2014; Gass, Behney, & Plonsky, 2013) and the ELF literature (e.g., Jenkins, 2007) this group would be considered a group of ESL users. On average, the ESL students reported to have studied English for more than 12 years.

The ELF presenters ($n=31$, female=24; male=7; $M_{\text{age}}=25.8$ years old) came from 13 different countries – i.e. Brazil, Burkina Faso, China, Japan, Indonesia, Hong Kong, Korea, Lebanon, Morocco, Panama, Taiwan, Ukraine, Vietnam – and spoke 10 different languages. Before coming to the U.S., they had studied English through formal instruction only in their native countries. They were all in their first term of study as graduate students in the same disciplines as the other participants, which means they had spent only a couple of months in their respective programs and the USA. Their presentations were collected from a couple of classrooms where they formed the majority of the students in those classes (between 80% and 95% of all students). They self-reported no previous experience or training in giving academic presentations prior to starting their programs in the U.S.

While all participants can arguably be considered to be EALF users, they differed in some important ways such as language background and experience with English, prior experience with the educational system and their respective programs, knowledge of the cultural academic expectations, immediate discourse community, etc. Thus, the grouping reflected main situational, cultural, and educational differences which are often discussed in the ELF literature as factors that significantly impact the way social meanings and linguistic norms are co-constructed in participants' academic activities.

4.2 Data

The presentations were on topics of the presenters' choice within the content of the courses they were taking. All presentations were given to satisfy a graded course requirement and had received grades in the highest grade range. Since the presentations were like a capstone assignment for the different courses, they were scheduled towards the end of each of the terms in which they were recorded.

To keep the three data sets comparable, special attempt was made to control several variables that can potentially influence the lexical complexity of the presentations. These variables included:

1. Research type on which the presentation was based: All presentations were based on library research carried out on topics of interest to the students.

2. Topic areas: The presentations were limited to coursework typically offered to students seeking a degree or a teaching certificate in applied linguistics and TESOL.
3. Class size: The classroom audience ranged from 14 to 23 students ($M=19$).
4. Time limit: The respective instructors had typically restricted the presentation time to 15–20 minutes and the students tended to observe the time limit ($M=16.6$ min., range between 13 min. and 23 min.).
5. Based primarily on their content, all presentations were graded as high-quality presentations by the respective instructors.
6. All presentations were given extemporaneously and none of the participants self-reported to have scripted their speech in preparation for their presentation delivery.

The presentations were audio-recorded and transcribed orthographically afterwards. The data included only the participants' monologic speech.

4.3 Data analysis criteria

Oral data are not as 'clean' and 'tidy' as data produced in writing. However, it was decided not to remove any words (e.g., repetitions, fillers, etc.) or clean up the samples in any other way so that the analysis could capture features that may be typical of prepared oral academic speech but unlikely to occur in written academic prose (e.g., truncated words, hesitations, fillers, inserts, etc.).

To find out the lexical complexity of the three sets of presentations, the data we analyzed in several ways. First the presentations were run through Cobb's *VocabProfile* to obtain some of the measurements. *Vocabprofiler* (v. 4 Classic) <<http://www.lex Tutor.ca/vp/>> provides information about the frequency of several categories but, for the purposes of this study, only few of them were used and others were recalculated to take into account the specificities of the data (oral academic presentations) and the way different lexical categories were defined.

The following variables were employed as measures of lexical complexity of the participants' presentations by adopting Zareva's (2012) classification criteria:

- I. Lexical diversity
 1. number of different words (types);
 2. MTLTD (i.e. the range and diversity of vocabulary in a text).
- II. Lexical density
 1. proportion of content words in a text.
- III. Lexical sophistication
 1. percentage of word types from the AWL (e.g., *affect, communication, environment, obviously, research, processing*);

2. percentage of off-list content word types beyond the AWL vocabulary, which included:
 - a. specialized vocabulary (e.g., *accentedness*, *comprehensibility*, *intelligibility*, *pitch*, *semantically*, *suprasegmental*);
 - b. lower frequency vocabulary (e.g., *synthesis*, *anomalous*, *assertion*, *disclaimer*);
 - c. names of countries and languages (e.g., *Senegal*, *Mandarin*, *Urdu*);
 - d. proper names used as citations (e.g., *Derwing*, *Laufer*, *Likert*);
 - e. area-specific acronyms (e.g., *SLA*, *TESOL*, *ESL*, *ESP*);
 - f. foreign (or other) words used in examples (e.g., *hwaet*, *knowen*, *ich*, *nicht*).

Thus, the dimensions of lexical complexity were captured by various measurements. Some of the measures were taken as calculated by the *Vocabprofiler* (e.g., total number of words, number of different words, percentage of word types from the AWL, lexical density). Other measures, such as percentage of off-list content word types, had to be re-calculated to exclude from the calculation word types such as inserts, fillers, hesitators, truncated words, etc. which were accounted for under this category in the *Vocabprofiler*. These included word fragments or truncated words (e.g., *depen-* [for *dependent*], *int-* [for *intrinsic*]); mispronunciation of words (e.g., *Alabic* [for *Arabic*], *blain* [for *brain*]); hesitations and fillers (e.g., *um*, *ah*, *ts*, *like*); lexicalized phonological reductions (e.g., *cuz*, *gonna*, *wanna*, *kinda*, *sorta*); inserts (e.g., *okay*, *yeah*, *mhmh*). More details about obtaining MTLD values can be found in McCarthy (2005) and McCarthy and Jarvis (2010).

5. Results

To find out how the presentations delivered by NES, ESL, and ELF participants compared with regard to the different lexical measures used in the study, a MANOVA was conducted with group as an independent variable and the lexical measurements as dependent variables. Additionally, to determine whether or not the presentations were of similar length across the three groups, they were compared on the total number of words (tokens). Means and standard deviations are presented in Table 1.

The results showed overwhelming similarities between the three groups along most lexical complexity measures. There were no significant differences ($p > .05$) between the three groups in the word length of the presentations, the presenters' use of different words (types), the relative share of different AWL, the presentations' lexical density, and diversity (MTLD). The only differences that were found

Table 1. Means and standard deviations of the NES, ESL, and ELF lexical measures used in the study

Lexical measures	NES (<i>n</i> = 31)		ESL (<i>n</i> = 31)		ELF (<i>n</i> = 31)	
	Mean	SD	Mean	SD	Mean	SD
Number of words (tokens)	2,096	482	2,035	360	2,037	378
Number of different words (types)	506	93	473	82	472	83
MTLD	36.9	4.11	33.69	6.51	37.66	10.03
Lexical density	0.49	0.02	0.5	0.03	0.51	0.03
% AWL word types	5.98	2.49	5.96	2.57	7.96	6.7
% off-list content word types	5.84	1.99	7.37	3.74	8.22	4.08

to be statistically significant were related to participants' use of off-list content word types, $F(2, 90) = 3.916$, $p < .05$, partial $\eta^2 = .08$. The pairwise comparisons revealed that the only noticeable difference was between ELF and NES students, $M = 2.38$, 95% CI [.278, 4.491]. The ESL presenters did not noticeably differ either from the NES or the ELF users on any of the other lexical complexity variables.

To find out which variables associated with the three subcomponents of lexical complexity – i.e. lexical diversity, lexical density, and lexical sophistication – described unique aspects of the NES, ESL, and ELF presentations, bivariate Pearson correlations were computed for each group. Using the Bonferoni approach to control for Type I error across the five variables, a p -value of less than .01 ($.05/5 = .01$) was required for significance. There were no significant correlations in the NES data suggesting that each of the variables captured an independent aspect of lexical complexity among the NES presentations.

The only significant correlation in the ESL and ELF data was found between percentage of AWL types and MTLD. For the ESL group the strength of the relationship was moderately weak ($r = .566$, $p < .001$). Similar moderately weak relationship was found for the ELF users ($r = .513$, $p < .001$). The more interesting finding, however, is that the rest of the lexical measures provided independent measurements of the lexical complexity of both the ESL and ELF presenters. This implies that most of the chosen variables add to the overall lexical complexity profile of NES, ESL, and ELF presenters in a unique way. The implications of this finding will be discussed in the following section.

6. Discussion

The present study set out to examine the lexical complexity of graduate NES, ESL and ELF academic presentations delivered by students who were seeking

degrees in Education, Applied Linguistics, and other areas in the Humanities at several U.S. universities. It is not unusual in some areas of study in the USA and other Anglophone countries, especially in graduate programs, to have classes in which the international students from non-English speaking countries comprise the overall majority. This means that the students in such classes are surrounded by, have to accommodate, and have to accommodate to not only other users of non-native Englishes, but they also experience different native varieties of English inside and outside their academic studies. Given that the research on ELF in academic settings is still in its beginnings, it was of interest to find out how the three groups of presenters compared on the lexical complexity of their prepared oral discourse despite the situational differences among them and their differing academic experiences. To my knowledge, such a comparison has not been discussed in the literature to date. Yet, I believe it will be useful to determine whether ELF users differ in this regard from the more traditionally discussed NES and ESL users in academic settings in the context of a specific academic genre.

In the absence of prior research, one of the most interesting findings was that the three groups shared overwhelming similarities along the three dimensional framework of lexical complexity used in the study. These similarities suggested that, regardless of presenters' native language, contexts of previous educational experience, and microsocial contexts at the time of their presentation delivery, their presentations shared a similar amount of different vocabulary and similar number of words to reach a point of text stabilization. On average, the presenters used between 472 and 506 different words (types) of which between 80.5% and 82.5% were high frequency content and function words (1K and 2K words), which leaves less than 20% to different vocabulary associated with the lower frequency bands. The high percentage of high frequency vocabulary comes to confirm what other researchers have previously established in academic writing and speech – i.e. that high frequency vocabulary in the 1K and 2K ranges provides the greatest word coverage of texts (Laufer & Nation, 1995; Morris & Cobb, 2004; Nation, 2001; Treffers-Daller et al., 2018; Zareva, 2012). However, mastering the lower frequency lexical layers, including academic, specialized and technical vocabulary, should be seen as a pre-requisite for EAP users to be able to put their academic knowledge on display (Morris & Cobb, 2004; Nation, 2001) in contexts where the demands for precision and disciplinary relevance are high (Zareva, 2012).

The second measure of lexical diversity – MTLTD – was used to determine the lexical diversity value of the presentations in terms of the average number of words required for a text to reach a point of stabilization beyond which neither additional repeated words nor the introduction of new word types would affect significantly its TTR (McCarthy & Jarvis, 2010). Thus, in general, the fewer words it takes to reach the point of text stabilization, the less diverse a text is in terms of

sequential use of lexis. Overall, the results from this study showed that, on average, it took all presenters between 34 and 38 words to reach the point of text stabilization. This MTLTD score range is much lower than the MTLTD values found in proficient NNES writing (e.g., Treffers-Daller et al., 2018 found 88.47 for C1-level and 93.84 for C2-level NNES writers) which sets the academic presentation apart from written academic discourse in this regard. Beyond this general conclusion, though, it is difficult to interpret the results in terms of whether the obtained MTLTD values show that the language used by the presenters is lexically diverse or not in comparison to other presentation studies or other oral academic genres. To my knowledge, the only other research that the results of the present study are comparable to is Zareva's (2012) research which found similar MTLTD values (range 33 – 37) for the NES and NNES presenters.

In a nutshell, the much lower MTLTD range of the presentations, compared to written texts, as well as the relatively small number of different words in the presentations suggest that all presenters, regardless of group affiliation, were most probably not striving for lexical diversity in their delivery. Rather, recycling the same vocabulary frequently seemed to serve the purpose of getting across their content point well, especially under the cognitive pressures of online processing for both presenters and listeners. In that sense, it is highly possible that the NES, ESL, and ELF users made similar low diversity lexical choices as an accommodation strategy to aid the processing needs of their audience as well as their own online production of informationally complex content.

Another lexical domain of similarities among the NES, ESL, and ELF participants was the lexical density of their presentations. On average, the proportion of content words (in tokens) in the presentations ranged between .49 and .50 and was similar to the proportion of content words found in other studies involving proficient EAP users (e.g., Kao & Wang, 2014; Zareva, 2012). What seems to be more interesting, though, is that the range of lexical density found for the presentations puts it closer to the lexical density of written texts, especially narrative and expository texts, rather than to spoken monologues (e.g., Morris & Cobb, 2004; Ure, 1971). This implies that, in terms of lexical density, the presenters in this study were aware that academic presentations in specialized areas should be as dense in content vocabulary as academic writing in order to effectively convey complex discipline-specific content (if not even denser given that the total number of words in presentations also includes various dysfluencies that are not found in writing samples).

The last dimension of lexical complexity – lexical sophistication – was captured by the percentage of different AWL words as well as the percentage of lower frequency and/or specialized content vocabulary. While all presenters employed a similar percentage of different AWL vocabulary, ranging between 5.9% and 7.9%,

the ELF presenters used a noticeably higher percentage of different lower frequency and specialized vocabulary (8.2%) compared to the NES students (5.8%). A further analysis into this subcategory of lexical sophistication within the ELF presentations revealed that the majority of the lower frequency content words (beyond the first 2K and AWL vocabulary) came from the 3K word families (e.g., *essay, cluster, catalogue, celebrate, confront, elaborate, heritage, racial, rendered, vital, etc.*) while the specialized vocabulary (e.g., *adjective, alpha, Basque, bilingual, lexical, linguistic, multilingual, noun, proficiency, segments, semester, syntactic, transcribe, tutor, verb, etc.*) was associated with the lower than the 3K frequency bands.

One possible explanation of the difference between the two groups is that the higher frequency of less common and specialized vocabulary in the ELF presentations may have been influenced by the presenters' understanding of the academic presentation as linked closely to the written sources on which the presentational content was based. For instance, Nation (2001) reported 8.5% of AWL vocabulary in written academic texts (a percentage that is close to the one the ELF presenters had in their presentations) which percentage was much higher compared to speaking, fiction, and newspaper language in his data. Another possibility is that the ELF presenters may have had a cultural frame of the academic presentation as a more formal speech act which they maintained by interspersing their speech with more specialized vocabulary. A third possibility is that they took advantage of having, at least, two specialized linguistic systems to draw upon in their prepared discourse and they used their specialized knowledge in other languages more often to illustrate linguistic phenomena in their presentations (for instance, to give examples from other languages they know). Nonetheless, the higher percentage of different lower frequency content vocabulary used by the ELF presenters did not influence the lexical diversity of their presentations which suggests that repetition of specialized vocabulary may have been one of the reasons for the differences found between the NES and ELF presenters.

The last research question addressed by the study was whether or not each dimension of lexical complexity (i.e. lexical diversity, lexical density, and lexical sophistication) and their associated measures described an independent aspect of the NES, ESL, and ELF presentations. Interestingly, as far as the NES presentations were concerned, there were no significant correlations associated with any of the measures of lexical complexity, thus, suggesting that each of the three dimensions can be considered as reflecting an independent aspect of NESs' productively used vocabulary for oral academic purposes. For the ESL and ELF presenters, there was a moderately weak correlation between their use of different AWL words and MTLTD (as one of the lexical diversity measures), suggesting that their use of different AWL vocabulary can explain between 26% and 32% (r^2) of the variance in

the number of words they employed to reach a point of text stabilization. However, no relationship was found between the AWL lexis and the presenters' use of different words (the second measure of lexical diversity) which implies that the presenters' use of AWL vocabulary contributes uniquely to their overall use of different word types in their presentations.

In a nutshell, the results from this line of analysis revealed that the three lexical dimensions and the measures associated with them are, for the most part, independent of each other. Consequently, this further suggests that each dimension should be approached individually in research and in teaching because, only in their totality, can we have a holistic picture of the lexical complexity of a given oral or written text. The results also provided some evidence that the three groups of EAP users who are traditionally discussed as "different," usually based on a certain norm-providing yardstick, were found to be very similar in the lexical complexity of their prepared oral discourse. Even though the study was limited in some ways – for instance, its scope in terms of genre was limited to the genre of academic presentations and in just one area of presenters' specialized competence – it is hoped to be seen as a step in the right direction to unveil similarities in EALP contexts along with differences whenever such exist.

7. Conclusion

Academic genres are highly specialized and one of the main goals of applied linguistic research into specialized language use is to describe and uncover its intricacies (Mauranen, 2012) so that the field can move forward in the direction of useful theoretical, empirical, and practical applications of its discoveries. The present study examined the lexical complexity of three groups of student presenters – NES, ESL, and ELF – who differed in a number of situational characteristics, but who shared a common academic purpose of completing their academic programs of study. They also shared a common goal of growing professionally by successfully participating in the discipline-specific knowledge construction of their discourse communities. In the absence of much research on the EALF lexicon, one of the primary goals of the present study was to determine what the lexical complexity profiles of academic presentations of NES, ESL, and ELF users looked like and how the three groups of presenters compared.

By and large, comparative studies of proficient EAP users seem to be much less frequently carried out than studies comparing linguistically unequal language users (e.g., NES and English language learners). Additionally, research that does not demonstrate differences across groups does not seem to enjoy the same popularity in our field, compared to studies that reveal or confirm differences. This, in

turn, has resulted in creating the misleading impression that NNES participants have linguistic 'imperfections' or 'deficiencies' in merely all aspects of their L2 use, which noticeably set them apart from the norm-providing NES users (Mauranen, 2012; Prodromou, 2008; Zareva, 2012). While native-centric authenticity has been recently challenged on many fronts, studies involving authentic language use of equally subject-area competent and proficient language users have the potential to redefine the notions of 'authenticity,' especially in academic contexts.

The present study compared three academically similar groups of participants and revealed overwhelming similarities across the three groups despite differences in their L1 backgrounds, context-related situational differences of the discourse, and composition of their immediate discourse communities. In a nutshell, the participants recycled about four times the same vocabulary in their presentations and they reached a point of lexical stabilization within a relatively short range of sequentially used words, compared to academic writing. To convey the complex content of their research in a discipline-appropriate manner, they employed a relatively high density of content vocabulary as well as about 6% to 8% of academic vocabulary and another 6% to 8% of technical and discipline-specific vocabulary. Thus, it seems that their lexical variability was mostly influenced by the oral mode of delivery of their presentations, while their lexical density and sophistication were closer to values obtained for written academic prose. The correlational analysis revealed that the three dimensions of the lexical complexity framework used in the study – i.e. lexical diversity, lexical density, and lexical sophistication – are, indeed, largely independent aspects of the participants' lexical repertoires.

Pedagogically, the results of the study can be used as guiding baselines for developing EALF students' EAP lexical repertoires for presentation purposes since the presentations included in the data analysis were graded as high quality ones. The findings can also be employed to raise students' awareness of what counts as lexically complex and encourage them to monitor this aspect of their academic speech and writing in practical terms. Equally importantly, considering that the three lexical complexity dimensions are relatively independent of one another, this further suggests that the students' learning effort should be directed to each one of them individually because developing, for instance, only one of the dimensions will not have noticeable benefits for the others.

Relating the findings to Mauranen's (2012) framework for analyzing ELF in academic context, it seemed that the ELF participants adapted their lexical complexity choices to the demands of the academic presentation task in a way that is similar to the more frequently and commonly compared groups of NES and ESL users. For all novice graduate students, giving an academic presentation is cognitively, intellectually, and academically demanding task and the ELF and ESL users attended to it as efficiently as the NES participants. Perhaps, the academic set-

ting itself, the shared awareness of the demands of the task at hand, as well as the presenters' discipline specific knowledge of appropriateness are factors that override traditional distinctions maintained about groups of uses, like NES, ESL, and ELF. It is also possible to conclude that, from a macrosocial point of view, the lexical complexity of the ELF participants' otherwise linguistically hybrid vocabulary repertoires tended to converge in the context of the academic presentation which was probably prompted by their shared knowledge system and awareness of discourse appropriateness and acceptability within the genre. From a microsocial point of view, the ELF presenters, like the other participants in the study, had to attend simultaneously to a range of complex extralinguistic events, content-related matters, interactional matters, etc. and they seemed to respond lexically to the pressures of the task at hand in ways that were similar to the NES and ESL users' lexical complexity choices.

On a final note, if the ultimate goal of applied linguistics research is to identify 'criteria for expert use of language like English in different cultural contexts' (McCarthy, 2001, p. 141), this study has offered some evidence regarding the lexical complexity profiles of what we can consider three comparable 'expert' groups of users. My hope is that future discussions of the linguistic characteristics of ELF in academic settings will embrace similarities to other EAP users alongside any peculiarities that research may uncover in various settings – that will allow us to separate 'the wheat from the chaff' theoretically, empirically, linguistically, and pedagogically.

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