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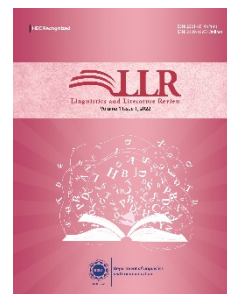| | |
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# Exploration of Logical Meta-functions in ICLE: An Analysis of Pakistani Argumentative Essays

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## Abstract

Systemic functional linguistics (SFL) studies how a language functions in a social context, concerning the meaning of clauses at three different levels: interpersonal, ideational, and textual. The aim of this corpus-based research is to find out the logical structures of clauses in Pakistani academic writings by evaluating two main elements of clause complexity: taxis and logico-semantics relations. For this purpose, Halliday & Matthiessen's (2014) system of clause complexing was employed as an analytical framework. A sample size of 100 argumentative essays was taken from the ICLE corpus, which was written by Pakistani students. This corpus was annotated by using the UAM corpus tool manually. Furthermore, the comparative distributions of different types of clause complexes were studied and evaluated accordingly. It helped to identify and understand lexico-grammatical variations at the clause level in non-native Pakistani academic writings. The findings showed that Pakistani students composed hypotactic and paratactic with almost the same ratio in their writing with a minor deviation. They also tend to build different types of logico-semantic relations of clauses during the argumentation; however, the occurrences of expansion were high in contrast to projection. The null hypothesis was tested by deploying the Wilcoxon signed rank test. It revealed no significant difference between paratactic and hypotactic approaches. However, their various logico-semantic relations displayed significant differences ($p \leq 0.05$).

*Keywords*: argumentative essays, Systematic Functional Linguistics (SFL), schematic structure, taxis and logico-semantic relations

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# Introduction

## Importance of Argumentative Essays in Academia

Argumentative essays are one of the types of academic writing that is well regarded and enjoys the status of "the language of power" (Martin, 1989). Argumentation ability and competence provide language users with manipulative power over several other platforms of democratic public forums. The literate and educated community in any democratic society can easily articulate their point of view and define their position on specific matters and significant issues (Crowhurst, 1990). After apprehending the significance of argumentation, the present research aims to analyze argumentative essays of non-native Pakistani English users who are L2 learners of English language. The main concern is to evaluate organizational patterns of AE and their taxis and logico-semantic relations in clause complexes according to the context of argumentative discourse (for instance, register).

Previous research has paid an inadequate amount of attention to logical structures and meanings of clause complexes, which is necessarily significant to highlighting the scope of argumentative writing and delineating the ability of argumentation of English language learners.

Moreover, two international standardized tests: IELTS and TOEFL amply demonstrated how the construction of argumentation in essay writing, indicates the student's writing skills. According to IELTS (International English Language Testing System), argumentative writing must be precise, concise, and have well-structured arguments (International English Language Testing System [IELTS], 2021). In the case of TOEFL (Test of English as Foreign Language), writers should entail unambiguous stance related to the topic and support it with logical claims that must comprise reliable evidence (Test of English as a Foreign Language [TOEFL], 2021).

The aforementioned parameters about the examination of argumentative essays directly indicate the key requirements for building and constructing the arguments in second language writing.

## Identified Issues in ESL Argumentative Writing

The key reason for difficulties in writing argumentative essays is due to its structural, schematics, and strategic expectations for the development of

argumentative essays, particularly in case of Pakistani English language learners (L2 learners). These    demands related to the concepts of argumentation also vary according to the level of learners from secondary school to university level (Andrews, 1995, as cited by Wingate, 2012).

Undoubtedly, students' writings are mostly enriched with a number of deficiencies, nevertheless,  English language teachers also carry the "fuzzy concepts of argumentation" (Wingate, 2012). They do not have a clear consensus about the structure of argumentation, for example, what should be included or excluded; what should be explicitly used as linguistic resources during the production of argumentative discourse or what is the difference between argumentation and persuasion. Similarly, language tutors' feedback is not clear regarding  the composition of argumentative writing, they also show uncertainties about the concept of argument (Wingate, 2012). Furthermore, ESL/EFL students face problems in  arguing a case, due to their weak syntactic construction and skill to develop valid argumentation, especially in the case of exposition genres such as argumentative essays (Dreyfus et al., 2016; Hirvela, 2017; Len, 2009; Riazi & Murray, 2016; Sagap, 2008; Wingate, 2012). Zappel (2011) also claimed that "argumentation is present in discursive activity, it is linked to the specific socio-cultural context in which a discourse takes place, and it is bound by linguistic and logical rules in order to be intelligible." (p. 219)

Prior research has notified two primaries linguistic factors that contribute to the inadequate and subpar academic writing skills of ESL/EFL learners. One is discourse level structural elements (Coffin, 2004; Lee, 2006). Henceforth, during the composition of the argumentative genre, it is always considered; how the list of ideas is organized appropriately in different recognizable rhetoricalparts, such as premises and conclusions.

On the other hand, the ideational aspects of language, however, here logical aspects are one of the essential components, deal with the structural and functional features (taxis and logico-semantic relations) of clauses. It identify  the  logic in natural language as affirmed by Eggins (2004) and Halliday and Matthiessen  (2014).

These logical meta-functions are the primary concern of the current research.  SFL-based domain examines grammatical relationship between clauses, by evaluating different linguistic aspects and units, such as conjunctions, punctuations,nesting, anddependency relations and embedding

clauses (Halliday & Matthiessen, 2004; Halliday & Matthiessen, 2014).

The current study examines the non-native Pakistani argumentative essays and reveal different kinds of clause constructions as indicated by Halliday & Matthiessen's (2014) system of clause complexing framework. Research Questions

After identifying the need to explore this new information and knowledge in the Pakistani EAPand ESL contexts, this study aims to answer the following research questions collected from the study of non-native Pakistani argumentative writings by using the SFL framework that are:

1. What types of clauses have been constructed by Pakistani students in argumentative essays?

2. What types of taxis and logico-semantic relations have been built by Pakistani students in argumentative essays?

**Null Hypothesis**

1. There is no statistically significant difference between paratactic and hypotactic constructions.

2. There is no statistically significant difference between logico-semantic relations of paratactic and hypotactic constructions.

**Objectives of Study**

This corpus-based study of logical meta-functions in argumentative essays has the key aim of identifying the variation of clause construction in non-native Pakistani argumentative essays regarding taxis and logico-semantic relations by using the SFL framework. The findings provide conclusive insights and valid instances for linguists, English language learners, and teachers in the future,in Pakistani ESL and EAP contexts.

**Significance of Study**

The logical meta-functions have been studied rarely by previous researchers in comparison to other meta-functions, namely: experiential, interpersonal, and textual, by using Pakistani academic argumentative essays. The findings of this research provide detailed descriptions of the lexico-grammatical resources and patterns of clause complexing for the construction of arguments used by Pakistani students. It provides lexico-grammatical variation and uniqueness in Pakistani argumentative writings.

The findings can also serve as insight material and provide discernment to both ESL teachers and students in the future. It will help to improve their argumentative writing.

## Literature Review

### Systemic Functional Linguistics (SFL)

Genre analysis shows its deep connection with Halliday's theory of language, systemic functional linguistics. It advocates functional aspects of language in social settings. In this domain, the concept of genre deals with language, its purpose, its contexts, and its structures and their correlations (Anada et al., 2018; Coffin, 2000, 2004; Derewianka, 2003; Ho, 2013; Lee, 2006; Rose & Martin, 2012; Schleppegrell, 2004, 2008). It becomes a kind of necessity for  language users of different socio-cultural, linguistic, and economic backgrounds to have proficiency in  these interrelated elements to compose an  effective piece of communicative discourse in a specific language for measuring successful academic and professional life (Dreyfus et al., 2016). So, this theory supports three main concepts that are also part of our research. It identifies:  language as the realization of the 'context of situation' in the context of culture' language as meaning potential, and language has meta- functions.

SFL-based analysis of language marked the language as semiotic system that intersects it into three different domains, namely stratification, instantiation, and meta-function (Halliday & Webster, 2003).  According to stratification domain, language can be stratified explicitly into three strata:

1.  The semantic stratum

2.  The lexicogrammatically stratum

3.  The phonological/graphological stratum

While the instantiation domain, the text is identified as an instance of a particular semiotic system (Plum, 1998). Matthiessen (2002) calls it  "the cline from text instances via text types/registers to the general systemic potential of language" (p.238). Last domain is all about meta-functions in which meaning is understood by deconstructing the understudied text into three social meta- functions, namely ideational, interpersonal, and textual.

The ideational meaning of the text discusses the experiences of the world. It has furthertwo modes, namely the logical mode and experiential

mode. In the first kind, experience is always modeledas a sequence and its expressions mark a serial, while in the second kind, it is always identified as a configuration and has the segmental mode of expression. Logical modes trace the development of input in the forms of clauses, which compose their interdependent chains of expression. On theother side, the experiential puts the focus inside the clause, what is possessed/ covered in its components such as sensor – Process: mental – Phenomenon." (Matthiessen, 2002).

The interpersonal meaning performs the social roles and discusses about the relationships between people who are part of written or spoken communication. People experience the world differently, and always translate it into language according to their needs to interchange and deliver the information, goods, and services" (Halliday & Matthiessen, 2014).

The textual meaning is considered as enabling one that provides the contextual mode to understand the text properly with its ideational and interpersonal meanings. It has a periodic mode of expression which delivered information in clause rank is identified by theme/ rheme structure that unfolds by prominence depending on newsworthiness. Following Figure 1 represents these three meta-functions of text in the context.

**Figure 1**

*Three Aspects of Functions in Relation to Text in Context (Halliday, 1994)*
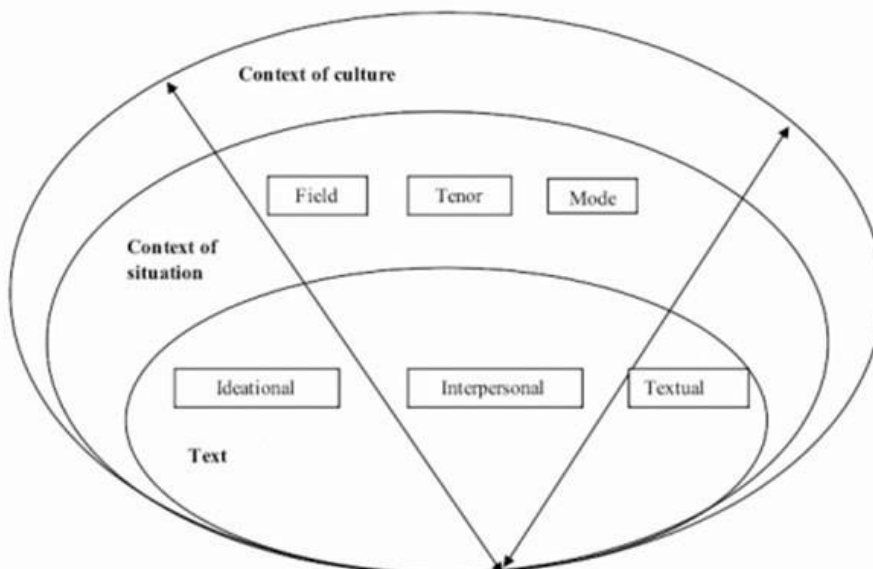
## SFL-Based Study of Clause Complexing

The analysis of clause complexing in genre-based study not only discusses the possible clause structures and patterns of specific genre, but also examines how specific kinds of constructions of the clause complexes assist writer to fulfill specific purpose and articulation of language in particular context (Ching, 1998; Ping & Geok, 2005; Ho, 2009; Srinon, 2011).

SFL framework studies the clause at a different delicate level according to three meta- functional approaches. These semantic constructs carry three kinds of meta-functions, namely the ideational, the interpersonal, and the textual. In the domain of lexico-grammar, a clause always attains the highest-ranking unit. It is important to recall that a clause often needs context, additional information and support to convey its complete sense. It could not stand on its own. That is why in discourse, there are number of clauses combine, joined, and linked with each other as clause complex.

Systemcists mostly use the term clause complexes for the grammatical and semantic units, it occurs in discourse when two or more clauses are joined together in a specific systematic and meaningful manner (Eggins, 2004). On the other hand, the term clause simplex is referred to sentences that carry only one clause or consisted of a single clause unit.

Moreover, clause complexing is identified as a structural entity that represents functional organization of a sentence. It is a complex syntactic system that describes how different clauses of a sentence are connected with each other logically and semantically. Halliday considered it as "the functional-semantic relations that make up the logic of natural language" (Halliday, 2014, p. 216). Such logic consist of different components of propositions and their constituents made the relationbetween them (Ellis, 1987, p. 108) . To marked text as coherent, the propositions of text always appeared semantically related with help of system of clause complex. Ellis summarized that "logical linguistic structure... relations between propositions represented by clauses and sentences in parataxis and hypotaxis, with their conjunctions and relevant adjuncts" (Ellis, 1987, p. 124). Following Figure 2 shows the system of clause complexing presented by Halliday and Matthiessen (2014) that is basic part of analytical framework of the present study.

**Figure 2**

*System of Clause Complexing (Halliday & Matthiessen, 2014, p. 438)*
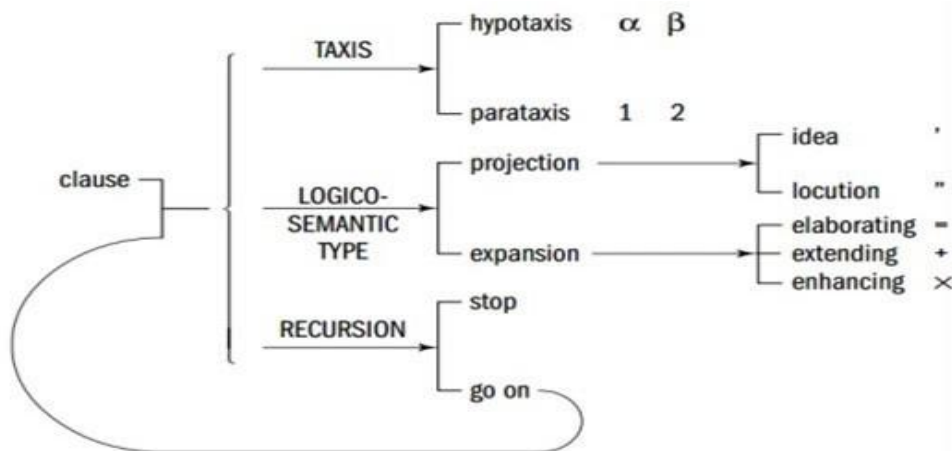


## Argumentative Writings in Prior Literature

One major kind of researches put main focus on the study of organizational structure of argumentative essays to compose the arguments (Bacha, 2010; De La Paz et al., 2012; Stapleton & Wu, 2015; Wingate, 2012). They studied and evaluated the quality of students' writings in this structural domain However, other studies have tended to evaluate argumentative writings with respect to their multidimensional analysis (Abdulaziz et al., 2016; Asención-Delaney & Collentine, 2011; Aziz, 2019; Crossley et al., 2014). These MD analysis-based studies of argumentative writings focused on the co-occurring linguistic features that indicate situational factors (such as, register variations). These functional aspects of linguistic features described pacific prevalent parameters of argumentative discourse.

In last two decades, several prominent studies on the ESL/EFL argumentative essays were conducted by using SFL genre-based approach as a theoretical and analytical framework (Ibrahim, 2019; Chong, 1997; Emilia, 2005; Kongpetch, 2003; Lee, 2006; Srinon, 2011), however the participants and writing samples were collected from socio-culturally, linguistically, and geographically different EFL students, such as Taiwanese, Chinese, Japanese, Korean, Thai, and Indonesian. Recently, Rasool and Mahmood (2023), conducted research on Pakistani high and low graded argumentative essays to study the trend of taxis and logico-semantic

relations in the writing of both datasets. Still, there remains uncharted territory for researchers to undertake a thorough, overall, and comprehensive analysis of taxis, encompassing both taxis and logico-semantic relations. Therefore, it can be right to claim that the present study has studied and analyzed the broader body of work for relevant findings that will fill the existing gap in Pakistani argumentative writings.

## Research Methodology

The current research deployed a mix-method approach to scrutinize the non-native Pakistani English academic writings.

### The Theoretical Framework of the Study

This research has utilized Halliday and Matthiessen's (2014) system of clause complexing as atheoretical framework.

### Type of Study

This study has followed the mixed method approach. For a clear examination of the sample size, the researcher selected understudied essays from ICLE and annotated each essay manually by using the UAM tool, and Halliday and Matthiessen's (2014) delicate categories of taxis and logico-semantic relations. Moreover, the clause complexes were distributed in constructions, which have been identified statistically to point out the differences and types of clause constructions in their writings.

**Table 1**

*Major Stages and Steps of Research*

| Stages | Steps |
|---|---|
| Corpus Selection and Sorting | Step 1- Non-native Pakistani Argumentative essays from ICLE Step 2- Select hortatory-exposition category of Argumentative essays |
| Data Analysis | Step 1-Analysis and Annotation of systems Clauses Step 2- comparative study of findings with the help of Paired Sample t-test. |

## Data Collection

A sample size of 100 Pakistani non-native English argumentative writings corpus has been used to study taxis and logico-semantic relations. The sample was collected from the international corpus of learner English (ICLE) randomly.

### *International Corpus of Learner English (ICLE)*

This corpus is written by higher intermediate to advanced learners of English as a foreign language. The corpus was collected by the Centre for English Corpus Linguistics at University ơfLouvain with the collaboration of a number of universities around the world.

The 3rd version of ICLE consisted of 5 million words written by English language learnerswho have different L1 backgrounds, including (Brazilian, Bulgarian, Chinese, Czech, Dutch, Greek, Finnish, French, German, Hungarian, Italian, Japanese, Korean, Lithuanian, Macedonian, Norwegian, Pakistani, Persian (Iran), Polish, Portuguese, Russian, Serbian Spanish, Swedish, Turkish, and Tswana). In this research, Pakistani argumentative essays that were examined to explore lexico-grammatical specifications of the indigenous English learners.

## Tools for Analysis

To annotate the understudied corpus, the updated version of the UAM Corpus Tool has been utilized (O'Donnell, 2008). To further investigate a unique annotation schemes by was designed by following Halliday and Matthiessen's (2014) system of clause complexing. Furthermore, to conduct the statistical analysis, the SPSS tool has also been used to explore the statistically significant difference between paratactic and hypotactic constructions and their logico-semantic relations.

## Findings and Discussion

The study reveals that Pakistani writers utilize both clause simplexes and clause complexes, however, the appearance of clause simplexes is comparatively high as shown in the following Table 2.

After identifying clause boundaries, different kinds of taxis and logico-semantic relations according to Halliday & Matthiessen's (2014) system of clause complexing were also studied.

**Table 2**

*Type of Clauses Boundaries and their Percentages*

| Clause Boundary | Occurrences | Percentage |
|---|---|---|
| Clause simplexes | 1943 | 54.9% |
| Clause complexes | 1596 | 45.1% |

**Table 3**

*Percentage of Taxis*

| Kind of Taxis | Occurrences | Percentage |
|---|---|---|
| Paratactic | 1815 | 38.9% |
| Hypotactic | 1830 | 39.28% |
| Embedded | 1004 | 21.5% |

**Figure 3**

*Comparative Percentage of Kind of Taxis and Clauses*
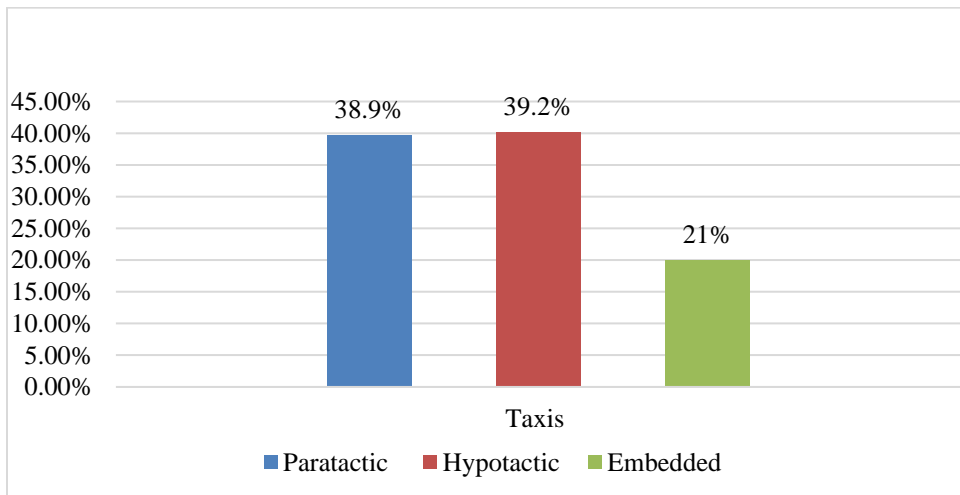


The aforementioned Figure 1 displayed the result of clauses analysis that shows that Pakistani writers   constructed more hypotactic clauses as compared to paratactic clauses, during the construction of argumentative text. They exposed a slight inclination towards the combination of unequal rank clauses in their writings, while in the case of logical–semantic relations, there are varieties of clause constructions, such as in the cases of expansion and projection, the former variety is against later one. They used

38.9% paratactic hypotactic deployment, which was only 39.2%. During this study, explicit numbers of embedded clauses have been identified in these writings. It reveals that learners try to explicitly construct almost all different kinds of clauses.

**Findings and Discussion on Projection Relations**

Projection relations can be identified as a necessary element of this genre. It reveals that writer's intellectual maturity when they utilize words, resources, and references in their writings to justify the propositions. As Srinon (2011) claimed that the appearance of projection in students' writings can be marked as a positive and mature development. These relations apparently considered better equipped or highlight the student's inclination to include such kind of references and external voices in their texts via projection (p. 143). Pakistani students composed this kind of relation with both kinds of taxis to give solid justification for their claimed proportions.

**Table 4**

*Percentage of Projection Relations*

| Projection Relations | Occurrences | Percentage |
|---|---|---|
| Paratactic | 66 | 1.4% |
| Hypotactic | 215 | 4.6% |

The findings reveal that students construct projection relations with hypotactic as compared to paratactic as shown in Fig 4.

**Figure 4**

*Comparative Percentage of Projection Relations*
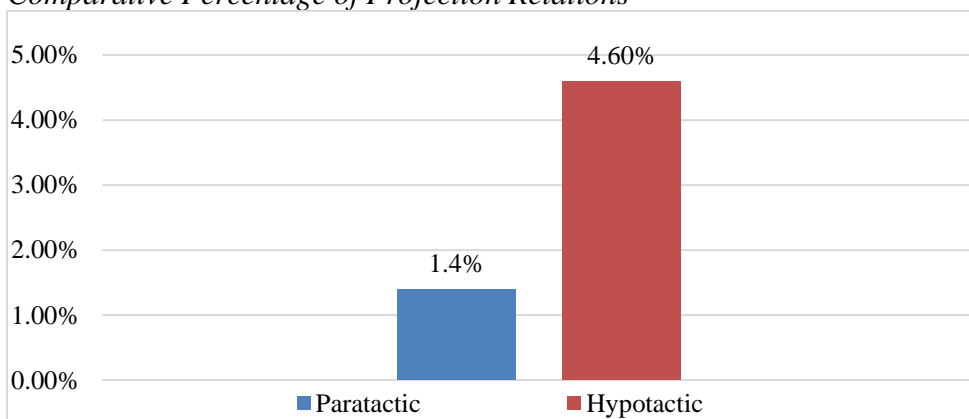
## *Paratactic Projection Relations*

The above findings show that Pakistani English language learners construct more clauses with hypotactic projection relations as compared to paratactic projection relations. In case of Pakistani argumentative essays, the percentage of paratactic projection relations is only 1.8 %, which carries 0.49% of idea and 0.92% of locution, respectively. It shows that learners do not favorably use verbal and mental relations in their writings exclusively with the combination of equal- ranked clauses. Inductively, it points out that Pakistani students don't want to use direct speech or may behesitant towards the use of proper kind of punctuation marks in their writing. It has been displayed in the following Table 5.

**Table 5**

*Percentage of Paratactic Projection Relations*

| Paratactic Projection Relations | | Occurrences | Percentage |
|---|---|---|---|
| Idea | | 23 | 0.49% |
| Locution | | 43 | 0.92% |
| | Verb say | 28 | 0.6% |
| | Statement | 03 | 0.06% |
| | Question | 01 | 0.02% |
| | Offer and command | 03 | 0.06% |
| | Verb say with circumstance | 04 | 0.09% |
| | Verb associate with speech connotation | 02 | 0.04% |
| | Verbal processing use of writing verb | 01 | 0.02% |
| | Verb embodied with Circumstances orsemantic features | 01 | 0.02% |

## *Hypotactic Projection Relations*

Like paratactic, hypotactic projection is only 4.6 %, which is comparatively higher thanparatactic projection. It built 2.04% idea-based

relations and 2.58% locution relations. Former type carried high percentage of word "say" verb-based relationship that is 1.7% against all other cases.

**Table 6**

*Percentage of Hypotactic Projection Relations*

| Hypotactic Projection Relations | | Occurrences | Percentage |
|---|---|---|---|
| Idea | | 95 | 2.04% |
| Locution | | 120 | 2.58% |
| | Verb say | 79 | 1.7% |
| | Statement | 10 | 0.21% |
| | Question | 08 | 0.17% |
| | Offer and Command | 11 | 0.24% |
| | Verb say with circumstance | 08 | 0.17% |
| | Verb associate with speech connotation | 01 | 0.02% |
| | Verbal processing use of writing verb | 02 | 0.04% |
| | Verb embodied with circumstances orsemantic features | 08 | 0.17% |

**Figure 5**

*Comparative Percentage of Subtypes of Projection Relations*
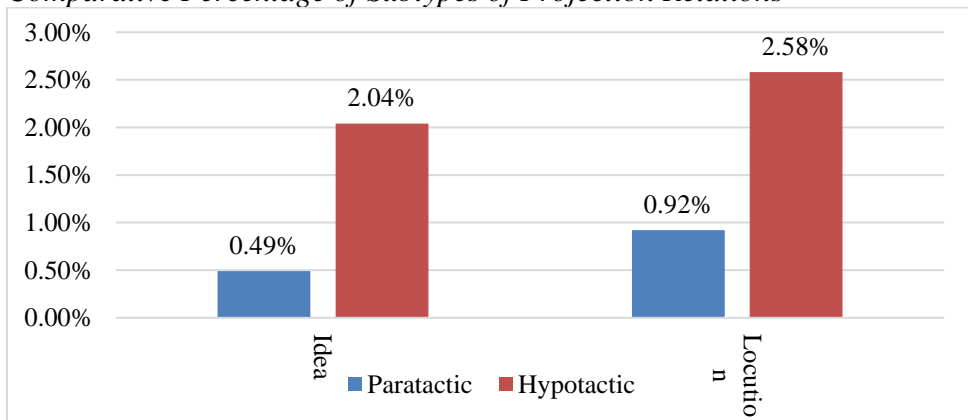
## Finding and Discussion on Expansion relations

The following table reveals that Pakistani writers construct more expansion-based relations in theirargumentative writings. It is apparent that in both paratactic and hypotactic cases, percentage of this kind of logico-semantic relation is high. These expansion relations have three further categories, namely extension, elaboration, and enhancement.

**Table7**

*Percentage of Expansion Relations*

| ExpansionRelations | | Occurrences | Percentage |
|---|---|---|---|
| Paratactic | | 970 | 20.8% |
| | Extension | 816 | 17.5% |
| | Elaboration | 66 | 1.4% |
| | Enhancement | 84 | 1.80% |
| Hypotactic | | 786 | 16.8% |
| | Extension | 45 | 0.97% |
| | Elaboration | 25 | 0.54% |
| | Enhancement | 716 | 15.37% |

**Figure 6**

*Comparative Percentage of Expansion Relations*
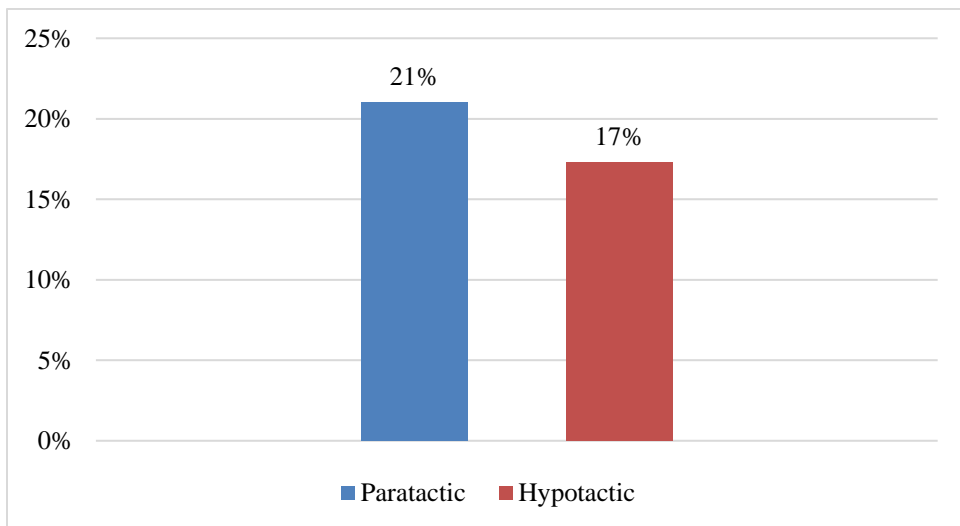
Comparative study of expansion relations and its subtypes highlights the high percentage of paratactic clause complexes as compared to hypotactic as represented in Figure 4. While its sub-types provide us with unique insights about Pakistani writers' constructions, namely logico-semantic clausal relations. Two types of expansion, such as extension and elaboration show the similar considerable trend with paratactic, while enhancements relations appear prominently with hypotactic clause complexes with 16% as compared to paratactic, which is highlighted in Figure 7.

**Figure 7**

*Comparative Percentage of Types of Expansion Relations*
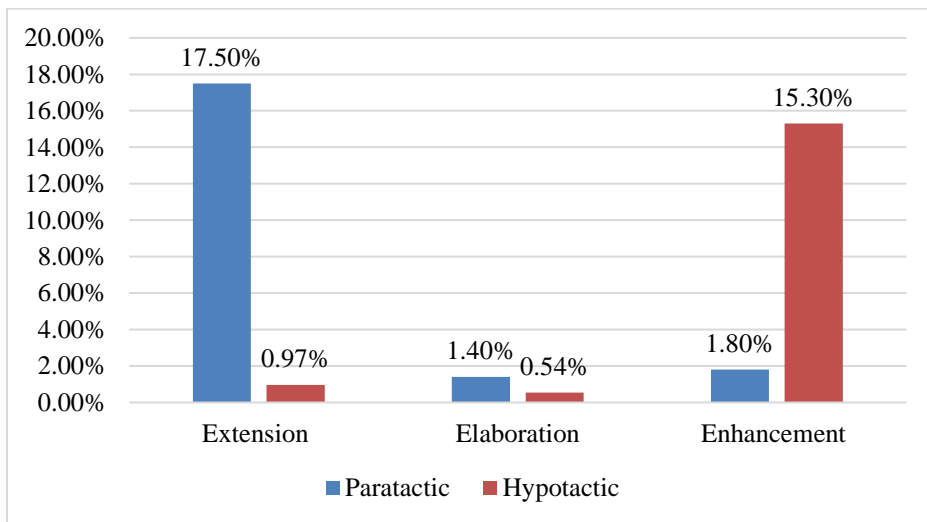


*Paratactic-Extension*

The findings displayed that occurrences of paratactic extension (17.8%) are prominent as compared to paratactic elaboration and enhancement. They exhibit 0.9% and 2.3%, respectively as shown in previous Table 7.

The further delicacy of this relation provides three kinds of logico-semantic relations, namely addition, variation, and alternation. The significant 16.2% of addition relations, which have further categories in which positive additive (13.1%) and adversative additive (3.05%) are highest in occurrences, while negative additive exhibit only 0.09% as represented in the following Table 8.

**Table 8**

*Percentage of Paratactic Extension Relations*

| Paratactic Extension Relations | | Occurrences | Percentage |
|---|---|---|---|
| Addition | | 759 | 16.2% |
| | Positive additive | 613 | 13.16% |
| | Adversative additive | 142 | 3.05% |
| | Negative additive | 04 | 0.09% |
| Variation | | 27 | 0.58% |
| | Replacive | 24 | 0.52% |
| | Subtractive | 03 | 0.06% |
| Alteration | | 30 | 0.64% |

While variation and alternation relations of paratactic extension cases have 0.58% and 0.64% that indicate that Pakistani learner do not incline to compose such logico-semantic argumentative constructions rather they construct arguments in straightaway.

The study found a positive addition in paratactic case, which is mostly done by adding conjunction of "And" with punctuation mark coma (,), while adversative additive is usually deployed by the utilization of conjunction "But" that explicitly showed the difference/opposite information, and content in next clause.

### Hypotactic Extension

Unlike paratactic extension, hypo-extension relations are constructed less in number by Pakistani writers. This study reports only 0.9% hypotactic extension relations among all kind of relations Through this study, it can be claimed that hypotactic adversative additives (0.54%) are more favorable constructions for Pakistani writers during the composition of argumentative genre.

Moreover, the other two relations of extension, namely variation and alternation are composed less in numbering these hypotactic relations by learners as shown in Table 9.

**Table 9**

*Percentage of Hypotactic Extension Relations*

| Hypotactic Extension Relations | | Occurrences | Percentage |
|---|---|---|---|
| Addition | | 33 | 0.71% |
| | Additive | 08 | 0.17% |
| | Adversative | 25 | 0.54% |
| Variation | | 10 | 0.21% |
| | Replacive | 10 | 0.21% |
| | Subtractive | 0 | 0 |
| Alterations | | 02 | 0.04% |

**Figure 8**

*Comparative Percentage of Extension Relations*
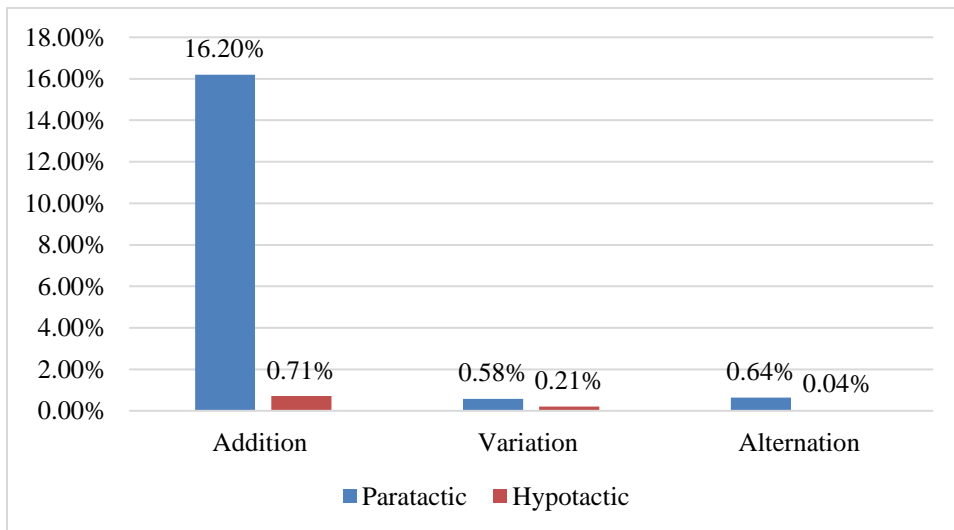


### Paratactic Elaboration

The findings indicate that this relation is less in occurrences. It has three categories, namely clarification, exposition, and exemplification that show their percentage, which is understudied corpus 0.9%, 0%, and 0.5%, respectively. It pointed out that writers try to build their proposition by providing the explanation in the form of examples and clarificationin to some extent.

**Table 10**

*Percentage of Paratactic Elaboration Relations*

| Paratactic Elaboration Relations | Occurrences | Percentage |
|---|---|---|
| Clarification | 42 | 0.9% |
| Exposition | 0 | 0 |
| Exemplification | 24 | 0.52% |

### Hypotactic Elaboration

These kinds of relationships carry the descriptive clause that is not the part of paratactic-elaboration. Pakistani writers used the combination of hypotactic clauses only for the clarification.

Such constructions mostly appeared with that-clause and wh-clause that syntactically showed the similarity with embedded clauses. Moreover, paratactic description relations are totally absent because Pakistani writers used the embedded clause for this purpose.

**Table 11**

*Percentage of  Hypotactic Elaboration Relations*

| Hypotactic Elaboration Relations | Occurrences | Percentage |
|---|---|---|
| Clarification | 18 | 0.39% |
| Description | 07 | 0.15% |

This genre can be a reason for the lack of description. It may be suitable in other genres, such as descriptive reports. (Brisk & de Rosa, 2014). It places the focus on the answers of why and what; rather than giving a new perspective or providing strength to the content of primary clause (Ibrahim, 2019).

### Paratactic Enhancement

Paratactic clause constructions didn't give more favor to enhancement relations like elaboration relations in the understudied written genre. It has only 1.8%. The findings of the following Table 12 display that Pakistani writers don't show high inclination toconstruct these logical relations with the help of equal ranked clauses.

**Table 12**

*Percentage of Paratactic Enhancement Relations*

| Paratactic Enhancement Relations | | Occurrences | Percentage |
|---|---|---|---|
| Temporal | | 16 | 0.34% |
| | Same time | 06 | 0.13% |
| | Later time | 10 | 0.21% |
| Spatial | | 0 | 0 |
| Manner | | 04 | 0.09% |
| | Means | 0 | 0 |
| | Comparison | 04 | 0.09% |
| Conditional | | 07 | 0.15% |
| | Positive | 02 | 0.04% |
| | Negative | 0 | 0 |
| | Concession | 05 | 0.11% |
| Causal | | 57 | 1.22% |
| | Cause | 14 | 0.30% |
| | Effect | 43 | 0.92% |

### *Hypotactic Enhancement*

Table 13 shows that Pakistani writers build most of the enhancement relations in the case of hypotactic expansion clause construction. It covers overall 16.8% in which cause and condition relations are highest in percentage, which is almost 6.7%, respectively. This relation has three subtypes: reason, purpose, and result. Uniquely, the reasons-based relations (3.5%) are comparatively high than the purpose (1.12%), and result (2.08%) for argumentation, respectively. It can be stated that Pakistani writers display an inclination towards the element of reason to justify their proportion in this genre.

**Table 13**

*Percentage of Hypotactic Enhancement Relations*

| Hypotactic Enhancement Relations | Occurrences | Percentage |
|---|---|---|
| Temporal | 161 | 3.46% |

| Hypotactic Enhancement Relations | | Occurrences | Percentage |
|---|---|---|---|
| Spatial | | 03 | 0.06% |
| Manner | | 68 | 1.46% |
| | Means | 47 | 1.01% |
| | Comparison | 12 | 0.26% |
| | Quality | 09 | 0.19% |
| Conditional | | 171 | 3.67% |
| | Positive | 128 | 2.75% |
| | Negative | 22 | 0.47% |
| | Concessive | 21 | 0.45% |
| Causal | | 313 | 6.7% |
| | Result | 97 | 2.08% |
| | Purpose | 52 | 1.12% |
| | Reason | 164 | 3.52% |

Furthermore, students also used temporal and manner relations in their constructions, which are 3.9% and 0.53%, respectively. A plausible and acceptable reason for these findings is that nature of genre demands and favors the justification to provide the reason by using the conjunction and connectors, such as because, therefore, due to, for, and by. Pakistani authors used these conjunctions and connectors in writings, to indicate nature and purpose of the genre. Figure 9 clear display the comparative percentage of each and every kind of enhancements relations with both kinds of taxis, namely paratactic and hypotactic.

## Statistical Analysis and Interpretation of Taxis and Logico-semantic Relations

To study the claim of a null hypothesis, data have also been evaluated statistically by using Wilcoxon singed rank test via SPSS tool with the help of significant $p$ value $\leq 0.05$. The finding revealed that there is no significant difference between paratactic and hypotactic approaches, while their logico-semantic relations; the expansion and the projection showed significant difference of $p$ value $\leq 0.05$, which revealed the rejection of the null hypothesis. Furthermore, elaboration and locution also show the same trend and rejected the null hypothesis.

In cases of extension, enhancement, and idea all show a $p$ value of .000.

It indicates that result is statistically significant and null hypothesis can be rejected. Although the probability of obtaining a result is as extreme or more extreme than the observed result, assuming the null hypothesis is true, - As shown in following Table 14.

**Figure 9**
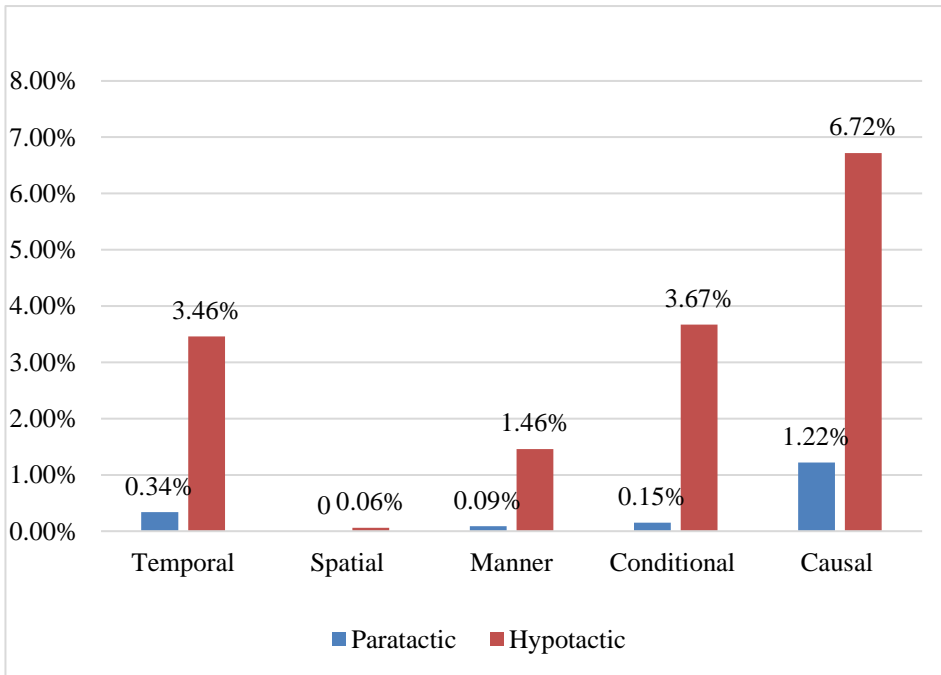*Comparative Percentage of Enhancement Relations*



**Table 14**
*Significant Difference Paratactic and Hypotactic and their Logico-semantic Relations*

|  | $z$ | Asymp. Sig. (2-tailed) | $p > 0.05$ Null Hypotheses |
|---|---|---|---|
| 1. Hypotactic-Paratactic | -.062b | .950 | Not Rejected |
| 2. Hypo-Expansion-Para-Expansion | -3.424b | .001 | Rejected |
| 3. Hypo-Projection-Para-Projection | -4.975c | .000 | Rejected |

| | $z$ | Asymp. Sig. (2-tailed) | $p > 0.05$ Null Hypotheses |
|---|---|---|---|
| 4. Hypo-Elaboration-Para-Elaboration | -3.283b | .001 | Rejected |
| 5. Hypo-Extension-Para-Extension | -8.665b | .000 | Rejected |
| 6. Hypo-Enhancement-Para-Enhancement | -8.407c | .000 | Rejected |
| 7. Hypo-Additive-Para-Additive | -8.639b | .000 | Rejected |
| 8. Hypo-Variation-Para-Variation | -2.034b | .042 | Rejected |
| 9. Hypo-Alternation Para-Alternation | -8.639b | .000 | Rejected |
| 10. Hypo-Temporal-Para -Temporal | -6.519c | .000 | Rejected |
| 11. Hypo-Conditional-Para-Conditional | -7.164c | .000 | Rejected |
| 12. Hypo-Causal-Para-Causal | -7.665c | .000 | Rejected |
| 13. Hypo-Spatial-Para-Spatial | -1.841c | .066 | Not Rejected |
| 14. Hypo-Manner-Para-Manner | -5.458c | .000 | Rejected |
| 15. Hypo-Idea-Para-idea | -4.589c | .000 | Rejected |
| 16. Hypo-Locution- Para-Locution | -4.489c | .000 | Rejected |

It shows that there is no significant difference between paratactic and hypotactic ($p<0.95$) approaches and hypotactic spatial and paratactic spatial relations ($p<0.06$) because the significance level was set at $\alpha = 0.05$ for this study. However, the rest of the cases showed a significant difference like in the cases of expansion, projection as represented in Table 1 and rejected the null hypotheses in these regards. Notably, there are numbers of relations that show the p value of 0.000, such as idea and locution relations that indicate the observed difference between the paired observations, which is statistically significant. In statistical hypothesis testing, a $p$-value of .000

means that the probability of obtaining such an extreme or more extreme result, assuming the null hypothesis is true.

## Conclusion

The current study aims to scrutinize non-native Pakistani argumentative writings, which showcased that leaners construct both hypotactic clauses and paratactic clauses with almost equal ratios during the composition of argumentative essays with minor deviation. The research further revealed that cases of projection relations were comparatively low at (6%) than the expansion relations, which was at (38%) with different constructional patterns and logico-semantic relations of clause complexes during the argumentation in Pakistani writings. As indicated above, the expansion relations have further three subcategories, and Pakistani learners struggle to build all types of logico-semantic-relations in their writings; however, their occurrences varied at different levels. In the case of expansion relations, the overall percentage of paratactic extension in the form of additives was exclusively high. However, the hypotactic enhancement relations showed more occurrences in the understudy corpus. Secondly, statistical analysis with the help Wilcoxon singed rank test revealed the significant difference between logico-semantic relations of paratactic and hypotactic constructions, such as, expansion and projection. The results rejected the null hypotheses and highlighted significant differences, which were expected in the case of taxis and spatial relations.

Furthermore, all occurrences of clauses displayed the patterns of clauses in the non-native Pakistani English students that can be identified as linguistic individuality of Pakistani writers. These findings provided further insights into Pakistani English language teachers and learners regarding the lexico-grammatical idiosyncrasy that can be helpful in Pakistani ELT and ESP contexts to understand the needs, as well as, provide roadmap to improve the learners' writings.

## Limitation of Study

This research only studied logical meta-functions in non-native Pakistani hortatory- exposition argumentative writings. Other kinds of meta-functions, such as textual, interpersonal, and experiential were not considered for the current research. Future researchers can move with others kinds of meta-functions to evaluate the targeted corpus in the SFL domain.

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