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Linguistic discourse analysis of the lexico-grammatical features of moves in the research abstracts of medical students in a Ghanaian university

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Abstract

Writing a quality research abstract is crucial for a scholarly report. An abstract should be informational and lexically dense, be formal, and have a professional tone. This requires precision, objectivity, logicality, technicality, and comprehensiveness. However, writing a good research abstract is a hurdle for novice and inexperienced undergraduate students who study English as a second language worldwide. This study investigated the research abstracts written by undergraduate medical students who also studied the English language at the University of Health and Allied Sciences in Ho, Ghana. A qualitative–quantitative approach, guided by Hyland's five-move model, was used to analyse the lexico-grammatical features in the rhetorical moves of the research abstracts written by these students. A corpus of 23 extracts representing a quota of sample tenses, hedges, boosters, and nominalisation was analysed. The data were coded manually and presented as frequency counts and percentages in tables and graphically. The results revealed that rhetorical moves in the research abstracts written by the students were filled with simple past, simple present, and perfect tenses, alongside lexico-grammatical devices such as hedges, boosters, and nominalisation to a greater or

lesser extent. We conclude that the research abstracts follow Hyland's rhetorical five-move model, and comprise specific lexico-grammatical features. The pedagogical implications are discussed, and suggestions for future research are provided.
Keywords: research abstracts; boosters, hedges; lexico-grammatical features; nominalisation; moves; tenses

Introduction

Whether in the form of articles, theses, or dissertations, research is a required skill for students across all levels of higher education worldwide. An integral part of any of these research outputs is the abstract. Conventionally, the abstract is located at the beginning of these documents. The reason for this is the natural role that the abstract plays in all research studies: it is a summary of the full details of a research study. For this reason, the abstract typically provides brief information on the key dimensions of the research. It gives background information to a research study, identifies the research problem leading to the study, describes the methods of data collection and analysis followed, and summarises the findings. In essence, therefore, the role of the abstract is to enable a reader to get the gist of a study beforehand to enable them to determine whether it is of interest to them and worth their time to read. It is necessary, therefore, that students are taught to write abstracts that follow the conventions of academic research. It is essential that this teaching considers the different conventions of writing abstracts that are dictated by different disciplinary contexts. Not only do university students struggle with academic writing in general, but they have also been found to lack the competence required to write for the specific programmes of study in which they enrol. As a piece of academic writing, the abstract is no exception to this. In the context of Ghana specifically and other parts of the world in general, the reason for this is likely to be that the generic nature of high school education renders it incapable of preparing school leavers for the specific kind of writing required for the myriad of disciplines that higher education offers. It is necessary, therefore, and as pointed out earlier, that students are effectively socialised into discipline-specific conventions of academic writing.

It is currently common knowledge in applied linguistics circles that corpus linguistics, as opposed to intuition, is the most reliable way of determining the intricacies of discipline-specific academic writing. Corpus linguistics is a research method that enables an analysis of the nature, structure, and use of language based on a collection of texts comprising naturally occurring language use (Esimaje & Hunston, 2019; McEnery & Hardie, 2011; Meyer, 2023). Linguistic intuition is the innate ability of native speakers to effectively understand and use their language without consciously considering its grammatical or syntactical structure (Marti, 2009). The advantage that corpus linguistics has over intuition is that it is data-driven, whereas the former is reliant on how speakers of a language *think* this language functions.

Several researchers on academic genres like research articles, abstracts, and dissertations have primarily concentrated on their textual organisation and linguistic characteristics (Afful, 2016; Afful & Nartey, 2014; Alonso-Almeida, 2014; Byun, 2015; Hu & Cao, 2011; Kwary et al., 2017; Menezes, 2013; San & Tan, 2012). Some of these studies have considered the linguistic features of research article abstracts (Abarghooeinezhad & Simin, 2015; Bašić & Veselica-Majhut, 2016; Nurhayati, 2017) by examining linguistic properties such as tense, modality, hedges, and boosters (Alonso-Almeida, 2014; Kwary et al., 2017; Hu & Cao, 2011).

Although some of these studies examined the linguistic properties of research article abstracts, they were not conducted in Ghana, particularly in the setting of the present study. Further, most of the existing studies examined the linguistic properties of research article abstracts but not dissertation abstracts specifically. Moreover, only a few studies in Ghana examined lexical cohesion and the language of dissertations of both undergraduate (Afful & Nartey, 2014) and postgraduate students (Afful, 2016). Since most existing studies have not focused on lexico-grammatical properties in the research abstracts written by undergraduate students in Ghana, there is a gap in knowledge that needs filling. It is this gap that the present study sought to fill. Therefore, the current study sought to answer the following research question. What lexico-grammatical features are typically characteristic of rhetorical moves in the abstracts written by undergraduate students who studied English as a second language (ESL) in the field of medicine at a Ghanaian university? Thus, the aim of the present article was a corpus-driven analysis of language in the moves of the abstracts written by undergraduate students who studied ESL in the Faculty of Medicine at the University of Health and Allied Sciences (UHAS) in Ho, Ghana. More specifically, the article aimed to identify the lexico-grammatical features that are typical of the moves evident in the abstracts of these students.

The study was undertaken against the background of the challenge that these students reportedly face in writing lexico-grammatically error-free abstracts within the disciplines offered in the faculty. The value of the study lies, in part, in the implications it has for the teaching of abstract writing to medical faculty students specifically and the lexico-grammar that gives expression to these abstracts. For the purposes of the study, the focal lexico-grammar included tense patterns, hedges, boosters, and nominalisation. As a matter of necessity, a brief exploration of the meaning of the concept of "rhetorical moves" and the lexico-grammatical features to be investigated as defining characteristics of such moves is provided in the literature review below. This is followed by a review of the methodology, findings, a discussion of these findings, and a conclusion.

Literature Review

As pointed out already, some studies have examined textual organisation and linguistic features such as tense, modality, hedges, and boosters in articles and research abstracts (Abarghooeinezhad & Simin, 2015; Afful & Nartey, 2014; Afful, 2016; Alonso-Almeida, 2014; Bašić & Veselica-Majhut, 2016; Byun, 2015; Hu & Cao, 2011; Kwary et al., 2017; Menezes, 2013; Nurhayati, 2017; San & Tan, 2012). However, these studies did not focus on the lexico-grammatical properties in the research abstracts written by undergraduate students in Ghana in particular. In order to fill that gap, a corpus-based approach is needed that would investigate the occurrence of specific lexico-grammatical features in the abstracts of undergraduate students of a faculty of medicine in the Ghanaian context. The findings of a study with such a focus would be a valuable source of instruction in focused academic literacies should the students involved be found lacking when using the required lexico-grammar to write research abstracts in the field of medicine. In the following paragraphs, we provide a review of studies that examined the rhetorical moves and some lexico-grammatical features targeted in the current study, such as the tense, hedges, boosters, and nominalisation that give disciplinary abstracts a typical identity.

Rhetorical Moves

Rhetorical moves are the discoursal or semantic units that perform different communicative functions in a genre such as the abstract (Connor et al., 2007; Esfandiari, 2014; Nwogu, 1997; Swales, 2004; Tankó, 2017; Tovar, 2020; Wannaruk & Amnuai, 2016). In other words, they are

segments of text or text frames that are linked to a writer's purpose. Both rhetorical moves and their linguistic expressions are important factors when writing research abstracts, especially for inexperienced non-native writers who have to write in English (Wannaruk & Amnuai, 2016). Hyland's (2000) model of analysing rhetorical moves specifies five basic moves for abstracts: (1) the introduction, (2) the purpose, (3) the method, (4) the product (referred to as the "findings" in the remainder of this article), and (5) the conclusion. In brief, as a move, the *introduction* functions to establish and situate the context of a study and the motivation for the research carried out for that study. The *purpose* communicates the reasons why the study was undertaken and outlines its aim(s) and objective(s). The *method* provides information on the design, procedures, and data analysis used in the study. The *results* function to communicate the outcome of the study. Finally, the *conclusion* comprises a summary of what the study found, the implications of these findings, and recommendations for policy and practice.

Lexico-Grammar

Lexico-grammar is a term used in linguistics to refer to the sentence-level features of language. Such features include vocabulary, grammar, and syntax, all of which make meaningful text production possible. In academic writing in particular, these features are not independent of each other. It is this interdependence that makes texts cohesive and coherent. In view of this understanding, Berne and Blachowicz (2008) have argued that without grammar, very little can be conveyed, and that without vocabulary, nothing can be conveyed. Clearly, then, successful academic and research writing requires a good understanding of and competence in the use of lexical and grammatical components of texts. It adds more weight to the requirement that the lexical and grammatical features of texts that are used in academic writing are specific and technical, and have higher lexical density and precision (Ranney, 2012; Scarcella, 2003; Schleppegrell, 2001). This means that if students and scholars are to write effective and communicative academic and research documents, their level of competence in the use of lexico-grammatical features should meet the required standard. According to this premise, and in the section below, we first review the literature on the lexico-grammatical characteristics of academic and research writing, particularly those of articles and research abstracts. As pointed out earlier, the lexico-grammar that is the particular focus in this article includes tense, hedges, boosters, and nominalisation.

Tense in the Moves of Research Abstracts

It is evident in the literature on the grammar of research texts that the present tense, past tense, and perfect tense predominantly feature across moves in abstracts across disciplines in general. Several studies (e.g., Abarghooeinezhad & Simin, 2015; Chalak & Norouzi, 2013; Doró, 2014; Gerbert, 1970; Gledhill, 2009; Hanidar, 2016; Khany & Malmir, 2019; Nurhayati, 2017; Pho, 2008; Tankó, 2017; Tseng, 2011; Wang & Tu, 2014) cite the simple past tense as the most frequently occurring tense in abstracts, followed by the simple present and perfect tense, with the rest of the other tenses showing fewer occurrences. In line with this finding, for instance, Tseng (2011) reported that scholars in applied linguistics use the past tense more frequently to state the results of a study. Similarly, a study by Nurhayati (2017) on tense patterns in the abstracts published in English as a foreign language journals, found that the past tense was used more frequently in the methods move. This can be explained by the writers' preference to attempt to depersonalise information and make their tone more academic and professional when summarising how a study has been conducted (Khany & Malmir, 2019; Pho, 2008; Tankó, 2017; Tseng, 2011). A study by Hanidar (2016) revealed that, generally, the past tense and active voice dominated medical abstracts. This can be accounted for by the fact that the past

tense is a linguistic feature that typically characterises expository texts. On the contrary, a low frequency of occurrence of this tense is a typical feature of event-oriented, static, descriptive discourse (Biber, 1988).

It is clear from the literature on the lexico-grammar of research texts that the present tense is commonly used to conclude a study: this is the case for the findings and the implications. This shows that, predominantly, writers use the simple present tense and active voice to present and summarize the main findings of a study. This is contrary to Nurhayati's (2017) revelation that the present tense is mostly also used in the introduction, purpose, method, product, and conclusion moves. A related finding is that the present tense is usually used in presenting definitions, descriptions, and observations; the perfect tense is mostly used in describing research processes (Gerbert, 1970); and the present perfect is commonly used to give information regarding the background to indicate the influence of previous research on a study.

Hedging Devices in Research Abstracts

Hedges are linguistic devices used by writers to indicate their intention to withhold complete commitment to a proposition and a reluctance to present or evaluate propositional content categorically (Gillaerts & Van de Velde, 2010). Hedging devices include modals of possibility (e.g., "may"), adverbs (for example, "often"), modal adverbs (e.g., "possibly", "perhaps", and "conceivably"), adjectives (e.g., "possible"), introductory verbs (e.g., "seem", "tend", "look like", "appear to be", "think", "believe", "doubt", "be sure", "indicate", and "suggest"), lexical verbs (e.g., "believe", "assume", and "suggest"), and nouns (e.g., "tendency"). Gillaerts and Van de Velde (2010) argued that writers are more likely to use hedging devices while making controversial claims which might need more negotiation between the writer and reader, which makes it necessary for the former to avoid full commitment to their claims and to leave room for alternative views (Gillaerts & Van de Velde, 2010; Hyland, 2004). These devices are commonly used when stating research gaps and summarising the research conclusions (Gillaerts & Van de Velde, 2010; Hyland, 2004). In other words, hedging devices are used by writers when stating the gap informing a research study so that they can soften the negative effect of the gap statement. An example is the use of the phrase, "this phenomenon is less fully researched."

Boosters in Research Abstracts

Boosters are metadiscursive devices that allow writers to express their certainty in what they say and to mark involvement with the topic and solidarity with their audience (Gillaerts & Van de Velde, 2010; Hyland, 2004; Serholt, 2012). Boosters typically take the form of evaluative adjectives (e.g., "critical", "positive", "possible", "significant", and "key"), adverbs (e.g., "significantly", "positively", "primarily", "largely", "definitely", "absolutely", "certainly", and "firmly"), verbs (e.g., "support", "improve", "benefit", "reinforce", and "tend"), and nouns (e.g., "tendency"). Boosters and attitude markers feature prominently in abstracts because of their promotional function and advertising nature (Gillaerts & Van de Velde, 2010). They are mostly used in the description of the research area, reviews of the existing literature that is relevant to a study, and summaries of the findings of a study in comparison with other highlights of relevance to the study being undertaken. Boosters appear more frequently in the introduction and discussion section of research abstracts (Serholt, 2012).

Nominalisation in Research Abstracts

Nominalisation involves the use of verbs or adjectives as nouns. Words and suffixes that end in *-ment, -ion, -sion, -ness, -ence, -ance, -ity, -ent, -ant,* and *-ancy* are a typical outcome of nominalisation. For example, "interference" is a nominalisation of the verb "interfere," "decision"

is a nominalisation of the verb "decide," "assumption" is a nominalisation of "assume", and "argument" is a nominalisation of "argue." Through nominalisation, processes (linguistically realised as verbs) and properties (linguistically realised, in general, as adjectives) are reconstrued metaphorically as nouns, enabling an informationally dense discourse. This enables authors to build chains or sequences of logical arguments (Halliday, 2008). Nominalisation is a distinctive feature of abstracts, the necessity for which is created by the informationally dense nature of the text in abstracts (Halliday, 2004a, 2004b, 2004c, 2008; Halliday & Martin, 1993). Given the varying degrees of length restriction applicable to the two, nominalisation tends to be more of a feature of abstracts and not that of the particular research document in which the abstract appears. This does not exempt the latter from nominalisation as one of its defining characteristics. As Biber (1988) pointed out, coupled with the use of passives, nominalisations are a characteristic of expository texts because of their highly dense informational discourse.

Theoretical Underpinnings

The study was underpinned by the theory of "academic literacies" as opposed to its counterpart, the generic or singular view of the notion of "academic literacy". The theory of academic literacies is a framework that examines students' writing and learning in higher education, highlighting the interconnectedness of language, learning, power, and ideology, recognising their deep-rootedness in academic disciplines (Lea & Street, 2006; Paré, 2014; Wrigglesworth, 2019). Both these concepts are founded on the understanding that students need a required level of competence in the kind of discourse(s) that they encounter in their studies at university in order for them to succeed. The difference between the two, however, is that, as its name implies, the former involves a nuanced approach to defining the discourses, whereas the latter approaches it as a singular and one-size-fits-all phenomenon. In essence, the "literacies" approach emphasises the need to acknowledge the different disciplinary contexts in which competence to cope with the discourse of academic education manifests and the impact of these contexts on how the literacies required for successful academic performance should be defined. The discipline-driven view of literacy suggests that students in electrical or mechanical engineering, for example, should be proficient in the specific language and communication standards for academic success in those disciplines. This competence, the literacies theory further maintains, might not necessarily be the same, partly or wholly, for students in the biomedical sciences, for example. While it is unlikely that there will be no overlaps between the literacies required for different disciplines, it is indisputable that determining the specific needs of students in such disciplines and designing instruction in accordance with the outcome of this nuanced analysis of needs is the most logical approach to embrace. In the words of Jacobs (2013), the literacies approach focuses on "what counts as knowledge in the discipline, and then making explicit for students the principles through which new knowledge is created" (p. 132). Similarly, Lea and Street (2006) have argued that optimal engagement with academic education requires students to be familiar with and competent in "a variety of communicative practices, including genres, fields and disciplines" (p. 159). This is where the current study fits.

Methods

Research Design

The study employed a mixed-methods research design, rooted in pragmatism. Pragmatism is a blend of quantitative and qualitative research approaches (Alharahsheh & Pius, 2020). This study utilised a linguistic analysis supported by Hyland's (2000) model to determine the frequency of lexico-grammatical features in the research abstracts written by undergraduate students of UHAS. Hyland's model was chosen for its clarity in the way it documents the

relationships among the lexico-grammatical features in the rhetorical moves of research abstracts. To this end, the data analysis employed for this study involved a qualitative and quantitative determination of the occurrence of the lexico-grammatical features that were identified earlier in this article.

The Sample for Analysis

The sample for the analysis was a corpus of 50 research abstracts written by undergraduate medical students who studied in ESL at the UHAS in Ho, Ghana. The choice and inclusion of this corpus of abstracts in the study were based on our assumption that undergraduate medical students are novice and inexperienced writers who study in ESL. Again, to the best of our knowledge, there is no existing corpus for the analysis of lexico-grammar features in the research abstracts written by undergraduate students in Ghana. Hence, this study excluded and did not cover article abstracts published in high-quality medical science journals. Of the 50 research abstracts, 23 extracts were analysed to determine the frequency of tenses, hedges, boosters, and nominalisation. These features were coded manually and presented as frequency counts and percentages in tables and graphically in this article.

Data Analysis

The present study employed conventional methods of qualitative coding to ensure the validity, reliability, and trustworthiness of the results (Mackey & Gass, 2015). Firstly, the researchers performed pre-coding, which involved carefully reading and re-reading the abstracts and extracts, reflecting on them, and noting down the lexico-grammatical properties in the rhetorical moves to be analysed. After pre-coding, we (the researchers) performed the actual coding, which involved highlighting portions of the texts and labelling them in a way that allowed easy identification, retrieval, and grouping of the lexico-grammatical features. This was done by applying multicoloured highlighters to hard copies of the abstracts and excerpts, using a coding scheme derived from the literature (Al-Khasawneh, 2017; Menezes, 2013). The coding scheme was first piloted on samples of the abstracts. The piloting allowed the researchers to modify the coding scheme if it appeared to be inadequate for the analysis. In addition to piloting the coding scheme, we ensured intra- and inter-coder reliability and, ultimately, the trustworthiness of the findings. Intra-coder reliability concerns the extent to which one coder assigns the same coding category to the data on different occasions. Regarding intra-coder reliability, we coded and recoded the abstracts and the extracts several times in a different random order until we were satisfied with the coding. Moreover, samples of the coded abstracts and excerpts were subjected to inter-coder reliability checks. This involved a statistical calculation of the inter-coder agreement rate. This was done by dividing the number of agreements by the total number of decisions made (Mackey & Gass, 2015). In cases of disagreements on the coding, a consensus was reached through discussion amongst the coders (that is, the researchers).

Findings

Table 1 presents the quantitative patterns of tenses in the moves in the abstracts of undergraduate medical students at UHAS.

As can be seen in Table 1 above, five tense patterns characterised the rhetorical moves found in the research abstracts of the students. Of these, the present tense dominated the introduction (62%). It is also evident that the simple present tense and present perfect tenses featured predominantly in the introductions of the research abstracts sampled for the study. Furthermore, the simple past tense clearly dominated the method (51%) and the product (29%) moves. Lastly, the past perfect and the simple past tenses mostly featured in the product

Table 1 *Patterns of tense in the rhetorical moves of research abstracts of undergraduate medical students of UHAS*

Move	Simple present	Simple past	Present perfect	Past perfect	Present continuous
Introduction	26 (62.0%)	1 (2.0%)	6 (75.0%)	0 (0.0%)	2 (100%)
Purpose	5 (11.9%)	6 (10.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Method	2 (4.7%)	30 (51.0%)	0 (0.0%)	1 (11.0%)	0 (0.0%)
Product	5 (11.9%)	17 (29.0%)	1 (12.5%)	8 (89.0%)	0 (0.0%)
Conclusion	4 (9.5%)	5 (8.0%)	1 (12.5%)	0 (0.0%)	0 (0.0%)
Total	42 (100%)	59 (100%)	8 (100%)	9 (100%)	2 (100%)

move of the research abstracts. Extracts 16, 17, and 87 are quoted verbatim from the abstracts to demonstrate the realisation of the simple present tense in the introduction move. In the following extracts, **bolded** text indicates that the simple present tense has been used in the introduction move.

> **Extract 16**
> Malaria **continues** to be endemic especially in sub-Saharan Africa; Ghana inclusive. Though there **are** several malaria programs; it **remains** endemic. Treatment **seems** very much delayed and if nothing is done about it, it **poses** a real threat to persons who **delay** seeking treatment. [MED 13].

> **Extract 17**
> Hypertension **is** one of the most common non-communicable diseases and the most common cause of morbidity and mortality in patients. Several treatment modalities **are** available to prevent complications through disease progression. However, despite these treatment modalities, hypertension still **accounts** for significant number of deaths and complications in patients. [MED 3].

> **Extract 87**
> Urethral catheterization **is** an invasive clinical procedure whereby a catheter **is** inserted into the bladder to help voiding in patients who **have** difficulty urinating. An estimation of 15% to 20% of patients **use** a catheter. Despite its benefits, there **are** several complications that **can arise** from the procedure. These complications usually **result** in poor prognosis and **impact** negatively on the treatment outcome. Urinary catheters are used in almost all the departments of a hospital and it **is** therefore essential for the catheterization procedure to be safe to minimize its associated complications. [MED].

Extracts 4, 22, and 97 below are quoted verbatim to show the dominance of the simple past tense in the purpose move of the research abstracts. Some of the underlined verbs are auxiliary verbs expressed in the simple past tense.

Extract 4
This study **was aimed** at assessing the most common diagnoses made at the Radiology Department of the Ho Teaching Hospital. [MED 19].

Extract 22
The study **sought** to determine the role of hysteroscopy in the management of uterine pathologies amongst women at Supercare Specialist Medical & Ho Fertility Centre (SUPERCARE). [MED 11].

Extract 97
This study **aimed** to evaluate the knowledge of health professionals who perform urethral catheterization and to assess immediate complications that patients experience during the catheterization process in various health facilities across the Ho Municipality. [MED].

Like the purpose, the method move of the research abstracts was also filled with the simple past tense. This is illustrated in Extracts 9, 99, and 100 below. These extracts are in the passive voice.

Extract 9
This study **used** a cross-sectional study design using quantitative research tools. A convenience sampling method **was** also **used** in selecting respondents in schools and at their homes at the time of the study. Data **obtained** from a pre-tested administered questionnaire **was analysed** using Microsoft Excel 2016, SPSS version 22 and STATA version 13.0 results **were recorded** as frequencies. Charts and tables **were** also **used** to view results comprehensively where needed. [MED 10]

Extract 99
This **was** a cross-sectional study involving a convenient sampling of patients who **had** a urethral catheter or had been catheterized urethrally in the Ho Teaching Hospital (HTH) during the period of study. A structured questionnaire **was administered** and responses **were collected, entered** and **analyzed** with SPSS version 22.0 for windows software. [MED].

Extract 100
The study **was** a cross-sectional study, and 400 students **participated** in the study**.** The study population **comprised** students of the University of Health and Allied Sciences. Percutaneous lengths of the humerus and the femur **were measured** after students' informed consent **were sought**. [MED].

As shown in Table 1 earlier, the simple past tense proved to dominate the product move of the sampled abstracts. This is illustrated in Extracts 26, 121, and 122, which are quoted verbatim below. The words underlined in these extracts are the verbs showing the simple past tense.

Extract 26
Majority of the mothers **were** between the ages of 20 and 35 (81.0%) and the mean age of the mothers **was** 28.78 (SD 5.93) years. Regarding knowledge

of the problem, 72.1% of respondents had heard of NNJ before and 62.8% **gave** a correct description of NNJ as yellowing of mucous membranes. Most mothers (79.2%) **had** inadequate knowledge on the causes of NNJ. There **were** statistically significant associations between the levels of education. [MED 16].

Extract 121

The mean (standard deviation {SD}) age of participants **was** 22 ± 3.25 years with majority (82.9%) being 18-24 years old. Of the 385 students **studied**, 281 (73%) of them ever heard of breast cancer, with the commonest source of information being the media and school teachers. With regards to knowledge of breast cancer, 365 (95%) of respondents **knew** at one risk factor, 236 (83.9%) know that family history to be a risk factor while, 176 (62.6%) know of individual lifestyle as a predictor of breast cancer. Even though more than half of the participants **were** aware of the various screening methods, 164 (42.6%) of them has ever performed Breast Self-Examination (BSE), 39 (10.1%) had ever gone for Clinical Breast Examination (CBE), 9(2.3%) had ever gone for Mammography while 173 (44.9%) of them had never been screened for breast cancer before. More than half (52.8%) of those who had ever gotten pregnant had ever induced abortion. About one quarter of the respondents had ever used hormonal contraceptives and 14.3% of them **had** a positive family history of breast cancer. Majority (28.5%) of those who had not screened for BSE **said** they **had** no reason for not performing it while 28.1% of them **said** they **did** not know how to do it. Intention to perform BSE **was** higher (85.3%) among students without family history of breast cancer compared with those with family history (76.5%). In addition, students who **perceived** themselves to be at risk of breast cancer **were** more likely (93.3%) to do BSE in the future compared with their colleagues who **did** not perceive themselves at risk (87.1 %). [MED].

Extract 122

Out of the 123 respondents, 34 (27.6%) **scored** more than 10 on EPDS which is suggestive of postpartum depression. Out of the total number of respondents, 3(50%) of the 6 mothers who **gave** birth to babies with congenital malformation **scored** more than 10 on the EPDS and **were** more likely to suffer from PPD. Other obstetrics risk factors which **yielded** recognisable but insignificant association with PPD **were** planned/unplanned pregnancy, complications with mother/baby during delivery and whether pregnancy **was wanted** or not. [MED].

Finally, Table 1 revealed that the past perfect tense was also used in the product move. Extracts 26 and 121 below help substantiate this claim.

Extract 26

Majority of the mothers were between the ages of 20 and 35 (81.0%) and the mean age of the mothers was 28.78 (SD 5.93) years. Regarding knowledge of the problem, 72.1% of respondents **had heard** of NNJ before and 62.8% gave a correct description of NNJ as yellowing of mucous membranes. Most mothers (79.2%) had inadequate knowledge on the causes of NNJ. There were statistically significant associations between the levels of education. [MED 16].

Extract 121

The mean (standard deviation {SD}) age of participants was 22 ± 3.25 years with majority (82.9%) being 18-24 years old. Of the 385 students studied, 281 (73%) of them ever heard of breast cancer, with the commonest source of information being the media and school teachers. With regards to knowledge of breast cancer, 365 (95%) of respondents knew at one risk factor, 236 (83.9%) know that family history to be a risk factor while, 176 (62.6%) know of individual lifestyle as a predictor of breast cancer. Even though more than half of the participants were aware of the various screening methods, 164 (42.6%) of them has ever performed Breast Self-Examination (BSE), 39 (10.1%) **had** ever **gone** for Clinical Breast Examination (CBE), 9(2.3%) **had** ever **gone** for Mammography while 173 (44.9%) of them **had** never **been screened** for breast cancer before. More than half (52.8%) of those who **had** ever **gotten** pregnant **had** ever **induced** abortion. About one quarter of the respondents **had** ever **used** hormonal contraceptives and 14.3% of them had a positive family history of breast cancer. Majority (28.5%) of those who **had** not **screened** for BSE said they had no reason for not performing it while 28.1% of them said they did not know how to do it. Intention to perform BSE was higher (85.3%) among students without family history of breast cancer compared with those with family history (76.5%). In addition, students who perceived themselves to be at risk of breast cancer were more likely (93.3%) to do BSE in the future compared with their colleagues who did not perceive themselves at risk (87.1 %). [MED].

In Table 2 (see p.11), the frequency of hedges, boosters, and nominalisation in the moves of the sample of abstracts written by undergraduate medical students at UHAS is quantified.

It is evident in Table 2 that hedging devices were mostly used in the introduction (43%), product (29%), and conclusion (29%) moves of the research abstracts studied. Moreover, boosters occurred mostly in the introduction (36%) and product (33%) moves. Lastly, nominalisation variably dominated the conclusion (28%), product (27%), and introduction (23%) moves. It can be concluded from the results in Table 2 that hedging devices, boosters, and nominalisation are the lexico-grammatical features that mostly dominate the introduction, product, and conclusion moves, but not the purpose and method moves of the abstracts that

Table 2 *Hedges, boosters, and nominalisation in the rhetorical moves of research abstracts of undergraduate medical students of UHAS*

Move	Hedge	Booster	Nominalisation
Introduction	3 (43.0%)	13 (36.0%)	10 (23.0%)
Purpose	0 (0.0%)	2 (6.0%)	8 (18.0%)
Method	0 (0.0%)	5 (14.0%)	3 (7.0%)
Product	2 (29.0%)	12 (33.0%)	12 (27.0%)
Conclusion	2 (29.0%)	4 (10.0%)	11 (28.0%)
Total	7 (100%)	36 (100%)	44 (100%)

were studied. However, hedging devices did not feature in the purpose and method moves, as shown in Table 2. This suggests that hedges are either less utilised or not utilised in the purpose and method moves of the abstracts. Evidence for the occurrence of hedges, boosters, and nominalisation in the abstracts is illustrated in the extracts below. Firstly, Extracts 3, 16, and 122 show evidence of hedging devices (*could, seems, can, more likely,* and *suggestive*) in the introduction, product, and conclusion moves of the abstracts:

Extract 3
Despite efforts to control under-five mortality rate over the years, Ghana's under-five mortality rate like many other low-and middle-income countries still remains high. Majority of these deaths **could** be avoided by prompt and appropriate care seeking. The health care seeking behaviour of caregivers therefore is key in controlling under-five mortality rate. [MED 6]

Extract 16
Malaria continues to be endemic especially in sub-Saharan Africa; Ghana inclusive. Though there are several malaria programs; it remains endemic. Treatment **seems** very much delayed and if nothing is done about it, it poses a real threat to persons who delay seeking treatment. [MED 13]

Extract 122
Out of the 123 respondents, 34 (27.6%) scored more than 10 on EPDS which is **suggestive** of postpartum depression. Out of the total number of respondents, 3(50%) of the 6 mothers who gave birth to babies with congenital malformation scored more than 10 on the EPDS and were **more likely** to suffer from PPD. Other obstetrics risk factors which yielded recognisable but insignificant association with PPD were planned/unplanned pregnancy, complications with mother/baby during delivery and whether pregnancy was wanted or not. [MED]

Extracts 2, 11, and 87 below attest to the use of boosters (*significant, growing, developing, invasive, optimal, lifelong, most, significantly, negatively, usually,* and *statistically*) in the introduction, product, and conclusion moves of the abstracts. As will be seen in the extracts, the boosters predominantly comprised adjectives and adverbs.

Extract 2
Hypertension, also known as high blood pressure is one of the **growing** public health concern **worldwide**. It is a **major** cause of cardiovascular disease morbidity and mortality in developing countries, Ghana inclusive. Unlike Malaria or certain acute illnesses, it is a **lifelong** non-communicable disease and hence has to be addressed with **utmost priority**. Aside lifestyle modification, keen adherence to medications is an intricate part of the management of hypertension as **optimal** blood pressure control slows down progression hence its associated complications. [MED 2]

Extract 11
About 63.57% of the hypertensive patients attending Ho Teaching Hospital had low adherence rates. Medication adherence was associated with some

demographic features such as educational level (p = 0.001), and duration of condition (p = 0.003), though not **statistically significant** males, married respondents and those 60 years and above were found to be more adherent. **Most** of the respondents 76.07% showed high knowledge level, however knowledge had no **significant** association with respondents' level of adherence. [MED 2]

Extract 87
Urethral catheterization is an invasive clinical procedure whereby a catheter is inserted into the bladder to help voiding in patients who have difficulty urinating. An estimation of 15% to 20% of patients use a catheter. Despite its benefits, there are several complications that can arise from the procedure. These complications **usually** result in poor prognosis and impacts **negatively** on the treatment outcome. Urinary catheters are used in almost all the departments of a hospital and it is therefore **essential** for the catheterization procedure to be safe to minimize its associated complications. [MED]

Lastly, the results captured in Table 2 revealed that nominalisation prominently characterised the introduction, conclusion, product, and purpose moves. It clearly was less utilised in the method and purpose moves. As explained earlier, nominalisation is a lexico-grammatical feature describing verbs or adjectives that convert to nouns and that end with suffixes such as *-tion, -sion, -ance, -ence, -ment,* and *-ent*. Extracts 2, 11, and 87 below give credence to the use of nominalisation (*modification, complication, medication, condition, estimation, catheterization, progression, adherence, adherent, management,* and *treatment*) in the rhetorical moves of research abstracts.

Extract 2
Hypertension, also known as high blood pressure is one of the growing public health concern worldwide. It is a major cause of cardiovascular disease **morbidity** and **mortality** in developing countries, Ghana inclusive. Unlike Malaria or certain acute illnesses, it is a lifelong non-communicable disease and hence has to be addressed with utmost priority. Aside lifestyle **modification**, keen **adherence** to **medications** is an intricate part of the **management** of hypertension as optimal blood pressure control slows down **progression** hence its associated **complications**. [MED 2]

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About 63.57% of the hypertensive patients attending Ho Teaching Hospital had low **adherence** rates. **Medication adherence** was associated with some demographic features such as educational level (p = 0.001), and **duration** of **condition** (p = 0.003), though not statistically significant males, married respondents and those 60 years and above were found to be more **adherent**. Most of the respondents 76.07% showed high knowledge level, however knowledge had no significant **association** with respondents' level of **adherence**. [MED 2]

Extract 87
Urethral **catheterization** is an invasive clinical procedure whereby a catheter is inserted into the bladder to help voiding in patients who have

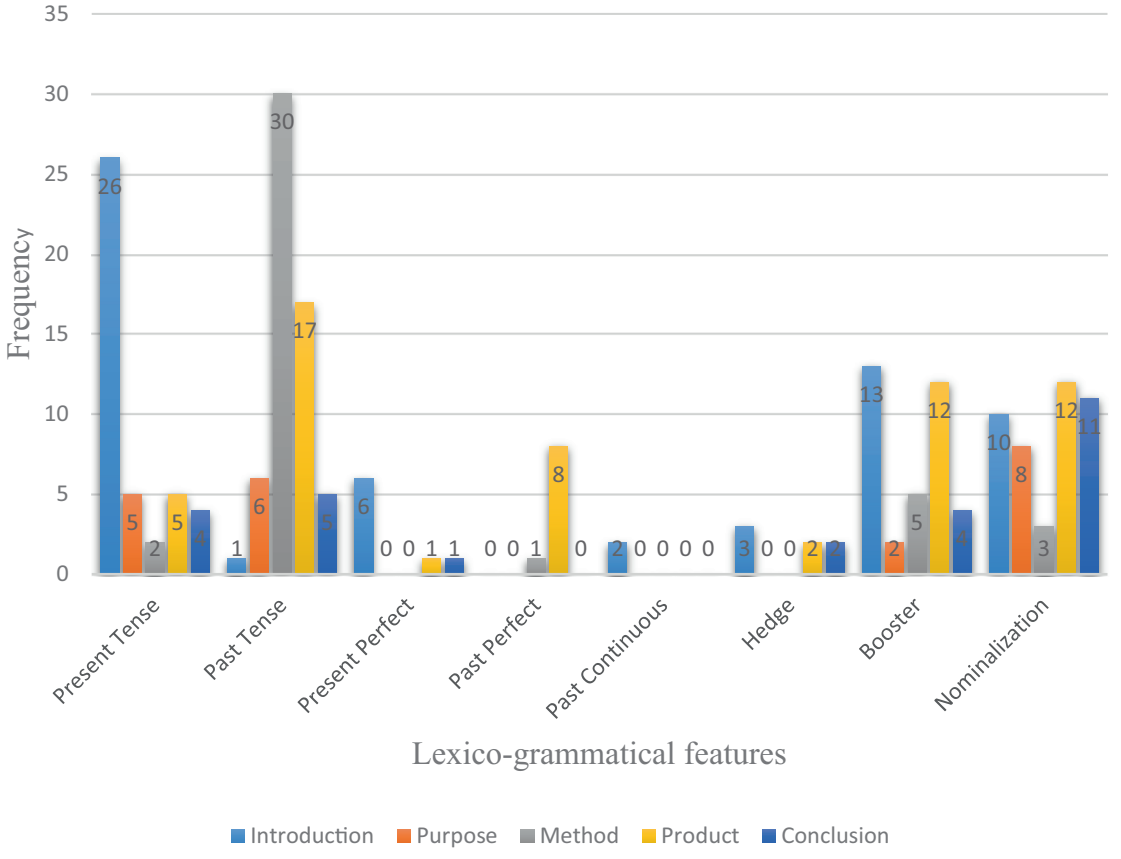

Figure 1 Lexico-grammatical features in the rhetorical moves of research abstracts.

> difficulty urinating. An **estimation** of 15% to 20% of patients use a catheter. Despite its benefits, there are several **complications** that can arise from the procedure. These **complications** usually result in poor prognosis and impacts negatively on the **treatment** outcome. Urinary catheters are used in almost all the departments of a hospital and it is therefore essential for the **catheterization** procedure to be safe to minimize its associated **complications** [MED].

In Figure 1 below, we summarise the frequency of all lexico-grammatical devices identified in the moves of the abstracts written by the group of undergraduate medical students studied in this article.

Discussion

This study sought to determine what lexico-grammatical features were typically characteristic of rhetorical moves in the abstracts written by undergraduate students who studied in ESL in the field of medicine at a Ghanaian university. The lexico-grammatical features that were found to be characteristic were the simple past tense, hedges, boosters, and nominalisation. We discuss these four in detail below.

Simple Past Tense

It was found that the simple past tense dominates rhetorical moves in the research abstracts of UHAS undergraduate medical students, followed by the simple present, past perfect, and present perfect tenses. This finding suggests that the research abstracts in medicine generally favours the use of the simple past tense more than the simple present and present perfect tenses. This finding is consistent with those of several other researchers (Abarghooeinezhad & Simin, 2015; Biber, 1988; Chalak & Norouzi, 2013; Doró, 2014; Gerbert, 1970; Gledhill, 2009; Hanidar, 2016; Khany & Malmir, 2019; Nurhayati, 2017; Pho, 2008; Salager-Meyer, 1992; Tankó, 2017, Tseng, 2011; Wang & Tu, 2014). The likely reason for this is that medicine as a field of study differs from disciplines such as engineering, biology (Hanidar, 2016), and applied linguistics (Chalak & Norouzi, 2013; Nurhayati, 2017; Wang & Tu, 2014), for example. In the latter disciplines, the simple present tense is favoured. Consistent with this finding, the study by Hanidar (2016) revealed that generally, the past tense with active voice dominated medical abstracts.

It was also evident from the results that the simple past tense mainly characterised the method, product, and purpose moves more than the others. The probable reason for this is that this tense aids academic writers make their tone more academic and professional in the effort to depersonalise the information presented. This observation buttresses the views of other researchers, who have averred that writers use this tense structure when summarising how a study was conducted in order to depersonalise the information and make their tone more academic and professional (Khany & Malmir, 2019; Nurhayati, 2017; Pho, 2008; Tankó, 2017, Tseng, 2011).

It was evident from the findings that the method move is filled with the simple past tense. The purpose of the past tense in research abstracts, particularly in the method and results (product) moves, is to explain what has been studied and how the results were obtained. As noted by Pho (2008), the use of this tense when reporting the results of a study distances the researcher from such results and thus ensures objectivity, whereas the present tense helps writers make generalisations about the results. Similarly, Tseng (2011) has argued that scholars in applied linguistics use the past tense more frequently to state the results of a study. This finding is consistent with the finding of Pho (2008), who also reported the dominance of the simple past tense rather than the simple present tense in summarising the findings of research. By nature, the past tense is a linguistic feature that is typically frequent in expository texts, since a low frequency of occurrence of this tense is expected for event-oriented, static, descriptive, or expository discourse (Biber, 1988).

Additionally, it was evident in the results that the simple past tense dominated the method move. The method move or methodology of a research abstract typically uses the past tense to report on previously conducted studies, experiments, or observed phenomena. Previous studies by Pho (2008) and Salager-Meyer (1992) cited a more frequent use of the past tense in this move. This finding is also consistent with the view of Swales and Feaks (2009) that the method move is often dominated by the past tense.

The results show, furthermore, that the simple present tense and present perfect tenses featured prominently in the introduction move. More importantly, the present tense dominated this move. This is because, in academic discourse, the introductory section is where general truths and facts are explained. The most pertinent explanation for this is that general scientific facts tend to remain constant and do not change over time. Additionally, abstracts are written in the present tense, as they focus on the author's interpretations rather than specific observations and methods. This finding corroborates the claim by Nurhayati (2017) that the present tense is mostly used in the introduction move. The dominance of the simple present tense in

the introduction move of research abstracts has further been reported by studies on research article abstracts in medicine (Salager-Meyer, 1992) as well as other disciplines such as applied linguistics (Tseng, 2011).

Hedges

This study indicated that hedging devices or hedges, as they are commonly known, featured prominently in the introduction, product, and conclusion moves in the research abstracts of novice undergraduate medical students of UHAS. There are various reasons why the writers employed hedges in the abstracts. It is likely that the authors of the sampled abstracts for this discourse employed hedges as a linguistic device to avoid taking a stance while stating the research gaps, summarising the results, making scientific arguments, and drawing conclusions. Thus, the writers used hedges to soften their statements to avoid criticism for being overconfident and flawless. Often in academic discourse, a writer may not be sure of the claims that are being made in their subject area, or perhaps the ideas are good but the evidence is not very strong. In stating the research gap in the introduction move, for instance, it is prudent to use hedges in expressing awareness of flaws. This will reduce the possibility of a writer's arguments or propositions being criticised. Similarly, using hedges in the product move and conclusion moves to summarise the findings and draw conclusions makes it much more difficult for someone, including readers with an opposing view, to argue with a statement. In brief, the authors of the sampled medical abstracts employed hedges to express the certainty and uncertainty of their scientific arguments or propositions. In academic writing, hedging is a commonly used communicative strategy to express caution or uncertainty. Hedges are employed to soften what authors say or write, contributing to an appropriate rhetorical and interactive tone, and conveying both epistemic and affective meanings. It is for this reason that the writers of medical research abstracts use hedges to soften their conclusions in research abstracts, as it is prudent to justify good scientific ideas that lack sufficient and robust evidence. Therefore, the use of hedges in academic discourse is a valuable tool to convey nuanced meanings and maintain a cautious and precise tone. This finding substantiates the views of other researchers, who claimed that hedges are mostly used while stating research gaps in the introduction and summarising research conclusions (Gillaerts & Van de Velde, 2010; Hyland, 2004). This implies that hedges mainly characterise the introduction and product moves in research abstracts. In academic discourse, hedges are a valuable tool to convey nuanced meanings and maintain a cautious tone. It is for this reason that the authors of the sampled abstracts used hedges to soften their statements while stating the research gaps in the introduction move, and thus expressing an awareness of the flaws in their claims or weak evidence. The probable reason was to avoid criticism for being overconfident and flawless. It is likely that the authors used hedges in the product and conclusion moves to summarise the findings and draw conclusions, making it difficult for readers to argue with their arguments, statements, or propositions.

Boosters

The results of this study indicated that boosters mostly occurred in the introduction and product moves in the research abstracts of novice undergraduate medical students of UHAS. This finding is in agreement with assertions by other researchers (Gillaerts & Van de Velde, 2010; Hyland, 2004; Serholt, 2012), who have indicated that boosters appear more frequently in the introduction and discussion (product) section of research abstracts. They have argued that boosters are mainly used by scholars and writers to describe the research territory, review the existing literature, and summarise the findings. They further explained that writers use boosters to express their certainty in what they say and to mark involvement with the topic.

Nominalisation

The study found that nominalisation, also referred to as nouning or grammatical metaphor, prominently characterised the conclusion, product, and purpose moves in the research abstracts of novice undergraduate medical students of UHAS. The use of nominalisation in the abstracts of medical discourses serve various communicative purposes. Writers often use this device to achieve a higher degree of abstraction, technicality, variety, objectivity, and information density. This helps to add an impersonal tone to texts and make them sound formal, objective, and information-dense. Essentially, nominalisation is used as a lexico-grammatical feature in research abstracts to condense information by expressing concepts in an incongruent form. This is very valuable in scientific registers, since it allows writers to pack, by embedding, as much information into a few words and sentences as possible. In other words, writers use nominalisation as a linguistic or language resource to embed information and express concepts in a concise and effective way (Halliday, 2008). This finding agrees with the views of other researchers (Halliday, 2004a, 2004b, 2004c; Halliday, 2008; Halliday & Martin, 1993), who stated that nominalisation provides information density in abstracts.

Conclusion

This article reported the findings of a study that investigated the lexico-grammatical devices used in the moves of research abstracts written by undergraduate medical students of the UHAS in Ho, Ghana. As stated earlier, most existing studies have not focused on lexico-grammatical properties in the research abstracts written by undergraduate students in Ghana, leaving a gap in knowledge. It is this gap that the present study sought to fill. In regards to the lexico-grammatical properties of the abstracts analysed, the results indicated that they followed the structure of five rhetorical moves proposed by Hyland (2004), and that these were realised through particular lexico-grammatical features that were configured distinctly in each of the moves. Essentially, the study found that the moves were filled with four main tenses (that is, the simple past tense, the simple present tense, and the present and past perfect tenses), with very little occurrence of other tense structures (for example, the past continuous tense). Moreover, the use of hedges, boosters, and nominalisation in the abstracts was evident. Hedging devices and nominalisation characterised the introduction, product, and conclusion moves, whereas boosters featured more prominently in the introduction and product moves. The study found a few occurrences of nominalisation in the purpose move. The contribution that the current study thus makes to the area of the literature focused on a new perspective, namely the usage of lexico-grammatical features in the rhetorical moves of research abstracts.

The study had a number of limitations. First, the study focused solely on examining the abstracts themselves, thereby missing contextual insights from the abstract writers. Had the writers of the abstracts been interviewed, for example, contextual sensibilities regarding their reasons for the linguistic or rhetorical and lexico-grammatical choices could have been revealed. Second, the sample of 50 abstracts may not be representative of all undergraduate medical students at UHAS. Despite these limitations, the findings can be generalised to specific departments at UHAS and more broadly.

In the introduction of this article, we stated that this study was undertaken against the background of the challenge that these students face in writing lexico-grammatically error-free abstracts within the disciplines offered in the faculty at UHAS. We also stated that the value of the study lies, in part, in the implications it has for the teaching of abstract writing to medical faculty students specifically and the lexico-grammar that gives expression to these abstracts. The findings of this study thus have a number of pedagogical implications. First, it would make sense for Ghanaian universities, including UHAS, to model their teaching of research abstracts

on the corpus-driven findings of articles such as the current one. Second, teachers of English for academic purposes and academic writing courses should consider teaching discipline-specific writing of research abstracts to students. In the domain of academic writing pedagogy for medical students in particular, teachers could equip students with the knowledge and skills needed to effectively use tense patterns, hedges, boosters, nominalisation, and other lexico-grammatical devices in research abstracts. Finally, this study may serve to inform textbook writers of English course books for academic purposes. By drawing on this research, they may be able provide a discourse that guides students and academicians on the use of lexico-grammatical devices in the rhetorical moves of research abstracts.

Future related research could focus on using interviews to explore the reasons for using specific lexico-grammatical, linguistic, or rhetorical features. Moreover, future corpus-based linguistics research could be used to examine the linguistic properties or lexico-grammatical features of journal article abstracts. Further studies could also adopt a comparative lens to examine the lexico-grammatical features in the rhetorical moves of journal article and research abstracts, across Bachelor's, Master's, and PhD levels, or multiple disciplines in humanities, social sciences, and sciences.

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