

UNIVERSITY OF CAPE COAST

A CROSS DISCIPLINARY STUDY OF CIRCUMSTANTIAL ELEMENTS
IN THE DISCUSSION SECTION OF RESEARCH ARTICLES

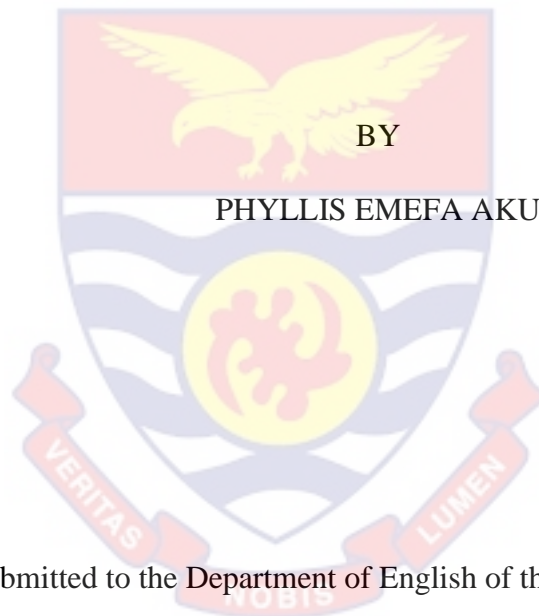


PHYLLIS EMEFA AKU

2023

UNIVERSITY OF CAPE COAST

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Thesis submitted to the Department of English of the Faculty of Arts, College
of Humanities and Legal Studies, University of Cape Coast, in partial
fulfillment for the requirements for the award of Master of Philosophy degree
in English Language

JULY 2023

DECLARATION

Candidate's Declaration

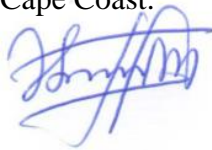
I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature..... Date.....

Name:

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.



Supervisor's Signature..... Date.....

Name:

ABSTRACT

Though circumstantial meanings have been explored in some sections of the research article (RA), they have received scanty attention in the discussion section of the RA. This study explores the structural and semantic categories of circumstantial elements in the discussion sections of RAs in six subjects namely English, History, Geography, Psychology, Mechanical Engineering and Chemistry across three broad disciplinary areas. Sixty (60) discussion sections of RAs in six (6) subjects were electronically retrieved and studied, using Halliday and Matthiessen's (2014) SFL as the theoretical framework. Findings showed that disciplines used prepositional phrases and adverbs as constituents of circumstantial elements, with prepositional phrases being predominant. Considering the 22 semantic categories identified in SFL, Location-Place, Matter, Time, Quality and Comitative were the most frequently used circumstances. However, there were variations in how the disciplines used them. Circumstantials were matched with Nwogu's (1997) moves in RAs to affirm that circumstantials are essential in arguing for the acceptance of research findings. Place circumstances were extensively used in promoting further research with slight variations noticed. The disciplines used Concession, Comitative and Additive circumstantials to contrast present and previous research. Reason and concession clauses were also frequently found in the move of interpreting specific research outcomes. From the study, it is evident that generic and disciplinary norms influence RA writers' deployment of circumstantial elements. It implies further research is needed if these generic and disciplinary preferences are to be clearly delineated for the purposes of socializing apprentice writers.

KEYWORDS

Academic Writing

Circumstantial elements

Disciplinary variation

Discussion section

Research article

LIST OF ACRONYMS

CE	Circumstantial element
EFL	English as Foreign Language
ESL	English as a Second Language
EU	European Union
LSWE	Longman Spoken and Written English
NNS	Non-native speaker
NS	Native speaker
PhD	Doctor of Philosophy
PP	Prepositional Phrase
RA	Research Article
SFL	System Functional Linguistics
UCC	University of Cape Coast

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DEDICATION

I dedicate this thesis to the memory of my late father, Rev. Wilson Komla

Aku, who believed in and invested in empowering my sisters and me.

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CHAPTER ONE

INTRODUCTION

1.0 Chapter Introduction

The introductory chapter of the thesis deals with the background to the study, statement of the research problem, research objectives, research questions, significance of the study, assumptions underlying the research, and definition of terms. It ends with a general overview of the thesis and a summary of the chapter.

1.1 Background to the Study

Academic discourse encompasses a number of genres. The genres are numerous in scope and focus. These academic genres can be classified as research genres for example research articles, dissertations and conference papers; expository genres include literature reviews or textbooks; and argumentative genres can be position papers or book reviews. These genres are not mutually exclusive and many academic texts blend elements of multiple genres. A lot of socialization is done in the academic discourse community to impart generic knowledge and conventions. Students are seen as apprentice writers who must imbibe the norms that govern the discourse practices of the academic discourse community. In pre-tertiary institutions, students are taught the basic distinctions between formal and informal writing styles. By the time students complete four years of undergraduate studies, they are deemed to have some ideas about a few genres in academic writing. However, studies prove that students do not find it easy to write esteemed genres such as dissertations and research articles (Murray, 2005).

While dissertations are viewed as academic writing for beginners, research articles (RAs) are seen as academic writing for experts in various fields or disciplines. Even more demanding for the neophytes is that the dissertation and research article (RA) are genres that require rigorous and strict adherence to generic conventions and disciplinary norms. A number of approaches have been proposed for socializing neophyte academics in writing dissertations and research articles to familiarize themselves with various disciplines and their associated writing demands (Hyland, 2006).

Notable among them are courses that aim at teaching genres and discourse features. Also, there are the process and product approaches to writing instruction, authentic language-based teaching (Starfield, 2012; Wood, Peacock & Flowerdew, 2001), differentiated instruction, the genre approach to writing and, more recently, post-graduate pedagogy based on Systemic Functional Linguistics (SFL). Concepts such as English for Academic Purposes (EAP) and disciplinary literacy instruction emerged as a result of the impact text-based grammar such as SFL has had on the way scholars perceive writing and writing tasks (Charles, 2012; Coffin & Donohue, 2012).

The literature on post-graduate pedagogy (Kaufhold, 2017; Hyland, 2003) addresses the need to use explicit discourse and genre based approaches to socialise novice writers and SFL is arguably one of the models that is making waves in this quest. A number of studies (Trojan, Harman & Zhang, 2021; Hyland, 2009) employed SFL to shed light on the generic expectations and disciplinary norms that govern the writing of academic genres. SFL has gained recognition as one of the most applicable theories for analysing genres. It has significantly transformed the interpretation of language to reflect its

usage in real-world situations, and has been applied widely in disciplinary studies and literacy instructions (Fang & Wang, 2011; Brynes, 2009). In SFL, language has three meta-functions. Though the meta-functions have different modes of meaning, they build unique aspects of our understanding of the world through language (Halliday & Matthiessen, 2004). In spite of the differences in the construction of meaning of the meta-functions, they are equally ranked and are expressed in language use. (Hasan, 2009).

One would have thought that because of the equal status that the meta-functions have, the various components in each system should be of equal status as well. However, that is not the case; in the transitivity system, for instance, value is placed more on participants and processes than circumstances (Sawirman & Ridhwana, 2020; Khorina, 2018; Wahyudin, 2016; Halliday, 1985). Apart from Halliday and Matthiessen (2014) and Halliday (1994) who gave circumstantial meaning a brief explanation, its analysis by systemicists generally does not go beyond mere description and labelling of circumstantial elements in clauses or texts (Rahmasari & Nurhayati, 2020; Cahyati, 2019). Hence, the impression created of circumstantial meaning is limited to an optional component within transitivity which the writer or speaker decides to include or not.

A more advanced probe undertaken by researchers such as Dreyfus and Hao (2020), Marr and Martin (2021) and Dreyfus and Bennett (2017), into circumstantiation revealed that the concept has much relevance. Dreyfus and Hao (2020) expanded the semantic and structural circumstantial elements (CEs), the structural definition of circumstantial meaning and outlined roles

CEs play in constructing disciplinary knowledge (Marr & Martin, 2021; Dreyfus & Bennett, 2017) and even across languages (Chen, 2016).

The research article (RA) constitutes an expert written genre that adheres to a disciplinary culture. In terms of register, vocabulary (including CEs) is used in a way that aligns with accepted conventions of disciplines from which the RA emerges. Studies on part genres of the RA, after Swales's (1981) study of RA introduction comprise abstracts and acknowledgements (Asafo-Duho, 2012), results (Brett & William, 1994), discussion (Holmes, 1997) and abstracts (Marefat & Mohammadzadeh, 2013; Hopkins & Dudley-Evans, 1988).

In shorter articles, results and discussion sections are merged (Cargill & O'connor, 2009). Despite the fact that it is a challenging section to write (Vieira et al., 2019; Day & Gastel, 2006), the discussion section answers research questions (Foote, 2009) by giving meaning to the results of the study and highlighting the contributions the article makes in the field of study (Annesley, 2010). Clearly, discussion sections are organized to conform to the conventions of various discipline-specific discourse communities. The present study focuses on the examination of circumstantial elements in clauses of discussion sections of RAs.

1.2 Statement of the Problem

Studies in SFL have shown that circumstantial meaning is an inadequately investigated area (Dreyfus & Hao, 2020; Wahyuni, R., Hamzah, H. & Wahyuni, D., 2019). Though it is almost always a part of the clause, it is labeled peripheral (Halliday & Matthiessen, 2004). Studies on the transitivity system have shown that genres vary in their use of circumstantial elements.

Since Hyland's (2004) study on abstracts, several other scholars (e.g. Asafo-Duho, 2012; Mwinlaaru 2012; Peacock, 2010; North & Samraj, 2002) have established that genre and disciplinary factors affect the choices writers make in the transitivity system. However, because of the notion that circumstantial markers are peripheral in the transitivity structure, little attention is paid to it. Thus far, there are a few studies that focus on circumstantial meanings (Chen, 2016; Peacock, 2010; Liu, 2008). Chen (2016) claimed it is an under-researched area which received insufficient attention in language studies. The present study identified variations in how circumstantial meaning defines writing in six selected subjects – History and English from the Humanities, Geography and Psychology from the Social Sciences, and Chemistry and Mechanical Engineering from the Hard Sciences. The realization that circumstantial meaning is less explored in these fields has long been recognized (Dreyfus & Hao, 2020).

1.3 Research Objectives

The following objectives guided the study:

1. To identify the structural types of circumstantial elements used by writers across selected disciplines in discussion sections of research articles.
2. To explore the semantic types of circumstantial elements used by writers across selected disciplines in discussion sections of research articles.
3. To investigate the rhetorical goals writers seek to achieve by deploying circumstantial elements in discussion sections of research articles.

1.4 Research Questions

The three research questions that guided the study are cited below:

1. What structural types of circumstantial elements are used in the discussion sections of research articles in the selected disciplines?
2. What semantic type of circumstantial elements are used in the discussion sections of research articles in the selected disciplines?
3. What rhetorical goals do writers seek to achieve by deploying circumstantial elements in the discussion sections of research articles in selected disciplines?

1.5 Assumptions Underlying the Study

Circumstantial meaning is the least investigated in the Transitivity system (Chen, 2016). Dreyfus and Hao (2020) note that circumstantial meaning is structurally regarded inessential but admit that earlier studies of circumstantial meaning contribute significantly to register and disciplinary knowledge. Among the three components in the transitivity system, circumstance is least explored. The inadequate attention given to circumstantial meaning may be due to the poor recognition it has gained as being peripheral in relation to the Participant and Process in a clause (Eggins, 2004; Halliday & Matthiessen, 2004; Martin, 1992).

This study is based on the assumption that even though Circumstantial Element is not a meta-function on its own, it cannot be treated as peripheral when dealing with disciplinary norms. The goal of this research is to demonstrate that Circumstantial Elements perform textual and interpersonal roles that subsequently result in the realization of the rhetorical goals of writers.

Another key assumption of this study is that writers have choices to make regarding circumstantial elements. However, they only make choices which serve their purposes. By studying the discussion sections of RAs, scholars interested in post graduate pedagogy can become aware of generic and disciplinary expectations that inform the selection of circumstantial elements. This will make them more efficient in socializing novice writers about the conventions involved in deploying circumstantial elements.

Finally, the study is built on the assumption that the goals of writers in the Pure Sciences, Social Sciences, and Humanities are marked by subtle differences due to disciplinary expectations. An exploration of circumstantial elements, coupled with an analysis of the rhetorical goals they are meant to achieve, can shed light on how disciplinary norms can be made more overt to novice writers. It is important to analyze expert writing so as to help map out the success criteria to use in socializing those who want to gain expertise.

1.6 Scope of the Study

The study focuses on the use of Circumstantial Elements in the discussion sections of RAs across three disciplines. An examination of the structural and semantic types of circumstantial elements as well as an in depth analysis of the rhetorical goals of the said grammatical unit may yield intriguing findings. The study is a qualitative research aimed at describing and comparing texts from the genre (discussion section of the RA) taking into consideration disciplinary variations, with samples equally selected to represent disciplines. Currency accounted for the researcher's decision to select only RAs submitted to journals between December 2020 and the first

quarter of 2021. In effect, only the circumstantial elements occurring in clause complexes were studied.

1.7 Significance of the Study

Disciplines in higher institutions of learning are tailored towards specific outcomes. In academia, though community members focus on the respective areas of study, it is increasingly important to investigate the cultures, differences, commonalities, and specialized purposes of communication across disciplines. Hence, a cross disciplinary examination of linguistic elements across disciplines is paramount.

In practice, studies of this nature educate and prepare both novice and experienced community members on laid down procedures that guide knowledge construction - it creates the environment for community members to learn to read, understand, analyze and interpret texts within contexts (Wineburg & Reisman, 2015). To this end, a standard is established for expert writers to adhere to and perfect their research work. Apprentice writers must excel in academic writing being conversant with the conventions in their areas of study in order to produce focused, purposeful and acceptable papers in research articles.

Circumstantial elements perform interpersonal and textual functions in discourse. Since the study focuses on circumstantial meanings in texts, the study will shed light on the usefulness of SFL as a discourse based grammar. The findings may help to expand knowledge on the role of circumstantial elements in organizing the clause as a message, an exchange and as a text.

Additionally, the study has pedagogical implications. Thus, it socializes post graduate students on expectations of the academic discourse

community in writing discussion sections of research articles (Birkenstein & Graff, 2008). It also provides teachers with a situational usage of circumstantial elements by expert writers and how the circumstantial markers align to the rhetorical goals of writers.

The study again contributes to the literature on disciplinary variations in academic discourse since it examines how circumstantial markers are used across disciplines (Berkenkotter & Huckin, 2016; Becher, 1994). It also enlightens community members on the expectations and implicit assumptions experts make about the discussion section as a sub-genre.

Finally, the present study is significant because it helps improve the practice of writing discussion sections of RAs because circumstantial elements are relevant options accessible to language users in the creation of language in use (Dreyfus & Bennett, 2017; Coffin, 2006). The findings, therefore, inform academia on how the selection of circumstantial markers influences meaning making in articles. Finally, the study triggers investigations of circumstantial markers in other part-genres of the RA as well as book reviews in the disciplines under study.

1.8 Organization of the Study

The thesis is organized in five chapters. Chapter One defined the scope of content of the entire study. It covered content necessary for directing the study such as statement of the problem, research questions and assumptions underlying the study. Chapter Two discusses Systemic Functional Linguistics (SFL), as the theoretical framework for the study. It also provides education on concepts that are related to SFL and examines empirical studies conducted on circumstantial elements in texts. In Chapter Three, the methodology for the

research is projected. It describes the sampling technique, data collection procedures and method of analysis. The chapter additionally highlights challenges encountered in the collection of data and how they were surmounted. Chapter Four was organized to address the three research questions which underly the study. Chapter Five provides a summary of the study, major outcomes, implications drawn from the study and recommendations for further research.

1.9 Definition and Function of Circumstantial Elements

In the framework of Systemic Functional Linguistics (SFL), circumstance is one of three resources that realizes the experiential meaning (Halliday & Matthiesen, 2014; Halliday & Matthiessen, 1999). The three components are participants that are involved in the process, a process which may unfold through time, and a circumstance that is associated with the process. The circumstance is a peripheral element that revolves freely around the process (Halliday, 1994). Circumstantial elements can also be classified structurally and semantically (Khorina, 2018). Structural circumstances refer to prepositional phrases and adverbial groups. The semantic categories on the hand, refer to the meanings they convey in complementing the process (Halliday & Matthiessen, 2014). Circumstances provide additional basic information which are associated with the process such as place (where?), time (when?), manner (how?), cause/reason (why?) and distance (how far?). There are other circumstance types that probe without wh-words. They include Accompaniment (together with whom/what?), Role (as/into what?), Contingency (under what circumstances?), Extent (at what interval?), Angle (whose/which perspective?) and Matter (about what/as for what?).

1.10 Chapter Summary

Despite the usefulness of circumstantial meaning in the construction of part-genres of the research article (RA), little is known about the importance of this grammatical unit in the discussion section of the RA; hence, the need to do a cross disciplinary study of CEs in the discussion section of RAs. The choices writers make regarding circumstantial elements sometimes determine disciplinary culture. This assertion is evident in the research questions that were formulated for the study. The chapter also provided insights into the scope of the study and demonstrated the significance of the study to theory and practice. The chapter concludes with an organization of the entire thesis.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter is organized into four sections. The first section discusses key concepts related to the study namely disciplinary variation, academic discourse, discourse community and stylistic expectations in the discussion section of research articles (RAs). The second section discusses the theoretical issues underpinning the research. The third section explores the treatment of Circumstantial Elements and other grammars antecedent to SFL, and the final section discusses some previous studies on circumstantial elements.

2.1 Key Concepts

This section explains concepts that relate to understanding the topic of the present study. They include disciplinary variation, discourse community, academic discourse, genre, and discussion section of research articles.

2.1.1 Disciplinary Variation

Over the years, programmes of study have been designed to contain a network of subjects and courses that are thought to be connected to acquiring a certain body of knowledge. The classification of courses into programmes that are run by departments, faculties and colleges in universities is informed by the early attempts by some scholars to categorize academic disciplines. There is enough evidence in the literature that these classifications resulted in the grouping of disciplines. Biglan (1973) proposed a classification system that includes four categories hard-soft, pure-applied, life-non life and physical-biological. He argued that university programs are classified based on these dichotomies.

In recent times scholars make classifications from different perspectives. For instance, the hard-soft distinction was the focus of Trowler and Becher (2001). Their work gave an insight into the proximity and relation of the disciplines to human beings. It also reveals differences between disciplines and the world of work (Garraway, 2009). Though the classification seems to signal a sense of similarity among disciplines in the same category, it is not the case; it goes beyond the epistemological nature of its knowledge base (Trowler, Saunders & Bamber, 2012).

Some classifications were mainly based on methodology (Hyland, 2015; Bazerman, 1993). The accounts also reveal differences among disciplines depending on factors such as writing practices, the influence of local circumstances on how texts appear and how they are used in individual cases. In his seminal work, 'The Structure of Scientific Revolutions', Kuhn (1962) challenged the traditional view of scientific progress as a gradual accumulation of knowledge, instead proposing that scientific knowledge occurs in revolutionary leaps driven by paradigm shifts. Kuhn asserts that these paradigm shifts are prompted by accumulation of anomalies and crises within existing paradigms ultimately leading to the emergence of new paradigms that define the field. Foregrounded in the literature is the recognition that factors such as community membership, rhetorical goals, disciplinary practices, methodology and principles are inseparable.

Variation in disciplinary culture is evident in academic writing. Hence, disciplines are perceived as "institutional conveniences, networks of communication domains of value and modes of enquiry" (Hyland, 2006, p.18). For instance, Biglan (1973), Donald (1990), and Kolb (1981) all drew on

faculty perceptions and learning style differences to provide categories that separated "hard" from "soft" and "applied" from "pure" knowledge fields. Kuhn (1977) classified disciplines in accordance with well defined paradigms.

There is no universally accepted categorization of the sciences into 'hard' and 'soft' and 'applied' and 'pure'. The Pure Sciences involve a higher level of difficulty and risk by scientists to offer contributions. It outlines more defined procedures in carrying out experiments and hardly any allowance for error, irrelevance and subjectivity of researchers. The Soft Sciences explore phenomena and human behavior which are usually complex to quantify and use qualitative methods such as interviews, observations and surveys to collect data (Storer, 1967). Berliner (2002) and Durbin (2012), on the other hand, argue that the Social Sciences, often referred to as the 'soft sciences', are more difficult compared to the physical and natural sciences. Berliner (2002) refers to disciplines such as Physics, Chemistry, and Geology as easier-to-do sciences while harder-to-do-sciences comprise Psychology, History and Economics. The authors suggest that the complexity of human behavior and social systems make the study of the social sciences more challenging and that the social sciences require a broader range of skills and conduct research under rather intolerable conditions than the hard sciences.

With regard to the dichotomy between Applied and Pure Sciences, Applied Sciences rely on scientific knowledge (from the Pure Sciences) such as theories, and models to create services and products to address real-world problems (Yaghmaie, 2017). Instances of disciplines in this area include Engineering, Medicine and Computer Science. Pure Sciences, however, explore basic principles about the world in its natural state with no emphasis

on practical application in focus (Ziman, 2000). Mathematics, and Theoretical Science are instances of Pure Sciences. Both sciences overlap at the point where the Pure Sciences provide the foundation for development in Applied Sciences while outcomes from the Applied Sciences lead to further research in the Pure Sciences. The literature attests that not only do disciplines reveal useful and unique styles of knowledge presentation and argumentation but there are also variations in the manner academic genres are written, used and responded to by individuals and researchers are sensitive to it (Hyland & Bondi, 2006).

The ongoing discussion shows that the variations that are associated with disciplines adhere to established conventions which are due to the identification of varied epistemologies and social practices (North, 2005). Knowledge may be stratified based on characteristics – cumulative, reiterative, and holistic. Disciplinary writing is also informed by the peak to which it is concerned with universals or specifics. These are some factors that account for disciplinary differences in the presentation of argumentation of knowledge.

This present study analyzed disciplines selected from the Humanities, Social Sciences and Pure Sciences domains. On the cline, the Humanities and the Pure Sciences are situated at the extremes with the Social Sciences in the middle. All three knowledge domains endeavor to understand the world but employ different approaches. Though the classifications do not always distinctly fit into the categories, knowledge construction and transmission were the common basis for stratification across the categories (Afful, 2006; MacDonald, 1994).

Areas of study in the Humanities include literature, language, philosophy, the arts, music and human culture. Their emphasis is on interpreting and analyzing their understanding of human experience, and are usually identified with probation of fundamental questions with regards to the meaning of life, and imaginative writing and critical thinking.

The Social Sciences comprise disciplines such as Anthropology, Psychology, Geography and Political Science and studies mainly human behavior, cultural practices, social happenings and structures of human communities. It further focuses on rendering explanations of how social, economic and political factors affect the functions of society and the interactions among people.

The Pure Sciences also known as the Natural Sciences, are concerned with understanding the primary laws of nature, the origins and evolution of the world, for instance. The Pure Sciences probe the natural world through experimentation, observation and hypothesis testing. Academic disciplines in this domain include Biology, Astronomy and Chemistry.

The Social Sciences and the Pure Sciences are more objective while the Humanities lean towards subjectivity. Also, while replicability may not yield the same results in the Humanities, specific outcomes are foreseen in the Social Sciences and the Pure Sciences due to the nature of disciplines in the domains and the principles that guide their stratification. It is expected that patterns may vary in the use of circumstantial elements from one broad disciplinary domain to the other that may indicate disciplinary (or generic) preferences.

2.1.2 Discourse Community

From the perspective of Swales (1990), discourse communities have set goals, give information, and receive feedback. Also, they use communication to achieve their goals, have special vocabulary and concepts for speech and writing. The members relate to common ideologies, assumptions that are fundamental to their course and well-defined values and conditions of membership which could be academic or social.

It is important to add that discourse communities thrive on the intellect and contributions of members who are assumed to share common practices, knowledge and approaches to interpreting experiences (Bizzell, 2003). These members include novices, research fellows, librarians and experts who perform gatekeeping roles. It is these same classes of people who act as audience, writers, and readers within discourse communities (Myers, 1989). Porter (1992) also observed that a discourse community reorganizes the traditional unities which include writer, audience and text into a new pattern.

Despite some criticisms of the components in the definition of discourse community, scholars recognize that discourse communities are closely related to genres but maintain variations exist in terms of the characteristics of Swales' parameters. On the contrary, communicative purpose, content, form, intended audience which constitutes members from professional or academic communities, and a medium which may be spoken or written (Afful & Mwinlaaru, 2010), are the attributes of a genre. I observe that the guidelines set by discourse communities define the genres associated with them. Swales' (1990) and Beaufort's (1997) studies render a solid foundation for further investigations on discourse communities in disciplines.

The foregrounding of the relationship that exists between discourse community and genre is relevant to this study because it intends to unravel the differences that are associated with disciplines selected for the present study in terms of the circumstantial elements that construct their discussion sections.

2.1.3 Academic Writing (AW)

Academic writing (AW) is a formal writing style embraced in educational and research communities. Its purpose is to communicate information and ideas in a clear, concise, and structured manner. Formality, logical structure, objectivity, critical analysis, formal referencing, effective use of academic conventions, hedging and complexity are some of the vital characteristics of academic writing (Hyland & Bondi, 2006).

An academic text requires a formal tone which must be devoid of colloquialism, slang and subjective expressions and rather employs concise language to convey arguments. It needs to be clearly and logically structured. Ideas must be properly organized and coherent, that is grouping and developing related points together into paragraphs that discuss specific themes. It typically begins with an introduction which outlines background information and states the aim of the study, the main discussion which is developed under several other subheadings, and the conclusion which restates key findings of the study.

There is also a critical approach to academic writing (AW) where results are examined from multiple perspectives – explaining, examining consequences, comparing, contrasting, evaluating, taking a stance, investigating claims made by other authors and supporting claims with credible evidence. Hedging is another essential element writers deploy to

cautiously make claims especially when the evidence to support those claims are tentative. Objectivity and evidence to support arguments are emphasized in AW. It is important to validate claims by including, where necessary, statistics, expert opinions, and citations from credible sources; and it is mandatory to acknowledge sources that are used to authenticate arguments in order to avoid plagiarism. Accurate citation and referencing provide credibility and validity to arguments.

Different disciplines align to specific referencing styles. For instance, American Psychological Association (APA), Chicago and Modern Language Association (MLA) have their corresponding guidelines for in-text citations and the creation of reference list or bibliography. It is important to apply the appropriate referencing style consistently throughout the text.

Lastly, authors are required to adhere to academic conventions in their disciplines, for instance, the appropriate use of personal pronouns and specific terms. Incorporating these key factors in writing a research article (RA) will boost clarity, objectivity and credibility in presenting arguments and research findings.

The features of academic writing (AW) discussed above pertain to all forms of academic writing (AW). However, the emphasis tends to be discipline dependent. Bazerman (1988), Biber et al. (1999), and Swales (1990) postulate that patterns and formulas exist in academic writing. Swales (1990) believes that the teaching of conventional ways – the introduction of topics, identification of sources and organization of arguments - are valuable tools for writing academic texts in clear language for members of academic discourse communities. The implication is that there are differences in rhetorical

strategies in writing across disciplines (WAD) (Thonney, 2011). When rhetorical requirements are adhered to, clarity and criticality are achieved in the argumentation of academic discourse (Chandrasegaran, 2008).

The importance of academic writing (AW) cannot be underestimated because it provides a standardized medium for community members to build their careers and ground authority in their areas of specialty regardless of their geographical locations. For the present study, AW is relevant because it will reveal specific rhetorical practices coded in the discussion section of RAs of disciplines selected for the present study. To sum up, AW has very high standards. It requires knowledge of the conventions and practices to succeed as a writer. The RA is a special form of AW. The next sub-section accounts for the rationale for selecting the discussion section of RAs as the focal point for the study.

2.1.4 Types of RAs

The RA is the primary means by which community members share findings and communicate to others about their research, I now turn attention to the types of RAs. Subsequently, I argue that the RA is a genre that embodies subgenres that have varied rhetorical goals.

The RA reports on a new research conducted and is categorized as primary literature. The RA is the most common type of journal articles. There are several types of RAs. One of them is the empirical research article which presents findings of original research through experiments and observations and is empirical in nature. Its content is organized to include research questions, research design and methodology, analysis and discussion of data and conclusions based on findings. It is conducted by following a five-phase

cycle namely observation, induction, deduction, testing and evaluation; it is usually published in a peer reviewed journal. An example of an empirical RA is Smith (2021).

State-of-the-art- review RA provides a summary of the state of current knowledge on a specific research topic, how it got to its present state, and possible direction for future development of the topic. Researchers compare and analyze and include authorial interpretation in the discussion section. This RA type focuses mainly on summarizing and synthesizing large bodies of literature on existing research which may cover key theories, models, identification of new research areas from the literature, in addition to offering recommendations for future research. An example of this RA is Jones et al. (2020).

Another RA type is synthesis. It combines data, findings, and conclusions from different research articles and integrates them to address a single argument in order to provoke new insight on the topic. A synthesis on the language of evaluation in academic writing research is an example (Afful & Twumasi, 2022).

Meta-analysis involves merging and analyzing multiple studies which address the same question. Synthesizing the data from these sources requires a quantitative approach where each study's level of error is captured. Combining the data also means drawing peculiar results from various sources, identifying patterns, disagreements and other interesting relationships that may emerge. An example of this RA is Kim (2019), who integrated investigations on the impact of social media on mental health.

There is the auto-ethnographic research article where the researcher describes how the cultural, social, political, and economic climate of the society he/she lives in culminates into his/her personal experience. An auto-ethnographer's, observations, interpretations and experiences become the source of data for discussion. Examples include Nartey (2017) which is a reflection on what it means to be a teacher in urban schools and Ngula's (2022) paper is a reflection on the challenges, myths and coping mechanisms of albino children.

Lastly, there are RAs that are interactional in nature. By interactional, they are written in response to other RAs. The oldest forms of these types of articles are book reviews and critical reviews of RAs. Reply articles are increasingly featured in journals. These articles entail negotiation of academic outcomes where writers evaluate and comment on other researchers' contributions (Itakura & Tsui, 2011). Reply articles carry an evaluative burden and push further the cycle of knowledge dissemination.

2.1.5 The RA as a Genre with Part-genres

RAs usually have different part-genres which perform different rhetorical goals. The part-genres generally include abstract, introduction, literature review, methods, results and discussion structure (AILMRaD), though there are variants abstract, introduction, results, discussion, and method (AIRDaM), and abstract, introduction, method, results and discussion and conclusion (AIMRaDC) (Viera, et al., 2019). In some cases, results and discussion are combined as a section. Most RAs usually end with a reference list or bibliography. This section examines the part-genres of the RA and their rhetorical goals.

The first major part-genre of the RA is the abstract which summarizes the entire paper and concisely states the background information on the problem of the study, the techniques used, the findings, interpretations of the results and their implications. It is part of the paper researchers scan to determine a further reading of the article and usually does not exceed 200 words.

The abstract is followed by the introduction section. It provides an overview of the problem authors plan to address and includes research questions, scope and significance of the study. The section's goal is to convince readers that the study is worth investigating.

Another part-genre is literature review. It synthesizes studies of previous investigations on the same topic which are supported by credible sources and identifies gaps the new study intends to probe. Its rhetorical goal is to persuade readers that the probing questions are important and valuable.

The methodology describes the methods selected and how they are used to conduct the study. Adequate information is also provided to replicate the study in this section. It usually adopts the past tense and establishes the validity and reliability of the research results.

The purpose of the results section is to present findings of the study. This can be accompanied by figures, charts, tables, graphs that simplify and enhance understanding of the data. It only reports findings and does not need any explanations. Authors report findings in the past tense and general statements in the present tense (Fischer & Zigmond, 2004).

In the conclusion, writers emphasize major findings, significance of the study and implications. The part-genre's goal is to foreground the

contributions of the study. A final part-genre is the reference/bibliography. Its goal is to provide a complete citation for all the materials used in the text. Information on references comprises the name of author, title of paper, the journal's name, volume number and page numbers. These must strictly adhere to the reference style adopted by the discipline.

The various part-genres of the RA are relevant because they exude rhetorical goals which help members of discourse communities glean a clear understanding of the paper's content. I argue that the discussion section is an equally relevant part-genre of the RA written with the aim of satisfying its rhetorical goals. The present study aims at exploring circumstantial elements that are used in this section and reveals the rhetorical goals they achieve.

2.1.6 The Discussion Section of Research Articles (RAs)

This section explains the purpose and characteristics of the discussion section of RAs. Writers are required to summarize and interpret the findings of their research. Thyer (2008) and Branson (2004) noted that the section which summarizes and interprets is the (Results and) Discussion.

In the discussion section of the RA, knowledge may be organized either separately or merged with the results section. The discussion section is an indispensable part of research reports (Dujcik, 2013; Lin & Evans, 2012), where writers present new knowledge as an addition to existing literature.

As important as the section is in RAs, authors have observed that challenges are associated with its organization, especially for non-native scholars (Flowerdew, 2001; Wood, 2001; Dudley-Evans, 1994). This implies that the academic discourse community requires discussion sections to be structured in a particular manner worthy of further exploration. Parkinson

(2011) opines that the use of phrase complex causal, conditional and purposive arguments guide readers to accept writers' claims in the discussion section of the RA. Hence, interpersonal and textual markers are strategically deployed to achieve this aim. In fact, the difficulty in convincing readers about results is very much about the arrangement, presentation of findings and the writers' degree of confidence in the results. Writers use circumstantial markers to assert and hedge claims. Disciplines vary in expectations about these. Herein lies the difficulty of most writers.

It is obvious from the ongoing discussions that the discussion sections of RAs are a core component of RAs, and RAs that are not written to conform to approved standards are incomplete and unacceptable for publication in journals. Therefore, it matters to publishers of RAs that writers adhere to disciplinary conventions in interpreting their findings in the discussion section. It is however an under-researched part-genre when compared to the analysis of Introductions despite the difficulty both sections cause writers (Dujsik, 2013).

The section's purpose is for writers to explain from multiple perspectives findings that emerge and ascribe reasons as to why they are presented in the manner they are presented (Hagin, 2009; Hess, 2004), or according to Annesely (2010), it establishes the importance of their studies and confines the presentation of the findings to conventions of their respective discourse communities.

The structure of the discussion section varies based on the discipline, the subject of the paper (Dunton, 2021) and author (Viera, et al., 2019). In spite of these factors, some fundamental guidelines can be followed to write a standard discussion section. Docherty and Smith (1999) proposed a structure

for discussion section; it must first state the key findings and link them to the research questions with evidence to support them. Secondary results should be summarized and generalized, with the inclusion of figures and tables where necessary.

Secondly, the limitations of methods and approaches are highlighted. The limitations indicate the shortfalls of the author, and state the implications such limitations have on the conclusion. The discussion section must additionally suggest modifications to the study design to reduce infelicities which can adversely affect future research.

A third sequence is contrasting previous and present research outcomes where writers make remarks on major findings of the study and relate them to existing studies in the literature stating whether they align or otherwise and possible reasons for the contrast. Conflicting results and unexpected findings are discussed in this section as well. The implications of the study place value on the findings by highlighting ways in which they can be used.

The final section is the future research outcome which mentions unanswered questions that emerged from the study and suggestions for future investigations. The discussion section is closed with a summary of the key points based on all the aspects examined in the paper. This constitutes interpretation of key findings and the significance of the study with a focus on practical application.

It is worth noting that the discussion section is a part-genre within the RA and communicates vital information on the findings, the meaning and the applications of a study as a whole. This study is specifically interested in the discussion section, a part-genre of the RA, and explores differences

circumstances demonstrate in the Humanities, Social Sciences, and Pure Sciences.

2.2.0 Systemic Functional Linguistics (SFL) Theory

Systemic Functional Linguistics (SFL) theory is employed by the study as its analytical tool. The theory treats language as a resource constantly geared towards meaning-making and focuses on the correlation between form and meaning. It was chosen for the present study to enable understanding and interpretation of circumstantial elements in the discussion sections of RAs across selected disciplines.

SFL is a discourse based grammar that construes language as a form of verbal behaviour in which interlocutors make both linguistic and non-linguistic choices to make meaning. It does not dwell on the grammaticality or otherwise of linguistic forms, but rather on the suitability of the functions of the structures and their constituents and the meanings they unravel in context (Lock, 1996). The theory explains the use of language, the structure, and different uses by people (Eggins, 1994). The interpersonal function, which is based on interactions that arise among speakers, is one of the three general functions of language that SFL emphasises. The ideational function constructs experiences through language, while the textual function refers to the connectivity and coherence of language in speaking and writing contexts (Emilia, 2014; Derewianka & Jones, 2012; Rose & Martin, 2012).

Language choices also create systems of Theme, Mood, and Transitivity in the clause. The composition of the syntactic structure of the systems are: Theme + Rheme (Theme System), Mood + Residue (for Mood system) and Participant + Process + Circumstances (Transitivity system) in the

clause. These constituents organize the clause as (a) a message, (b) as an exchange and (c) as a representation. This study focuses on the clause as a representation, the system which embeds CEs.

The theory is relevant to the study in diverse ways. It establishes that authors make language choices which enable them to convey their experiences in defined contexts, in this regard the discussion section of the RA. The theory allows for structured texts to be labelled for their functional meanings. The functional labels further elucidate the distinctions in the use of CEs in the selected disciplines and therefore, substantiate that variations exist in the writings of authors of disciplines.

Four underlying principles are associated with SFL. These are presented in table 1.

Table 1: Key Aspects of Systemic Functional Linguistics

Language as a resource for meaning	Language is a system of choices. Language users choose from the resources of the language system to make meaning which are appropriate to the social context, which constrains the choices.
Texts as the basic unit of language	Language users communicate in texts, not isolated words or sentences. Texts, no matter how long or short, are the basic units of meaning in language. The study of language should look at the structure and organization of language in texts not as isolated and idealized extracts.
Systemic relationship between text and context	All languages occur in social contexts. There is a symbolic relationship between language and the social context in which it is used. Social contexts exert influence on the choices that are made from the linguistic system and language itself helps shape social contexts. SFL gives a detailed

	systemic account of the relationship between text and context.
Functional linguistics	SFL identifies and labels elements of texts according to the function they perform in making meaning

(Adapted from Feez, Iedema and White (2008), as cited in Emilia and Hamied (2015, pp. 156-157).

The basic tenets of SFL are summarized by Eggins (2004): that all systemic linguists share an interest in how people use language with one another to achieve common place social claims about language, including that language use is functional; that language makes meanings; that meanings are influenced by the social and cultural contexts in which they are exchanged; and that language use is a semiotic process, a process of making meanings through choices.

In sum, the meta-functions are intertwined and work together as choices made by users to communicate happenings in their environment. Hence, the manner in which an utterance is made and explained needs to consider the actual and possible choices that are made. In SFL, language is ‘a daily unfolding social action’ (Halliday, 1985: xxiii).

2.2.1 The Transitivity System in SFL

Transitivity in SFL is a grammatical system that realizes people’s experiences of the world through the process, participants and circumstances in a clause. The ideational system deals with experiential meaning. It represents the world of ideas, concepts and mental constructs (Eggins, 2004). Almurashi (2016) describes it as “the way reality is represented and the grammatical resources for construing our experience of the world around us, as to what is

going on, who is involved in the going-on, and when, where and how the goings-on are going-on” (p.73).

Three elements are central in constructing experiential meaning. They include (a) Participants (human/ non-human) that are involved in the processes and are visible in the nominal group, (b) Processes and (c) Circumstances which are constituted by prepositional phrases and adverbial groups. Process is the central grammatical choice for constructing meaning in the system.

There are six processes: Mental, Material, Verbal, Behavioural, Existential, and Relational. Each of them gives a unique configuration of process plus participants to create meaning in the clause. Mental processes express thoughts, feelings or perceptions and probe what a Participant thinks, feels or knows about another Participant (Halliday & Matthiessen, 2014). Halliday and Matthiessen, (2014) further categorise Mental processes into three: cognition expresses the act of thinking, knowing and understanding. For example, *I don't understand* ^[cognition] *his decision*. Affection category has verbs that demonstrate liking or fearing. An example is: *I hate* ^[affection] *Mondays*. The third category is Perception and deals with processes of seeing and hearing. Senser and Phenomenon are Participants in the Mental Process. Senser refers to the being that sees, feels, fears, and thinks. The Phenomenon is the constituent that is felt, thought of, seen or sensed. An instance is: *I* ^[senser] *trust* ^[Pr: mental] *you* ^[phenomenon].

Material Process expresses tangible actions and refers to a thing or a person who performs an action. The participants, Actor and Goal, are associated with Material Process where the former performs an action. The

Actor must be an only and active participant to qualify as Actor of the clause. For instance, *Meari [Actor] bought stationery*. Goal is the Participant at whom the action is pointed. The question ‘what did x do?’ is the criterion for identifying Material Processes.

Initiator, Scope, Recipient, Client and Attribute are other participant roles associated with Material Processes. The Initiator typically coexists with an Actor when the agency of the process described in the clause is started by an outside party (the Initiator), who is only incidentally involved in the process because the Actor is. The Scope participant is not influenced by the action in the clause and is goal-like in nature. The Recipient participant assumes the role of someone who receives something from the Actor participant. The Client, on the other hand, is identified by the Process as the party to whom a service is delivered (Mwinlaaru, 2012). Any quality ascribed to any of the other participants that has been named and discussed constitutes the Attribute element.

The Verbal Process indicates verbal action, and has the Participants Sayer, Receiver and Verbiage. The *Sayer* is the Participant who speaks. The verbal action is directed to the *Receiver*, while the third Participant is *Verbiage*; it expresses a verbal behaviour. For instance: *They* ^[Sayer] *asked* ^[verbiage] *him* ^[Receiver] *a lot of questions*. Apart from these three is the *Target* which occurs when the Sayer acts verbally on another Participant directly. For example, *I told them* ^[Target] *what to do..*

The Behavioural Process makes meaning partly from the meaning realized from Material Processes and partly from Mental Processes. It portrays psychological and physiological behaviour (Eggins, 2004). Examples of these Processes include *sniff, smile, cough, look and watch*. Majority of Behaviour Processes have only one Participant hence, rendering them intransitive verbs. For instance, *She* ^[Behaver] *played* ^[behavioural] *with passion*. Where another Participant is not a restatement of the Process, it is realized as Phenomenon. For example, *Nandy* ^[Behaver] *sniffed* ^[Pr:Behavioural] *the paint* ^[Phenomenon].

Existential Process is a representation of something that happens or exists. It usually makes use of the verb 'to be' and verbs that show existence such as *exist, arise* and *occur*. It is one of the two Processes that encode meaning about the state of being, and is mostly identified with its frequent use of *there*, which does not denote location but only occupies the subject position and is unstressed. An instance of this is in the clause: *There was a crowd at the park*.

The existential *there* is not analysed in transitivity however, the compulsory Participant which receives a functional label is called the *Existent*, while the Participant is the Phenomenon and often refers to an event. For instance: *There is* ^[Pr:existential] *a coat* ^[Existential: event] *on the rack*.

Relational Process is the second of two Process types which express a state of being. The Relational Process is categorized into three: the type which establishes a link between two entities (Intensive), the circumstantial category and the category, that indicates possession.

Each of the Relational Process types has sub-types. For instance, the attributive sub-type has the characteristic of being realised by a nominal group and being given to a Participant, whose name is the Carrier. Identifying and attributive modes are used to express relational processes. While in the identifying mode, one entity (identifier) is utilised to identify another (identified), an attribute is ascribed to an entity (carrier) in the attributive mode. In the given example *Abena is brainy*, [Abena] is the Carrier; the Process [is] denotes a relationship Process and [brainy] is characteristic of the Carrier. *Kwakyee is the therapist*. In the example, whereas [the therapist] is the identifier and [Kwakyee] is the identified element, [is] represents an identifying Relational Process.

The key components in the Transitivity system are sub-systems, configured to construe distinct interpretations. The circumstantial component, a sub-system in Transitivity, is the focus of the current study.

2.2.2 Definition of Circumstantial Elements

Circumstantial elements are the circumstances that together with the participants and processes, construe people's experiences of the world. They provide additional basic information about for instance, the place, time, manner, cause or distance of an idea or an event. There are other circumstance types that probe without wh-words. They include Accompaniment (together with whom/what?), Contingency (under what circumstance?), Role (as/into what?), Extent (at what interval?), Angle (whose/which perspective?), and Matter (about what/as for what?).

Circumstantial elements can also be classified structurally and semantically. Structurally, circumstances refer to the meanings they convey in complementing the processes (Halliday & Matthiessen, 2014).

2.2.3 Circumstantial Elements from a Functional Perspective

Circumstantial Elements (CEs) can occur anywhere in the clause without any restrictions and maintain the same significance (Halliday & Matthiessen, 2014). Though a circumstance may occupy the outermost space of the clause regardless of the process type selected, it is considered optional and not a core component of the clause (Halliday & Matthiessen, 2004).

Eggins (2004) noted that Circumstantial Elements (CEs) underly the distinctions between a simple and an expanded clause. Though the clause could maintain its meaning devoid of a circumstance in its configuration, the difficulty with this understanding is that some clauses may be vague without circumstances. Despite the vagueness that may occur, there is sufficient evidence that semantic and syntactic positioning of circumstantial elements in clauses are purposeful in discourses. Their use distinguishes one discipline's way of organizing thoughts from another discipline. Undoubtedly, circumstantial elements play a vital role in academic prose and strongly show differences, hence, deserving of a description other than being regarded as peripheral.

In the investigation of adverbials in four registers, they revealed that although adverbials are optional, “they are a common feature of discourse as the information in adverbials is crucial for fully understanding the proposition in a clause” (Biber et al., 2007, pp. 765-766). With regard to AW, they also claim adverbials are more commonly used than lexical verbs. Among the three

types of adverbials, circumstantial elements are the commonest due to the varied meanings they express. Also, several circumstantial elements can co-occur in clauses. Linking adverbials are most frequently utilized in academic prose because “linking adverbials allow the writers to mark the development of their arguments, relating one proposition to another for example, explicitly showing contrasts, restatements and conclusion” (Biber et al., 2007, p. 767). Scholars further admit that the dominance of PPs in clauses is due to their overuse in circumstantial adverbials. However, among stance (interpersonal) adverbials, PPs account for 15 to 20 percent only, which is almost the same distribution of linking adverbials.

The classification of CEs are similar with subtle differences (Halliday & Matthiessen, 2014; Biber et al., 2007). Biber et al. (2007) proposed that circumstances are:

the most varied class, as well as the most integrated into the clause structure. Circumstance adverbials add information about the action or the state described in the clause and answers questions such as how, when, where, how much, to what extent and why? (Biber et al., 2007, p. 763).

Their categorization is shown in Table 2:

Table 2: Functional Classification of Adverbials

<u>Circumstantial</u>	<u>Stance</u>	<u>Linking</u>
<u>Process</u> : Manner (Manner proper; companies; accompaniment)	<u>Epistemic</u> Actuality and reality, source of knowledge, <u>Limitation</u> (on the whole, in general)	<u>Enumeration and addition</u> (for one thing, for another, in addition).
<u>Means</u> ; <u>instrumental</u> ; <u>agent contingency</u> : reason/cause; purpose; concession; condition; result.	<u>View point or perspective</u> (in my view)	Summation (in Sum, in conclusion)
<u>Extent / degree</u> : amplifier, diminisher	<u>Attitude</u> (for all I / we / know / care)	Apposition (in other words, for example)
<u>Addition/ restriction</u> : addition; restriction	<u>Style</u> (in short, in a word, in brief)	Result inference Contrast / concession Transition (By the way)

Source: Biber et al. (2007, pp. 776-879).

Halliday and Matthiessen (2014), on the other hand, examine meaning, and also focus on the function of expressions in language. Adjuncts are a reflection of the three modes of meaning in SFL, with experiential Adjuncts serving as circumstantial elements, interpersonal Adjuncts serving as modal Adjuncts, and textual Adjuncts serving as conjunctive Adjuncts. (Halliday & Matthiessen 2014, p. 156), as shown in Table 3.

Table 3: Functional Classification of Circumstantial Elements

<u>Circumstantial</u>	<u>Modal</u>	<u>Conjunctive</u>
<u>Manner</u> (Means, quality, comparison, degree)	(de-morality, modality, intensity)	Appositive (in other words, for instance)
<u>Cause</u> (reason, purpose, behalf)	<u>Comment adjunct</u> (propositional speech functional)	Corrective (at least) Dismissive (in any case) Summative (in short, in conclusion) verifiable (in fact, as a matter of fact) Additive (in addition) Adversative (on the other hand). Variative (on the contrary, except for) Temporal (at the same time, at once) Comparative (in the same way) Causal (as a result for this reason) Conditional (in that case, under the circumstances) concessive (despite) Respective (in this respect).
<u>Contingency</u> (condition, concession, default)		
<u>Accompaniment</u> (commutative, additive)		
<u>Role</u> (guise, product)		
Matter / Angle		

Source: Halliday & Matthiessen (2014, pp. 187-19)

Participants serve as the Subject or Complement in the Mood grammar, and circumstances correspond to Adjuncts. Hence, when the PP is syntactically and semantically required, downgrading a circumstance to the outer circle as merely a process attendant does not accurately reflect their crucial significance. Their observation of this phenomenon is not different even in English. Halliday and Matthiessen (2014) established categories of circumstances as shown in Table 4. Regarding research question number two, this categorization is the analytical framework used in classifying the data for the current study.

Table 4: Types of Circumstantial Elements

TYPE		Wh-item		Examples of realisation
Enhancing	1 Extent	Distance	how far?	for, through, 'measured' nominal group
		Duration	how long?	for, through, 'measured' nominal group
		Frequency	how many times?	'measured' nominal group
	2 Location	Place	where? [there, here]	at, in, on, by, near, to, towards, into, below, under, behind, onto, (away), from, out of, off, on front of, above, upstairs, downstairs, inside, outside, out, up, down, left, right, straight... 'there, here
				at, in, on, until, till, towards, into, from, since, during, before, after,
				Adverb of time: today, yesterday, tomorrow, now, then
	3 Manner	Means	how? [thus]	by, through, with, by means of, out of, [+material], from
				in+a+quality (e.g. dignified) +manner/way, with+abstraction (e.g. dignity); according to adverbs in -ly, -wise; fast, well; together, jointly, separately, respectively
		Quality	how? [thus]	like, unlike, in+the manner of..., adverbs of comparison differently
		Comparison	how? what like?	to+a high/low/...degree/extent;
	Degree	Degree	how much?	adverbs of degree much, greatly, considerably, deeply [often collocationally linked to lexical verb, e.g. love + deeply, understand + completely

Table 4 continued

Extending elaborating Projection	4 Cause	Reason	why?	because of, as a result of, thanks to, due to, for want of, for, of, out of, through
		Purpose	why? What for?	for, for the purpose of, for the sake of, in the hope of
		Behalf	who for?	for, for the sake of, in favour of, against,['not in favour of'], on behalf of
	5 Contingency	Condition	why?	in case of, in the event of
		Default		in default of, in the absence of, short of, without['if it had
		Concession		despite, in spite of
	6			
	Accompaniment	Comitative	who/what with?	with; without
		Additive	and who/what else?	as well as, besides, instead of
	7 Role	Guise	what as?	as, by way of, in the role/shape, guise/form of
Product		what into?	Into	
8 Matter				
	9 Angle	Source		according to, in the words of
		Viewpoint		to, in the view/opinion of, from the standpoint of

(Source: Halliday & Matthiessen, 2014, pp. 313-314)

Circumstantial meanings based on discourse grammars have been extensively reviewed by several scholars. An overview of the literature reveals that circumstances are a significant language resource. The next section discusses some selected empirical studies about CEs.

2.2.4 Previous Studies on Circumstantial Meanings

This section reviews selected studies on Circumstantial Elements in SFL and non-SFL studies.

A multistrata view of circumstantial meanings is the focus of Dreyfus and Hao (2020). The paper established that the lexico grammatical approach to circumstantial meaning is inadequate. To provide a principled account for circumstantial meaning, they argue for the examination of the three strata of genre, register and discourse semantics. Using two texts only, the paper proved that a multi layered approach to circumstantial meaning is worthwhile. For historical texts they found spatio-temporal circumstantial markers as very important. In effect, the spatial – temporal properties provide factual information which builds the knowledge of historical events. Analysis of circumstantial meanings in the student's creative writing clearly demonstrated that 'ambience' is created by contextual meanings of the setting around the figure in the story. The study corroborates earlier studies in identifying location and time circumstances as a defining feature of historical texts. (Tong, 2012; Dreyfus & Jones, 2011; Coffin, 2006)

Dreyfus and Hao 2020 further assert that circumstantial meaning, is frequently misunderstood and treated as 'extra,' but it is crucial to the development of a text's genre and register. Similar sentiments can be found in Khorina (2018) who investigated circumstantial relational process clauses in

scientific texts. The data analysed in this study is three Mechanical Engineering text books. By using a qualitative approach and applying an SFL framework, she concluded that attributive relational processes occurred more often than identifying processes. The results also found four types of CEs which represent attributes. These included purpose, means, guise, and place, with the purpose being frequently used. The predominant use of a CE of purpose implied that circumstantial relational process clauses operate in attributive mode. CEs of purpose appear to realize attributes and values.

A number of studies looked at circumstantial meanings in the context of literary texts . Examples of such studies include Rahmasari and Nurhayati (2020) , Nurhasanah (2017) and Garllado (2006). Rahmasari and Nurhayati (2020) examined two characters in a novel using SFL in conjunction with content analysis. They affirm that an analysis of circumstantial elements reveal the power relations among the two characters. They presented two examples of phenomenon that can project other clauses which are augmented by some kinds of CEs. Phenomenon of fact was embedded with circumstance of Location, Extent, Manner and Matter. Secondly, Phenomenon of thought is mostly accompanied by Extent, Location, Manner, Cause and Role, with the most common circumstances for both types of phenomenon being Manner and Extent. The position of the authors, like many other systemicists, confirms that circumstantial meaning is optional because the study could not unveil functions of circumstantial meaning.

Similarly, Nurhasanah (2017) examined CEs in the ‘Taming of the Shrew’ another literary text. The study shows that out of the nine circumstances proposed by Halliday (1994), eight of them were found except

circumstantial adjunct of Angle. He reported varied percentage usage of each of the eight circumstances, the dominant type being Location. He also found that circumstantial adjuncts are essential in the clause because they occur with all process types. Garllado (2006) examined two plays focusing on how male and female characters are portrayed. The goal of the study is to examine the material, mental and relational processes in the transitivity system to unravel the power dynamics and gender issues hidden in the play. The circumstantial elements in all the processes were pivotal to the conclusions the study made.

Some studies focused on academic genres. These include Dreyfus and Bennett (2017), Chen (2016) and Marr and Martin (2021). Bennett (2017) analyzed four introduction sections in English and History. The focus was the semantic system of ideation. The findings confirm that circumstances of Location, Manner: Quality and Cause are dominant. Purpose circumstances were used to create an 'ambience' in literary works and develop knowledge in History. Other lexico-grammatical structures—qualifiers, processes and enhancing clauses, were found to serve circumstantial purposes. The authors noted that combined with the fact that CEs are viewed as peripheral in the analysis of the experiential meaning, they are an understudied topic in SFL. This may be because they have not yet been fully formed.

While Nurhasanah (2017) did not find angle circumstances in the data analysed, Chen 2016 specifically focused on circumstances of Angle. His argument was that researchers in English and Chinese have neglected this useful linguistic resource. His most important discovery was that whereas Angle can be both explicit and implicit in English, it is primarily explicit in Chinese until it is projected in writing. In addition, the English implicit mode

of Angle widens the meaning potential of projection, changing the usual meaning. In order to see the levels of projection, one might, therefore, argue for a two-dimensional classification of Angle. Chen concludes by arguing that because of Angle's distinctive grammatical property, it should be handled as a figure circumstance.

Marr and Martin's (2021) use of situations as a training tool for academic writing across meta-functions and their ability to provide disciplinary-specific insight were both successful. They expanded the definition of circumstantial meaning structurally to include clauses and post modifiers, similar to Dreyfus and Bennett's (2017) study (to better define ranked circumstances). Marr and Martin (2021) not only showed how describing the use of circumstantial meanings broadens students' linguistic and analytical skills and enables them to develop in-depth insights into the relevance of circumstantial meaning to academic discourse but also reveals how broadly circumstances generate the understanding of challenging academic materials.

A transitivity analysis of 15 memoirs written by English as a Foreign Language (EFL) students was examined by Wahyuni et al. (2019). The analysis discovered that the most dominant factors were Material process (338 data), human Participants (916 data), and Location, which accounted for the highest percentage of student papers. Emilia (2014) found that adverbs of time and place are typically utilised in narrative text in order to locate the events in order to emphasise the maximum count of circumstantial aspects of location. The majority of Location circumstances that appeared in students' texts were utilised to provide in-depth information about the setting of the story. The

authors visualised their experience by identifying the time and place of occurrences and incorporating those details into the clause structures, which helped the reader understand what they were trying to convey. Kaffashi et al. (2014) undertook a comparison of the way relational attributive clauses are expressed in English and Persian narrative texts using Halliday's (2004) transitivity scheme. The findings revealed general parallels between Persian and English. There were no statistically significant changes in the positions, number of participants, kinds of processes or in the ways that people expressed themselves (circumstances).

Some conclusions were made in Derewianka's (2021) investigation of the types of circumstantial adjuncts that are most frequently found in Jakarta post headlines News. In these headlines, there were eight different circumstances – Location, Extent, Role, Manner, Accompaniment, Cause, Matter and Angle except Contingency. Location adjunct was most dominant with a (42.57%). Mirzahoseini et al. (2015) investigated how adjuncts are expressed in English and Persian based on Halliday (2004) transitivity system. Using some English novels and their translated versions in Russian as source of data, English and Russian were almost similar in their use of adverbial and PPs and clauses to express experiential adjuncts.

None of the papers reviewed investigated CEs in the discussion section of RAs. Studies reviewed were rather genre or discipline focused, and their findings revealed conventions of the genres they investigated. The fact that so few research have been conducted exclusively on CEs and that there have been almost no attempts to examine them in the discussion portion of RAs is, therefore, rather evident. Although these academics contend in their studies

that circumstantial meanings are crucial to discourses, they also portray CEs as being unworthy of the position of auxiliary linguistic elements. The gap this study seeks to fill is to explore the rhetorical goals circumstances can perform and to debunk the notion that circumstance is a peripheral component in the transitivity system in SFL.

A number of studies have shown that CEs can perform varied rhetorical functions (Hinkel, 2004). Linking adverbials are useful in AW because they connect sentences, paragraphs/ideas or thoughts Peacock (2010) looked at linking adverbs in 320 RAs published in science and non-science fields from eight subjects. He examined the variation of frequency, form, and function of connecting adverbs in the RAs. The results demonstrated both an increase and a shift in the earlier use of connecting adverbs. He discovered an overuse of the semantic categories contrast, addition, and apposition in a subsequent analysis of the Longman Spoken and Written English (LSWE) corpus. Additionally, it showed that the results/inference category had a restricted use and that non-science disciplines used connecting adverbs more frequently than the sciences.

Lei (2012) also looked at linking adverbs in the AW of Chinese PhD students in comparison to those of professional writers. The findings showed that PhD students' writing used linking adverbs more frequently than expert writing. Over half of the 25 linking adverbs that were neglected were adversative, while 33 linking adverbs were found to be overused. Liu (2013) found that Chinese EFL learners used more linking adverbs in speech than in writing, which contrasts with native speakers' pattern of speaking and writing. This was found in a similar comparison of linking adverbs between Chinese

English as a Foreign Language (EFL) learners' writing and native speakers' corpora. This revealed that Chinese learners showed a tendency towards overusing linking adverbials. In addition to these findings, Chinese learners used adverbials differently in registers. For instance, they spoke with excessive use of corroborative adverbs while they wrote with inadequate use of them. Common to both studies is the over usage and under usage of certain categories of linking adverbials; these tendencies were due to factors such as semantic understanding, application of L1 principles and pedagogical instructions.

Using a corpus-based approach, Trebits (2009) conducted a study on conjunctive cohesion with focus on connecting adverbials and conjunctions in European Union (EU) documents, and she discovered that additives, temporal and causal as well as adversative, clarifying, and hypothetical adverbs were among the least frequently occurring classifications in EU texts. Additives outperformed all other categories by 2.4 times. Considering the previous studies discussed, it was observed that the appropriate use of adverbials is a hindrance to even advanced learners of English despite the fact that ESL and EFL learners had lessons in adverbs (Philips, 2008). There is also evidence of lack of awareness of functions of circumstances in genres which may be the reason a number of the studies conducted remained at a mere level of identification of circumstances.

2.2.5 Chapter Summary

Chapter Two reviewed key concepts that are related to the study. Key among them are disciplinary variations, circumstantial elements, discourse community, academic discourse, and genre and discussion section of RAs. .

The review acknowledged the existence of a network of disciplines which reveal variations with regards to AW. The Systemic Functional Linguistics Theory was discussed hereafter. The chapter also included various CEs from the SFL standpoint. The previous studies I evaluated demonstrated that the purpose of RA discussion sections is to influence readers by presenting arguments and assertions regarding the study's findings.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter discusses the methodological approaches used in this study. Thus, the chapter specifically described the research design and the data. It includes also data collection procedures, sampling method and data analysis procedure. The limitation of the fieldwork and the efforts made to address them are also covered in the chapter.

3.1 Research Design

The research used a qualitative research design. According to Lincoln and Guba (1985),

The human instrument is, in effect, the research instrument in the qualitative study. The researcher is the data gatherer, the data analyzer, and the data interpreter- and , indeed, the data are only 'data' because the researcher perceived them, recorded them and analysed them. The human instrument method is essentially what qualitative research is. (p. 242)

3.2 Data Source

Scimago Journal rankings database was the source relied on. Articles were selected for the period between December 2020 and the first quarter of 2021. This was the closest period to when I planned to collect data for this thesis. The journals I chose for the study are shown in Table 5.

Table 5: Journals Selected in the Disciplines

Discipline	Selected Journals
History	<i>Anthropological Journal of Archaeology</i> <i>Journal of Ecological Science</i>
English	<i>Applied Linguistics</i> <i>Journal of Literacy Research</i> <i>Studies in Second Language Acquisition Journal</i> <i>Journal of Second Language Writing</i>
Geography	<i>Global Environmental Change</i> <i>Economic Geography Journal</i> <i>Weather and Climate Extremes</i>
Psychology	<i>Psychological Review</i> <i>Journal of Psychological Bulletin</i> <i>Journal of Personality and Social Psychology</i> <i>Clinical Psychology</i>
Mechanical Engineering	<i>Nature Materials Journal</i> <i>Advances in Mechanical Engineering Journal, Journal of Mechanics</i> <i>International Journal of Mechanical and Materials Engineering</i>
Chemistry	<i>Chemical Engineering Journal</i> <i>Journal of Archaeological Science</i>

	<i>and Environmental Science and Technology.</i>
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The journals were chosen based on their interdisciplinary approaches, methodologies and high impact factors, which ensure a collection of rich scholarly works. The selected journals also reflect the multidimensional nature of the present study. These factors allow for a distinct exploration assessment of the connection and strains between natural and social systems. By drawing on these perceptions, the study seeks to contribute to a profounder understanding of circumstantial elements in the discussion section of RAs across selected disciplines.

3.3 Data Collection Procedure

The articles were retrieved from the internet and hard copies were printed. After carefully selecting articles that would serve the purpose, the articles were sorted according to specific disciplines and the discussion sections were highlighted since it was the focus of the investigation. Articles with only discussion sections in the various subjects were chosen while those with results and discussion sections merged were excluded.

Alpha-numerical codes were assigned to the articles so that in case any distinct attribute of writers emerged, the researcher would notice and draw attention to it. For instance, the first article selected for English was coded ENG 001. The data were manually coded in order to identify all the variables required for the investigation.

3.4 Description of the Corpus

The corpus was made up of discussion sections of 60 RAs selected from six subjects (see Table 6).

Table 6: Selected article samples across disciplines and subjects

Discipline	Subject Area	Sample Size
Humanities	History	10
	English Language	10
Social Sciences	Geography	10
	Psychology	10
Pure Sciences	Chemistry	10
	Mechanical Engineering	10
Total		60

Table shows the three major disciplinary areas and the subjects that were selected from each. It also shows that ten (10) articles were sampled for each subject, making a total of sixty (60), which is thought adequate for the study.

3.5 Sampling Procedure

This study employed the non-probability sampling method specifically, purposeful sampling. A qualitative description of meanings, concepts, definitions, traits, metaphors, symbols, and descriptions of things is emphasised in qualitative research, and this technique supports it (Lune & Berg, 2017). The method was used to choose subjects from the three main disciplinary domains, the Hard Sciences, Social Sciences, and Humanities. Given the time allotted for the study and the difficulties involved in manually working on the data for results, the sample size is deemed reasonable and appropriate.

Another factor which led to deciding on the sample size of 60 as adequate was the fact that each article selected had numerous CEs. This was evident from the pilot study that was undertaken. A sample of 6 articles (three each from Geography and Sociolinguistics yielded 166 CEs. It was therefore assumed that the selection of 60 articles would yield over 1500 CEs. It is hoped that those individual cases will be adequate for any manual analysis.

Finally, a number of previous studies on CEs used a corpus that was less than ten. For example, Dreyfus and Bennett (2017) had a corpus of four, Dreyfus and Hao (2020) had two and Charles (2007) had sixteen. On the basis of this argument, I believed a sample of 60 is adequate for the current study.

In selecting samples for each subject area, some criteria were considered. First, subject areas that typify each of the three broad fields were considered. In the Humanities, History, and English were chosen because they were subjects the researcher had a particular affinity to and was personally interested in finding answers to how system choices are made in them. The goal of History as a subject is also different from English. While History seeks to analyze and argue about past events, English deals with the various aspects of language and the arguments based on observable attributes of language. The intriguing diversity in the approach of these two subjects was the reason for selection.

In the Social Sciences, Geography and Psychology were selected because apart from the fact that they represent core subjects within the discipline, Geography is broad enough to be representative of the Social Sciences, given its many branches (Physical, Human, and Environmental). Psychology, though classified as Social Sciences is also quite different from

Geography in the sense that while Geography focuses on the external environments of man, psychology focuses on the observable behaviours and cognitions of man. It could be interesting to find out if these subtle differences would influence the use of CEs.

The Hard Sciences are represented by Chemistry and Mechanical Engineering on the basis that they are too far apart even if they are classified together. Chemistry is a Pure Science, while Mechanical Engineering is an Applied Science. On the whole, the selection took into consideration the diversity that exists in the disciplines that are often put under one umbrella.

In general, the subjects were selected after a cursory reading of the existing literature on their rhetorical moves. Some of these subjects feature predominantly in the extant literature. Thus, it can be easier to relate my findings to the existing research.

3.6 Data Analysis Procedures

A key requirement in qualitative research is the delineation of analytic procedures to ensure that the procedures can be trustworthy and easy to replicate in subsequent studies.

In answering the first research question, all instances of CEs occurring in the data that could be considered PPs and adverbials were counted, irrespective of where they occurred in the clause. Given that circumstances are variously defined in the literature, grammarians aligned to SFL have their points of departure on what constitutes circumstances. The CEs selected for this study included those that were thematic, those that were in the Rheme of the clauses and those that were marked.

- a. **Accordingly**_[marked adjunct], English educators have begun to offer strategies for teaching critical media literacy in a post truth era. (DIS ENG 004)
- b. **As a result of the spatial vagaries**_[marked PP], the global results hardly ever correspond with the local outcomes and they obscure associations between household formation markers far exceeds that predicted by Hajnal. (DIS HIS 010)

Accordingly in (a) *as a result of the spatial vagaries* in (b) are thematised circumstances that have been given prominence in the clauses.

- c. This is **in spite of the fact that all their stimuli appeared in predetermined groupings which favoured HA**. (ENG INTP 009) In clause (c), the PP is the Rheme and provides information about the Theme *This* and is unmarked.

I selected all PPs and adverbial elements that could stand as a unit and be analysed as a grammatical unit. In cases where there were CEs embedded in other CEs, the larger unit was considered.

- d. **By varying the temporal unit in the STUM**, it is quite clear we witness a change in home location at the weekly scale. (DIS GEO 009)
- In clause (c), *by varying the temporal unit and in the STUM* are embedded so I counted such circumstances as a unit.

In answering the second research question about the semantic types of CEs, the embedded structures were made to stand alone if they performed a different semantic role other than the superstructure. An instance is shown in the clause below:

- e. **Even though Sweden has a relatively low PV penetration level from an international perspective (0.3% in 2018 [85]),** DSOs are already experiencing some issues, not least because new PV systems are often reported to the DSO after the installation is done. (DIS MECH ENG 010)

In the extract above, *from an international perspective (0.3% in 2018 [85])* is a Viewpoint circumstance embedded in the Concession circumstance *even though Sweden has a relatively low PV penetration level*. Though both circumstances belong to different categories, they were analysed as a single unit due to the semantic meaning they conveyed together.

The third research question dealt with rhetorical goals that are exuded by circumstances in the disciplines. Four moves, according to Nwogu's (1997) move analysis model of the RA, were selected to answer the question. They are Move 1 (Highlighting overall research outcome of the study), (Explaining specific research outcomes), a sub-move in Move 2 (contrasting present and previous outcomes), (Interpreting the research outcomes) sub-move in Move 3 and (promoting further research).

This study is qualitative research which adopted a discourse analysis approach. This approach involves coding the data by reading each text and identifying key linguistic variables of interest to me. The key variables were underlined and labelled. For instance, structural CEs that are PPs were labelled 1 and 2 for adverbial groups in the texts. Three categories of semantic types of CEs were also coded in the data. The nine basic types of CEs were coded 1, 2, 3...9. The sub-types were coded, using their first or first two letters which

were attached to the tag of the ‘mother’ CEs. Hence, the coding generated for Extent and its sub-types – distance, duration and frequency for example read:

Extent – distance →1di,	Extent – duration →1du,
Extent – frequency →1f,	Location – place →2p
Location – time →2t,	Angle – viewpoint →9v

The classifications described above were further put into much broader categories – enhancing, elaborating, extending and projection. These categories were shown graphically.

After the keywords were identified with codes, I counted and summed the various categories of both structural and semantic CEs. The totals were used to tabulate and graphically present the data. The tables and graphs enabled me to compare outcomes and interpret observations made from the data. Further interpretations were deduced by citing relevant examples from the papers which supported the claims made by authors and conclusions were drawn.

3.7 Validity and Reliability Concerns

By taking into account certain factors, the study's validity and reliability were ensured. Firstly, the data was coded and analysed with the aid of a structured scheme for identifying CEs in SFL. Secondly, data analysis was done in phases by coding data from one discipline in each of the three knowledge domains in turn to ensure that as I interrogated the data and new insights occurred, the scheme could be consistently applied to data in all disciplinary sets.

Moreover, I believe that by providing adequate description of the data, citing examples in context and making deductions and assigning probable

reasons for the choices made by authors, adequate insight can be made. In all cases, instances were provided in context. Consultations were made in areas where I had challenges. My supervisor and colleagues were consulted especially in areas where disagreements could not be resolved by consulting the literature.

Finally, a sample each from the three broad knowledge domains was given to a colleague to code and the inter-rater reliability scores were computed. A score of 0.82 was obtained.

3.8 Problems Encountered During Data Collection and Analysis

I intended to rely on papers from print versions of publications that the University of Cape Coast's main library (Sam Jonah Library) subscribes to when I set out to gather data for this study. My visit to the Periodicals and Journals section of the library and an interaction with a library staff who took me round the shelves revealed that the journals were dated and had gathered dust. The Staff explained the University currently subscribes to soft copies. I resolved this challenge by resorting to electronic means to collect data. The staff at the UCC library were very instrumental in obtaining passcodes to journals whose content I had access. Without their valuable support, obtaining the data and converting them into meaningful forms would have been challenging for me.

Another challenge I encountered in the study was coding of the data. Though Halliday and Matthiessen's (2014) classification scheme of circumstances was adopted as a guide, I had to deal with the appropriate placement of some lexical units in the various categories. I cleared the confusion by relying on my Supervisor and a Senior Lecturer in the

Department who constantly responded to my emails, text messages, in-person visits, and phone calls.

Another setback was the inability to obtain enough empirical research to compare my results with. This is because the work on discussion sections of RAs and CEs in RAs are very few and some of the existing ones required making substantial payments to access them. With the assistance of my friends and colleagues, I had access to several of them. Joining virtual communities of like-minded scholars was my main source of obtaining relevant literature suggested by my Supervisor and peers. Without reaching out to others, it could have been difficult to get the information on my own within the given time frame.

3.9 Chapter Summary

The study's techniques and procedures were outlined in this chapter. It began with the description of the research design, data source, data collection and sampling procedures, among others. The chapter also discussed steps taken to attain valid and reliable results and the methods of analysing data. Finally, the challenges encountered in the field work and data analysis were discussed.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.0 Introduction

The results of the analysis and discussion are presented in this chapter. There are four sections to the chapter. In the first section, the various types of circumstances obtained from the analysis are presented with frequency tables and graphs. In the second section, variations in the use of circumstances across the six subjects are discussed. The third section discussed the semantic categories of circumstances used in the three disciplinary fields, while the fourth section covered the rhetorical functions that the CEs often executed in the disciplines. It ended with a summary of the chapter.

4.1 RQ1: Structural Types of Circumstantial Elements in Discussion Section of RA in Selected Discipline

There are variations in the structural representation of circumstances in the disciplines. Variations in the use of circumstances also emerged in the Theme and Rheme positions in clauses. Table 7 presents the distribution of circumstances in terms of forms and frequencies across the disciplines.

Table 7: Structural Types of Circumstantial Elements across Disciplines

Discipline	Subject	Prepositional phrase	%	Adverb phrase	%	Total
Humanities	History	1,636	58.91	668	55.43	2,304
	English	1,141	41.08	537	44.56	1,678
	Total	2,777		1205		3,982
Social Sciences	Geography	923	44.18	390	45.66	1,313
	Psychology	1,166	55.81	464	54.33	1630
	Total	2089		854		2,943
Hard Sciences	Chemistry	1,031	50.44	379	60.15	1410
	Mechanical Engineering	1,013	49.55	251	39.84	1264
	Total	2,044		630		2,674
	Overall total	6,910		2689		9,599

As shown in Table 7, structural types of CEs in the form of PPs and adverbs were used generously in all the disciplines. PPs were used more than adverbials. History recorded (58.9%) of PPs and English had (41.0%) for the same category. (44.1%) and (55.8%) of PPs were used by Geography and Psychology respectively. Chemistry and Mechanical Engineering which represent the Hard Sciences used (50.4%) for the former and (49.5%) for the latter.

Regarding the use of adverbs, History and English had (55.4%), and (44.5%) respectively. Geography recorded (45.6%) while Psychology used (54.3%) of adverbs. Chemistry recorded (60.1%) while Mechanical Engineering used (39.8%). Chemistry appears to be the only subject which preferred more adverbs to PPs. Comparing the data from the Humanities and Social Sciences, only these two from the Hard Sciences displayed substantial margins in their use of adverbs. Table 7 again showed that the percentages reported for PPs within subjects of disciplines are almost insignificant. This observation is the same for adverbs. However, vast differences emerged when the percentages between PPs and adverbs are compared within and across disciplines. Surprisingly, the Hard Sciences recorded the highest use of PPs and least used adverbs.

The dominance of circumstances in all disciplines suggests that circumstantial meaning is indispensable to the disciplines in making logical arguments in their discussion sections of RAs.

As a result, prepositions can be seen as significant categories in terms of the English Language, supporting the claim made by Mindt and Weber (1989) that every eighth word in the language is a preposition. This finding can

be viewed as a "global probability," which is "pertaining to the language as a whole, in all contexts and registers" (Halliday & Webster, 2009, p. 252), meaning that it reflects broad features of the English Language.

Figure 1 below shows distribution of adverbs and PPs across the three disciplines.

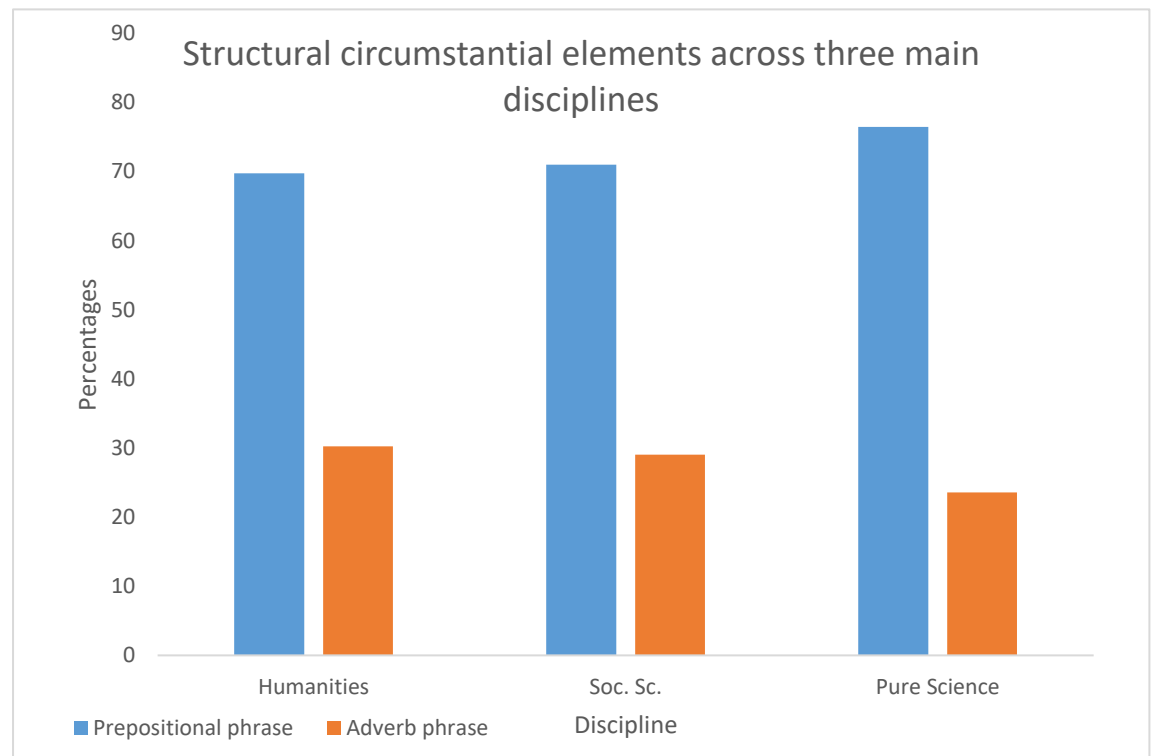


Figure 1: Structural Cicumstantial Elements across Disciplines

With reference to the graph in Figure 1, the three major disciplines employed more PPs than adverbs though the proportions of both PPs and adverbs varied across the disciplines. This result aligned with Halliday and Matthiessen (2014) and Downing and Locke (2006), who describe CEs as non-nominal groups which are either adverbs or PPs with usually a more frequent use of the latter.

Prepositional phrases and adverbs were also thematised. Though the present study did not focus on thematisation, I observed their use in the data.

According to Halliday (1999), Theme is the starting point of the message, what the clause is about. Theme is the element that occupies the initial position in the clause, and the part of the clause that expands the the Theme is called Rheme. In furtherance, Theme may be realized by a nominal group, verbal group, adverbial group, prepositional phrase or a dependent clause. The Rheme on the other hand, is information the listener already has access to. Hence, a marked Theme is a topic or a lexical group, which, under normal circumstances will not have been the subject of the clause, but receives attention because it is not what readers expect to find. When a Theme is unmarked, it has assumed the usual position of the subject of the clause. In the context of the present study, it is the adverbial group and the prepositional phrase that are CEs, and occur in Theme and Rheme positions that are highlighted. Some examples of circumstances markedly used in discussion sections of the RAs are illustrated below:

1. **‘In a previous study**, we used a similar design to compare the effects of PS MPs on natural clay particles’. (DIS MECH ENG 004). (Marked theme)
2. **‘Without significant alteration in the thread dimensions and friction coefficient**, same difference at each loading and unloading process can be expected from theoretical point of view’. (DIS MECH ENG 002). (Marked theme)
3. **‘Given that in the present research the CLPM and RI-CLPM were the only models that converged consistently**, we focus on these two models’. (DIS PSYCHO 007). (Marked theme)

4. **‘Despite his great efforts and obvious progress,** he did not manage to get into high school in time and was expelled from Sweden, after my fieldwork has ended and soon after he turned 18’. (DIS ENG 010). (Marked theme)
5. **‘At Makri and Dikili Tash,** grape pips and grapevine charcoal have been discovered in the same contexts and interpreted as indications for early grapevine management as the joint discovery of seeds and charcoal is strong evidence of cultivation’. (DIS HIS 001). (Marked theme)

The PPs and adverbs which occupied the frontal position in the clauses above show that CEs can function as sources of thematic information which gets elaborated on in the Rheme. From the examples, extracts (1) and (5) are simple in structure whereas the others had some degree of complexity. The data seems to suggest that because of the demands of academic communities, the writers of discussion sections of RAs pack much information into circumstances in Theme position. The next group of clauses show instances of unmarked CEs which were found in the Rheme of clauses of discussion sections of disciplines.

6. **‘The phenomenon was different from the aforementioned jerked motion at lower loading because the torque was not immediately recovered’.** (DIS MECH ENG 002). (unmarked)
7. **‘In general, these predictions were upheld for both languages’.** (DIS ENG 007) (unmarked)

8. ‘We operationalised face identity discrimination **as the ability to recognise a face by invoking a mental representation of face identity in the absence of the percept**’. (DIS PSYCHO 005) (Rheme)
9. ‘This finding challenges the current policy discourse **in India** which frames development and climate change management **as incompatible**’. (DIS GEO 001) (Rheme)

The instances of PPs and adverbs in Rheme position in the clauses above show that CEs can equally perform explanatory functions. It will be worth exploring in a future study the degree of complexity of CEs in Theme and Rheme positions. Extract (8) above, for example, has four circumstances embedded in one. *as the ability to recognise a face*[PP 1] *by invoking a mental representation*[PP2] *of face identity*[PP3] *in the absence of the percept*[PP4]. They can function differently in their separate forms, however, they convey a better meaning in an embedded form. This example was from Psychology. Extract (6) from Mechanical Engineering also has embedded circumstances. *from the aforementioned jerked motion*[PP1] *and at lower loading*[PP2] *because the torque was not [immediately]*[PP3] *recovered*[PP4]. As seen in extract (8), the embedded circumstances have different meanings but are more meaningful as one unit.

4.2 RQ2: Semantic Types of Circumstantial Elements in the Discussion Sections of RAs in the Selected Disciplines

There is the concept of logico semantic connections that expand clauses. Expansion and Projection are the two types of expansion. Enhancing, Elaborating and Extending constitute the expansion type, the Projection type (Halliday & Matthiessen, 2004). The nine semantic types and the twenty-one sub types of circumstances are classified under the expansion categories based

on their functions. The Enhancing group comprise Extent, Location, Manner, Cause and Contingency. Extending category covers Accompaniment, Elaborating includes Role while Projection includes Matter and Angle. Table 8 shows frequencies of the semantic kinds and sub-types.

Table 8: Semantic Types of Circumstantial Elements across Selected Subjects

		English%	History%	Geog%	psychology%	mec eng%	chem%	number	Total%
Extent	Distance	14.29	17.86	28.57	17.86	10.71	10.71	28	0.25
	Duration	11.63	25.58	4.65	18.60	20.93	18.60	43	0.38
	Frequency	24.00	0.00	32.00	12.00	20.00	12.00	25	0.22
Location	Place	13.67	19.39	12.22	13.64	16.29	24.79	3388	29.84
	Time	15.03	21.88	11.01	10.42	16.67	25.00	672	5.92
Manner	Means	16.92	25.71	15.60	12.97	12.97	15.82	455	4.01
	Quality	15.80	21.80	14.07	15.34	5.31	27.68	867	7.64
	Comparison	25.76	22.35	16.29	13.64	6.44	15.53	264	2.33
Cause	Degree	14.88	23.66	15.85	13.90	9.27	22.44	410	3.61
	Reason	14.85	15.38	18.30	15.92	12.73	22.81	377	3.32
	Purpose	13.16	22.51	12.28	14.62	9.65	27.78	342	3.01
Contingency	Behalf	13.13	18.99	15.08	19.83	10.06	22.91	358	3.15
	Condition	5.56	22.22	17.78	34.44	1.11	18.89	90	0.79
	Default	20.00	20.00	30.00	10.00	0.00	20.00	10	0.09
Accompaniment	Concession	17.38	17.38	14.52	17.86	8.57	24.29	420	3.70
	Comitative	19.29	17.44	12.35	14.81	12.50	23.61	648	5.71
	Additive	14.90	20.30	12.96	14.04	9.72	28.08	463	4.08
Role	Guise	16.46	20.70	12.22	11.22	12.97	26.43	401	3.53
	Product	12.82	28.21	20.51	5.13	5.13	28.21	39	0.34
Matter		16.75	17.11	12.50	14.70	16.91	22.03	1952	17.19
Angle	Source	2.47	28.40	16.05	17.28	7.41	28.40	81	0.71
	Viewpoint	40.00	15.00	15.00	20.00	10.00	0.00	20	0.18
	Total	15.43	19.74	13.30	14.39	13.33	23.82	11354	100.00

From Table 8, Location (Place) circumstances were dominant (29.84%) followed by Matter (17.19%). There were higher frequencies of Comitative and Concession circumstances especially in Chemistry (Concession: 24.29%; Comitative: (23.61%) and English (Concession: 17.86%; Comitative: 19.28%). The fact that Chemistry (24.29%) used more of Concession than English (17.86%) is worth exploring further. Additionally, the table showed that Chemistry (25%) and History (21.88%) favoured the use of time circumstances (above 20%). Crucially, there were no Default circumstances from Mechanical Engineering but they were present in all the other subjects. Viewpoint circumstances were largely used in English (40%).

Of the location clauses, Chemistry topped with (24.79%) and History followed with (19.39%). This is worth noting because it has been established by Martins (2002) that History makes use of Location clauses. However, the present research showed that Chemistry used more. This may be attributed to the need to accurately describe where the chemical reactions and changes occur. Just as Historians rely on Location to describe past events, Chemistry authors are obliged to specify exact locations and conditions under which reactions occurred.

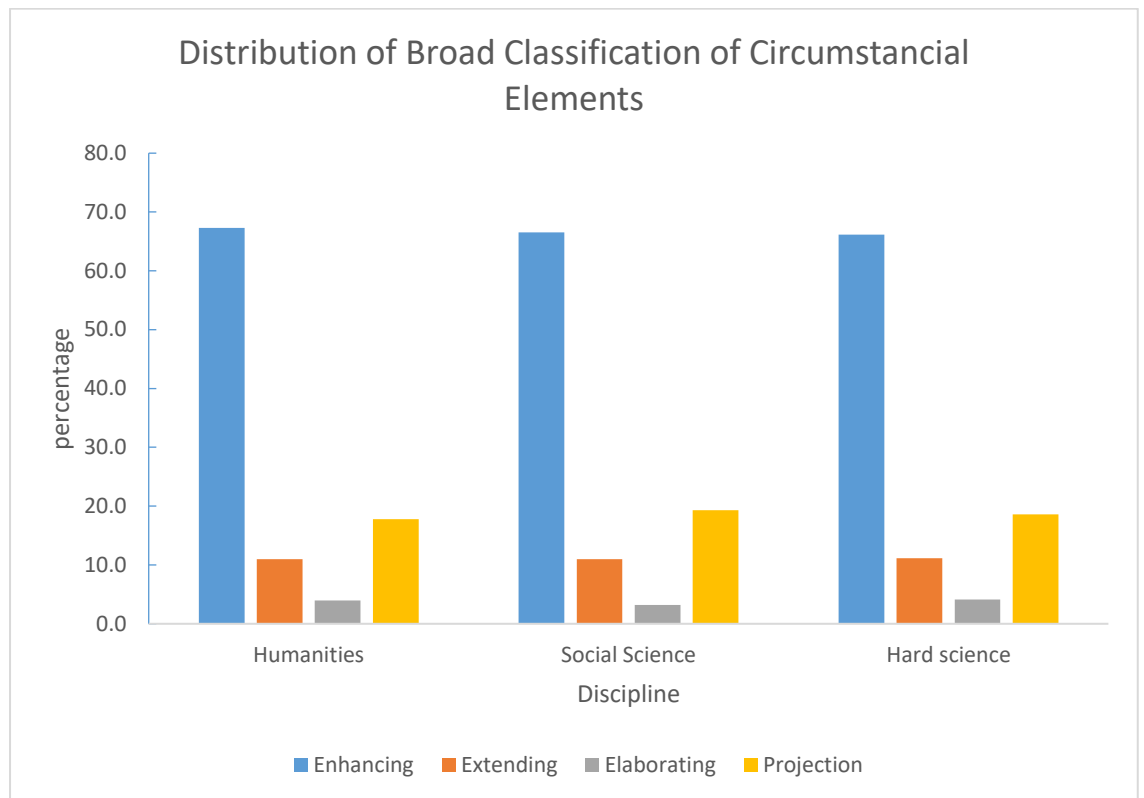


Figure 2: Broad Classifications of Semantic Circumstantial Elements

The four main classifications of CEs were employed by the disciplines in the discussion sections of RAs. Enhancing category was most used and constituted (45%) of circumstances in the entire database. This outcome is not unexpected because it is consistent with Halliday and Matthiessen's (2014:313/314) taxonomy of circumstantial factors, which includes five (out of the nine) types of CEs: Extent, Location, Manner, Cause, and Contingency in the enhancing category. The enhancing circumstances expand meaning by explaining the clause in terms of the types mentioned earlier. Hence, authors employ enhancing circumstances to explain arguments. Individual disciplines recorded these percentages: (13.6%) each for English and Psychology, and (19.3%) for History against (24.7%) for Chemistry. Geography had (12.2%) while Mechanical Engineering used (16.2%).

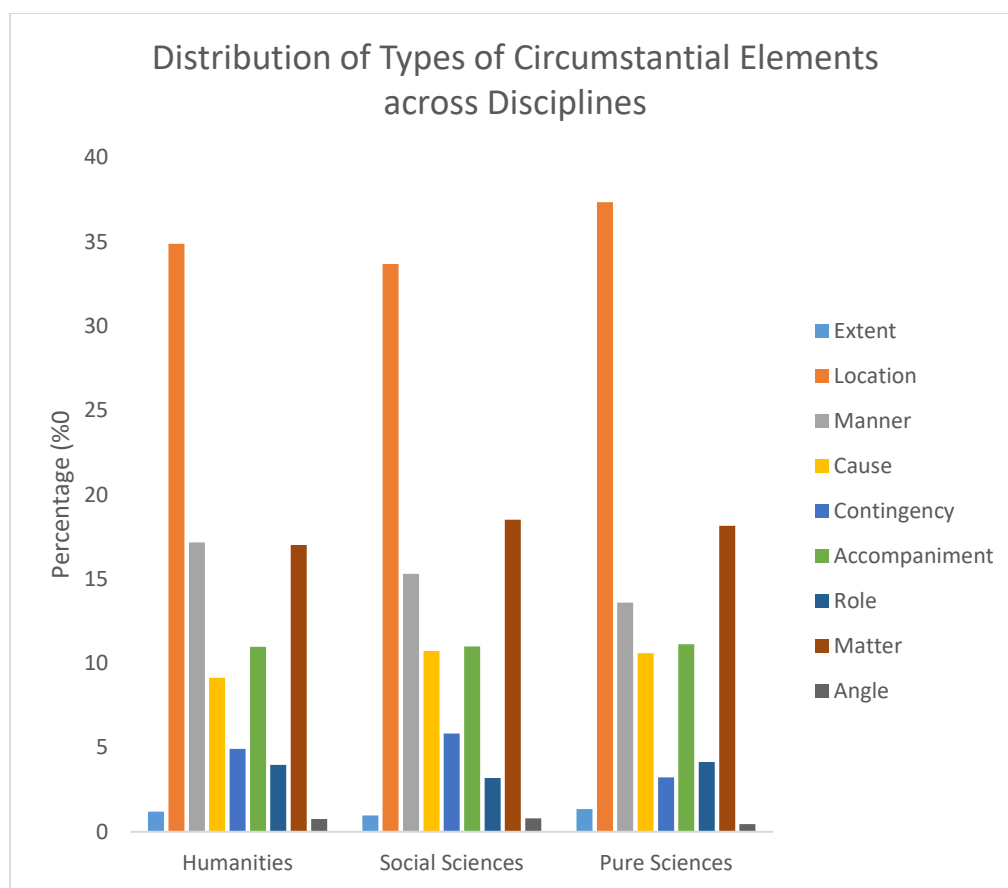


Figure 3: Types of Circumstantial Elements Across Selected Disciplines

Figure 3 shows frequencies of the nine types of CEs. Place, Matter, Manner, Accompaniment, and Cause circumstances dominated the data. The dominance of Location circumstances and its distribution across the disciplines is very interesting. The data showed their use is related to the disciplinary culture. The Hard Sciences used location clauses to refer to precise locations of objects and times events under investigation occurred and what was done in experiments or reactions that took place. Location in the Social Sciences and Humanities deal primarily with physical and abstract places together with time which were needed for arguments. To make this clearer, Figure 4 provides a presentation of the semantic types of circumstances in the selected disciplines. Subsequently, the relevance of

Location circumstances in History and the meanings they convey in the discussion section of the RA are explained.

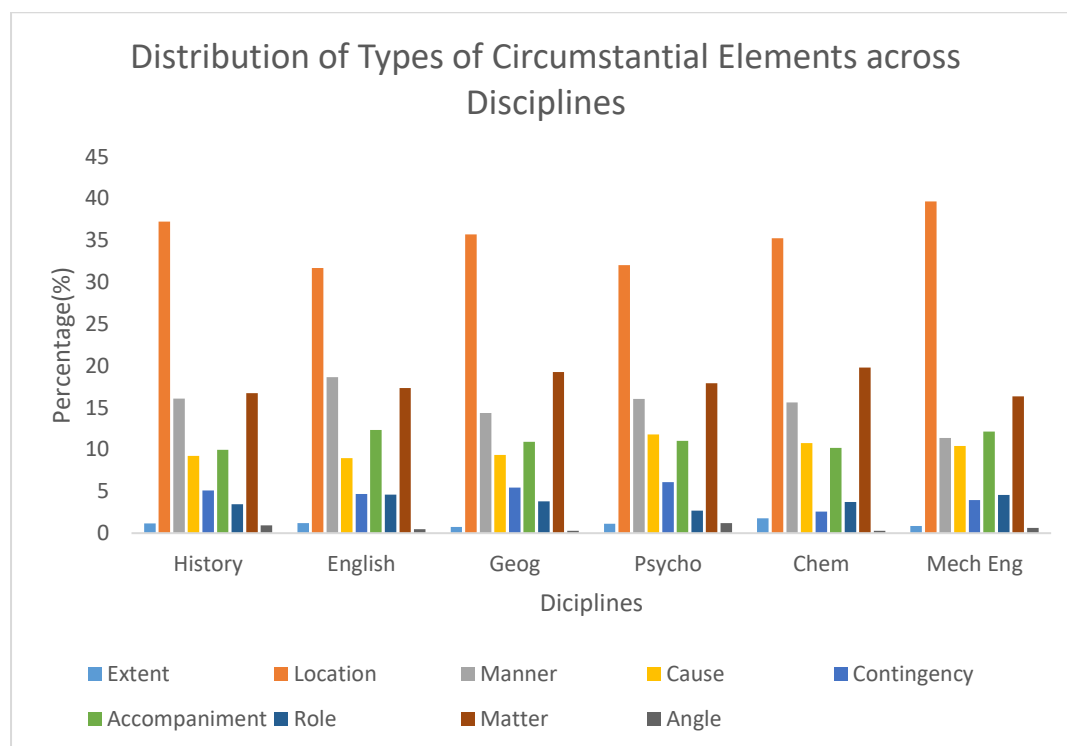


Figure 4: Distribution of Circumstantial Elements Across Subjects

In Figure 4, Location circumstances were the most frequently used especially in the Hard Sciences, History and Geography. Mechanical Engineering recorded (39.6%), Chemistry (35%), while History had (37%) and Geography (35.7%). This result agrees with Dreyfus and Bennett's (2017) observation that Location in Place and Time circumstances, among other functions, made reference to specific geographical locations of importance to the writers. They studied circumstantial meanings in the introduction sections of RAs in History and Inorganic Chemistry. Writers after foregrounding expanded their subject through description and explanation. Some examples are:

10. 'Fourth, **in Indian households**, daughters typically move in with the in-laws after marriage, and sons continue to reside with parents.' (DIS HIS 008)

11. 'Thus, the links between the number of children or short intervals and stunting are not attributable **to parental attitudes towards particular children** whose addition to the family may have been undesired.' (DIS HIS 009)

Place circumstances state facts in order to persuade readers:

12. 'Even **in arid regions such as Libyan Sahara**, the independent inception of dairying practices by mobile pastoral groups has been dated to the fifth millennium BC.' (DIS HIS 002)

13. 'An adequate response **to a more stringent legislation** requires the will and ability to transform regulation into implementation.' (DIS HIS 005)

From the above examples (extracts 10 – 13), though facts were stated, writers also elaborated their facts in order to gain acceptance and achieve the purpose of argumentation in the discipline. Place circumstances show relationships between entities. These entities may be concrete and tell where the events being discussed occurred, abstract places which reflect the area of research and academic register.

14. 'The observed discrepancy **between faunal remains and compound specific isotope results** raises several hypotheses.' (DIS HIS 002)

From the above examples (extracts 10 – 14), the circumstances may be showing differences and similarities.

Time circumstances, on the other hand, interpret historical events in terms of time past, present and future. In other words, these circumstances show different time lines events occurred.

15. 'In their natural environment, wild boars are opportunistic omnivores, and feed predominantly on plants, including roots fruits, stems and leaves, and acorns, and beech mast **when available.**' (DIS HIS 007)
16. 'Pollen records indicate that the plant was growing in Greece **during the Pleistocene and from the Early Holocene onwards.**' (DIS HIS 001)
17. 'Both pig post-cranial bones and teeth increased in size **in the 7th and 8th centuries** while, **in the following 9th and 10th centuries**, they decreased.' (DIS HIS 007)
18. According to seeds and fruit remains, grape was consumed **from the Early Neolithic (7000-5200 BC)** in the Peloponnese and Thessaly.' (DIS HIS 2t 001)

Irrespective of the use of location circumstances as temporal or spatial, one key feature is characteristic of the discourse of History: it interprets phenomena by establishing the sequence in time and setting in time (Martin, 2002). For instance, in the examples above, temporal circumstances such as *when* (extract 15), *during* (extract 16) and *from* (extract 18) were employed to organize happenings in a particular sequence. In extracts (15), (16) and (18), setting in Time circumstances were used to describe specifically the happening of an occurrence. Such chunks of time are treated as proper nouns; *Pleistocene and the Early Holocene* (extract 16) and *Early Neolithic (7000-5200 BC)* in extract (18). This way of packaging time makes it easier for

historians to examine and refer to them because they have become part of the accepted conventions in the subject. Martin (2002) further distinguished between actions sequenced in time by both implicit and explicit temporal connections. The present investigation was only able to deal with the explicit temporal markers and the summary data shows that History used much more temporal circumstances than the other disciplines. An analysis that will focus on both the implicit and the explicit temporal markers may highly be of interest to scholars interested in the discipline, History.

4.3.0 The Use of Location Circumstances in English

Location in place and time circumstances are equally present in the English data. Place circumstances perform ‘destination’ roles; this means they serve as end points where an activity happens, and these can be concrete or abstract entities. Unlike in History where the location and time circumstantials enhance the argument and description of the RA by putting it in a spatio-temporal context, in English, CEs are used for purposes more akin to contextualizing the argument in the area of methods employed, how results align or misalign with existing claims and the extent to which the claims made by the authors are valid. Some examples that are used to contextualize methods used as part of argumentation include the following:

19. ‘The reliability of many of our individual MC tests was, however, somewhat lower than that of the total battery and more similar **to several previous single instruments** that were reviewed.’ (DIS ENG 008)

20. ‘Research on L2 adolescents with emergent literacy is sparse and often focuses on cognitive factors related **to alphabetic print literacy.**’ (DIS ENG 010)
21. ‘That understanding should lead us to consider deviances **from the standard** not as errors, but as a starting point for improvement.’ (DIS ENG 002)
22. ‘The difference **between these two CAFL components** which is not immediately predictable from SAT, may perhaps be accounted for by the context-specific nature of lexical learning.’ (DIS ENG 007)
23. ‘Although Hopp reports a correlation **between WM and proficiency,** he did not effect for proficiency alone.’ (DIS ENG 009)
24. ‘Our systematic and staged data cleaning resulted in the removal of 38 per cent of the items seen by test-takers, which aligns with Littlemore’s reduction (of 29, 33 and 50 per cent) **after piloting,** and highlights steps needed to maximize the validity and reliability of tests measuring MC constructs.’ (DIS ENG 008)
25. ‘This review suggests that for many researchers, ‘culturally relevant’ and ‘culturally responsive’ refer **to the same concept:** providing instruction relevant to the cultural experiences of students from minority groups.’ (DIS ENG 005)

The circumstance in Extract (19) refers to the research instrument. The circumstances in extracts (20) through (25) are useful in understanding the context of the research in terms of instruments used, assumptions made or the clarity of terminology adapted. Curiously, extract (25) further lends credence to the constant contestation of ideas and the fluidity of terminology that

characterizes the Humanities. The extract shows that two seemingly different concepts are used interchangeably. The role of CEs in all the cases help the writers to provide contextual information relevant in making their claims. Some examples to illustrate alignment or misalignment of results with existing literature are:

26. 'However we note that direct comparison **between our findings and previous findings** is complicated by the mix of participants.' (DIS ENG 008)
27. 'Paris' ideas were published **more recently**, and scholars may centralize culturally sustaining pedagogies with time.' (DIS ENG 005)
28. 'Our finding that sensitivity to break cues correlate **with proficiency** mirrors what was observed earlier by Liljestrand Fultz (2007).' (DIS ENG 009)
29. 'Crucially, Hopp's offline task required participants to read the stimuli, so it is indeed conceivable that they were inserting a break at that point **in their silent reading**.' (DIS ENG 009)

Extract (26) has a circumstance that showed comparison with previous studies and problematizes why similarity cannot be drawn. In extract (27) the circumstance added a dimension of currency to the alignment to a previous study whereas extract (28) alluded to correlation as a basis for alignment. In extract (29) the circumstance was used by the present writer to argue for the acceptance of what a previous researcher did. From the extracts, History used Location more to refer to specific places and time periods, while English used them to contextualize arguments.

Further, in English, Place circumstances function as a source of reference. In such cases, writers explain the referent or give reasons for the choice of a referent or as solution. For example, authors focused on a referent and clarified the importance of their choices in extracts (30) and (31). In extract (32), the referent is the target learners wished to achieve.

30. 'The assumption can be made, then, that perceptual issues may largely reside **within the individual learner**, as opposed to being a necessary condition inherent in all adult learners new to print literacy.' (DIS ENG 001)

31. 'All three students expressed the desire to invest **in learning to write**.' (DIS ENG 010)

32. '**In the current climate of accountability**, adults who have difficulty reading are not 'the right people' to participate in publicly funded ABE programs.' (DIS ENG 006)

Place circumstance were also found showing the relationship between entities. This feature emerged when writers wanted to show a difference or a similarity. These Place circumstances were either concrete or abstract. Instances of these are:

33. 'ES magnitudes of improvement **between** Presojourn-Insojourn 1 and Presojourn-Insojourn 2 were small-to-medium for fluency and medium-to-large for lexis, indicating considerable improvement over the course of SA.' (DIS ENG 007)

34. '**In the two sentence types where LENGTH points to HA**, NP1 differs in length and the corresponding RC matches it in length;

similarly, **in the two sentence types where LENGTH points to LA, NP1 differs in length**, as does the corresponding RC.’ (DIS ENG 009)

35. ‘However, we note that the direct comparison **between** our findings and previous findings is complicated by the mix of participants.’ (DIS ENG 008)

From the extracts, (30 – 35) above, Place CEs compared results of two situations and the arguments were structured to highlight the exact findings which were measured, as well as the findings that emerged from the comparisons. In extract (33), the result indicated an improvement; in extract (34) a difference emerged; and, in extract (35), a complication was identified. Hence, distinctions emerge when authors in English use Place circumstances to construct relationships. Time was used to indicate various time lines of doings such as past, present and future in English. Examples include the following:

36. ‘Similarly, as consistent with the literature, when needing to glance back and forth (to copy letters entailing multiple shapes) she **often** lost her place, producing incomplete letter forms.’ (DIS ENG 001)
37. ‘Furthermore, the gains made **during SA** for fluency and lexis appear to have been maintained on return to the instructed context.’ (DIS ENG 007)
38. ‘The IP in (19) was posted **in November 2016** that is, five months **after the Facebook account was opened.**’ (DIS ENG 003)

An observation of the above examples shows that there is an element of comparison and measurement of change that has occurred before and after the administration of a test as seen in extracts (36) and (37) and specificity in

extract (38). The establishment of these connections was not complete without narrations and descriptions of the phenomenon. For this reason, narration and description emerged as features of argumentation in this discipline. This observation aligns with North (2005), who in her study of disciplinary variation of theme in undergraduate essays found the nature of knowledge of the Humanities to be concerned with specifics, quality, complications, among others. If these are attributes of disciplines in the Humanities of which English is one, then narration and description are achieved through Place and Time circumstances.

4.3.1 The Use of Location Circumstances in Geography

In Geography, Place and Time circumstances show a relationship between entities just as it occurs in History. However, there are other Place and Time circumstances that enhanced the argument by situating it in context, refers the results of actions taken and when a task was executed or was being processed. Some examples that improve the argument in this discipline by contextualizing include:

39. 'These initiatives reflect the niche experiments and social learning which are valued **in existing urban sustainability competences and nature-based adaptation scholarship.**' (DIS GEO 2p 002)
40. 'Each additional new confirmed case of COVID-19 leads **to a reduction in the number of metro trips** by 1.43% after controlling for the number of international arrivals to Taiwan.' (DIS GEO 008)
41. 'Thus, there are trade-offs **between the financial burdens incurred by metro systems and reduced medical expenditures.**' (DIS GEO 008)

Instances that illustrate when a task is executed or is being executed include these:

42. ‘On one hand, it is true that climate change poses real risks with the potential to cause harm, and that there is a need to understand how tropical ecosystems may function differently to those in temperate climates that take prominence in much international rhetoric **to date.**’

(DIS GEO 002)

43. ‘Third, we find that the effect of COVID-19 on metro use is larger **during weekends than week days.**’ (DIS GEO 008)

Geography discussion sections also utilized Cause circumstances to persuade readers. They were used to interpret consequences or effects which occurred due to an earlier phenomenon. This suggests that it is required of authors in Geography to state and discuss the cause and event of a phenomenon. Examples include the following:

44. ‘**Consequently**, it is likely that estimates of household and individual carbon footprints within our study are underestimated. (DIS GEO 002)

45. **Thus**, there is a real consistency between the outputs of the model and the current situation.’ (DIS GEO 005)

46. ‘In a similar vein as (Oke et al., 2019), which demonstrated the value of using a prototypical city to extrapolate the results of transportation modelling scenarios to other similar cities, our two-level typology could enable a model to be calibrated to observed travel outcomes and **thereby** used to predict outcomes of different transportation investment strategies in different location types.’ (DIS GEO 010)

Place circumstances played another role in Geography argument by showing a relationship between entities. Below are some instances:

47. 'At the same time, a multitude of intermediary traders create quickly shifting links **between buyers and producers** to make the post auction processing of fur unfollowable.' (DIS GEO 003).
48. 'Thus, there are trade-offs **between the financial burdens incurred by metro systems and reduced medical expenditures.**' (DIS GEO 008)
49. 'The first major result is the coherence **between the company's organization and the model's outputs.**' (DIS GEO 005)

Authors used this group of place circumstances to show connections that exist between two entities. Such relationships may not necessarily indicate similarities or differences but rather show cause and effect as in extract (47) and (48), and the relationship of one entity on the other extract (49). 'Between' was found to be the most commonly used CEs.

4.3.2 The Use of Location Circumstances in Chemistry

Like Geography and English, Chemistry employed CEs to contextualize their claims. It is also similar to English where they showed agreement or disagreement with existing claims. However, comparison of existing literature to current study is done with reference to the ongoing experiment. Examples in this field include:

50. 'Further, high pressures include high wall shear stresses and high flow velocities, which is disadvantage **to arterial tissues and leads to irrelevant diseases.**' (DIS CHEM 003)

51. ‘As previously reported, bleach wash and pre-digestion treatments increase levels of endogenous DNA, yet this increase is coupled **to higher failure rates during library creation.**’ (DIS CHEM 006)

52. ‘Therefore, these high hemodynamics factors result **in the progression of stenosis severity.**’ (DIS CHEM 003)

Examples that illustrate the use of Place circumstances to show relation to existing and new findings include the following:

53. ‘Although the native vegetative carbon stock offered by Searchinger et. al. (2014) has a higher spatial resolution, the stock value in some places was too implausible to use; for instance, **from Figure S1a**, we can see that the native vegetative carbon stock in most grid cells in India was close to 0 ton/ha, which is unreasonable, because most land of India is located **in subtropical regions with favourable natural conditions for plant growth.**’ (DIS CHEM 001)

54. ‘The **above** discussion exemplifies that numerous drivers (which prompt corrective action) and barriers (which hinder corrective action) may exist for the different stakeholders.’ (DIS CHEM 002)

extracts (50) through (52) had Location circumstances that contextualized writers’ arguments. However, the focus of extract (53) was on a figure that introduced a discrepancy in findings made by the author and how a result earlier obtained was problematic in relation to what was known about ‘sub-tropical regions’. extract (54) referred back to what the writer had previously discussed.

4.3.3 The Use of Location Circumstances in Psychology

Psychology used (32%) of Location circumstances. In persuading readers of this discourse, writers made claims by contextualizing methods and concepts of importance with Location circumstances. Contextualization is found to be the dominant function in making arguments in this field. In this regard, it is a similar feature in Chemistry, English and Geography. Instances in context include:

55. 'In contrast, self-evaluation showed negative, or at least relatively negative, developmental trajectories **in the domains of morality, mathematics, and verbal abilities.**' (DIS PSYCHO 004)
56. 'The association **between paranoia and generosity** might depend upon strategic concerns.' (DIS PSYCHO 003)
57. 'Essentially, this means that the score of an average ASD individual is almost 1 SD **below the average TD individual on face identity recognition task.**' (DIS PSYCHO 005)
58. 'It remains to be seen how well it accounts for the Ranschburg effect and its modulation **across tasks.**' (DIS PSYCHO 006)
59. 'There is always a growing notion that autistic sympathy may be manifest differently **in men and women**, particularly in terms of face processing.' (DIS PSYCHO 005)

Examples which showed writers in this field juxtaposed new found knowledge with available literature in Psychology include these:

60. '**Before we discuss the implications of the empirical findings**, we first address conceptual considerations about the models.' (DIS PSYCHO 007)

61. 'The use of pre-post standardized mean difference to indicate treatment effects in meta-analyses has been problematized **in a recent study**, as it can contribute to biased outcomes and does not provide reliable information about the effects of the intervention.' (DIS PSYCHO 010)
62. 'A substantial number of clients do not respond to the treatments **currently available**.' (DIS PSYCHO 010)
63. 'Interestingly, they found a within-group effect size of 0.70, which is only slightly lower than the effect size for ADHD **in the present study**.' (DIS PSYCHO 009)

Examples which show when tasks occurred include the following:

64. 'It should be noted, however, that delaying major depressive episodes **during a critical period** could have important positive effects.' (DIS PSYCHO 008)
65. 'Clearly, **when the goal is to examine associations of within-person variance**, then models that separate the within-person and between-person component are the models of choice.' (DIS PSYCHO 007)

Clearly, from extracts (55) and (56), abstract entities highlighted the core of arguments. Extracts (57) to (59) showed how the circumstances were used to show contrast. In these examples, it is the inconsistencies and disparities in concepts that the Location circumstances dealt with. This contrasted sharply with extracts (60) to (63) where the Location circumstances primarily pitch the argumentation against or along existing knowledge claims.

4.3.4 The Use of Location Circumstance in Mechanical Engineering

Location circumstances are argumentative tools to writers in this discourse. They are used to contextualize phenomena or experiments. Like the

other subjects, they were employed to contextualize phenomena or experiments. Arguments are further projected using the Location circumstances to enhance the outcomes of experiments. Evidence of circumstances that put concepts and methods in perspective include:

66. 'The singular avoidance method would be applied **on a 6-DOF manipulator** with a spherical wrist, which can operate **in 4500km under water environment.**' (DIS MECH ENG 007)
67. 'Similarly, PCA is used **in this article** to obtain the shape coefficient **of the 3D curve model.**' (DIS MECH ENG 006)
68. 'Accordingly, the differences **in behaviour and toxicity of the pristine and wastewater-incubated MPs** were unrelated **to the physicochemical properties** we analyzed.' (DIS MECH ENG 004)

From the above extracts, Place circumstances identified the instrument and the field on which it will operate in extract (66). In extract (67), argumentation revolved around concrete places whereas the instrument used to obtain the result in the study of the concrete object was the focus of extract (68). In the Pure Sciences, the accuracy of results is judged by the instruments used and the conditions under which the results were obtained. Hence, Location circumstances foregrounded these relationships in Mechanical Engineering.

Time circumstances were indispensable to authors in Mechanical Engineering and the meaning they conveyed was not different from what was realized in the other disciplines. Time circumstances were used to report when certain conditions prevailed for a kind of result to be achieved. Examples include the following:

69. ‘**When the size of the model was 5000mm**, the error rate of the prediction model was 3.7% and the error rate of the control point data was 2.3%, **after sampling point was the least**, the error rate was 2.1%.’ (DIS CHEM 006)
70. ‘We emphasized the capability of our algorithm of exploring multiple grids **at the same time**, which was not evident in previous works, thus ensuring the achievement of the resolution-optimal solution.’ (DIS MECH ENG 008)
71. ‘**In a 2008** survey of nearly 2,400 households in the US, more than half of the respondents stated that they **already** had the ability to charge a PHEV at home (within 7.5 m/25 feet of the vehicle) but had little opportunity to charge at work or other locations.’ (DIS CHEM 006)
72. ‘The length of this time period is significant uncertainty across the globe, and no data is available **now** to determine it exactly; thus here we uniformly set it to 20 years based on the default time period of land conversion provided by IPCC.’ (DIS CHEM 001)

Time circumstances used in the clauses above expressed the specific periods an experiment occurred or a result was achieved. Authors referred to conditions which necessitated certain outcomes in extract (69) and concurrent activity of tests in extract (70). In extract (71), time circumstances referred to happenings in the past, while extract (72) described a current situation in context.

4.3.5 Use of Location Circumstances for Within Text Reference across Disciplines

In all the disciplines, I observed that authors substantiated their claims by referring to tables, charts, figures and earlier discussions mentioned within the text with Location in Place circumstances. Location circumstances used in this manner in extracts (73) to (76) and (79) were followed by a summary of the content of the referent. In extract (77) however, the content of the figures referred to highlighted a decrease. A different pattern was observed in extract (78) where a mere reference was made to the appendix. It is observed that authors across the disciplines employed statistical tools which included figures, charts and tables to integrate a bulk of relevant information in their writing. This suggests that the tools were used to simplify complicated information and economize space, which may be as a result of disciplinary conventions authors must adhere to. Examples that illustrate the use of Place circumstances for reference purposes include the following:

73. ‘Although the native vegetative carbon stock offered by Searchinger et. al. (2014) has higher spatial resolution, the stock value in some places was too implausible to use; for instance, **from Figure S1a**, we can see that the native vegetative carbon stock in most grid cells in India was close to 0 ton/ha, which is unreasonable, because most land of India is located in subtropical regions with favourable natural conditions for plant growth.’ (DIS CHEM 001)
74. ‘The **above** discussion exemplifies that numerous drivers (which prompt corrective action) and barriers (which hinder corrective action) may exist for the different stakeholders.’ (DIS CHEM 002)

75. ‘Our analysis reveals the dialectics (Blair, 2019) of associations and dissociations (see **far right column in Table 1**).’ (DIS GEO 003)
76. ‘Lastly, **in section 3.2** where we attempt to quantify the carbon emissions associated with poverty alleviation in India, we base our calculations on the \$1.9 poverty line, as defined by the UN and other agencies, but accept such threshold has been disputed in the literature and upwardly revised to reflect the cost of meeting a basic and healthy living standard.’ (DIS GEO 00)
77. ‘For example, **Figures 5 Panel (a) and 7 Panel (a)** report a consistent decline of the shares of the top 1 percent and the top .01 percent from about 1914 to 1975.’ (DIS HIS 003)
78. ‘The details of the method and inferential statistics are presented **in Appendix B.**’ (DIS PSYCHO 002)
79. ‘To illustrate, **in Fig.9** Fiona formed her w’s consistently on the board.’ (DIS ENG 001)

From extracts (73) to (79), the Location circumstances were used as meta discourse markers that guided the reader to navigate the text. Interestingly, the specific reference to *far right column* in extract (75) is indicative of the writer’s desire to be as precise as possible and directed the reader to find the desired information. In extracts (76) to (79), the Location circumstances have numerical or alphabet labels that serve the same purpose. This is in line with the generally acclaimed notion that the writer of academic English is responsible for helping the reader to make meaning out of text and talk.

Essentially, most of the examples here are meta discourse markers that are endophoric markers. Endophoric meta discourse markers refer to information

in other parts of the text. According to Hyland (2005:51), ‘These make additional ideational material salient and therefore available to the reader in aiding the recovery of the writer’s meaning, often facilitating comprehensive and supporting arguments by referring to earlier material or anticipating something yet to come’.

4.3.6 The Use of Quality Circumstances Across the Disciplines

Quality CEs were used across the disciplines, but predominated Chemistry than other disciplines. Quality circumstances were used primarily as interpersonal markers showing authors’ stances towards the observations they made. Examples of these include:

80. ‘But, **overall**, the development pattern was similar across both groups.’ (DIS ENG 3q 007)
81. ‘**Unsurprisingly**, Lulia, who arrived in class with one year of previous schooling during childhood, also formed letters without difficulty.’ (DIS ENG 3q 001)
82. ‘Selective interventions in high risk groups, however, are applied in people who do not **necessarily** already have symptoms, and this **certainly** comes closer to ‘real’ prevention.’ (DIS PSYCHO 3q 008)
83. ‘Although such technique has been **widely** employed to identify the drivers and distributions of carbon emissions within developed countries, equivalent assessment in developing countries is lacking.’ (DIS GEO 3q 001)
84. ‘**Obviously**, the growth rate of P against x has a slight increase with the increase of the out-of-plane stretching velocity vod.’ (DIS MECH ENG 3q 001)

From extracts (80) through (84) above, it is evident that all disciplines used Quality CEs to make authorial comments that drew attention to arguments that were clearly stated as a strategy to engage and persuade their readers to acceptance of their claims. Instances such as *necessarily* (extract 82), *widely* (extract 83) and *obviously* (extract 84) are adverbial in nature and enabled writers express their personal feelings towards the claims they made. The author used *overall* (extract 80) to give a holistic view of the pattern mentioned. The attitude marker *Unsurprisingly* in extract (81) indicated the author was not shocked by the result that emerged. This function of circumstances corroborates the findings of Hyland (2005) and Nugrahani and Bram (2020) study of meta discourse markers as attitude markers.

In extract (82), *necessarily* described in uncertain terms people who may have the symptoms. *Widely* in extract (83) aided the author to express with authority the vast area the technique in question was employed. *Obviously* (extract 84) and *certainly* (extract 82) highlighted the increase in growth rate, irrespective of how minute they were and was noticed by not only authors but readers. The rhetorical goal achieved with these Quality circumstances is similar to meta discourses that are boosters. Gholami et. al. (2014) describe boosters as linguistic units that are used to show certainty rather than doubts so as to prevent conflicting arguments.

However, some Quality circumstances were used as hedges by authors to convince readers about their findings. Examples of these include:

85. 'Furthermore, a **considerably** lower char elutriation is expected in larger systems due to the higher reactor height and a better separation by the cyclone.' (DIS CHEM 3q 004)

86. 'The approaches used for calculating the native and managed vegetation carbon stock are **seemingly** different, but they are linked through vegetation parameters which result from a consistent biological process; thus the carbon stock estimates resulting from the two methods are able to be compared.' (DIS CHEM 3q 001)
87. '**Generally**, differences in tooth wear rates were statistically insignificant.' (DIS CHEM 3q 003)
88. '**Ideally**, future work would explore the extent to which these findings might generalize across populations and also in samples including patients with a psychotic-spectrum disorder.' (DIS PSYCHO 003)
89. 'Because of the design of our stimuli, the effect of length that we have found cannot be attributed **solely** to the RC but must, instead, be due to the SSSC, that is, to the length of the RC relative to NP1 or NP2.' (DIS ENG 010)
90. '**Perhaps** the most important incentive for charging a PHEV is the price difference between electric charging and gasoline fueling as well as the ability of the PHEV user to obtain that knowledge.' (DIS MECH ENG 009)

The use of hedges is explored extensively in Hyland (2006). Circumstantial clauses are mainly used to achieve this. The nature of argumentation in academic discourse does not permit making absolute knowledge claims especially in the Humanities and Social Sciences. *Considerably* (85) and *perhaps* (90) did not express complete certainty concerning the outcome anticipated as a result of other conditions that were fulfilled. Price difference and expertise of user were the reasons considered in

extract (90). In extract (86), the writer used *seemingly* to express his/her sincerity to other opinions contrary to his/hers, which is whether the approaches were the only factor for the difference observed. The hedges from the soft disciplines exemplified above in extracts (88) and (89) *ideally* and *solely* respectively are tentative and in the case of extract (90), just wishful thought. Authors employed Circumstances to satisfy academic conventions in their disciplines, and to also defend their positions with regard to arguments which they have no evidence to support.

The observation made on Quality circumstances in the above instances align with meta discourse markers that function as hedges. Hedges are tools writers use to convey uncertainty and possibility, and they are essential in academic writing as it is uncommon for claims to be made without personal judgements about their accuracy (Hyland, 2005). However, the others are from the Hard Sciences, an indication that this area also has room for hedging claims.

4.3.7 The Use of Comitative Circumstances Across the Disciplines

Comitative circumstance types were copiously used by authors across the disciplines and again, Chemistry recorded the highest number of Comitative circumstances. They showed how entities functioned simultaneously. In other words, these circumstances act as necessary conditions the other entity needs or otherwise in order to achieve a certain result. Examples of these include the following:

91. 'Third, as with most surveys, the NSS only provided information on children for parents who co-reside **with other children.**' (DIS HIS 6c 008)

92. 'His oral competence and quick understanding of teacher's requests, **along with his willingness to help his peers**, made him stand out as a leader in the group, to whom the other Somali students could turn for help.' (DIS ENG 6c 010)
93. 'Because of the design of our stimuli, the effect of length that we have found cannot be attributed solely to the RC but must, **instead**, be due to the SSSC, that is, to the length of the RC relative to NP1 or NP2.' (DIS ENG 6c 010)
94. 'This suggests one pathway by which paranoia and social reward value might share common cause and thus be associated **without paranoia** necessarily causing altered social reward value'. (DIS PSYCHO 6c 003)
95. 'In fact, the actual firing responses, including the decay, can be reconstructed **without considering the skin as a viscoelastic material**, by treating the decay characteristics of the SA1 receptor in this study.' (DIS MECH ENG 6c 005)
96. 'Figure 6a shows that the stretching ration λ at $x = 5\text{mm}$ increases with the increase of r_b when r_s is given, and Fig. 6b shows that the stretching ratio λ at $x = 5\text{ mm}$ decreases **with the increase of r** , when r_b is given.' (DIS MECH ENG 6c 001)
97. 'Recently however, it has been suggested that it is the absence of bone remodeling – **rather than bone density per se** – that helps promote DNA preservation, following observations that the petrous bone, the auditory ossicle and the circumferential lamellae of long bones experience little or no bone remodeling.' (DIS CHEM 6c 006)

The examples indicated Comitative circumstances are necessary in making arguments in the disciplines. They were deployed to show how other factors affected the phenomenon under investigation.

4.3.8 The Use of Matter Circumstances Across the Disciplines

Matter circumstances are the equivalent of the Verbiage (Halliday & Matthiessen, 2014). It is that element which is referred to, described, narrated, and talked about. This circumstance was also frequently used by authors across the disciplines. This suggests that all fields of study have their contents built around concepts that they investigate and without these concepts, there probably will be nothing to examine. Examples of Matter circumstances in the disciplines include the following:

98. ‘As Machado (2017) documented, most of these studies occurred in individual classrooms; we know less **about fostering culturally informed learning environments across school systems.**’ (DIS ENG 8 005)
99. ‘Here, we present the largest study **on DNA preservation in ancient fish bones to date**, assessing the effects of bone element, archaeological site, DNA extraction and sequencing library preparation protocols on library success and levels of endogenous DNA.’ (DIS HIS 8 006)
100. ‘Kelman asserted, for example, that EL Nino~’s responses in the Pacific are rooted in a hazard-based approach, and underlying causes are overlooked, with “a disconnect appear [ing] to be emerging between harzard and vulnerability **with respect to EL Nino~**” (Kelman, 2019 p.417).’ (DIS GEO 8 007)

101. 'Previous studies have interpreted the reduced prosocial tendency in paranoia **in terms of distrust.**' (DIS PSYCHO 8 002)
102. 'The singularities **of a 6R manipulator** are avoided by the approximate damped reciprocal method in this article.' (DIS MECH ENG 8 007)
103. 'This Danish case study shows that the existing Danish policy **regarding the acceptable level of risk** is not upheld by the current concentrations of As in drinking water.' (DIS CHEM 8 002)
104. 'The normalized concentration **of CH₄** was always lower than CO, whereas only two measurements were available for H₂.' (DIS CHEM 8 004)

From the instances above, themes whose concepts are broad in nature are seen in extracts (98) and (99). In extracts (100), (101) and (103), Matter circumstances were used to project the discussion of themes from particular perspectives. In extract (102), *of* made direct reference to an instrument and reasons for its avoidance, while *of* referred to an experiment and its results in extract (104). The data, therefore, suggest authors across the disciplines employed Matter circumstances to give importance to themes which they discuss as matters of concern. These themes are the core around which discussions revolve.

4.2.3 RQ3: Rhetorical goals writers seek to achieve by deploying circumstantial elements in the Discussion Sections of RAs

Research question three was answered by employing a move analysis. Nwogu's (1997) move analysis model was chosen where two moves and two steps were selected to examine rhetorical goals that were embedded in the

discussion sections of RAs through the use of CEs. Move 9 (Highlighting overall research outcome of study), Move 10, step (Intrepreting the research outcomes), a step in Move 10, step 4 (Contrasting present and previous outcomes), and step 2 in Move 11 (Promoting further research) were selected.

4.4.0 Highlighting Overall Research Outcome of Study

Circumstantial Elements which predominated Move 9 were Location in Place, Matter and Additive circumstances. The three domains employed Place circumstances in this Move with some differences. While History, Geography and the Pure Sciences relied on concrete Place CEs, English and Psychology seemed to have preferred abstract Place CEs. History and Geography used concrete Place CEs for reference purposes; that is to point at identifiable physical places. This trend was the case probably as a result of authors' interest in physical geographical locations of these disciplines. Some examples include these:

105. 'Pollen records indicate that the plant was growing **in Greece** during the Pleistocene and from the early Holocene onwards.' (HIS DIS 001)
106. 'This finding challenges the current policy discourse **in India** which frames development and climate change management as incompatible.' (GEO DIS 001)

Extracts (105) and (106) above have circumstances that point to existing geographical locations. Real concrete places are *Greece* and *India*. Extract (105) gave it a past dimension. The subject is History. In extract (106), the physical location of India is a subject of an ongoing debate in Geography. It shows that by highlighting the overall outcomes of a study, Location

circumstances in History and Geography tend to be concrete but past and current time dimensions were distinguishing features of these two related subjects. The concrete Place circumstances enabled authors in the Pure Sciences to show how at various stages an instrument in focus functioned. The trend shows the depth of practicality in these disciplines.

107. 'This observation differs **from ancient DNA results obtained from mammalian bones**, where high endogenous DNA preservation is localised, either **in the petrous bone or in the dense, recently deposited circumferential lamellae of long bones**, with particular poor yields from low-density spongy elements.' (CHEM DIS 006)
108. 'In addition, the numeral comparisons of 30% and 50% stenosis suggest that the wall shear stress and the velocity **in the artery zone** may be more sensitive than the pressure with the increase of percentage stenosis.' (CHEM DIS 003)
109. 'The influence of r_b and r on the DEM's mechanical behaviour is further studied **in this section.**' (MECH ENG DIS 001)
110. 'We compared the multigenerational effects of irregular MPs that were incubated **in waste water or ultrapure water** over the four generations of *D. Magna* held under food limitation.' (MECH ENG DIS 004)

Extract (107) through (110) above show a trend unique to the Hard Sciences. The Location circumstances pointed to a place or a point at which a manipulation or a reaction occurred. Place circumstances in extracts (107) and (108) pointed at parts of a mammal that were observed. In extract (107), it was a reference to the exact section of the experiment research. Curiously extract

(110) made reference to two different mediums. This is in line with experimental research where there must be variations and conclusions are drawn based on the reactions that occurred in varied mediums (in this case *waste water and ultra-pure water*). A deep analysis of circumstances that are matched to moves provided some amount of evidence as to the main concerns of the author and gave indication of the overall purpose of the inquiry.

Why are most of the Place circumstances used in the Humanities abstract rather than concrete? These disciplines usually deal with debates around concepts. I already established in answering research question two that Matter circumstances in English and Psychology were also abstract entities. The abstract Place circumstances were used by English and Psychology to name specific findings and claims. This type of circumstance enabled authors to state in exact terms what the study sought to investigate in this move.

111. 'But **in this study**, an ethnographic approach was used to investigate students' participation **in several L2 writing practices**.' (ENG DIS 010)

112. 'There are similarities and differences in the stage of writing development we have identified **in adult L2 learners** as opposed to L1 children.' (ENG DIS 002)

113. 'However, TLC's evolution **to a program with top-down accountability** has shifted the focus of its ABE programs **to the fulfilment of policy expectations**.' (ENG DIS 006)

114. 'We compared seven competing models that have been proposed for testing cross-legged effects **between constructs** by

examining modern convergence, model fit and consistency of estimates across 10 longitudinal samples.’ (PSYCHO DIS 007)

115. ‘CRUD’s EDSOD model predictions agreed well with the observed data **in six summary measures (list accuracy, serial position effects, transpositional gradients, contiguity effects, error magnitudes and error types).**’ (PSYCHO DIS 006)

From extracts (111) to (115) above abstract entities like *L2 learning practices* and *summary measures* are circumstances that were used in the Humanities to state overall research outcomes.

Matter circumstances were used by all the disciplines in this move, with the same aim of talking about events, phenomena or concepts. Matter circumstances appear to occupy a key position such that without them, it may be challenging for disciplines to build discourses around a subject and make claims, argue or show alignment with previous and present studies. Hence, for the reason of the similarity of its purpose across disciplines, I did not discuss Matter circumstances in subsequent moves.

116. ‘First, we established clear definitions **of face identity processes.**’ (PSYCHO DIS 005)
117. ‘In this study, an improved mechano-neurophysiological model **of the fingertip** was developed.’ (MECH ENG DIS 005)
118. ‘The focus **on three students** offered insights into the different ways in which they participated in instructional activities, which were analysed with the help Luke and Freebody’s (1999) four literacy resources model.’ (ENG DIS 010)

119. 'As suggested by Miller (2008), charcoal recovered in domestic contexts may indicate the use of **wood provided by pruning**, which is a key operation of grapevine cultivation.' (HIS DIS 001)

120. 'We organise the Discussion **around two challenges** raised at the start of the paper.' (GEO DIS 002)

Though there were other Matter circumstances such as *regarding* and *in terms of*, *of* was mostly preferred across the disciplines. Additives were well patronised by History and the Pure Sciences in the move. Additives listed in succession several reasons for outcomes of specific findings.

121. '**Firstly**, nearly 60% of the vessels analysed for compound-specific isotopic analysis fall within the range of non-ruminant fats, even though the lipid profiles of most vessels were characterised by odd, branched chain fatty acids that are common in ruminant fats.' (HIS DIS 002)

122. 'Our study **also** provides insights into the heterogeneous nature of the association between children's education and parental health.' (HIS DIS 008)

123. '**Besides** these first indications for grapevine cultivation in northern Greece dated to the Late Neolithic, evidence for juice extraction and wine making is provided by the large concentration of grape pips from Dikili Tash (Late Neolithic, 4500-4000 BC), where 2460 grape pips have been discovered, associated with other by-products of pressed grapes while tartaric and malic acids, present in grapes, as well as other acids characteristic of alcoholic fermentation, were detected on sherds.' (HIS DIS 001)

Extract (121) has the Additive, *firstly* which was used to provide the first result of the study. Similarly, *also* in extract (122) marks an additional finding. Whereas *besides* in extract (123) highlighted a significant finding in the background by producing a new evidence to support the finding.

Other authors employed Additives to assign more than a reason to investigate a phenomenon.

124. **‘Secondly**, we wanted to investigate whether any potential differences could be linked to changes in dietary regimes, as known from the literature dealing with the Late Medieval and Early Modern periods in England.’ (HIS DIS 007)

125. **‘First**, unlike previous studies, we were able to confirm results by taking into account unobserved mother-level heterogeneity.’ (HIS DIS 009)

126. **‘Finally**, our study is one of very few to investigate whether or not reproductive attitudes mediate the effects of preceding intervals or family size on the growth of children.’ (HIS DIS 009)

127. **‘Furthermore**, chicken bones have not been conclusively identified from the study sites.’ (HIS DIS 002)

128. **‘Also**, we implemented several file export functions, relying as much as possible on existing formats, e.g., bag files, so that further tools can be developed even in environments outside of ROS, such as MATLAB.’ (MECH ENG DIS 008)

129. **‘In addition**, the firing pattern of Figure 9(a) is similar to the C-shaped part of the letter ‘G’, and, hence, the curvature pattern can

also be found in the experimental data (Figure 9(b)).’ (MECH ENG DIS 5)

130. ‘**Further**, implications for emission reduction targets and the carbon budget are substantial **as well**.’ (CHEM DIS 006)

In extracts (124) to (130) there were strong reasons to investigate the chosen phenomena. In extract (124), *secondly* signified an additional reason for the investigation. In extract (125), *first* foregrounded the difference between earlier studies and the current investigation. In extract (126), *finally* emphasized the novelty of the current study. However, in extracts (124) to (126), the Additives listed in order of importance the major conclusions reached by authors. The rhetorical goals realized in the instances are in line with Hyland (2005), that Additives are meta discourse markers which are transitional.

It was common to see Concession circumstances used in the Move by History RAs. Authors used Concession circumstances to announce observations that were equally important but contrasted with earlier observations. Instances in History are presented in extracts (131), (132) and (133) below:

131. ‘**However**, from a synthetic household perspective, this probate rate is consistent with over 80 percent of households having some wealth, if we assume one wealth holder is being probated per married couple.’ (DIS HIS 003)
132. ‘**Nonetheless**, the residual association between children’s education and parental SRH remains large.’ (DIS HIS 008)

133. **‘Although one can note clear differences between the kidnapping schemes,** certain similarities can also be observed.’ (DIS HIS 005)

Extract (131) showed misalignment with previous observations, whereas extracts (132) and (133) highlighted that the observations are unexpected but true. Concession clause markers are usually expected in negotiating meaning in Results Sections of RAs as long as the results of the new study are at variance with conventional requirements or with earlier findings. The exemplified circumstances in the extracts are thus meta discourse markers which foregrounded contrast writers wanted to instantiate.

4.4.1 Interpreting Research Outcome Sub-Move

The disciplines employed Concession, Additive, Reason and Quality circumstances in this step. Concrete Place circumstances also dominated the disciplines with a balance of abstract circumstances in Geography.

Concession circumstances in the disciplines showed contrast in previous and present findings and in some cases expressed exceptions to a standard or a situation. Its function was similar across the disciplines. Examples include:

134. **‘Although we selected studies that met our inclusion criteria, there was variability in the background and treatment data provided,** for example reporting of attrition, intent to treat or complete analyses, and information of samples such as comorbidity and use of psychopharmacological treatments.’ (PSYCHO EXP 010)
135. **‘Similarly, a recent Pew Research centre report has indicated that 64% of US adults reported being confused by ‘fake news’, yet**

84% **nevertheless** claimed to feel confident in their ability to identify factual reporting.’ (ENG EXP 004)

136. ‘Then, **despite the low number of pips analysed**, a large proportion of the assemblage from Middle Bronze Age Paraskevi (1900-1700 BC) is classified as domesticated (22%), even if the wild morphological type is dominant (64%).’ (HIS EXP 001)

137. ‘**However**, after the electric shock, the training set will not be reduced to the loss under normal circumstances.’ (MECH ENG EXP 006)

138. ‘**Irrespective of the kinetic model used to simulate mass gain and the reaction time range**, a vast majority of fits involving the time offset calculation returned a goodness of fit that would be considered perfect for RHX experiment data, and thus apparently enables E_a to be calculated for the reaction.’ (CHEM EXP 007)

Extracts (134) through (138) have one thing in common. In written academic discourse, authors argue and create a dialogue with the readers and react to previous authors. There are contestations also about methods employed and how findings align or misalign with logic, existing knowledge or disciplinary expectations. In extracts (134) and (135), Concession was related to previous research. In extract (137), the author used Concession marker *however* to make an excuse for methodology. The sample size was not adequate to draw the desired conclusions but the author wanted to have the conclusion accepted. In extracts (137) and (138), Concession circumstances illustrated deviation from the norms of the discourse community. A look at the examples showed there are disciplinary variations as to what Concessions the authors were

allowed to make. The sweeping generalisation and call for acceptance based on unreliable sample size as seen in extract (136) can only be observed in the Humanities. The Hard Sciences and, to some extent, the Social Sciences reject this. Similarly, the inherent reliance on logic rather than observation in making a claim is the reason for Concession clauses in extracts (137) and (138). Logically, the deductions are valid but since the Hard Sciences favour inductive approach to logic rather than the deductive approach, the use of Concession circumstances is a way of making apologies for not using the preferred logical reasoning.

The Concession circumstances in the instances above fit as transitional meta discourse markers in Hyland (2005), and function as essential tools for writers to express contrastive opinions of claims.

Additives also dominated this move. Examples include these:

139. ‘**Secondly**, these results do not correlate with available faunal assemblages in the region.’ (HIS EXP 007)
140. ‘For CH₄, the dependence on fuel type is **also** observed in Fig.11 and clearly related to the different volatiles fractions as discussed before.’ (CHEM EXP 004)
141. ‘Regarding complexity, we **again** see the most substantial improvement immediately following the move from the instructed context to SA, but this element then essentially plateaus during SA.’ (ENG EXP 007)
142. ‘**Furthermore**, some studies suggest that parenting behaviour mediates the effect of parent training.’ (PSY EXP 009)

143. **‘In addition**, the types of stimuli varied dramatically.’ (PSY EXP 005)

From extract (139) from the Humanities, the focus of the Additive circumstantial *secondly* was to indicate how the research outcome did not correlate with what is expected. In extract (140), *also* highlighted a result available and showed how it was related to what the research was about. In these two instances, the results of the study were given prominence.

In extract (141), the result was rather put into context and explained by using an Additive. It drew attention to the necessary conditions under which the result was obtained. Extracts (142) and (143) are from Psychology. The Additives did not only explain the results of the study, but extract ((142) also drew attention to the other studies upon which the results can be explained whereas extract (143) highlighted the dramatic variation in stimuli.

Reason circumstances also dominated this step of the discussion section. It was required of authors to ascribe meaning to research outcomes, and state reasons why findings elicited certain interpretations and how the findings were deduced. Instances of Reason circumstances include the following:

147. **‘Accordingly**, the differences in behaviour and toxicity of the pristine and wastewater-incubated MPs were unrelated to the physiochemical properties we analysed.’ (MECH ENG INTP 004)
148. ‘Ladson-Billings (2006b) wrote that she came to regret describing culturally relevant teaching as leading to ‘academic excellence’ **because that term has become associated with the test score frenzy and less associated with authentic learning.**’ (ENG INTP 005)

149. ‘**Consequently**, the importation of grape varieties along with other products from more eastern areas is highly probable.’ (HIS INTP 001)
150. ‘**Thus**, when the results of his study are compared with others, the lifespan should be examined first.’ (CHEM INTP 001)
151. ‘Furthermore, a considerably lower char is expected in large systems **due to the higher reactor height and a better separation by the cyclone.**’ (CHEM INTP 004)
152. ‘**For this reason**, the RI-CLPM does not allow for a perfect distinction between within-person and between-person variance.’ (PSY INTP 007)
153. ‘The calculation of household and individual carbon footprints assumed certain products in the household survey had the same carbon emissions intensity **since equivalent product-level detail were unavailable for most countries in the Eora (2020).**’ (GEO INTP 001)
154. ‘Our findings **hence** show two reasons why competence in defining, developing and realising pathways towards expected outcomes is important.’ (GEO INTP 002)

In extract (147), *accordingly* justified the appropriateness of the intention cited by the authors. Similarly, in extracts (148) through (154), the circumstances enabled authors to refer to earlier developments and state specifically factors accountable for the present or future outcomes. Circumstances of Reason functioned similarly as transitional meta discourse markers (Hyland, 2005) where they guided readers through the text by logically connecting the various

paragraphs of the text into a whole. They also exhibited rhetorical goals by explaining the rationale for a process or a phenomenon.

Means circumstances were dominant in the sub-move. Some instances of Means circumstances include the following:

155) ‘This is precisely the same process used **by learners who acquire a second language naturalistically.**’ (ENG INTP 003)

156) ‘Of the 12 studies that referred to an achievement gap, half of them did not define what they meant **by culturally informed literacy instructions.**’ (ENG INTP 005)

157) ‘The spatial firing data of the SA1 receptor was constructed from a single fibre **by repeatedly scanning the letters while shifting the stimulator,** possibly because it was difficult to accurately identify all the target SA1 afferents from an enormous number of nerve fibres.’ (MECH ENG INTP 005)

158) ‘One is that competence in localising international experience, and connecting small-scale community-level experiments, is strongly present in Taipei as the case study city making the most progress towards networking and learning **from practical actions.**’ (GEO INTP 002)

The Humanities data suggests that Means circumstance focused more on participants in the research, as in extract (155) or clarification of concepts as in Extract (156). In extract (157) taken from the Hard Sciences, Means circumstances dealt with manipulative actions which produced results from the research. In extract (158), from the Social Sciences, the Means circumstance highlighted the benefactor of the study. This trend is evident

throughout the texts studied. It is significant to note that the focus on clarity of concepts and the focus on accurate reporting of processes to ensure replicability of studies are unique distinguishing elements of Humanities research versus scientific research and this uniqueness in disciplinary expectations is observable in a simple issue as circumstantial usage. It shows that language choice is shaped by the lenses that the disciplines provided (Hyland, 2006).

Quality circumstances functioned as hedges in this sub-move. They allowed authors to express their personal opinions on their findings. Examples include the following:

159. 'Among the outgroups, the Late Iron Age and Romano-British site of Heybridge has revealed a wear rate that is only **slightly** lower than that of the English Medieval and Early Modern sites.' (HIS QTY 007)
160. 'That is to say classroom contexts **potentially** favour (morpho) syntactic development over fluency, while the context **likely** favours meaning focused communication over syntactic development, an idea also evidenced to some extent in participants' comments about their language practices Insojourn.' (ENG QTY 007)
161. 'Theoretical works on this subject to date **presumably** used full reaction profiles at each investigated isothermal run, therefore they are **roughly** equivalent to the broadest Δm range used in $C\Delta m$ calculations in the present study.' (CHEM DQTY 007)

The adjuncts boldened in extracts (159) and (160) in the Humanities and extract (161) from the Hard Sciences are Quality circumstances that brought authorial perceptions and beliefs into the discourses. The uncertainty of the writer in extract (160) is marked by the use of two important hedges *potentially* and *likely*. This is also present in extract (161). However, in extract (159), the writer avoided using two hedges and instead used an important qualifier *only* to give more illocutionary force to the circumstance *slightly*. In fact, authors in academic discourse refrain from making claims that can bring too much controversy. Hedging those claims is a wise decision sanctioned by all disciplines. The communicative functions Quality circumstances elicited in the examples agreed with Hyland (2005).

4.4.2 Contrasting Previous and Present Outcomes Move

A cursory observation of this step across the disciplines revealed some commonalities as well as differences in the use of circumstances. Commonly used circumstances across the three disciplinary domains are Comitative and Additive.

Across the disciplines, Concession circumstances authors used Concession circumstances to state conditions which did not conform to an earlier or later claim made about findings of the study. Instances of Concession circumstances are:

162. **‘However**, a meta-analysis by Fabiano et al (2009) was similar in study inclusion criteria and effect size calculation.’
(PSY DIS 009)

163. **‘Nonetheless,** findings from Hanoi and Fukuoka in particular indicate that competence in setting spatial vision and promoting city-wide urban greening initiatives is not in itself sufficient to support adaptation.’ (GEO DIS 002)
164. **‘Although the PS MP treatment group in Schur et al. (2020) is very similar to the one with the pristine MP used here,** we observed differences between both studies.’ (MECH ENG DIS 004)
165. ‘The extent of selection biases resulting from co-residence in the study sample, **however,** is likely to be relatively small because of the high rates of co-residence observed in many Indian surveys.’ (HIS INTP 008)

It is clear from extracts (162) to (165) that Concession circumstances from the Humanities, Social Sciences and Hard Sciences showed major differences between current and previous research outcomes. Comitative circumstances across the disciplines generally showed alignment or contrast to previous or current studies.

166. ‘We concur **with Hopp (2014) and Cunnings (2017)** that LA responses are not astructural; rather they indicate a choice made on structural grounds, including recency.’ (ENG DIS 009)
167. ‘These results contrast strongly **with those from an analysis of 45 DHS countries by Rutstein and Winter (2014),** for reasons that are unclear but which may include a lower ability in India than in other countries for parents to

increase income in response to a growing family or seek support from a wider family network.’ (HIS DIS 009)

168. ‘The results were similar across tasks, differing quantitatively but not qualitatively (Figures 6-12), which is consistent **with a single mechanism account.**’ (PSY DIS 006)

169. ‘The shape coefficient dimension here is still 40, which is consistent **with the above.**’ (MECH ENG DIS 006)

170. ‘The TTTQ model seems to be applicable as an approximation of the rehydroxylation reaction profile and even returns reproducible E_a values, which remain in agreement **with previously published results,** especially if the time offset correction is applied.’ (CHEM DIS 007)

Comparison circumstance predominated the Pure Science in this step.

Examples include these:

171. ‘Although our results differ from those of previous studies, the difference was not **so great as to change the order of these land types in terms of land carbon loss per unit area.**’ (CHEM DIS 001)

172. ‘**Similarly,** PCA is used in this article to obtain the shape coefficient of the 3D curve model.’ (MECH ENG DIS 006)

173. ‘In addition, the present model can accurately treat contact mechanics, including frictional behaviour, **unlike previous models.**’ (MECH ENG DIS 005)

Despite the fact that Additives were found in the other disciplines, it was predominant in English in this step and its rhetorical goal was similar across the disciplines. Examples include:

174. ‘**Moreover**, she inadvertently omitted letters from her written words and or added additional, unnecessary letters/characters to her words.’ (ENG DIS 001)

175. ‘**Furthermore**, the fact that the L2ers in our study can make use of break cues, aligning them with syntactic boundaries suggest that their LA responses are in fact structurally based rather than simply linear.’ (ENG DIS 009)

Also in this step, the only circumstance which seemed commonly used by Geography, History, and Psychology was Place circumstances. While Geography balanced the use of concrete and abstract Place circumstances, History had preference for concrete Place circumstances and Psychology on the other hand stuck to abstract Place circumstances. Examples of physical and abstract Place circumstances are shown below:

176. ‘This finding is not surprising since the schools **in Taiwan** operated normally without lockdowns during the COVID-19 period.’ (GEO DIS 008)

177. ‘This supports the assertion in the sustainability competences literature that spatial planning or efficient use of space is an important part of competence in laying out a vision and reflects empirical findings **from other geographical regions** on the value of plans and visions in coordinating

different actors to work towards adaptation via urban greenspace.’ (GEO DIS 002)

178. ‘However, the literature is no consistent on this matter; two previous meta-analyses on parent training found no significant association **between age and treatment outcome**, whereas another found that older children benefitted more **from behavioural parent training**.’ (PSY DIS 009)

179. ‘Previous work showed that proneness **to paranoid thoughts** is positively associated with punitive tendency and negatively associated with generosity in the Dictator Game.’ (PSY DIS 003)

180. ‘Studies of Examples of similar scope such as Ahmed et al. (2015) Ivanova et al. (2016), but fall **below estimates from other assessments** which base carbon footprint calculations on total final demand.’ (GEO DIS 001)

Location in place circumstances in extract (176) *in Taiwan* and extract (177) *from other geographical regions* focused on the physical settings of investigations. In extracts (178) through (180), the circumstances identified abstract concepts which were realized through defined criteria or processes. This result is consistent with Brandt's (1986) observation that circumstances are linguistic elements that give the reader a context for understanding the rest of the sentence.

4.4.3 Promoting Further Research Move

In this sub-move, the Humanities and Pure Sciences had preference for abstract Place circumstances while the Social Sciences exhibited a blend of

both. Place circumstances used in Humanities and Pure Sciences referred to concepts or ideas of concern to their discussions.

181. 'Future research is needed to confirm if - and how- children's resources shape parental old age health **in low resource settings.**' (HIS DIS 008)

182. 'A final issue to consider is whether the comparative lack of HA responses overall indicates that the L2ers are adopting an astructural approach **to syntactic parsing.**' (ENG DIS 009)

183. 'These programmatic responses **to accountability pressure** prompt many questions that could form the basis of further research.' (ENG DIS 006)

184. 'Future work may address the importance of fuelling behaviour of biofuel vehicles **in other regional markets or at a global scale.**' (MECH ENG 009)

185. 'For example, data on widely deformed finger pads and responses of tactile receptors **under various stimulations.**' (MECH ENG 005)

186. '**In future works**, improving these aspects may give better simulation results and fuelling.' (MECH ENG DIS 005)

It was observed that promoting further research is not a compulsory feature of the Pure Sciences; few papers had this step in both subjects. In addition, I noticed that Place circumstances were not a great feature of this domain though there was a preference for non-concrete Place circumstances.

The usage of both physical and abstract Place circumstances varied in the Social Sciences, however. While Geography showed a balance, Psychology held to abstract Place circumstances. Instances of physical Place circumstances used by authors are|:

187. ‘Whilst our database improves on the spatial, sectoral and supply chain scope of previous greenhouse gas emissions accounting **in India**, it is limited in a few respects which we hope can be addressed in future work.’ (GEO DIS 001)

Examples of non-concrete Place circumstances in the Social Sciences include these:

188. ‘It is also important to consider biological risk markers **in the further development of the field**, although until now, few markers have a sufficiently strong association to be clinically relevant.’ (PSY DIS 008)
189. ‘Use of POMRS, or a similar scale, is recommended **in future meta-analyses**.’ (PSY DIS 010)
190. ‘Ideally, future work would explore the extent to which these findings might generalise **across populations** and also in samples including patients with a psychotic-spectrum disorder.’ (PSY DIS 003)

Additives dominated the Pure Sciences and only English in the Humanities and Psychology in the Social Sciences in this move. Additives outlined reasons for proposing a new research.

191. ‘**Additionally**, it would be worth testing L2ers, in their L1 as well, to determine the extent to which our assumptions

about potential transfer from the L1 are justified.’ (ENG DIS 009)

192. ‘It is **also** important to consider biological risk markers in the further development of the field, although until now, few markers have a sufficiently strong association to be clinically relevant.’ (PSY DIS 008)

193. ‘**Third**, we recommend utilizing library protocols that include intermediate purification steps before adapter ligation when targeting archaeological fish bones in order to maximize the potential of successful library creation.’ (CHEM DIS 006)

194. ‘**In addition**, adjusting or modifying the present model may need more comparison with other experimental data.’ (MECH ENG DIS 005)

Guise appeared to be commonly used in the Pure Sciences by some authors to refer to the position or state of an entity.

195. ‘We speculate further that, to achieve a successful risk reduction, multiple drivers and barriers must be addressed **as a supplement to promulgating stricter legislation**, in both low and high income countries.’ (CHEM DIS 002)

196. ‘It has been shown that this practice can distort vehicle sales mix estimation considerably, which is why future work should either use a broader range of vehicle options or use correction methods **as described in Yip et al.**’ (MECH ENG DIS 009)

197. ‘Additionally, the present research can serve as a **stimulus and reference** for future research related to land carbon loss per unit area given that existing research on it is limited.’ (CHEM DIS 001)

Geography, which departed from using Additives in this sub-move used Purpose circumstances to argue what specifically needed to be investigated:

198. ‘Future research into competencies **for innovation and experimentation** in subtropical Asian contexts may also wish to consider lessons that can be learned from greenspace and adaptation in post-socialist states in Europe, which can give insights into greenspace and adaptation development in relatively new democracy contexts with differing institutional and governance histories.’ (GEO DIS 002)

Authors of Geography and Psychology discussion sections in this sub-move employed Reason CEs to state or explain the need for further research. Hence, I concluded through my observation that where Purpose circumstance was not used, Reason circumstances were used to argue for further research.

199. ‘**To that end**, it will be useful to have more empirical research looking at these trade-offs in greater detail in the future.’ (GEO DIS 006)

200. ‘**To this end**, we encourage future use of database, published in full at <https://city.spatialfootprint.com/india>, and available in the Supplementary Information, to assess the consequences of different poverty thresholds to assess the

carbon cost associated with poverty alleviation.’ (GEO DIS 001)

201. ‘**Therefore**, further research in which the distribution of males and females is consistently balanced is required to truly evaluate the possibility that the magnitude of face identity recognition deficits is modulated by sex.’ (PSY DIS 005)

202. ‘**Because** the majority of the world population lives in low and middle income countries, it is important that future studies examine the possibilities of preventive interventions in these settings.’ (PSY DIS 005)

203. ‘We encourage future MC test developers seeking to elicit and evaluate metaphor more authentically to explore MC **in these terms**.’ (ENG DIS 008)

In extracts (199) and (200), Reason circumstances *to that end* and *to this end* respectively were used, and both extracts are from Geography. *Therefore* in extract (201) and *Because* in extract (202) were taken from the same paper, and were used to argue for future research. However, in extract (203), the writer was very sophisticated. He presented the argument for further research before he made an anaphoric reference to the circumstance, *in these terms*.

In sum, a brief focus on the moves and sub moves selected from Nwogu’s (1997) research model revealed that CEs were highly employed to construct moves within the discussion section of RAs. The rhetorical goals writers seek to achieve determine the circumstances that are chosen

in writing to accomplish the goals. This has further implications for training people to become effective at writing discussion sections of RAs.

4.5 Chapter Summary

This chapter responded to the research questions posed for the study by investigating meanings authors infer in RA discussion sections using Circumstantial Elements.

According to the study, PPs and adverbs are considered Circumstantial Elements in terms of structure, and the former is preferred by the disciplines over the latter. The Pure Sciences emerged the highest user of both PPs and adverbs. Enhancing and Projection classes of circumstances were key in persuading and making claims in research articles.

It also emerged that Place, Time, Quality, Matter and Comitative were the most used circumstances across the disciplines. Mostly, the CEs assumed thematic positions in texts. In the case of Quality circumstances, hedges were significant tools authors used to communicate their interpersonal experiences. Rhetorical goals were examined by using a move analysis. Some differences were also seen across the individual *disciplines*. Finally, I argue that the differences and similarities of outcomes that emerged from the study are so because they aligned with the conventions of constructing the discussion section of each of the disciplines selected for the study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The final chapter of the thesis is divided into six sections. Section one summarises the entire study. The second section highlights key findings from the current investigation. A discussion of conclusions gathered from the examination of the data is the concern of Section Three whereas in Section Four, the implications of the study are outlined. The study's shortcomings are discussed in the section that follows, and recommendations for further research are provided in the sixth section.

5.1 Summary of Research

The primary focus of this study was to examine the circumstantial elements used in the discussion sections of RAs from six different fields, which were chosen from the Humanities, Social Sciences, and Hard Sciences. The aim was to explore an indispensable yet challenging to write section of the RA – the discussion section– and establish conventions that are followed by expert writers. This will in turn serve as a guide for prospective researchers who are expected to write research articles which conform to the standards of the discourse communities they belong. Circumstantial elements seem to be pivotal in writing good discussion sections and cannot be treated as peripheral elements in the transitivity structure, as Systemic Functional Linguists would want us to believe. The outcome of the present study also intends to help instructors and gatekeepers get acceptance of their articles into prestigious journals for publication. Due to these factors, three research questions were created to direct the investigation. The research questions focused on the

structure of CEs used in RAs, the semantic types of CEs used in RAs and whether the functional types can be linked to moves in the discussion section. The second chapter reviewed literature in the area of the RA, the discussion section and CEs. The relevance of the concepts was established though not many studies in the area I chose to investigate were available according to my search. The few that were found were discussed. Chapter Three dealt mainly with the methodology. I did a linguistic analysis using a qualitative design, especially the discourse analysis approach. The study involved a sample of 60 discussion sections of RAs which I selected across three disciplines. Halliday and Matthiessen's (2014) classification of CEs; that is Enhancing, Extending, Elaborating and Projection which are further classified into nine and much further into twenty-two sub-types was used as a theoretical guide for the inquiry. In Chapter Four, the results of the study were presented.

5.2 Key Findings

The present study established PPs and adverbs as structural CEs that appeared in the three main knowledge domains. Prepositional phrases dominated the discussion sections and the Pure Sciences recorded the highest usage of them. The structural elements were explored further for their semantic categories.

Four main classifications, nine types and twenty-one sub-categories of semantic CEs were identified. The Humanities recorded the highest frequencies with regard to their use of enhancing circumstances while the Social Sciences had the highest frequency of projection circumstances.

With regard to the distribution of semantic types of circumstances, Location, Matter, Manner, Accompaniment and Cause were highly employed across the disciplines. However, the Pure Sciences surpassed the other domains in their employment of Location and Accompaniment circumstances, while the Social Sciences made the most use of Cause circumstances. The Humanities on the other hand dominated with Manner circumstances.

Generally, the moves represent the rhetorical goals authors employed to validate their findings. They, however, relied on circumstances to construct key aspects of their findings appropriately. Concrete Place CEs predominated History, Geography, and the Pure Sciences to show places that can be seen are used as a foreground for arguments. Matter circumstances across the disciplines and moves were the subjects for discussion. The finding that Quality circumstances functioned as hedges across the disciplines was novel to the present study. Across the disciplines also was the employment of Location circumstances as endophoric meta-discourse markers that enabled readers to navigate the text.

Highlighting the Overall Research Outcome of the Study Move engaged Location, Matter and Additive circumstances. Place circumstances described the exact settings or instruments involved in their studies and Additives stated and elaborated on major conclusions reached by authors across the disciplines.

All disciplines used Concession, Comitative and Additives to achieve contrasting present and previous research goals. Concession was used to report claims that were not key findings while Comitative showed alignment or

misalignment to previous and present studies and Additives outlined several reasons to explain arguments.

Interpreting Research Outcome Move had a preference for Reason circumstances to explain research findings and used Concession to announce observations that were unexpected but worthy of mention. Promoting Further Research Move was predominated by Place circumstances which were abstract concepts that mattered in the argument.

5.3 Implications of the Study

The study first showed that while performing any genre analysis, researchers should also be interested in part-genres, demonstrating that SFL is capable of describing the generic qualities in the discussion parts of research publications. The insights derived from studying the discussion sections of RAs alone may have been lost if the study had focused on RAs in general.

Secondly, the study confirms the already established belief that there are different strokes for different folks as far as academic writing is concerned (Hyland, 2004). Circumstantial clauses tend to vary and these variations are linked not only to generic conventions but the focus and type of argumentation preferred in respective disciplines. It, therefore, implies that if we want to establish the focus of a subject and the epistemological assumptions of the subject, we can deduce it from the use of CEs especially in persuasive part-genres of the discipline.

The current study has undoubtedly contributed to research in the areas of academic writing, disciplinary variation and analysis of genres. Insights gleaned from the study are worthy contributions to research.

Findings from this study will improve the socialization process of apprentice writers. Writers and reviewers of journal articles usually know a priori what an effective discussion section of RAs looks like. However, they are not always able to clearly suggest how novice writers can improve their arguments. Since CEs are important ideational, textual and interpersonal resources for writers and this study has effectively shown that even at the level of moves, there are subtle differences in how subjects deploy these resources, it is prudent that writers and reviewers especially of interdisciplinary research are aware of the variations. They will thus be clear in suggesting changes to novice writers. This will make interdisciplinary research more efficient and resolve controversies easier.

5.4 Limitations of the study

Though the present study presented some important findings it has some limitations. The study did not apply a mixed method approach such as seeking expert opinion through interviews or or doing focused group discussions on the use of CEs in the discussion section of research articles. This strategy could have provided a comprehensive grasp of the use of circumstantial elements in research article discussion sections. Furthermore, our study investigated the use of rhetorical goals in four moves out of the eleven in Nwogu's (1997) move analysis model because of time and space concerns. An analysis of all the moves would have been comprehensive and worthwhile.

5.5 Suggestions for Further Research

Some recommendations for further research are required in light of the findings of the current study. Firstly, since only four moves were investigated

for rhetorical goals in this study, future studies should consider the rest seven moves in Nwogu's (1997) move analysis model. Second, Quality, circumstances doubled as hedges. Further study is necessary to find out how various subjects use various semantic types of CEs to hedge utterances. To determine whether there are disciplinary differences in the utilisation of textual, interpersonal, and ideational situations in the discussion phase of RAs, more research is needed. Finally, the complexity of circumstances needs to be investigated. It emerged from my analysis that some circumstances have many embedded circumstantial structures in them. For example, a study on the degree of complexity of CEs will be worthwhile.

5.6 Concluding Remarks

It is hoped that this work has contributed to research in academic writing, genre analysis, SFL, disciplinary variation and academic discourse. The study brought to light the generic functions of circumstantial elements in the discussion section genre of RAs. It also made efforts to do a genre analysis with an understanding of SFL. It is envisaged that other scholars may endeavour to investigate RA part-genres from the stand point of SFL. To a considerable extent, SFL offers a valuable way to investigate how academics make deliberate language choices.

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APPENDIX

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