DIRECTIVE USE IN UNIVERSITY CLASSROOM DISCOURSE:

VARIATION ACROSS DISCIPLINES, ACADEMIC LEVELS, AND INTERACTIVITY

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ABSTRACT

DIRECTIVE USE IN UNIVERSITY CLASSROOM DISCOURSE:

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ELNAZ KIA

Directives— "attempts by the speaker to get the hearer to do something" (Searle, 1976, p. 11)—are one of the recurrent speech acts in university classrooms (Barbieri, 2008; Garcia, 2004). Directives are used by the instructors to perform important functions, such as assigning homework and guiding class work. Previous research has revealed that ineffective use of directives can result in misunderstanding and difficulty in learning (Waring & Hruska, 2012); thus, it is important to explore the variety of use of directives and analyze how they are perceived by the students to examine their effectiveness. Despite the abundance of research analyzing directives in academic contexts (Garcia, 2004; Hwang, 2013; McAllister, 2014; Reinhardt, 2010), no studies, to this date, have investigated the use of directives and their pragmatic functions from the listeners' perspective.

The present study explores the use of directives in academic lectures by triangulating structural and situational variation (i.e., discipline, levels of instruction, and level of interactivity) in directive use as predictors of perceived pragmatic force of directives (i.e., strength of obligation and imposition) in a large corpus of university lectures. The data in this study comes from a 1.2 million-word corpus of lectures sampled from the TOEFL 2000 Spoken and Written Academic Language corpus (T2K-SWAL, see Biber et al., 2002). Possible linguistic patterns of directives were identified by manually analyzing sample lectures from various situational contexts. Subsequently, five major structural types of directives (i.e., imperatives, obligation, intention, permission verbs, and directive vocabulary) were selected for the automatic analysis,

according to their frequency and lexico-grammatical explicitness. Python scripts were used to automatically identify directive utterances with the five structural types and the 27 structural sub-types included. Structural variation of directives was analyzed in relation to three situational variables: (1) discipline (business, engineering, education, humanities, natural sciences, social sciences), (2) level of instruction (freshman/sophomore, junior/senior, graduate), and (3) level of interactiveness (low, medium, high). For the qualitative analysis, directives manually extracted from a 83,725 word sample of lectures from engineering and humanities in T2K-SWAL were coded for strength of obligation and level of imposition from university students' perspectives. Structural variation of directives and situational features of the lectures were examined as predictors of the perceived strength of obligation and level of imposition of directives.

The results show that structural features of directives are better predictors of perceived strength of obligation and imposition, compared to the situational factors. The relationship between various structural types and the pragmatic force of directives is also explained by thorough qualitative investigations of discourse patterns in individual texts. In summary, this dissertation helps to improve our understanding of the use of directives in lectures and their effectiveness with respect to directives' structural variance. Findings from this study can be used to train international teaching assistants to effectively use directives, with respect to disciplines, levels of instruction, and levels of interactivity of university lectures.

Elnaz Kia

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For my loving husband

Mehdi

I couldn't have done this without your unconditional love and support along the way.

Thank you so much.

CHAPTER 1: INTRODUCTION

1.1 Motivation for Analyzing Directives in Academic Lectures

Directives, as one of the recurrent speech acts in university classrooms (Garcia, 2004; Barbieri, 2008), are used by instructors to perform significant functions, such as assigning homework, guiding students to do class work, and encouraging participation. Research has found that ineffective use of directives can bring about misunderstanding and hindrance in learning for students (Waring & Hruska, 2012), therefore, it is important for teachers to use appropriate language to perform directives, to ensure students' understanding of what is being asked. Two of the main factors that have been associated with the ineffectiveness of directives are the linguistic realization of a directive and the pragmatic function linked to it and lack of variation in the linguistic forms of directives used (Fitch & Morgan, 2003; Hwang, 2013; Reinhardt, 2010). Thus, the principal aim of this research project is to explore the use of directives with respect to structural forms and pragmatic functions to be able to present the variety of structural forms used in directive utterances and to identify the relationship between the structural forms of directives and the functions they perform. The ultimate goal is to find out the directive structural forms that are perceived as more effective from the students' perspective.

As for the relationship between the structural forms and pragmatic functions, previous research has shown that certain structural forms of directives, such as imperatives and obligation modals are associated with constraining the students' choice, whereas structural types such as permission/possibility modals are mostly linked with promoting involvement and participation (Reinhardt, 2010). One theoretical perspective that seems to be similar in research on the use of directives in spoken academic registers is the focus on the illocutionary force (Austin, 1962; Searle, 1969) or the speaker's intent in expressing directives. While this is a legitimate

perspective in analyzing speech acts (e.g., directives), it does not seem to answer the question, why the students perceive certain directives less effective than others. To truly address this question, we need to investigate how directives are perceived from the listeners'—the students'—perspectives. Another common feature among previous studies is the way they assign pragmatic functions to directives. All previous studies have applied the Searlean taxonomy of speech acts, which features distinct categories of illocutionary acts, such as commands, suggestions, requests, offers, and advice. Searle's (1969) theoretical framework emphasizes on the status and position of the speaker, in order to classify speech act functions and recognizes the fact that more than one illocutionary act can be assigned to one speech act. There are two main issues with this perspective: (1) identifying the function of directives from the teacher's viewpoint does not tell us how the students perceive the directives, and (2) assigning more than one function to an utterance confirms the difficulty and ambiguity of assigning directives to distinct functions and consequently, does not provide us with clear data to investigate the relationship between the linguistic realization of directives and pragmatic functions associated with them.

In response to the discussed gap in the literature, this dissertation project analyzes the functionality of directives in academic lectures from the students' perspective. To perform the analysis, this study draws on Leech's (2014) scales for categorizing speech acts, in which two main factors that distinguish speech acts from one another are optionality of the act and cost and benefit to the speaker or the hearer. The scale of optionality refers to the extent to which the speaker gives options to the hearer or the obligation force of an act and the cost and benefit scale deals with the level of imposition of an act. In contrast to Leech (2014) which puts emphasis on the speaker's intent, this study examines the obligation strength and imposition of a directive

from the listeners' (students') perspectives. A more detailed description of the framework used in this study will be presented in chapters 2 and 3.

A secondary focus of the research presented here is an exploration of the variation in the use of directives across texts with different situational features. The situational features of academic lectures that will be investigated in this research project are discipline (business, education, engineering, humanities, natural sciences, and social sciences), level of instruction (freshman/sophomore, junior/senior, and graduate), and level of interactivity (low, medium, and high), as well as possible interactions among them. Although the role of situational features in academic lectures has been examined in previous research (Biber, 2006; Barbieri, 2008), no studies to this date have focused on the effect of discipline, level of instruction, and level of interactivity, per se, on the use and functions of directives in academic lectures.

1.2 Overview of the Study

This descriptive corpus-based dissertation project draws on a combination of quantitative and qualitative approaches to determine the variation in the use of directives in academic lectures. Data analyzed comes from a corpus of academic discourse, TOEFL 2000 Spoken and Written Academic Language (T2K-SWAL; Biber, Conrad, Reppen, Byrd, & Helt, 2002). There are two main research goals in this study: (1) to determine the variation in the use of major (lexicogrammatically explicit) directive structures in lectures with respect to three situational factors (discipline, level of instruction, and level of interactivity), and (2) to identify the students perceived strength of obligation and imposition of directives and reveal the relationship between the students' obligation/imposition perception and the structural type of a directive, as well as the situational features of the lecture in which the directive occurred.

The data that is analyzed to address the first research goal is the complete lecture sub-corpus in T2K-SWAL, containing 176 texts and 1,298,913 words. To analyze directives in this large corpus, automatic computer techniques were developed using Python scripts (Version 3.5 for Windows). To systematically identify the lexicogrammatically explicit directives, first, a qualitative bottom-up discourse analysis was performed on a sample of 14 texts in two disciplines, using a developed operational definition of directives, in order to identify all the possible directives. The identified directives were then coded for linguistic realization and consequently, a list of structural types was presented as the common structural types of directives we would expect in lectures. Based on this list, lexicogrammatically explicit directives which lend themselves to automatic computer search were selected. These directive structural types accounted for almost 80% of the total structural types used in lectures. Based on the grammatically explicit directives selected for analysis, a comprehensive list of 460 directive linguistic algorithms was developed to ensure the inclusiveness of the automatic computer search. This is one of the major contributions of this dissertation. Future researchers interested in analyzing directives in academic lectures can benefit from this carefully developed list of algorithms for automatic identification of directives. Using the developed Python scripts, lexicogrammatically explicit directives were located in the 176 lectures, annotated for their structural types, and counted relative to the word count of the text in which they occurred (rates of occurrence). Variation in the use of these directives across 6 disciplines (business, engineering, education, humanities, natural sciences, and social sciences), 3 levels of instruction (freshman/sophomore, junior/senior, and graduate), and 3 levels of interactivity (low, medium, and high) were investigated through multivariate statistical techniques.

To address the second research goal, directive utterances that were qualitatively identified in 14 texts were coded for perceived strength of obligation and level of imposition by 3 university students, using 4-point scales. The three coders' scores for strength of obligation and level of imposition on each directive were averaged separately. Consequently, each directive utterance was assigned a mean score (from 0 to 3) for students' perceived strength of obligation and a mean score (from 0 to 3) for students' perceived level of imposition. These pragmatic codings were used to determine the relationship between the obligation and imposition force of a directive and its structural type. This project also examined the interaction between the structural types and situational features of lectures (discipline, level of instruction, and level of interactivity) in predicting the obligation and imposition force of directives. Results are discussed and supported by presenting excerpts from the data.

Taken together, the triangulation of methods and techniques in this dissertation project is expected to provide a comprehensive analysis of the use of directives in lectures and to provide insights into areas that international teaching assistants (ITAs), ITA trainers, and experts in English for academic purposes (EAP) can focus on to enhance the pragmalinguistic competence of teachers or to make awareness of the use of directives in different contexts for future university students.

1.3 Research Questions

The research questions are directed at exploring the use of directives in academic lectures in terms of structural characteristics and pragmatic force (obligation and imposition strength). In all the research questions, special attention has been given to the effect of situational features of lectures and the interaction between them on predicting the structural type and pragmatic force of

directives. The following are the three research questions that will be addressed in this dissertation study.

1. How does structural type frequency of directives in university lectures vary across disciplines, levels of instruction, and levels of interactivity?

2. How does the use of directives with different pragmatic forces—perceived level of obligation and imposition—in university lectures vary across structural types, disciplines, levels of instruction, and levels of interactivity?

    2.1. How does the use of directives with different strengths of obligation in university lectures vary across structural types, disciplines, levels of instruction, and levels of interactivity?

    2.2. How does the use of directives with different levels of imposition in university lectures vary across structural types, disciplines, levels of instruction, and levels of interactivity?

3. To what extent do linguistic and situational factors predict the pragmatic force of directives (perceived level of obligation and imposition)?

    3.1. To what extent do disciplines, levels of instruction, and levels of interactivity predict the perceived strength of obligation of directives?

    3.2. To what extent do disciplines, levels of instruction, and levels of interactivity predict the perceived level of imposition of directives?

    3.3. To what extent do the structural types interact with situational factors as a predictor of the strength of obligation of directives?

    3.4. To what extent do the structural types interact with situational factors as a predictor of the level of imposition of directives?

1.4 Organization of the Study

       This dissertation comprises seven chapters. Thus far, the first chapter has presented the motivation for the research topic by briefly summarizing what has been researched and what needs further research in this area. In addition, this chapter states the research goals, describes how the research goals are addressed, and presents the research questions that the study aims to answer. Chapter 2 describes an overview of the past literature as it relates to the dissertation. Chapter 3 presents the methodological approach employed in the study, describes the corpus to be used, and elaborates on the analytical procedures to be taken to answer the research questions. Chapter 4 lays the foundation for the automatic identification of directives by justifying the analytical procedures that were conducted in a pilot study to assure a reliable and comprehensive identification of directives. Chapter 5 focuses on presenting the results for research question 1, regarding the variance in the use of lexicogrammatically explicit directives across situational factors. Chapter 6 reports the results for research questions 2 and 3 regarding the pragmatic force of directives across structural and situational factors and discusses the findings by providing sample excerpts from the corpus and explaining the factors attributing to the patterns. The last chapter (Chapter 7) summarizes the results of the analyses carried out in chapters 5 and 6, highlights some of the theoretical, methodological, and pedagogical implications of the study, and explains the limitations of the study and areas for future research.

CHAPTER 2: LITERATURE REVIEW

To determine a solid theoretical framework to base the study on, an extensive review of the literature on directives in spoken language was conducted. The organization of this section will be as follows: section 2.1 (viz., Directives) presents various operational definitions and linguistic categorization of directives; section 2.2 (viz., Directives in university discourse) reports the results of the studies of directives in academic discourse; and section 2.3 (viz., Conclusion) restates the identified gaps in the literature, outlines the overall aim of the current study, and lists the research questions that will be answered.

2.1 Directives

One of the earliest and most-cited definitions of directives in the pragmatics literature is that of Searle's (1976). Searle (1976, p.11) defines directives as "attempts by the speaker to get the hearer to do something." According to Searle (1976), directives contain speech acts, such as commands, requests, suggestions, and questions, and they perform various functions such as asking, ordering, requesting, and advising. Searle distinguishes directives from other speech act categories (i.e. representatives, commissives, expressives, and declarations) by introducing the following set of felicity conditions (see Table 2.1). Moreover, Searle (1969) adds additional rules for differentiating speech act categories included in the category of directives (i.e. commands, requests, and suggestions). For instance, for producing commands, the speaker must be in authority over the hearer. Moreover, a sincerity condition for suggestions is that the speaker (S) believes the action (A) will benefit the hearer (H).

Unlike Searle (1969), which differentiates directive speech act types by clear-cut defining rules and categorizes them into distinct groups, Leech (2014) considers the distinction among the speech act categories as more scalar and indistinct. He puts more emphasis on the optionality of

the act, rather than the status of the speaker to classify speech act categories. In other words, he claims that what distinguishes speech act categories from each other is the "scale of optionality" of the speech act rather than the status of the speaker (Leech, 2014, p. 135). That is, the extent to which a speaker gives options to the hearer to do an act will identify the obligation force of a speech act and will distinguish one type of speech act from another. For instance, a request can be close to a command if the speaker leaves the hearer with no options. On the other hand, a request can occur at the other end of the optionality continuum and act similar to a suggestion if the speaker gives a lot of options to the hearer.

Table 2.1 *Felicity Conditions for Directive Speech Acts (Searle, 1969, p. 66)*

Preparatory condition	H is able to do A.
Sincerity condition	S wants H to do A.
Propositional content condition	S predicts a future act A of H.
Essential condition	Counts as an attempt to get H to do A.

Three other scalar factors, proposed by Leech (2014), which will place the speech acts on a scale based on their level of imposition are vertical distance (i.e., position of the speaker in comparison to the hearer), horizontal distance (i.e., familiarity and affect between the speakers), and the cost and benefit scale (i.e., cost and benefits to the speaker or the hearer). These three factors correspond to the three parameters in Brown and Levinson's (1978) politeness theory (i.e., power, distance, and rank of imposition). Evaluating the vertical and horizontal scale (viz., power status and familiarity of the speakers) have proven to be difficult, due to lack of detailed information about the speakers. In this dissertation study, however, there was no need for including these factors, as both were constant in the data. That is, the target feature was only produced by the teacher and it was always addressed to the students. Thus, the cost and benefit

scale, as well as the optionality scale in Leech's (2014) model were used in the current study to realize imposition and obligation weight of the directives.

In the late 70s and early 80s, two seminal studies were conducted by Ervin-Tripp (1976) and Holmes (1983), in which detailed description of directive constructions were presented. The former investigated directives in the context of naturally-occurring conversations in a bottom-up approach (line-by-line analysis of texts to identify the target feature). Ervin-Tripp (1976) introduced six directive construction types, including need statements (e.g., "I need a match"), imperatives (e.g., "coffee, black"), embedded imperatives (e.g., "why don't you open the window?"), permission directives (e.g., "can I have my records back?"), question directives (e.g., "you ready?"), and hints (e.g., my nose is bleeding). She suggested that for precise interpretation of directives, we should examine the social features of the register, as speakers may use different linguistic forms based on the contextual factors, such as familiarity, social status, or gender.

Holmes (1983) investigated directives in the context of elementary classrooms and focused on teacher directives. She presented three main categories for directives: imperatives, interrogatives, and declaratives. She also divided each category into different sub-categories. According to Holmes (1983), imperatives appeared in 6 different construction forms: 1) base form of the verb (e.g., "speak up"), 2) you + imperative (e.g., you look here"), 3) present participle form of the verb (e.g., "listening."), 4) verb-ellipsis (e.g., "hands up."), 5) imperative + modifier (e.g., "children looking this way please."), and 6) let + first person pronoun (e.g., "Let's finish there."). Interrogatives, which were less frequent than imperatives in Holmes (1983), appeared in 2 different forms: 1) modals (e.g., "would you open the window?", and 2) non-modal interrogative directives (e.g., "have you tried it?"). Finally, declaratives fell into two

categories according to their explicitness: 1) embedded agent (e.g., I'd like everyone sitting on the mat.") and 2) hints (e.g., "Kelly's hand is up.").

Ervin-Tripp's (1976) and Holmes' (1983) categorization of directive construction types have been adapted and employed in recent studies (Hwang, 2013; Reinhardt, 2010). The slight differences in the types of directives emerging in different studies are due to several reasons, such as differences in the data that is analyzed, differences in the context of speech (i.e., the register), and also the scope of the study. Although different studies have presented different categorizations with different names, they are all comparable to each other and to Blum-Kulka and Olshtain's (1984) request realizations.

According to Biber (2006), the linguistic features of various registers, as well the texts in each register will vary due to the situational differences of their context. To put it another way, studies on different collections of texts with various situational features will show variation in their linguistic forms. Therefore, thorough analysis of texts is necessary to identify the linguistic features of directives specific to a register (e.g., university lectures in the proposed study). Consequently, the linguistic features included in this study were selected based on the results of a pilot study which conducted bottom-up discourse analysis approach to identify all possible features emerging in lectures. In addition to the qualitative portion of the study which included all the possible directives in a sample of lectures, in an attempt to automatize the pragmatic identification of directives, this study systematically selected structural types of directives that were lexicogrammatically explicit and easy to extract using a computer program to be included in the quantitative portion of the project.

2.2 Directives in University Discourse

University discourse comprises a range of spoken and written activities related to academic life, including but not limited to classroom teaching, labs, office hours, study groups, student presentations, service encounters, textbooks, and pamphlets (Biber, 2006). Academic corpora, such as TOEFL 2000 Spoken and Written Academic Language (T2K-SWAL; Biber, Conrad, Reppen, Byrd, & Helt, 2002) and MICASE (Michigan Corpus of Academic Spoken English; Simpson, Briggs, Ovens, & Swales, 2002), include a range of sub-registers, and situational features (e.g., speaker roles, audience characteristics, academic levels, and interactiveness) and therefore, they are suitable resources for pragmatics analysis, as "language in the context is in the heart of pragmatic research" (McAllister, 2014, p. 30). Since the focus of the current study is on the spoken university discourse, the literature on the spoken register will mainly be reviewed in this section.

The literature on the spoken academic register has demonstrated variation within discourse in the linguistic features and pragmatic functions of directives, as a result of various situational characteristics of sub-registers. Reinhardt (2010) illustrated the use of directives by learner (international teaching assistants) and expert (native English speaker teaching assistants) speakers in a corpus of office hours. The learner speaker data contained recorded role-plays in ESL and international teaching assistant (ITA) preparation courses and the expert data were retrieved from the office hour speech events in MICASE (Simpson et al., 2002). Reinhardt (2010) employed a mixed corpus and discourse analytic approach under a social-functional politeness framework. Initially, he employed the lexical search technique, which is a traditional corpus linguistic technique in corpus linguistic studies, to look for a pre-determined list of directives (i.e., modals, semi-modals, directive vocabulary, and imperative forms). The corpus

analysis indicated that ITAs mostly tended to use structures that limit hearers' choice, such as 'had better'. This structure implied authority and "undesirable consequences with non-compliance", which leads to restricting students' choice (Reinhardt, 2010, p. 98). Reinhardt also reported on ITAs underuse of structures that promote involvement, such as periphrastic modals (e.g. 'you need to', or 'you've got to'). On the other hand, the expert group frequently used "you can" and "you want to" structures.

In addition to the corpus analysis, Reinhardt (2010) triangulated the results by including post-course interviews and surveys to examine the effects of social factors (e.g., teachers' identity, gender, teaching experience) on the use of directives. While the combination of quantitative and qualitative analyses brings depth to Reinhardt's results, there is a factor that could have improved the accuracy of the results: role-play data is not equivalent to naturally occurring data; thus, the learner group could have produced different utterances if they were in real situations.

Hwang (2013), which similarly examined the use of directives by native speaker TAs and ITAs (i.e., Korean TAs), also used a mixed method approach for the analysis. However, it differed from Reinhardt (2010) in that the ITA data transcribed were videotaped teaching sessions and comparable to the native English speaker TA data (retrieved from MICASE), in terms of authenticity. The transcripts in the native English speaker TA data were sampled from four different registers or speech events (student presentation, lecture, lab, and discussion section), while the ITA data were sampled from three registers (lab, lecture, discussion section). Unlike Reinhardt (2010), Hwang used a bottom-up approach in identifying directive realizations. Therefore, Hwang's corpus analysis results indicated a full range of directive forms that

appeared in the data. As for the qualitative analysis, Hwang (2013) used stimulated retrospective interviews to obtain speakers' thoughts regarding their language choices.

The results indicated that ITAs favor particular types of directives such as bare imperatives. However, these structures were mitigated about 30% of the time using lexical and syntactic devices. Hwang (2013, p. 71) also investigated the purposes of directives to come up with a categorization of directives including three types commanding, requesting, and suggesting. In terms of the difference between native English speaker TAs and the ITAs, ITAs used less direct structures compared to native speaker TAs. On the contrary to the mentioned studies (Reinhardt, 2007; Hwang, 2013), the current study focused on the use of directives by one participant group (i.e., university teachers), who happened to be mainly native speakers of English in the current data, except for two cases. However, it is hoped that the results of this study could benefit future university teachers who are non-native speakers of English.

In an earlier study, Garcia (2004) examined the use of speech acts (based on Searle's speech act categories) in T2K-SWAL, a corpus of academic English, representing the language used in American universities. She conducted a bottom-up corpus analysis by reading the conversations line by line and listening to the audio recordings simultaneously. Given her thorough methodology, she limited the analysis to three registers (i.e., service encounters, office hours, and study groups). In addition, she only selected highly-interactive conversations involving two interlocutors. Her results indicated that situation type and speaker role played a part in the form of directives used. For instance, while service encounters were abundant with requests, and suggestions, office hours were characterized by high frequency of suggestions/commands. It was also found that in office hours, the professors produce more suggestions/commands rather than requests.

While Garcia (2004) and Hwang's (2013) inclusion of a variety of registers allowed the researchers to see the role of situation type in the type of speech acts (i.e., directive forms) used, the small sample size in both studies limited the generalizability of the results. To address this issue, the proposed study will analyze a larger corpus, using computer programming techniques.

The role of situational factors in university language has been investigated in previous studies on spoken and written discourse (Barbieri, 2008; Hyland, 2002). Hyland (2002) found that directives in a corpus of academic writing are used for various purposes and they are used in various forms across disciplines and Barbieri showed that there is little variation in the use of involvement markers with respect to different situational factors, such as interactiveness, class size, and level of instruction. Given the fact that no previous studies have examined the effect of discipline, level of instruction, and level of interactivity on the use of directives in spoken academic discourse, including these variables in the current study contributes to the existing literature on directives.

2.3 Conclusion

According to the review of the literature in this chapter, four research gaps were identified:

1. We need more research to identify the structural features of directives, specifically used in academic lectures.

2. We need to revise our view of pragmatic functions of directives. Research on directives is usually motivated by the significant functions of directives in the classroom and the consequences of using them ineffectively (e.g. student complaints). However, no past research has emphasized on the perception of students, as receivers of the directives.

3. We need more research on pragmatic functions of directives with a scalar view of the functions, rather than distinct categories.

4. More research needs to be conducted to enhance the reliability and validity of automatic pragmatic coding techniques.

   To fill the research gaps in the reviewed literature, the current study will explore the use of directives in a representative corpus of academic lectures with respect to structural features and pragmatic force (i.e., strength of obligation and level of imposition as perceived by university students). Particular attention will be paid to three situational factors: (a) discipline (i.e., business, education, engineering, humanities, natural sciences, and social sciences), (b) level of instruction (i.e., freshman/sophomore, junior/senior, and graduate), and (c). level of interactivity (i.e., low, medium, and high). The current study employs methodological triangulation to investigate the use of directives in lectures from different perspectives. The study uses qualitative and quantitative analytical techniques subsequently to answer an overarching question: how are directives used in lectures? Chapters 3 and 4 present details about the methodological approach, the data, and the steps of the analysis in this project.

CHAPTER 3: METHODS

3.1 Overview

The goal of this study is to explore the use of directives in academic lectures with respect to three situational features of the lectures—(1) discipline (i.e., business, engineering, humanities, social sciences, natural sciences, and education), (2) level of instruction (i.e., lower-division or freshman/sophomore, upper-division or junior/senior, and graduate), and (3) level of interactivity (i.e., low, medium, and high interactivity). Directive utterances used by university professors are examined in terms of linguistic features, strength of obligation and level of imposition. The purpose for examining directives in this study is twofold. First, the study attempts to offer a description of the major structural types of directives—lexicogrammatically explicit directives—used in lectures with respect to the discipline, level of instruction of the course, and level of interactivity of the class session. The provided description can give insight to international teaching assistants (ITAs) or lecturers who are second/foreign language speakers of English as to the structural variety of directives common in different situational contexts. Second, the information provided by the pragmatic coding of directives aims to explain the students' perceived realization of various types of directives with regard to strength of obligation and imposition. This information will reveal the connection between the structural type of a directive and its perceived pragmatic force and consequently, would allow the ITAs or university lecturers to realize the effect of using directives with different structural types on the extent to which students feel obliged or imposed to perform the task. The following steps were taken to meet the study goals:

1. classification of the 176 texts according to discipline, level of instruction, and level of interactivity

2. development of a comprehensive pragmatic definition of directives

3. identifying all the possible directives in a sample of 14 texts representative of two disciplines (humanities and engineering), employing the definition developed in step 2

4. structural categorization of the directives found in step 3

5. selection of explicit structural types from the categorization developed in step 4

6. development of detailed algorithms and regular expressions of lexicogrammatically explicit directives

7. development of a computer program to identify, structurally categorize, and quantify the directives with lexicogrammatically explicit structures automatically from the corpus

8. running the finalized program scripts and regular expressions on the 176 lecture texts to automatically locate, structurally categorize, and compute the rates of occurrence of lexicogrammatically explicit directives—to answer RQ 1

9. qualitative coding of all the directive utterances found in a sample of 14 texts (step 3) for perceived strength of obligation and level of imposition using a discourse analysis approach

10. quantifying directives with different structural types and averaging strengths of obligation and levels of imposition of directives across disciplines, instruction levels, and levels of interactivity—to answer RQ 2 and RQ 3

11. conducting descriptive and multivariate statistics to demonstrate the variation in the use of directives in relation to three situational factors in the classroom (viz., discipline, level of instruction, and level of interactivity), as well as to examine the interaction between linguistic and situational factors in predicting the pragmatic force of directives—to

answer all research questions (Detailed description of the steps is discussed in section 3.4).

This chapter will present the methodological approach to the study of directives (section 3.2), provide a description of the corpus analyzed in the study (section 3.3), and elaborate on the analytical procedures (section 3.4) performed to answer the research questions posed by the study:

1. How does structural type frequency of directives in university lectures vary across disciplines, levels of instruction, and levels of interactivity?

2. How does the use of directives with different pragmatic forces—perceived level of obligation and imposition—in university lectures vary across structural types, disciplines, levels of instruction, and levels of interactivity?

   2.1. How does the use of directives with different strengths of obligation in university lectures vary across structural types, disciplines, levels of instruction, and levels of interactivity?

   2.2. How does the use of directives with different levels of imposition in university lectures vary across structural types, disciplines, levels of instruction, and levels of interactivity?

3. To what extent do linguistic and situational factors predict the pragmatic force of directives (perceived level of obligation and imposition)?

   3.1. To what extent do disciplines, levels of instruction, and levels of interactivity predict the perceived strength of obligation of directives?

   3.2. To what extent do disciplines, levels of instruction, and levels of interactivity predict the perceived level of imposition of directives?

3.3. To what extent do the structural types interact with situational factors as a predictor of the strength of obligation of directives?

3.4. To what extent do the structural types interact with situational factors as a predictor of the level of imposition of directives?

3.2 Methodological Approach

A descriptive, corpus-based methodological approach has been used for the analysis of directives as they occur in academic lectures. According to Biber, Conrad, & Reppen (1998, p. 4), corpus-based studies are characterized by four features: (1) they are empirical since they analyze the patterns of use of language in texts collected in natural environments, (2) they use large collection of texts, called corpora, as data, (3) they rely on computer analysis tools, and (4) they utilize both quantitative and qualitative techniques. This study includes all four features: (1) the purpose of the study is to analyze the patterns of use of directives in texts collected in actual university classrooms, (2) the data used for the analysis comes from a large corpus of university discourse, (3) a computer program is developed to automatically identify directive utterances in the corpus, and (4) both quantitative and qualitative approaches are employed to analyze the data in the study.

This study uses a combination of methodological triangulation and mixed-methods sequential design (Teddlie & Tashakkori, 2006) to explore the use of directives in academic lectures. The study is a methodological triangulation in that it employs two different methodological approaches to investigate the same construct or to answer the same overarching research question—how directives are used in academic lectures. The initial stage of the analysis uses a bottom-up approach to explore directives in lectures by reading through sample texts and identifying all the possible directives (step 3 in section 3.4.3), classifying directives by structural

types (step 4 in section 3.4.4), selecting the structural types that are explicit and easy to identify automatically (step 5 in section 3.4.5), and qualitatively coding all the directives for strength of obligation and level of imposition (step 9 in section 3.4.9). Once directives with lexicogrammatically explicit directives are determined through a bottom-up approach, subsequent analysis employs a top-down approach. In this stage, the list of explicit structural types is employed as a baseline for the development of a thorough list of algorithms and regular expressions for the automatic identification of directives (step 6 in section 3.4.6). Consequently, a computer-assisted corpus-based method and a concordancer program are used to identify the developed algorithms and the regular expressions in texts, annotate the identified utterances for their structural types, and quantify the identified directives in each structural type category (steps 7 and 8 in sections 3.4.7 and 3.4.8 respectively).

Simultaneously, this study uses a mixed-methods sequential design as it combines qualitative and quantitative methods to answer the research questions with more depth. The design is sequential since qualitative and quantitative methods are employed sequentially and the results of the qualitative method inform the quantitative analysis. The qualitative analyses included steps 2, 3, 4, 5, and 9 of the analysis (which were previously explained in the description of the analyses included in the bottom-up approach). Once, steps 2 through 5 were taken, the selected explicit structural types of directives were used as the framework for the quantitative analysis or the automatic identification of directives. The quantitative phase also involved the statistical analyses conducted to answer all three research questions.

Another methodological strength of the current study is including research questions from both variationist and text-linguistic perspectives. The main difference between these two approaches is the unit of analysis; while in the variationist approach to research, the unit of

analysis is individual occurrence of a linguistic feature—a directive utterance in the current study—studies with the text-linguistic perspective consider each text (or corpus) as the unit of analysis (Biber, Egbert, Gray, Oppliger, & Szmrecsanyi, 2016, p. 355; Biber & Jones, 2009). One other important distinction between these two perspectives is how they report the results. While variationists report on the "proportional preferences" (e.g., directives with one structural type are more preferred than those with another structural type), text linguists report the rate of occurrence of a certain linguistic feature (e.g., directives with imperatives) in each text (Biber, et al., 2016, p. 355). In this study, research questions 1 and 2 (including two sub-questions, 2.1. and 2.2) are answered from a text-linguistic perspective. In these research questions, the unit of analysis is texts and the use of directives is investigated in terms of rates of occurrence of different types of directives in each text. On the other hand, research question 3 (3.1, 3.2, 3.3, and 3.4) takes a variationist approach in that it considers each directive utterance as the unit of analysis and offers overall frequencies of certain types of directives in comparison to other types of directives.

3.3 Description of the Corpus

This section describes the data used in the study and is organized in the following order. Section 3.3.1 provides a general description of the corpus and discusses the representativeness of the corpus. Subsequently, section 3.3.2 describes the sub-corpus used for the automatic linguistic analysis of directives (RQ 1) and explains how certain situational features of texts included in the analysis are defined in the corpus. Finally, section 3.3.3 specifies the sub-corpus used for developing an operational definition of directives, as well as for conducting the pragmatic analysis of directives (RQ 2 and 3).

3.3.1 Description of T2K-SWAL and its representativeness. The data in this study comes from the TOEFL 2000 Spoken and Written Academic Language corpus (T2K-SWAL; Biber, et al., 2002), consisting of 2.7 million words, representing the spoken and written discourse in American universities. T2K-SWAL was chosen for analysis in this study, because of its relatively large size, representativeness (Biber, 2006), and the nature of research questions. Texts in T2K-SWAL are sampled from a range of written and spoken registers happening in American universities, including, but not limited to, lectures, labs, office hours, study groups, textbooks, brochures, and service encounters.

The wide range of registers included in T2K-SWAL, as well as the sampling procedures are valid evidence for representativeness of the corpus. Texts in T2K-SWAL are sampled from six major academic disciplines—business, engineering, humanities, social sciences, natural sciences, and education—at four American Universities situated in four main regions in the United States, (i.e. West Coast, Rocky Mountain West, Midwest, and the Deep South; Biber et al., 2002, p. 16). The four selected universities are of different types: a teacher's college, a mid-size regional university, an urban research university, and a research 1 university. Moreover, the texts are representative of the academic levels in American universities, i.e., lower division (freshman and sophomore), upper division (junior and senior), and graduate. Furthermore, T2K-SWAL provides valuable information about different situational features of the registers (texts), e.g., course name, gender of the instructors, status of the speakers or writers, and level of interactivity of the classes.

Since the focus of the present study is on the use of directives in lectures, the lecture register in the spoken sub-corpus of T2K-SWAL is used for the analysis. However, due to the nature of the research questions, two different samples were drawn for analysis from the lecture

sub-corpus. Details and distribution of texts in each sample are presented in the following sections.

3.3.2 Distribution of the sub-corpus used for the linguistic analysis of directives. To answer RQ1 regarding the distribution of directives with lexicogrammatically explicit structures across situational contexts, the complete set of texts in the lecture sub-corpus was analyzed (for a detailed description of the analysis see step 8 in section 3.4.8). Using automatic processing methods not only improved the speed and accuracy of coding directives, but also allowed the researcher to include all the available texts in the analysis and consequently enhance the representativeness of the data and generalizability of the results. The 176 lectures included in the linguistic analysis of directives consist of 1,298,913 words and are collected from six major academic disciplines—business, engineering, humanities, social sciences, natural sciences, and education.

In order to compare the use of directives in lectures across disciplines, levels of instruction, and levels of interactivity, the 176 texts were grouped by these factors (see step 1 in section 3.4.1 for a detailed explanation of the classification procedure). Since all three situational features—discipline, instruction level, and level of interactivity —had already been annotated in T2K-SWAL transcripts, the researcher only needed to identify the codes for the three situational features in each text and group the texts with the same codes together. Table 3.1 indicates the breakdown of T2K-SWAL across disciplines and instruction levels. In T2K-SWAL, levels of instruction are defined as follows: lower division refers to classes taught to freshmen and sophomores, upper division refers to classes taught to juniors and senior, and graduate refers to classes taught to graduate students.

Table 3.1 *Breakdown of Lectures across Disciplines with Different Levels of Instruction in T2K-SWAL*

Disciplines	Instruction Level			Total
	Lower Division	Upper Division	Graduate	
Business	8 (45,345)	20 (136,969)	8 (70,275)	36 (252,589)
Engineering	8 (47,555)	14 (75,384)	8 (55,332)	30 (178,271)
Humanities	10 (68,764)	12 (94,346)	9 (92,583)	31 (255,693)
Social Sciences	15 (126,777)	15 (111,339)	8 (64,030)	38 (302,146)
Natural Sciences	9 (49,701)	7 (42,058)	9 (76,670)	25 (168,429)
Education	4 (26,602)	4 (26,674)	8 (88,509)	16 (141,785)
Total	54 (364,744)	72 (486,770)	50 (447,399)	176 (1,298,913)

Table 3.2 illustrates the breakdown of T2K-SWAL across disciplines and levels of interactivity. Biber (2006, p.25) defines levels of interactivity in T2K-SWAL as seen below:

- Low interactivity: "Fewer than 10 turns per 1,000 words (i.e., average length longer than 100 words per turn)"

- Medium interactivity: "Between 10 and 25 turns per 1,000 words (i.e., average length between 40 and 100 words per turn)"

- High interactivity: "More than 25 turns per 1,000 words (i.e., average length shorter than 40 words per turn)"

Table 3.2 *Breakdown of Lectures across Disciplines with Different Levels of Interactivity in T2K-SWAL*

Disciplines	Interactivity # of texts (# of words)			Total # of texts (# of words)
	Low	Medium	High	
Business	3 (15,257)	13 (92,893)	20 (144,439)	36 (252,589)
Engineering	20 (113,147)	7 (51,255)	3 (13,869)	30 (178,271)
Humanities	8 (53,226)	9 (73,192)	14 (129,275)	31 (255,693)
Social Sciences	11 (89,573)	17 (134,052)	10 (78,521)	38 (302,146)
Natural Sciences	11 (68,961)	10 (59,979)	4 (39,489)	25 (168,429)
Education	1 (8,347)	5 (46,029)	10 (87,409)	16 (141,785)
Total	54 (348,511)	61 (457,400)	61 (493,002)	176 (1,298,913)

See Appendix A for a table of the breakdown of T2K-SWAL across all three independent variables: disciplines, instruction levels, and interactivity levels. The information presented in Appendix A will allow us to evaluate whether the variables are confounding or not.

In order to assure variety of speakers, all the text files in the lecture sub-corpus of T2K-SWAL were reviewed and information regarding the instructors were extracted. It was found that out of a total of 176 text files across 6 disciplines, there were only 6 files with 3 shared instructors, i.e., 173 different instructors on the 176 lecture files. That is, there is variety of speakers throughout the corpus. The 176 lecture files were also examined for any comments related to the language status of the instructor. It was revealed that, there were 8 non-native English speaker instructors in 8 texts among the 176 lecture files. These files were retained in the analysis, as the number was low and there were no comments regarding unintelligibility of these speakers in the text files.

3.3.3 Distribution of the sub-sample used for the piloting stages and the pragmatic analysis of directives. A stratified random sample of 14 texts—comprising 83,725 words—was

drawn from two disciplines in the lecture sub-corpus in T2K-SWAL for multiple analytical

purposes: (1) developing an operational definition of directives (see step 2 in section 3.4.2), (2)

identifying all possible directive utterances in sample lectures (see step 3 in section 3.4.3), (3)

presenting a structural categorization of directives found in lectures (see step 4 in section 3.4.4),

(4) selecting lexicogrammatically explicit structural types for the automatic identification of

directives (see step 5 in 3.4.5), and (5) qualitative coding and annotation of directives for

strength of obligation and level of imposition (see step 9 in section 3.4.9). For conducting the

stratified random sampling, texts in engineering and humanities were randomly drawn from 2

strata, each with 3 substrata— (1) levels of instruction (lower division, upper division, graduate)

and (2) levels of interactivity (low, medium, high). Special attention was paid to having roughly

equal numbers of texts in each situational category (level of instruction and interactivity).

However, this was not possible in specific substrata, such as graduate level engineering lectures

due to the number of texts available in graduate level lectures in T2K-SWAL. Overall, the

sample comprised 19% of the total number of words in the business and engineering lectures.

Tables 3.3 and 3.4 show the distribution of the 14 sample lectures from engineering and

humanities across levels of instruction and levels of interactivity respectively.

Table 3.3 *Breakdown of 14 Lectures in Engineering and Humanities across Levels of Instruction*

Disciplines	Instruction Level # of texts (# of words)			Total # of texts (# of words)
	Lower Division	Upper Division	Graduate	Lecture
Engineering	3 (193,27)	3 (15,566)	1 (1,025)	7 (35,918)
Humanities	2 (7,432)	3 (21,854)	2 (18,521)	7 (47,807)
Total	5 (26,759)	6 (37,420)	3 (19,546)	14 (83,725)

Table 3.4 *Breakdown of 14 Lectures in Engineering and Humanities across Levels of Interactivity*

Disciplines	Interactivity # of texts (# of words)			Total # of texts (# of words)
	Low	Medium	High	Lecture
Engineering	2 (8,587)	3 (19,327)	2 (8,004)	7 (35,918)
Humanities	2 (8,634)	2 (15,462)	3 (23,711)	7 (47,807)
Total	4 (17,221)	5 (34,789)	5 (31,715)	14 (83,725)

The main reason for using only 14 texts for the pragmatic analysis of directives practical constraints. Due to the detailed nature of pragmatic coding and lack of time and resources, it was not possible to qualitatively analyze all the extracted directives from the 176 texts in lectures. Therefore, principled decisions were made to select a sample of texts from two disciplines.

Among the six disciplines in T2K-SWAL, engineering and humanities were selected for the qualitative analysis of directives and successively, sample texts were randomly drawn from these two disciplines. Decisions regarding the inclusion and exclusion of disciplines were made based on the following reasons:

1. Humanities and engineering were included in the analysis since they fall at the two ends of a continuum, humanities being an "academic" discipline and engineering being a "professional" discipline (Biber, 2006, p. 226). Consequently, it was expected to see discrepancies in the language used in the classroom across these two disciplines. According to the results of the Multi-Dimensional analysis (MD) of spoken academic registers in Biber (2006), engineering texts were marked as procedural, while humanities texts were content-focused. In terms of lexical patterns of use, texts in engineering used a smaller range of words with fewer technical terms. On the other hand, texts in humanities

showed wider range of vocabulary used to describe the varied range of everyday topics they discuss.

2. Business was excluded from the analysis due to its similarities with engineering in terms of lexical patterns of use, based on the results of the Multi-Dimensional analysis (MD) of spoken academic registers in Biber (2006). Business and engineering texts were both marked as procedural and they both used a small range of words for describing technical terms.

3. Education was excluded from the analysis because there were noticeably fewer number of texts and words in education (16 texts and 141,785 words) compared to the other five disciplines (see Table 3.1 for the comparison). Therefore, a principled decision was made to only keep the disciplines with solid, comparable number of texts and word counts.

4. Texts in social sciences were excluded from the analysis due to their similar patterns of lexical and linguistic features with texts in humanities (Biber, 2006, p. 225). In other words, social sciences and humanities are expected to show similar patterns of variation. Therefore, it is believed that only including one of the two disciplines probably would not affect the results drastically.

5. Natural sciences were excluded from the analysis since they were in the middle of the professional-academic continuum (Biber, 2006, p. 226). On the one hand, natural sciences share similar linguistic features with the professional disciplines (hard sciences) and on the other hand, they show similarities to the academic disciplines (soft sciences) in terms of the range of vocabulary they use.

3.4 Detailed Discussion of Analytical Procedures

To answer the three research questions, eleven analytical steps—briefly mentioned in section 3.1—were undertaken. Table 3.5 provides an overview of the steps as well as the research questions that are related to each step. Steps that were not specifically linked to a research question are marked with N/A in the RQ column. Details and motivations for each step are discussed in the following subsections.

Table 3.5 *Analytical Steps to Answer the Research Questions*

Step #	Description of the Analytical Steps	RQ
1	Classifiy the 176 texts according to discipline, level of instruction, and level of interactivity	N/A
2	Develop a comprehensive pragmatic definition of directives	N/A
3	Identify all the possible directives in a sample of 14 texts representative of two disciplines (humanities and engineering), employing the definition developed in step 2	RQ 2 & 3
4	Structurally categorize the directives found in step 3	N/A
5	Select lexicogrammatically explicit structural types of directives from the categorization developed in step 4	N/A
6	Develop detailed algorithms and regular expressions of the lexicogrammatically explicit directives	N/A
7	Develop a computer program to automatically identify, structurally categorize, and quantify the directives with lexicogrammatically explicit structures • Compute precision statistics to evaluate the developed program	N/A
8	Run the finalized program scripts and a concordancer program on the 176 lecture texts to automatically locate, structurally categorize, and compute the rates of occurrence of lexicogrammatically explicit directives	RQ 1
9	Qualitatively code all the directive utterances found in a sample of 14 texts (step 3) for perceived strength of obligation and level of imposition using a discourse analysis approach	RQ 2 & 3

10	Quantify directives with different structural types, strengths of obligation and levels of imposition, across disciplines, instruction levels, and levels of interactivity using two different perspectives:	
	• Compute rates of occurrence per text	RQ 2
	• Compute proportional frequencies	RQ 3
11	Conducting descriptive and multivariate statistics to answer the research questions	
	• Conduct descriptive statistics	RQ 1, 2, 3
	• Conduct Factorial MANOVA	RQ 1
	• Conduct Factorial ANOVAs	RQ 3

3.4.1 Step 1: situational categorization of texts. In the first step of the analysis, all the

texts collected from the lecture register were identified in the spoken sub-corpus of the T2K-

SWAL corpus and were placed in a separate folder. Afterward, the 176 lecture texts were

classified according to discipline, level of instruction, and level of interactivity. In other words,

the texts were manually grouped together if they had occurred in the same discipline (viz.,

business, engineering, humanities, social sciences, natural sciences, and education), with similar

level of instruction (viz., lower division, upper division, and graduate), or interactivity (viz., low,

intermediate, and high). The information regarding discipline, level of instruction, and level of

interactivity of each text was extracted from the corpus file names. All files in the T2K-SWAL

corpus have a name of 14 spaces (e.g., busacleldmn048) and each one or more space represents a

contextual factor. According to Biber et al. (2002), letters 1–3 represent disciplines—"Bus" for

business, "Eng" for engineering, "Hum" for humanities, "Soc" for social sciences, "Nat" for

natural sciences, "Edu" for education; letters 4–5 characterize sub-disciplines—all the majors

included in each discipline; letters 6–7 refer to the situations or registers—all the texts in the

lecture sub-corpus had "le" in letters 6 and 7; letters 8–9 show the level of study or instruction—

"ld" for lower division, "ud" for upper division, and "gr" for graduate level; letter 10 represents

level of interactivity—"l" as low, "m" as medium, and "h" as high; and the last letter, 11, characterized the university the text was collected in—"n" for NAU, "g" for Georgia State, "I" for Iowa State, and "s" for California State Sacramento. For example, the file, named busacleldmn048 was added to a group of texts in business, with lower division level, and medium level of interactivity. To be able to compare texts across levels of one, two, and three factors, six types of groupings were developed: (1) texts categorized across disciplines, (2) texts categorized across levels of instruction, (3) texts categorized across levels of interactivity, (4) texts categorized across disciplines and levels of instruction—e.g., business lower division, business upper division texts, business graduate texts, humanities lower division texts, and so on, (5) texts categorized across disciplines and levels of interactivity—e.g., education texts with low interactivity, education texts with medium interactivity, education texts with high interactivity, and so forth, (6) texts categorized across disciplines, levels of instruction and levels of interactivity.

    3.4.2 Step 2: development of a comprehensive pragmatic definition of directives. To reliably identify all possible directive utterances in lectures (step 3 in section 3.4.3), a comprehensive operational definition of directives was developed through a pilot research study. First, an initial definition of directives was developed by relying on the directive literature (Holmes, 1983; Hwang, 2013; Searle, 1976; Sinclair & Coulthard, 1975), and by reading through sample texts and getting to know the data. Next, to evaluate and improve the reliability of the developed definition, multiple piloting procedures were conducted on 8 texts (29,756 words) randomly selected from the 14 engineering and humanities texts (83,725 words) employed in the pilot research—previously described in section 3.3.3. In the piloting procedures, the researcher along with 2 other coders read through 8 texts (4 from each discipline) line by line and identified

the directive utterances, using the initially developed definition of directives and through a bottom-up discourse analysis approach. After each round of piloting, the researcher met with the second coder to discuss discrepancies, discover patterns among the utterances with conflicting codes, and reach mutual agreement on the conflicting codes. The percentage agreement between the researcher and the second coder in the final round of piloting was 72% for both disciplines before discussing discrepancies and 100% after discussing the discrepancies. The operational definition used in the piloting procedures was revised after each round of piloting based on examining the sources of discrepancies with the coders. The final revised version of the operational definition of directives which was used for the bottom-up identification of all directive types in the 14 sample texts (step 3 in section 3.4.3) is presented in the next subsection.

3.4.2.1 Operational definition of directives. In this study, directives are operationalized as utterances produced by an instructor to get the students to perform an action, regardless of whether the action is performed immediately or later. The action could be either concrete (e.g. writing, reading, turning in) or mental (e.g. thinking, remembering, noticing). Excerpt 3.1 is an example of a directive (T stands for teacher):

Excerpt 3.1. humenleldhg049

> *T: ... Now **you're going to be highly specific and establish in your papers how and why you selected your works** which you selected. And as well as how women represent themselves.*
>
> Directive constructions may appear in 3 different clause types (Adopted from Holmes'

(1983) categorization of directive construction types):

1. Declaratives or subject-verb structures which usually express statements (e.g. "I'd like to know how many are taking each one")

2. Imperatives (including base form of the verb, usually without the subject, such as "narrow them")

3. Interrogatives (wh-questions, yes/no questions, alternative questions, and statements marked with a question mark in the transcripts)

However, in some instances, directives can be non-sentential. Excerpt 3.2 provides an example of a non-sentential directive from the corpus (S stands for student). By saying "you my dear", the instructor is asking for participation.

Excerpt 3.2. humenleldhg049

    *T: … You remember Rochester? What was, tell us a little bit about Rochester, his position in society. **You my dear**, yeah. No, what?*

    S: Like I was in high school. I don't remember.

In contexts that there are successive directive verbs within the same utterance, each main verb is counted as a different directive. For instance, in the following excerpt (3.3) there are two directives, "you're gonna have to do …" and "you're gonna have to show".

Excerpt 3.3. engcslegrhn217

    *T: …OK here's what you're <u>gonna have to</u> **do** you're <u>gonna have to</u> **show** either using the navigation tool or use the story board type PowerPoint presentation to show how you designed and set up your system board, alright?"*

The following explains utterances that will not be counted as directives:

1. Any response to a student's question is not counted as a directive. For instance, in the following utterance (excerpt 3.4), the instructor's response is not a directive.

Excerpt 3.4. engcslegrhn217

    S: so when does it mean that we are going to do the presentations?

    T: **Wednesday, next week Wednesday**

2. Clarification requests do not count as directives. For instance, "what?", "huh?", "could you please repeat that?" are not considered directives.

3. Questions that the instructor asks in order to elicit course-related content are not considered directives, e.g., "What do you think he means by the term expedient there?"

3.4.3 Step 3: bottom-up coding of directives in 14 sample texts. In this step, using the operational definition of directives in section 3.4.2.1, all the available directives (including both grammatically explicit and indirect directives) in the 14 sample texts from engineering and humanities were manually identified by the researcher through careful line-by-line reading of texts and highlighting directive utterances. It should be noted that 8 of the 14 texts were previously coded—in the piloting procedure in step 2—by the researcher and the second coders and therefore, in this step, the remaining 6 texts were coded solely by the researcher. Subsequently, all the highlighted directives in the 14 texts were manually extracted and placed into individual rows in an Excel spreadsheet. Conducting step 3 of the analysis was based on two main reasons: (1) identifying all the possible directive types in sample lectures provided us with the baseline for determining major structural types of directives in lectures, and (2) results of this step were used as data for the pragmatic analysis of directives in step 9 (see section 3.4.9).

3.4.4 Step 4: structural categorization of directives. To distinguish the directives found in step 3 based on their structural types, all the directives were coded for their linguistic features and eventually, a structural categorization with 15 types was developed for directives used in the sample university lectures (see Table 3.6).

Table 3.6 *Structural Categorization of Directives Used in University Lecture Sessions*

Clause Type	Structural Categorization
Declaratives	1. Performatives (e.g. I ask you to V, directive verbs-e.g. suggest, recommend, required, expect) 2. Obligation modals (e.g. have to, must, should, going to, ought to) 3. Intention and desire verbs (want/need) 4. permission/suggestion/possibility modals (e.g. can, will, could, may) 5. If you + verb 6. Would/wouldn't (e.g. "you'd at least have a paragraph introducing adverbials") 7. Non-sentential (e.g., "your papers, please!") 8. Other (e.g. "if you don't go this year, it's something to keep in mind for next year)
Imperatives	9. Base form of the verb (e.g. "narrow them") 10. Subject + base form (e.g. "you narrow the scope.") 11. Present progressive (e.g. "Looking at the order of these place time ones.") 12. Let's (e.g. "let's just pause a moment here")
Interrogatives	13. Feasibility/ability modal questions (e.g. "Would you pass that back to Joe.") 14. Non-modal questions (e.g. "are you passing out that article then?") 15. Suggestory formulae (e.g. "(How about) if I allowed you to write it out? neatly?")

In building the structural categorization of directives and naming different categories, Blum-Kulka and Olshtain's (1984) framework on request strategy types as well as Hwang's (2013) categorization of construction types were taken into consideration. The structural types that emerged in the data were of three clause types (Holmes, 1983): (1) declaratives, (2) imperatives, and (3) interrogatives. A description of these clause types was presented in the operational definition of directive in section 3.4.2.1. As shown in Table 3.6, there were 8 structural types among the declarative directives, 4 structural types among the imperative directives, and 3 structural types among the interrogative directives. Due to objective nature of coding structural types, the researcher coded these features without the help of second coders.

3.4.5 Step 5: selection of explicit structural types of directives. The motivation for

conducting steps 5 and 6 of the analysis was to be able to identify directives automatically and

reliably in a large quantity of texts. The decision to automatically identify directives was made

based on the results of the pilot research, which will be elaborated in chapter 4. Following is a

brief description of these results.

In the pilot research, the following analyses were performed: exploring the structural

types of directive utterances found in step 4, analyzing the frequency of each structural type to

identify the most frequently-used types, calculating the inter-coder reliability for identifying

directives with different structural types, and examining the sources of discrepancies between the

coders in identifying certain types of directives. Based on the findings, it was revealed that the

most frequent structural types of directives (imperatives, permission/suggestion/possibility

modals, intention/desire verbs, and obligation modals) were all linguistically overt—i.e.,

directives with permission/suggestion/possibility modals have conventional structures which

occur frequently, and it is easy to identify these directives in texts. Moreover, it was found that

the most frequent directives, which appear to be lexicogrammatically explicit, were coded with

the highest inter-coder agreement. With respect to the structural types with lower frequency

rates, the inter-coder agreements were examined and performatives with 90% coding agreements

were included in the analysis. However, this category was renamed to directive vocabulary—

detailed descriptions of selecting 5 out of 15 structural types is provided in chapter 4.

Consequently, it was concluded that automatically coding directives with lexicogrammatically

explicit directives will result in a higher reliability rate or precision rate compared to manually

identifying directives. The explicit structural types of directives that were selected from the

structural categorization developed in step 4 to be used for the automatic identification of

directives are illustrated in Table 3.7. Example linguistic patterns are also provided for each

structural type.

Table 3.7 *Explicit Structural Types of Directives Included in Automatic Identification of Directives*

Structural Types	Example Linguistic Patterns
Imperatives	Base form of the verb
	Let's V
Obligation Modals	You have to
	You must
	You should
	You are going to
	You ought to
Intention and Desire Verbs	You need to
	You want to
Permission/Suggestion/Possibility Modals	You can
	You could
	You may
Directive Vocabulary[1]	I ask you to V
	I suggest
	I recommend
	You are required to V
	I expect you to V

[1] Performatives in Table 3.6 were renamed to "directive vocabulary".

3.4.6 Step 6: development of algorithms and regular expressions of lexicogrammatically explicit directives. The explicit structural types of directives selected in

step 5 were used as the basis for developing detailed algorithms and regular expressions of

directives with lexicogrammatically explicit structures to automatically identify directives. In

total, 454 algorithms and 6 regular expressions were written for the 5 major structural types and

the 27 structural sub-types (see Appendix B for a full list of algorithms and regular expressions

representing lexicogrammatically explicit directive utterances explored in this study). The list in

Appendix B includes only the directive structural types that are lexicogrammatically overt and

have the potential to be automatically coded with precision. Based on the results of the pilot research regarding the frequency of directives with the 5 explicit structural types (see chapter 4 for more details), we can assume that the list of the algorithms offered in Appendix B will roughly catch 78% of the existing directives in lectures.

In addition to the structural type categorization, three other sub-categories were added to the list of algorithms: (1) personal vs. impersonal (i.e., directives with personal pronouns vs. those with 3rd person indefinite pronouns), (2) mitigated vs. unmitigated (i.e., directives with or without mitigating devices, such as "please"), and (3) positive vs. negative (i.e. directive utterances that ask the students to perform or not to perform a task). In other words, distinctions were made among linguistic patterns or algorithms with different combinations of these three factors. This is due to the fact that directives with similar structural types and different use of pronouns, inclusion or exclusion of mitigating devices, or positive vs. negative utterances can take entirely diverse functions and therefore, they should be separated in counts. Overall, 27 structural sub-types were identified. A more detailed description of step 6 and the process of developing the algorithms has been presented in chapter 4.

3.4.7 Step 7: development of a computer program for the automatic identification of directives. The list of algorithms developed in step 6 (see Appendix B) was used to write Python scripts (Version 3.5 for Windows) to automatically code lexicogrammatically explicit directives with 23 structural sub-types (or four structural types: obligation modals, intention and desire verbs, permission/possibility modals, and directive vocabulary). Python scripts that were developed for this study do the following (The Python scripts developed for this study can be provided upon request):

1. Extract the file name

2. Distinguish and separate teacher turns (coded with "1:") from other turns ("2:", "3:", "4:") in texts

3. Extract information regarding the situational features of the texts, i.e., discipline, level of instruction, and interactivity

4. Automatically identify lexicogrammatically explicit directives in teacher turns

5. Count the number of words in teacher turns

6. Code the identified directives for their structural sub-types

7. Quantify the identified directives across structural sub-types

8. Produce an excel sheet with texts files in each row. The columns provide information regarding the file name, teacher turn word count, raw frequency of directives with the 27 structural sub-types, discipline, sub-discipline, level of instruction, and level of interactivity (see Figure 3.1 for a screen shot of a portion of this program output).

FILE NAME	WORD COU	TYPE 5	TYPE 6	TYPE 7	TYPE 8	TYPE 9	TYPE 10	TYPE 11	TYPE 12	TYPE 13	TYPE 14	TYPE 15	TYPE 16	TYPE 17	TYPE 18	TYPE 19	TYPE 20	TYPE 21	TYPE 22	DISCIPLIN	STUDY LEV	INTERACT
busacleldln052	1957	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	Business	LL	low
busacleldmn048	6275	5	2	0	0	1	0	0	0	4	0	1	0	0	0	0	0	14	0	Business	LL	medium
busacleudhs057	3998	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	10	1	Business	UL	high
busacleudms056	9884	41	2	1	0	1	0	0	0	4	1	0	0	0	0	0	0	16	5	Business	UL	medium
busacleudms058	8410	19	1	0	0	2	0	0	0	21	4	0	0	0	0	0	0	14	4	Business	UL	medium
busatlegrmg077	6630	15	1	0	0	1	0	0	0	4	1	0	0	0	0	0	0	33	3	Business	Grad	medium
busatlegrmg084	6137	16	1	2	0	0	0	0	0	7	0	0	0	0	0	0	0	27	1	Business	Grad	medium
busatleudhg013	5648	16	0	1	0	0	0	0	0	2	0	1	0	0	0	0	0	11	0	Business	UL	high
busatleudhg016	7060	13	0	0	0	0	0	0	0	10	0	2	0	0	0	0	0	26	1	Business	UL	high
busbalegrhn218	5017	4	0	0	0	0	0	0	0	5	1	1	0	0	0	0	0	11	0	Business	Grad	high
busbalegrhn219	5740	6	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	25	2	Business	Grad	high
busbaleldhn045	5172	3	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	15	1	Business	LL	high
busbaleldhn046	4568	2	1	0	0	0	0	0	0	5	0	2	0	0	0	0	0	7	2	Business	LL	high
busbaleldmn044	6533	13	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	10	3	Business	LL	medium
busbaleldmn054	4725	5	4	0	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	Business	LL	medium
busbaleudhn152	8060	14	5	0	0	2	0	0	0	1	2	0	0	0	0	0	0	14	2	Business	UL	high
busbaleudhn154	1665	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	0	Business	UL	high
busbaleudhn170	4003	2	0	0	0	1	0	0	0	3	1	0	0	0	0	0	0	7	1	Business	UL	high

Figure 3.1 A portion of the program output with raw frequencies

9. Produce another Excel sheet similar to the first Excel sheet with the exception of the frequencies of the 27 structural types. In this Excel sheet, instead of the raw frequencies, normed rates of occurrences of directives with specific structural types are calculated (see Figure 3.2 for a screen shot of a portion of this program output). The rate of occurrence is

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calculated through the equation in Figure 3.3 (Biber, Conrad, and Reppen, 1998). The normalizing basis is determined based on the average length of texts to be analyzed. The true average length of texts in the lecture sub-corpus was 5,648; however, it is recommended that the normalizing basis be rounded to the nearest whole number (Biber, Conrad, and Reppen, 1998, p. 264), so it was decided that the normalizing basis would be 6,000.

FILE NAME	WORD CO	TYPE 5	TYPE 6	TYPE 7	TYPE 8	TYPE 9	TYPE 10	TYPE 11	TYPE 12	TYPE 13	TYPE 14	TYPE 15	TYPE 16	TYPE 17	TYPE 18	TYPE 19	TYPE 20	TYPE 21	TYPE 22	DISCIPLIN	STUDY LEV	INTERACT
busacleldln052	1957	3.07	0	0	0	0	0	0	0	6.13	0	0	0	0	0	0	0	0	3.07	Business	LL	low
busacleldmn048	6275	4.78	1.91	0	0	0.96	0	0	0	3.82	0	0.96	0	0	0	0	0	13.39	0	Business	LL	medium
busacleudhs057	3998	4.5	0	0	0	0	0	0	0	1.5	0	0	0	0	0	0	0	15.01	1.5	Business	UL	high
busacleudms056	9884	24.89	1.21	0.61	0	0.61	0	0	0	2.43	0.61	0	0	0	0	0	0	9.71	3.04	Business	UL	medium
busacleudms058	8410	13.56	0.71	0	0	1.43	0	0	0	14.98	2.85	0	0	0	0	0	0	9.99	2.85	Business	UL	medium
busatlegrmg077	6630	13.57	0.9	0	0	0.9	0	0	0	3.62	0.9	0	0	0	0	0	0	29.86	2.71	Business	Grad	medium
busatlegrmg084	6137	15.64	0.98	1.96	0	0	0	0	0	6.84	0	0	0	0	0	0	0	26.4	0.98	Business	Grad	medium
busatleudhg013	5648	17	0	1.06	0	0	0	0	0	2.12	0	1.06	0	0	0	0	0	11.69	0	Business	UL	high
busatleudhg016	7060	11.05	0	0	0	0	0	0	0	8.5	0	1.7	0	0	0	0	0	22.1	0.85	Business	UL	high
busbalegrhn218	5017	4.78	0	0	0	0	0	0	0	5.98	1.2	1.2	0	0	0	0	0	13.16	0	Business	Grad	high
busbalegrhn219	5740	6.27	1.05	0	0	0	0	0	0	1.05	0	0	0	0	0	0	0	26.13	2.09	Business	Grad	high
busbaleldhn045	5172	3.48	0	0	0	0	0	0	0	12.76	0	0	0	0	0	0	0	17.4	1.16	Business	LL	high
busbaleldhn046	4568	2.63	1.31	0	0	0	0	0	0	6.57	0	2.63	0	0	0	0	0	9.19	2.63	Business	LL	high
busbaleldmn044	6533	11.94	0	0	0	0	0	0	0	2.76	0.92	0	0	0	0	0	0	9.18	2.76	Business	LL	medium
busbaleldmn054	4725	6.35	5.08	0	0	0	0	0	0	6.35	0	0	0	0	0	0	0	7.62	0	Business	LL	medium
busbaleudhn152	8060	10.42	3.72	0	0	1.49	0	0	0	0.74	1.49	0	0	0	0	0	0	10.42	1.49	Business	UL	high
busbaleudhn154	1665	0	0	0	0	0	0	0	0	3.6	0	0	0	0	0	0	0	14.41	0	Business	UL	high
busbaleudhn170	4003	3	0	0	0	1.5	0	0	0	4.5	1.5	0	0	0	0	0	0	10.49	1.5	Business	UL	high

Figure 3.2 A portion of the program output with normed frequencies

$$\left(\frac{\text{Frequency of a structural type of directives}}{\text{Total words in the text}}\right) * (6{,}000) = \text{Rate of occurrence}$$

Figure 3.3 Equation for calculating the rate of occurrence of a linguistic feature in a corpus

10. Produce duplicate files of all the 176 texts, in which all the identified directives have been annotated with a code representing the structural sub-type (ranging from 1 to 27) and the number of the algorithm in Appendix B. For instance, in Figure 3.4, the code tag <5.1> means that a directive with the algorithm "you + have to" has been found. The purpose of making these duplicate files and annotating texts for the identified directives and the structural sub-types was for calculating the precision statistics.

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we   ⟨13.1⟩   want to know if the average sell of our suits is more than seventy three seventy five that's not a decimal so our alternative is [writes on c
's goes into the null hypothesis 1: ok so that the statement and this is what we were talking about the other day when very important to design the experiment fir
: mean or whatever is worse if this is a true statement now what we're asking is under what condition do i no longer believe that number that statement well if th
ther day is still appropriate where in the world did point o five come from we'll get there ok step four is calculate and interpret [writes on chalkboard] we'll
n looking at the variances have we we've been looking at the standard deviations all semester and all of a sudden they decide ok we'll through in the variance her
in answers for explaining all about the standard error how we going to get it 1: well what is the standard error the standard error is standard deviation over th
the next number they give us oh we need it 1: we need it the degrees of freedom because it's a horribly difficult calculation remember 1: that one horribly diffi
aren't you as they haul you off in the paddy wagon we know that we know that two and a half 's a pretty big number in this scenario it's a pretty big number in t
jection region so in that case you   ⟨5.1⟩   have to mentally go in [writes on chalkboard] and put a negative sign in there because that cell gives you the
:board] the null [writes on chalkboard] is true and now you   ⟨21.1⟩   can go up and you   ⟨21.1⟩   can start talking to people about seven out of a t
e with each other well [573] what it allows us to do is to give a better explanation of what's going on of what these results are so that we   ⟨21.1⟩   can
the machine get it it had to calculate the t first 1: no but you   ⟨21.1⟩   could you   ⟨21.1⟩   could do you   ⟨21.1⟩   could 1: get it from t
dy uh representatives will be here they'll be here monday tuesday and wednesday as i pointed out to you the other week with the mission possible thing that (cont
e polite and positive ok uh 1: i don't know what we're going to do about the guy with the gray hair (can't like him) y'all have a good weekend [095] [end

Figure 3.4 A sample duplicate file annotated for individual algorithms in each sub-type

As can be seen in Appendix B, to locate imperatives in lectures, regular expressions were written for the four structural sub-types of imperatives. A concordancer program, AntConc (Version 3.5.7; Anthony, 2018), was used to search for the regular expressions in the tagged lecture texts (i.e., texts that have been previously annotated for parts of speech of the words). Using tagged texts allowed the researcher to find all the imperative directives as defined in the study, without confining the search to certain verbs.

3.4.7.1 Calculation of precision. Precision of the automatic coding was calculated based on two different methods. First, precision statistics (Figure 3.5) were run to analyze the accuracy of the program in finding the algorithms it was given. Second, regarding the imperatives which were searched for in tagged texts using the regular expression formulas, all the instances that were returned by the concordancer were carefully examined in context and only instances that were actual directives were kept in the analysis. In other words, the precision for the 24 structural sub-types located by the developed program (Table 3.8) only gives us information about the accuracy of the program, whereas the precision rate for identifying imperatives in Table 3.9, provides us with the percentage of imperatives included in the final analysis that were actual directives.

To assure the accuracy of the program developed in step 6, precision statistics were calculated using the equation in Figure 3.5. To perform precision statistics, the duplicate files produced by the program were searched for each structural type tag and the annotated directive utterances were examined to see whether they have been correctly tagged or not.

$$\frac{Correctly\ identified\ directives}{Total\ directives\ identified}$$

Figure 3.5 Precision statistics for identifying lexicogrammatically explicit directives

It is noteworthy that in addition to the final precision measures that were analyzed after running the program, multiple precision analyses were consistently performed while developing the program scripts. That is, after adding each structural type of directives to the program, sample directive utterances with the same structural types were added to test files and subsequently, the program was run, and output files were examined in terms of precision. Table 3.8 provides a list of precision measures for individual directive structural types.

Table 3.8 *Precision of the Developed Program for Individual Structural Types of Directives*

Structural Type	Personal/ Impersonal	Mitigated/ Unmitigated	Positive/ Negative	Index #	Overall Count	Program Precision
Obligation Modals	Personal	Unmitigated	Positive	5	1,289	100%
	Personal	Unmitigated	Negative	6	149	100%
	Personal	Mitigated	Positive	7	47	100%
	Personal	Mitigated	Negative	8	0	N/A
	Impersonal	Unmitigated	Positive	9	41	100%
	Impersonal	Unmitigated	Negative	10	2	100%
	Impersonal	Mitigated	Positive	11	2	100%
	Impersonal	Mitigated	Negative	12	0	N/A
Intention and Desire Verbs	Personal	Unmitigated	Positive	13	934	100%
	Personal	Unmitigated	Negative	14	105	100%
	Personal	Mitigated	Positive	15	74	100%
	Personal	Mitigated	Negative	16	1	100%
	Impersonal	Unmitigated	Positive	17	1	100%

	Impersonal	Unmitigated	Negative	18	0	N/A
	Impersonal	Mitigated	Positive	19	0	N/A
	Impersonal	Mitigated	Negative	20	0	N/A
permission/suggestion/possibility modals	Personal	N/A	Positive	21	2,915	100%
	Personal	N/A	Negative	22	360	100%
	Impersonal	N/A	Positive	23	5	100%
Directive Vocabulary	Personal	N/A	Positive	24	48	100%
	Personal	N/A	Negative	25	10	100%
	Impersonal	N/A	Positive	26	21	100%
	Impersonal	N/A	Negative	27	1	100%

As for the imperative directives that were identified based on the regular expressions and using AntConc (Version 3.5.7), 3,247 utterances were found initially. However, after precise qualitative analysis of the concordance lines, only 668 were coded as directives.

Table 3.9 *Accuracy of the Imperative Directives Included in Final Analysis*

Structural Type	Personal/ Impersonal	Mitigated/ Unmitigated	Positive/ Negative	Index #	Overall Count	Directive Precision
Imperatives	N/A	Unmitigated	Positive	1	600	100%
	N/A	Unmitigated	Negative	2	28	100%
	N/A	Mitigated	Positive	3	39	100%
	N/A	Mitigated	Negative	4	1	100%

3.4.8 Step 8: running the Python program to automatically identify, categorize, and quantify explicit directives. After developing the program script in step 7, the program was run on the 176 texts in lecture sub-corpus to automatically locate, structurally categorize, and quantify 24 types of lexicogrammatically explicit directives. The output Excel sheets were used as the data set for performing descriptive and multivariate statistics to answer research question 1. It should be noted that the counts (raw and normed) for imperative directives were manually added to the output Excel sheets.

3.4.9 Step 9: pragmatic coding of the directives found in step 3. In this step, all the

directive utterances found in step 3 and structurally categorized in step 4 of the analysis were

coded for perceived strength of obligation and level of imposition using the scales in Tables 3.10

and 3.11.

Table 3.10 *A Scale to code Perceived Strength of Obligation of Directives*

Perceived Strength of Obligation to Perform a Directive			
Zero	Low	Moderate	High
0	1	2	3

Table 3.11 *A Scale to code Perceived Imposition Level of Directives*

Perceived Level of Imposition to Perform a Directive			
Zero	Low	Moderate	High
0	1	2	3

The scales' constructs (obligation strength and imposition weight) have been adopted

from the cost and benefit, and the optionality scale in Leech's (2014) model respectively. The

low, moderate, and high level in the scales are roughly equivalent to three main pragmatic

functions of directives identified in Garcia's (2004) and Hwang's (2013) study. However, one

idea distinguishes the present rubric from that of past literature and that is regarding the speaker

vs. listener perspective. Unlike the previous studies which draw on speaker perspectives for

identifying the functions of directives, the current approach emphasizes on the listener's

perception to identify the pragmatic function. For instance, in Leech's (2014) model, the level of

obligation of doing the act has been defined as the amount of option that the speaker gives to the

hearer (viz., expectation of compliance). On the other hand, the present study seeks the perceived

level of obligation of the act from the listeners' (students') perspective.

In order to assure reliability of coding with these scales, first operational definitions were

developed for each construct and examples were provided for each level of the scales. Next, the

operational definitions and the rubrics were piloted with the target audience. Since the focus of the analysis in this study was on the students' perspectives, three senior students in humanities (two males and one female) were recruited as coders for the piloting stage, as well as the final stage of coding. Three norming sessions, lasting for three hours total, were held with the three coders, in which the researcher trained the coders to use the rubric and afterward, asked the coders to code sample directive utterances. Based on the discrepancy patterns that emerged among the coders in each norming session, certain revisions were made to the operational definitions and the rubrics. The following sections (3.4.9.1 and 3.4.9.2) present the finalized operational definitions and rubrics that were used by the three coders to pragmatically code all the directive utterances identified in step 3. Inter-rater reliability among the three coders is also presented in section 3.4.9.3.

3.4.9.1 Operational definition of strength of obligation. Perceived strength of obligation to perform an action is based on the degree to which an action is perceived as optional, and it ranges from zero obligation to a high level of obligation on a four-point scale. Perceived level of obligation is based on the optionality level of the action being requested. Note that a directive at ALL levels can state an obligation to do or NOT do an action, e.g., "you should study half of the book" and "you must not be late".

In the following table (3.12), specific features along with examples for each level of obligation (i.e., zero, low, medium, and high) are presented. In order to assign a level of obligation to each directive, coders have to find the criterion that best embodied the directive type.

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Table 3.12 *Rubric for Coding the Perceived Strength of Obligation of Directives*

Perceived Strength of Obligation to Perform a Directive			
Zero Obligation	**Low Obligation**	**Medium Obligation**	**High Obligation**
Students feel zero level of obligation for following the directive.	Students feel a low level of obligation for following the directive.	Students feel a medium level of obligation to follow the directive.	Students feel a high level of obligation to follow the directive.
It is totally up to the students to perform the task.	Students have high level of personal choice on performing or not performing the task.	Students have medium level of optionality on following the directives; the students feel there are few options in regard to following the directive.	There is a clear statement of expectation by the teacher, in which very few options, if any, are left for the students.
There are no course-related consequences for not following the directives.	There are minimal course-related consequences for not following the directives.	There are some course-related consequences for not following the directives.	There are major course-related consequences for not following the directives.
EX 1(humenlegrhi003) **T:** not much, but it helps. Yeah. Even if you don't go this year, it's something to keep in mind for next year, the call for papers usually comes out in, April or, March actually. And then it's due in, May or something really early, **you have to plan almost a year ahead.**	EX 1 (humenlegrhi003) S: That time is always shorter than place? The time adverbial is usually always shorter than the place adverbial. Is that even [2 sylls] **T:** um, again **that's something that you might want to check out** Because we know place could be here. And time could be at two oh clock in the afternoon. EX 2 (engcsleldmn047) **T:** and the spread sheet I handed out last time didn't break the parastitics into the in part in the P. component of the parastitics **so if you throw away that that first page I gave you last time and replace it with this first sheet here that that would be fine.**	EX 1 (humenlegrhi003) **T:** So **you could even pick out particular words** that you notice and then use them in examples, to support your project. EX 2 (engcsleudhn208) **T:** um you know default protocols, uh default DOS directory names these sorts of things. OK? but **as far as uh step by step instructions you don't need to bother with that**. so you don't really need to spend a lot of time on page thirty-eight	EX 1 (humhileudln070) **T:** so this is about the civil rights movement talks about the basic case for it, and then all the variations, freedom rides, uh, the bus boycott in, um, Montgomery, Alabama, uh, voting rights, it's pretty much textbook, **you'll have to read for the second exam** about half of this book.

3.4.9.2 Operational definition of perceived level of imposition. Perceived level of imposition of the action depends on the size of the cost of the action for the students. Imposition level of a directive is perceived as zero, low, medium, or high, based on whether there will be any personal, physical, social or economic costs associated with performing the desired act. The following table (3.13) illustrates examples along with specific features for each level of imposition (i.e., zero, low, medium, and high). In order to assign a level of imposition to each directive, coders had to find the criterion that best embodied the directive type.

Table 3.13 *Rubric for Coding the Perceived Level of Imposition of Directives*

Perceived Level of Imposition to Perform a Directive			
Zero Imposition	**Low Imposition**	**Medium Imposition**	**High Imposition**
The task does not involve any action.	The task is an easy task for the students.	The task is slightly challenging, time-consuming, or costly for the students.	The task is very difficult, time-consuming or costly for the students.
Zero	**Low**	**Medium**	**High**
EX 1 (engcsleudhn208) **T: I don't expect you to memorize the tables** that have the different work station server levels. EX 2 (engcsleudhn208) **T:** starting on page seventy-five, **I wouldn't waste my time with** activating remote console from the server on auto M.C.F. which is on page seventy EX 3 (engcsleudhn208) **T: don't bother with that** um setting up the Java page remote console on seventy-nine, yes. Seven.	EX 1 (humenlegrhi003) **T:** Um, other announcements, **don't forget the T.E.S.O.L. applied linguistics I.E.O.P. social, potluck** dinner Saturday November seventh, six thirty at Jane Doe's house, [4 sylls] get that in your mailbox there's, a message. EX 2 (humenleldhg049) **T:** But other times you'll find a great deal of hysteria. So that it actually becomes an insult to your intelligence as a college student. So **you have to step back and look at** the phenomenon, and intellectually examine the phenomenon.	EX 1 (humenleldhg049) **T:** five six, the sixth line down. "Government is at best but an expedient." You know, **like it or not you're going to have to look up** these terms, yeah. A tool, yes. EX 2 (engcsleudhn208) **T:** oh yes many of those. there's many of those, **so make sure to read the questions very carefully**. Choose two, choose three, there's a lot of those.	EX 1 (humenlegrhi003) **T:** Yeah if you are interested in getting your language requirement done, in an intensive way, **that three-week Spanish intensive course may be the way to do it**. But they only offer it the first, one year. They don't offer the second year that way. No. EX 2 (engcsleudhn208) **T:** OK, a lot of them. um so uh starting from the beginning of the chapter **you need to know everything on page** two twenty six two twenty-seven two twenty eight …

Note that the two constructs of obligation and imposition are distinct from each other, i.e., a directive can have a high level of imposition and low level of obligation at the same time. For instance, in Example 1 in the high imposition column, although the students feel a low level of obligation to take the intensive Spanish course, the imposition level of taking the course is very high as it is costly and time-consuming for the students. Negative sentences almost always have zero imposition, even if they have high obligation (See the examples of zero imposition in Table 3.13).

3.4.9.3 Inter-rater reliability for coding obligation and imposition strength of directives. After three norming sessions, all the directive utterances found in the sample 14 texts in step 3 were shared with the coders. Each coder individually coded all the directive utterances for their strength of obligation and level of imposition. Kendall's coefficient of concordance or Kendall's W was run twice through IBM SPSS (version 24.0) to determine if there was agreement among three coders' perception of the strength of obligation and level of imposition of directives. Kendall's W is a measure of inter-rater agreement for ordinal variables when there are two or more raters (Daniel, 1980; Marascuilo & McSweeney, 1977). There are three required assumptions for running Kendall's W and they were all met: (1) the raters' codings were measured in an ordinal scale, (2) the three raters rated the same subjects or utterances in this study, (3) the three raters coded independently, and their coding was not affected by each other's coding. The strength of obligation and level of imposition of the 518 directive utterances that were coded were determined according to a 4-point scale ranging from zero to high (i.e., zero, low, medium, and high). The three coders statistically significantly agreed in their coding of strength of obligation ($W = .752$, $p = .000 < .001$) and level of imposition ($W = .686$, $p = .000 < .001$). Slightly lower agreement rate of coding level of imposition is reflective of raters'

comments during norming sessions. Raters' repeatedly mentioned that they have different perceptions about the difficulty of a task and that leads to disagreements on the level of imposition of a directive.

3.4.10 Step 10: quantifying and norming the directives coded in step 9. To answer research questions 2 and 3, two types of quantification were performed on the directives coded in step 9: (1) rates of occurrence per text to answer RQ 2, and (2) individual directive counts to answer RQ 3. To calculate rates of occurrence (see Figure 3.3 in step 7), raw frequency counts of directives with different structural types per text were divided by the total word counts of each text and multiplied by 6,000. It should be noted that the strength of obligation and level of imposition of each text was calculated by averaging the ratings for each directive utterance. The same procedure was performed to calculate rates of occurrence across disciplines, instruction levels and interactivity levels. Normalization of frequency counts allowed for accurate comparison of texts with various sizes. The raw and normed counts were calculated using Formulae in Microsoft Excel.

3.4.11 Step 11: conducting descriptive and multivariate statistics. In the final stage of the analysis, descriptive and multivariate statistics were conducted to answer the research questions. Research question 1 asked about the effect of discipline, level of instruction, and level of interactivity of lectures on the structural types of directives. The unit of observation in this question was texts (viz., lectures). To answer this question, the normed rates of occurrence of directives with 16 different structural patterns (the reason for including only 16 out of 27 structural sub-types is explained in chapter 5) per text were averaged for each situational feature and its levels—disciplines (business, engineering, and humanities, social sciences, natural sciences, and education), instruction level (lower-division, upper-division, graduate), and levels

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of interactivity (low, medium, and high interactivity level). Subsequently, descriptive statistics were performed and reported to help develop a general understanding about the differences in the structural types of directives depending on the situational features of the lecture they were used in.

After analyzing descriptive statistics, in order to identify the statistically significant differences in the use of structural types of directives in texts with different disciplines, levels of instruction, and levels of interactivity, a three-way Factorial Multivariate Analysis of Variance (MANOVA) test was conducted applying IBM SPSS (version 24.0). The independent variables in this test were discipline with 6 levels (business, engineering, and humanities, social sciences, natural sciences, education), instruction level with three levels (lower division, upper division, graduate), and level of interactivity with 3 levels (low, medium, high). The dependent variables, on the other hand, were rates of occurrence of 16 different structural sub-types of directives with continuous levels of measurement. The 6 x 3 x 3 Factorial MANOVA evaluated the significance of the effect of discipline, level of instruction, and interactivity, as well as the interaction between these independent variables on variance in the use of 16 different structural sub-types of directives.

In order to analyze the pairwise comparisons between each 2 independent variables, multiple ANOVAs were run after conducting the MANOVA. Bonferroni adjustment was applied to the level of significance for analyzing the two-way ANOVAs because of the number of dependent variables (i.e., 16). To interpret results, first, interaction effects were analyzed. If a significant interaction effect existed between two independent variables, subsequently, simple main effect analyses and follow-up simple comparisons were conducted for the dependent variables (structural types) that contributed to the significant interaction. In cases with no

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interaction effects, main effects were examined. The main effect produced by the Factorial

MANOVA provided statistical evidence on whether the differences among the structural types of

directives due to changes in disciplines, levels of instruction, and levels of interactivity were

actually significant. Table 3.14 illustrates the variables and the statistical analyses to address all

three research questions.

Table 3.14 *Statistical Analyses to Answer the Research Questions*

RQ	Unit	Independent Variables	Dependent Variables	Statistical Analyses
RQ 1	Texts	1. Discipline 2. Instruction level 3. Interactivity	Rates of occurrence of 16 structural sub-type	Descriptive statistics 6 x 3 x 3 Factorial MANOVA Post Hoc
RQ 2.1	Texts	1. Discipline 2. Instruction level 3. Interactivity	Mean strength of obligation per text	Descriptive statistics
RQ 2.2	Texts	1. Discipline 2. Instruction level 3. Interactivity	Mean level of imposition per text	Descriptive statistics
RQ 3.1	A directive utterance	1. Discipline 2. Instruction level 3. Interactivity	Obligation strength of a directive	Descriptive statistics Factorial ANOVAs
RQ 3.2	A directive utterance	1. Discipline 2. Instruction level 3. Interactivity	Imposition level of a directive	Descriptive statistics Factorial ANOVAs
RQ 3.3	A directive utterance	1. Discipline 2. Instruction level 3. Interactivity 4. Structural types	Obligation strength of a directive	Descriptive statistics Factorial ANOVAs
RQ 3.4	A directive utterance	1. Discipline 2. Instruction level 3. Interactivity 4. Structural types	Imposition level of a directive	Descriptive statistics Factorial ANOVAs

Research questions 2 and 3 attempt to examine whether the functional force of directives, defined as perceived strength of obligation and level of imposition, varies across different structural types of directives, and/or the disciplines, instruction levels and levels of interactivity of the lectures they appear in. To answer research question 2, mean strength of obligation and level of imposition are calculated per text, while for research question 3, each individual directive utterance coded in Step 9 is treated as an observation. To answer research question 2, descriptive statistics (i.e., mean and standard deviation) are reported and mean strength of obligation and level of imposition of directives are compared across texts with different situational features.

To answer research question 3, to measure the statistical significance of the variance in strength of obligation and level of imposition of directives, initially descriptive statistics are run and reported and subsequently, 12 two-way ANOVAs between discipline, instruction level, interactivity level, and structural type are conducted using the IBM SPSS (version 24.0). The quantitative results of the research questions are supported and justified by providing examples from the corpus.

CHAPTER 4: EXPLICIT VS. IMPLICIT DIRECTIVES IN UNIVERSITY CLASSROOM DISCOURSE

4.1 Introduction

Directives occur in various direct and indirect speech act realizations with explicit or implicit structural forms. On the one hand, there are explicit linguistic forms of directives, such as imperatives and obligation modals which directly ask the interlocutor to do a certain task. On the other hand, the directive speech acts can be realized in an implicit form, such as a non-sentential or a question with modals which gets the interlocutor to do the task implicitly. According to corpus pragmatic studies, the abundance of indirect speech acts and their unconventional forms make the automatic analysis of these pragmatic features challenging (Garcia 2015; Ruhlemann & Aijmer, 2015). Traditionally, research in the field of corpus pragmatics, specifically corpus analysis of speech acts, has focused on corpus search of predetermined lexical features (Aijmer, 1996; Adolphs, 2008). Although, this method accelerates the analytical process and provides us with highly reliable data regarding certain conventional features of speech acts (i.e., high precision), it is important to recognize the amount of data that is being disregarded and make claims accordingly. Moreover, decisions regarding the selection of predetermined pragmatic features should be taken based on empirical evidence from an equivalent register or context of use. To achieve these goals, studies combine manual coding with automatic lexical search and consequently reach high precision and optimal recall (Koester, 2002; Garcia 2004; Garcia 2007; Kohnen, 2009). In this approach, usually researchers read all texts or a sample of texts (in larger corpora) line by line considering the context of use and identify all the existing target speech acts (e.g., directives). Next, they code the retrieved speech acts in terms of their cotext and context. Lastly, they use computerized corpus analytic

techniques, such as POS tagging, key word in context (KWIC), or corpus programming on the large corpus to explore the pattern of use of selected speech act features. The present study has employed similar techniques to validate the automatic identification of directives.

This chapter lays the foundation for the automatic identification of directives by justifying the analytical procedures that were implemented through a pilot research to guarantee a reliable and representative identification of directives in university lectures. The chapter is organized in order of the analytical steps conducted prior to the automatic identification of directives. These steps, which have been briefly discussed in chapter 3, illustrate the full range of structural types of directives that emerged in 14 sample texts (step 4 in section 3.4.4), describe the process of selecting structural types of directives for the automatic identification procedure (step 5 in section 3.4.5), and detail the process of developing a comprehensive list of directive algorithms and regular expressions based on the selected structural types (step 6 in section 3.4.6).

4.2 Structural Classification of Directives Used in Lectures

As previously explained in steps 2 and 3 of the analysis in chapter 3 (sections 3.4.2 and 3.4.3), prior to exploring the range of structural types of directives in lectures, two analytical steps were taken:

1. An operational definition of directives was developed and repeatedly piloted, using a sample of 8 stratified random texts (29,756 words) from the engineering and humanities lectures (step 2 in section 3.4.2). The percentage agreement between the researcher and the second coder in the final round of piloting was 72% for both disciplines before discussing discrepancies and 100% after discussing the discrepancies. It is worth noting that the 72% coding agreement was the overall percentage agreement and it varied for different structural types (see Table 4.1).

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2. Fourteen sample texts (83,725 words) from engineering and humanities—7 from each discipline—were manually coded for the use of directives, using the revised operational definition (see section 3.4.2.1 in chapter 3) through a bottom-up discourse analysis approach (step 3 in section 3.4.3). These 14 texts included the 8 texts that were already coded in the piloting process. Therefore, in this step, the researcher read through the remaining 6 texts and highlighted all the existing directive utterances. Consequently, all the highlighted directives in the 14 texts were manually extracted and placed into individual rows in an Excel spreadsheet.

To structurally categorize directives, the researcher coded the directives extracted in step 3 of the analysis for linguistic patterns and accordingly, presented a structural categorization including 15 types. Table 4.1 illustrates the 15 structural types of directives that emerged in sample lectures, sample linguistic patterns for each structural type, the frequency percentage of each structural type, and the inter-coder agreement to identify directives with each structural type. To calculate the frequency percentage for each structural type of directive, raw frequency of directives with each structural type was divided by the total number of directives found in the 14 sample texts and the result was multiplied by 100. In addition, the inter-coder reliability for identifying each structural type was calculated by dividing the number of directives with a certain structural type which were coded similarly by the two coders divided by the total number of directives with that structural type.

Table 4.1 *Structural Types of Directives, Frequencies, and Coding Reliability*

Structural type	Linguistic patterns	Frequency (%)	Inter-coder agreement (%)
1. Performatives	I ask you to V I suggest I recommend You are required to V I expect you to V	2.51%	90%
2. Obligation modals	You have to You must You should You are going to You ought to You'd better	14.29%	81%
3. Intention and desire verbs	You need to You want to	14.67%	85.4%
4. Permission/suggestion/ possibility modals	You can You could You may	17.76%	72.8%
5. If you + verb		2.32%	66.7%
6. Would/wouldn't	I would(n't) V You would(n't) V	4.44%	100%
7. Non-sentential	e.g., "you my dear."	0.77%	0%
8. Other declaratives	e.g., "It's something to keep in mind for next year."	5.60%	55%
9. Imperative	Base form of the verb	24.13%	71.8%
10. Subject + imperative	You + base form of the verb	4.44%	72.2%
11. Present progressive	e.g. "Looking at the order of these place time ones."	0.77%	66.7%
12. Let's	Let's V	5.79%	35.5%
13. Feasibility/ability modal questions	e.g., "Would you pass that back to Joe."	0.58%	N/A[1]
14. Non-modal questions	e.g. "are you passing out that article then?"	1.74%	N/A[1]
15. Suggestory formulae	e.g. "How about if I allowed you to write it out? neatly?"	0.19%	N/A[1]

[1] The structural types that do not have a coding reliability measure (i.e., N/A) were not present in the 8 sample texts that were used for piloting the operational definition of directives.

4.3 Selection of Structural Types of Directives for the Automatic Identification

An interesting pattern that emerged in Table 4.1 was that directive structural types with the highest frequency were coded with high reliability. For instance, directives with imperatives, permission/suggestion/possibility modals, intention/desire verbs, and obligation modals were among the most frequent directive types with frequency of 24%, 18%, 15% and 14% respectively. A look at the inter-coder agreement column in Table 4.1 shows that directives with these structural types were identified by the two coders with over 70% reliability (i.e., 72% reliability for identifying imperatives, 73% for permission/suggestion/ possibility modals, 85% for intention/desire verbs, and 81% for obligation modals).

One important reason for the relatively high coding agreement was due to the linguistic nature of those directives. All of the four most frequent structural types were grammatically overt, or they had a grammatical feature that made them obvious instances of directives. For instance, directives with permission modals, intention/desire verbs, and obligation modals all had a verb included in them which got the hearer to do an action. In the case of imperatives, they are commonly associated with giving directions in a short and fast manner. Based on these findings, it was concluded that automatically coding certain forms of directives will result in a higher reliability rate or precision rate compared to manually identifying directives. Therefore, decisions were made to use automatic processing techniques to locate grammatically explicit directives rather than identifying all the possible directive types using a bottom-up discourse analysis.

To include as many directive types with explicit lexicogrammatical features, the remaining structural types—other than the four most common ones, e.g., performatives, if + you, would/wouldn't, subject + imperatives, present progressive—were also analyzed for their coding

agreement measure and linguistic features and consequently, principled decisions were made to whether include them in the analysis or not. To make valid decisions, different approaches were adopted. First, the categories were put in order of reliability from the highest to the lowest, with a consideration of frequency where the inter-coder agreement percentages were similar for two or more directives (see Table 4.2). Table 4.2 shows the directive types in the order of importance for inclusion in the analysis. Moving down the table, the decision to exclude certain structural types from the analysis or to include specific linguistic patterns of a structural type was made by considering two factors: (1) does the linguistic environment of the directive lend itself to automatic coding or is the linguistic pattern of the directive lexicogrammatically overt?, (2) would the lexicogrammatically overt directive return actual directives majority of times?

The first type in Table 4.2, "I/you + would/wouldn't", although has a grammatically overt form (i.e., the program could easily search for the combination of I/you + would/wouldn't), can occur in several utterances without a directive force. Therefore, it is not a worthy decision to include it in the analysis. Otherwise, the researcher would need to read through all the program outputs to check for accuracy of the identified directives and this would contradict the purpose of the study as to fully automatize the identification of directives. However, analyzing the patterns of use of "I/you + would/wouldn't" in the pilot study showed that there are specific examples of this type that could be included in the analysis without the risk of involving many false positives. The patterns were "it would be nice to", and "that would be nice if". In addition, "you'd better" was added to the analysis from Reinhardt's (2007) analysis of directives in office hours. "You'd better" was selected from a list of linguistic patterns including "would/wouldn't" due to the fact that it is easy to be automatically coded and it would most probably return actual directives. It should be noted that these specific instances— "it would be nice to/if" and "you'd better"—

were later assigned to other structural types that showed fit and consequently, the "I/you +

would/wouldn't" structural type was removed from the analysis and the mentioned linguistic

patterns were merged with the following structural categories: obligation modals and

permission/suggestion/possibility modals (see Appendix B).

Table 4.2 *Directives with Less Frequent Structural Types in Descending Order of Inter-Coder Reliability*

Structural type	Frequency (%)	Inter-coder Agreement (%)	Inclusion/Exclusion Decision
Would/wouldn't	4.44%	100%	That/it would be nice if It would be nice to You'd better
Performatives (directive vocabulary)	2.51%	90%	I (don't) expect I (would) suggest I (don't) recommend What you will be required to do is NP is required It is (not)necessary Students/you are expected to I am asking you to I (would) encourage you to I (would) discourage you from
Subject + imperative	4.44%	72.2%	Excluded
If you + verb	2.32%	66.7%	Excluded
Present progressive	0.77%	66.7%	Excluded
Other	5.60%	55%	Excluded
Let's	5.79%	35.5%	Excluded
Non-sentential	0.77%	0%	Excluded
Non-modal questions	1.74%	N/A[2]	Excluded
Feasibility/ability modal questions	0.58%	N/A[2]	Excluded
Suggestory formulae	0.19%	N/A[2]	Excluded

The second structural type in Table 4.2 is the performatives category. First of all, this

structural type was renamed, since not all the patterns that were included in this type were

actually performatives. For instance, while "I ask you" is considered a performative since it

involves the action, the other patterns (see Table 4.1) are not. Therefore, in order to have a more inclusive name, the category was renamed to "directive vocabulary". This name was selected based on Reinhardt's (2007) and Hwang's (2013) categorization of directive types.

The "directive vocabulary" structural type was also among the features that could be easily coded due to the presence of lexical terms which could be searched in texts (e.g., expect, suggest, recommend, required). The 90% agreement in coding this category also provides more evidence on the grammatically-overt nature of this type. Based on analyzing the linguistic environment of instances with directive vocabulary in the pilot data, "I (don't) expect you to + v", "I (don't) recommend", and "I would suggest" were included in the analysis. In order to add more possible patterns with this structural type, previous literature was also reviewed and patterns with high chance of being identified as directives were added to the directive vocabulary structural type. The patterns that were added include "what you will be required to do is", "NP is required", "it is not necessary", "students/you are expected to", "I am asking you to", "I (would) encourage you to", and "I (would) discourage you to".

The third category on Table 4.2 is "subject + imperative", which has a fairly high reliability (72%). However, it will not be included in the final analysis, since it would return far more false positives than true directives. The next reliably-coded type is "if you + verb", which although linguistically overt, appears to have a wide variety of functions other than directives and including it in the analysis will produce many false positive results. Moreover, this structural type has not shown to be frequent as a directive. The next category which was similarly reliably coded was "present progressive". This category which accounts for less than 1% of directive instances was also excluded from the analysis, since it is not grammatically overt, and it highly

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depends on the context to be considered a directive. Excerpt 4.1 is an example of this structural type.

Excerpt 4.1. engcsleudhn208

 *T: ... now **getting over to** one ninety-five [unclear word] start talking about some of the login script commands.*

The next structural type on Table 4.2 is the "other" category. This category was also excluded from the analysis due to involving a variety of patterns that could not be explicitly coded or that they highly depended on the context and cotext to function as a directive. Excerpts 4.2, 4.3, and 4.4 demonstrate examples of this type.

Excerpt 4.2. engcslegrhn217

 *T: **you get until next week** Friday at five o'clock to get to the finish point right?*

Excerpt 4.3. engeeleudli022

 *T.: ... so just because I'm not going to spend a lot of time talking about the rise and fall times, **doesn't excuse you from,** [5 sylls] in the book. And to discuss it. OK.*

Excerpt 4.4. engeeleudli022

 *T: ... **the important thing is** [3 sylls] be resourceful when you do these.*

The next structural type in Table 4.2 is "let's", which was excluded from the analysis because it had a very low reliability of identification. That is, because utterances with "let's" can perform several functions in a classroom discourse. Adding this type to the program will result in many false positives and will consequently decrease the precision rate of the identification analysis. The "non-sentential" structural type was also excluded from the analysis since it does not have a lexicogrammatically overt form and it is difficult to retrieve automatically. Moreover, the coders could not agree on this type. The last three structural types were also discarded from the analysis due to their very low frequency. To sum up, five lexicogrammatically explicit

structural types of directives that were selected for the automatic identification of directives are: (1) imperatives, (2) obligation modals, (3) intention/desire verbs, (4) permission/suggestion/possibility modals, (5) directive vocabulary.

Adding up frequencies of the two structural types in Table 4.2 that were selected for analysis (performatives and I/you would/wouldn't) and the frequencies of the four most frequent and most reliably coded structural types in Table 4.1 (imperatives, obligation modals, intention/desire verbs, and permission/suggestion/possibility modals), we can conclude that the automatic analysis in the dissertation could roughly extract 78% of the existing directive utterances in lectures. This is a relatively high number to reveal patterns of use of a construct in a register. To ensure the inclusiveness of the directive linguistic patterns under each of the structural types, a careful process was performed in which detailed lexicogrammatically explicit directive algorithms and structural subcategories were developed. Section 4.4 describes the process of developing lexicogrammatically explicit directive algorithms for the five structural types selected for the automatic analysis.

4.4 Development of Directive Algorithms of Lexicogrammatically Explicit Directives

In this step, careful attempts were made to ensure comprehensiveness of retrieval of the lexicogrammatically explicit directives. First, the patterns of occurrence of all the instances in the pilot data (8 texts) were analyzed and all the elements of patterns were added to a list of patterns to be included in the program scripts. For instance, instead of just having "you" and "you'll" as the subject in directives with obligation modals, other existing subjects that were relevant were also added (e.g., "you'd", "we", "we'll", "we're", "we'd", "you're", "these", "everyone", "everybody"). Moreover, since there were some obligation utterances with intervening words such as adverbs, these were added to the list of patterns in all five structural

types to be searched by the program or the concordancer (e.g., "you will <u>really</u> have to", "you <u>just</u> need to"). Finally, all possible contracted forms of a verb were added to the patterns. For example, "you're", "you'd", and "you'll". Another change that was made to the algorithms was in the directive vocabulary type. In this category, "it is necessary to" was one of the patterns that was included in the analysis. It was predicted that similar patterns with synonymous necessity adjectives might also occur as directives. Therefore, three other adjectives of necessity— essential, important, and vital—were also added to the algorithms (Biber, Johansson, Leech, Conrad, and Finegan, 1999).

As for imperative structural types, the patterns to be searched for had to be constrained since imperatives do not have specific lexical features to be looked for. The only characteristic that distinguishes them is that they include the base form of a verb. Thus, to catch this grammatical feature, the T2K-SWAL tagged texts were used. Since there are no specific tags for imperatives, the regular expressions were aimed at finding a combination of a clausal punctuation mark (^clp+++), a mitigator or a negator (i.e., please, don't, or just), and "vb+", which is the tag for the base form of the verb, as the second right word after the punctuation mark.

While in the process of developing algorithms, three important factors that could affect directive functions emerged: (1) personal vs. impersonal (i.e., directives with personal pronouns, such as "we" and "you" vs. those with 3rd person indefinite pronouns, such as "this" and "these"), (2) mitigated vs. unmitigated (i.e., directives with or without mitigating devices, such as "please", "just", "only"), and (3) positive vs. negative (i.e. directive utterances that ask the students to perform or not to perform a task, such as "have to" and "don't have to"). These factors were considered as structural sub-types and as a result, 27 directive structural sub-

categories were developed, i.e., imperative unmitigated positive as type 1, imperative

unmitigated negative as type 2, imperative mitigated positive as type 3 and so on. The decision to

have individual sub-categories representing these factors was made because directives in positive

or negative forms with personal/impersonal subjects, or with/without mitigation devices tend to

have different pragmatic forces and functions and therefore, should be interpreted distinctly.

Table 4.3 indicates the 27 structural sub-categories with individual index numbers for each sub-

category.

Table 4.3 *Explicit Structural Types and Sub-Types of Directives Included in the Analysis*

Structural Type	Personal/Impersonal	Mitigated/Unmitigated	Positive/Negative	Index #
Imperatives	N/A	Unmitigated	Positive	1
	N/A	Unmitigated	Negative	2
	N/A	Mitigated	Positive	3
	N/A	Mitigated	Negative	4
Obligation Modals	Personal	Unmitigated	Positive	5
	Personal	Unmitigated	Negative	6
	Personal	Mitigated	Positive	7
	Personal	Mitigated	Negative	8
	Impersonal	Unmitigated	Positive	9
	Impersonal	Unmitigated	Negative	10
	Impersonal	Mitigated	Positive	11
	Impersonal	Mitigated	Negative	12
Intention and Desire Verbs	Personal	Unmitigated	Positive	13
	Personal	Unmitigated	Negative	14
	Personal	Mitigated	Positive	15
	Personal	Mitigated	Negative	16
	Impersonal	Unmitigated	Positive	17
	Impersonal	Unmitigated	Negative	18
	Impersonal	Mitigated	Positive	19
	Impersonal	Mitigated	Negative	20
Permission/suggestion/possibility modals	Personal	N/A	Positive	21
	Personal	N/A	Negative	22
	Impersonal	N/A	Positive	23
Directive Vocabulary	Personal	N/A	Positive	24
	Personal	N/A	Negative	25
	Impersonal	N/A	Positive	26
	Impersonal	N/A	Negative	27

Appendix B reflects the 27 sub-categories presented in Table 4.3 and demonstrates a full list of algorithms that were included in the Python program, as well as the regular expressions that were searched for via a concordancer (i.e., AntConc) for the automatic identification of directives. As described in step 7 of the analysis in chapter 3 (section 3.4.7), the list of algorithms in Appendix B was utilized to write a Python script (Version 3.5 for Windows). According to Table 3.8 in chapter three, the precision rate of automatically identifying directives using the program was 100 percent. While the perfect precision rate confirms the reliability of using the program for identifying lexicogrammatically explicit directives (as described in the algorithms), it does not provide us with any information about what percent of these algorithms are used as directives. Further precision analysis is required to prove the reliability of using the program script developed in this dissertation study for future research.

CHAPTER 5: STRUCTURAL VARIANCE OF DIRECTIVES ACROSS SITUATIONAL

FACTORS

5.1 Overview

This chapter reports the results of RQ 1—how does structural type frequency of directives in university lectures vary across disciplines, levels of instruction, and levels of interactivity. RQ 1 investigates whether there is a statistically significant difference in the use of directives with various structural types across levels of situational features of the lectures—discipline (business, engineering, education, humanities, natural sciences, and social sciences), levels of instruction (lower-level, upper-level, and graduate), and levels of interactivity (low, medium, high). To answer this question, first, 176 university lectures (1,298,913 words) in the spoken sub-corpus of T2K-SWAL (see Table 3.2 in chapter 3 for a breakdown of the corpus across disciplines, levels of instruction, and levels of interactivity) were automatically analyzed and lexicogrammatically explicit directives were identified and coded for their structural types. Directives were identified based on a self-developed list of directive algorithms (see Appendix B) from 5 major structural types and 27 sub-types. Overall, 6,673 directives from 22 structural sub-types were located in the data. Among the 27 structural sub-types initially defined, five did not have any representation (viz., sub-types 8, 12, 18, 19, 20); therefore, they were excluded from the analysis. Table 5.1 shows the characteristics and raw frequencies of each structural sub-type, as well as the total frequencies of the major structural types in the corpus. The raw frequencies of directives with different structural sub-types across the situational factors were normalized per 6,000 words. The normalization criterion was selected based on the average word counts of texts in the corpus. It should be noted here that the word counts per text in this research question refer to the frequency of words produced by the professor in each text.

Table 5.1 *Frequencies of Directives with Various Structural Types in University Lectures*

Structural Type	Sub-Type #	Personal/ Impersonal	Mitigated/ Unmitigated	Positive/ Negative	Overall Count
Imperatives	**1**	**N/A**	**Unmitigated**	**Positive**	**600**
	2	**N/A**	**Unmitigated**	**Negative**	**28**
	3	**N/A**	**Mitigated**	**Positive**	**39**
	4	N/A	Mitigated	Negative	1
	Total				668
Obligation Modals	**5**	**Personal**	**Unmitigated**	**Positive**	**1,289**
	6	**Personal**	**Unmitigated**	**Negative**	**149**
	7	**Personal**	**Mitigated**	**Positive**	**47**
	8	Personal	Mitigated	Negative	0
	9	**Impersonal**	**Unmitigated**	**Positive**	**41**
	10	Impersonal	Unmitigated	Negative	2
	11	Impersonal	Mitigated	Positive	2
	12	Impersonal	Mitigated	Negative	0
	Total				1,530
Intention and Desire Verbs	**13**	**Personal**	**Unmitigated**	**Positive**	**934**
	14	**Personal**	**Unmitigated**	**Negative**	**105**
	15	**Personal**	**Mitigated**	**Positive**	**74**
	16	Personal	Mitigated	Negative	1
	17	Impersonal	Unmitigated	Positive	1
	18	Impersonal	Unmitigated	Negative	0
	19	Impersonal	Mitigated	Positive	0
	20	Impersonal	Mitigated	Negative	0
	Total				1,115
permission/suggestion/possibility modals	**21**	**Personal**	**N/A**	**Positive**	**2,915**
	22	**Personal**	**N/A**	**Negative**	**360**
	23	**Impersonal**	**N/A**	**Positive**	**5**
	Total				3,280
Directive Vocabulary	**24**	**Personal**	**N/A**	**Positive**	**48**
	25	**Personal**	**N/A**	**Negative**	**10**
	26	**Impersonal**	**N/A**	**Positive**	**21**
	27	Impersonal	N/A	Negative	1
	Total				80

Note. Only the bold sub-types were included in the MANOVA.

In order to examine the statistical significance of structural type variance across levels of discipline, instruction, and interactivity, a three-way Factorial MANOVA of the situational factors was run in IBM SPSS (version 24.0), in which only two-way interactions and main effects models were analyzed. The independent variables in the MANOVA were discipline (6 levels), level of instruction (3 levels), and level of interactivity (3 levels). On the other hand, the dependent variables were 16 structural sub-types of directives (viz., the bold sub-types in Table 5.1: 1, 2, 3, 5, 6, 7, 9, 13, 14, 15, 21, 22, 23, 24, 25, and 26). Each dependent variable included normed rates of occurrences of directives with a certain structural sub-type per text; thus, the level of measurement was scale. It should be noted that 6 of the 22 structural sub-types with a representation in the corpus were omitted from the analysis since they only had 1 or 2 instances in the whole corpus.

Means and standard deviations of directives with different structural sub-types across disciplines, levels of instruction and levels of interactivity are presented in Table C1 in Appendix C. In the following sections, results of the MANOVA and the follow-up ANOVAs are presented for the two factors that have significant interaction effects. The significant interaction effects and the pair-wise comparisons are reported and discussed by providing sample excerpts from the corpus.

5.2 Results of the Three-Way MANOVA across Disciplines, Levels of Instruction, and Interactivity

Based on the results of the 6 x 3 x 3 Factorial MANOVA, there was a statistically significant interaction effect between discipline and level of interactivity on the combined dependent variables (structural types[1] of directives), $F (160, 1103.721) = 1.483, p = .000$, Wilks'

---

[1] From this point in this chapter, structural types refer to the 16 bold structural sub-types in Table 5.1.

$\Lambda = .190$, partial $\eta^2 = .153$, indicating that the effect of disciplines on the use of structural types

of directives was not the same across different levels of interactivity and this interaction

accounted for 15% ($\eta^2 = .15$) of the total variance in the structural types of directives. As shown

in Table 5.2, the other two interaction effects between discipline and level of instruction and

between level of instruction and level of interactivity were not significant. Thus, no further

analysis will be run on these interactions.

Table 5.2 *Two-way MANOVA for Directive Structural Types across Disciplines and Instruction Levels*

Source	Value	F	Hypothesis df	Error df	p	Partial η^2
Discipline × Instruction	.284	1.096	160	1103.721	.212	.118
Discipline × Interactivity	.190	1.483	160	1103.721	.000*	.153
Instruction × Interactivity	.628	.985	64	499.459	.512	.110
Discipline	.352	1.865	80	615.694	.000*	.189
Instruction	.762	1.157	32	254	.266	.127
Interactivity	.585	2.444	32	254	.000*	.235

Follow-up univariate two-way ANOVAs between discipline and level of interactivity

showed statistically significant interaction effects for unmitigated positive imperatives (Type 1),

$F (10, 142) = 4.871$, $p = .000 < .003$, partial $\eta^2 = .255$, and personal unmitigated positive

obligation modals (Type 5), $F (10, 142) = 3.009$, $p = .002 < .003$, partial $\eta^2 = .175$. The positive

mitigated imperatives (Type 3), although not significant, is worth discussing, due to its close

significance value and considerable effect size—$F (10, 142) = 7.730$, $p = .003$, partial $\eta^2 = .165$.

None of the remaining 13 structural types showed a statistically significant interaction effect;

thus, they will not be further analyzed and discussed. However, complete results of the univariate

two-way ANOVAs can be found in Table C2 in Appendix C. It is worth noting that Bonferroni

adjustment was applied to the level of significance for analyzing the two-way ANOVAs because

of the number of dependent variables (16). Thus, an interaction effect was only declared

significant if $p < .003$ ($p < .05/16$). To learn more about the interaction effect between discipline

and level of interactivity for structural types 1, 3, and 5, simple main effects analyses (see Tables

C3 and C4 in appendix C) and follow-up simple comparisons were conducted for these three

structural types.

As for Type 1 (positive unmitigated imperative) directives, results of the simple main

effects for discipline (see Table C3 in Appendix C) showed that there was a significant

difference across disciplines in high interactivity lectures, $F (5, 142) = 10.460, p = .000 < .0167$

($.05/3$), partial $\eta^2 = .269$. Pairwise comparisons of Type 1 mean scores across disciplines in high

interactivity lectures revealed that high interactivity engineering lectures ($M = 210.73, SD$

$=360.90$) were significantly different from high interactivity lectures in all other 5 disciplines:

business ($M = 7.01, SD = 4.17$), education ($M = 8.16, SD = 5.04$), humanities ($M = 7.36, SD = $

10.26), natural sciences ($M = 2.21, SD = 2.18$), and social sciences ($M = 3.35, SD = 4.04$). Table

5.3 indicates the results of the simple comparisons of Type 1 (positive unmitigated imperative)

mean scores between engineering and other disciplines in high interactivity lectures.

Table 5.3 Pairwise Comparisons of Type 1 Mean Scores across Disciplines in High Interactivity Lectures

Interactivity	Discipline	Discipline (J)	Mean Difference (I-J)	Std. Error	p [1]
High	Engineering	Business	192.870[*]	27.213	0.000[*]
		Education	187.792[*]	29.567	0.000[*]
		Humanities	184.565[*]	28.912	0.000[*]
		Natural	178.282[*]	37.172	0.000[*]
		Social Sciences	189.128[*]	29.394	0.000[*]

* p value < 0.05
[1] Bonferroni adjustment for multiple comparisons

Figure 5.1 illustrates the estimated marginal means for positive unmitigated imperatives across disciplines and level of interactivity. The plot clearly shows the significant difference between high level engineering lectures and other disciplines.
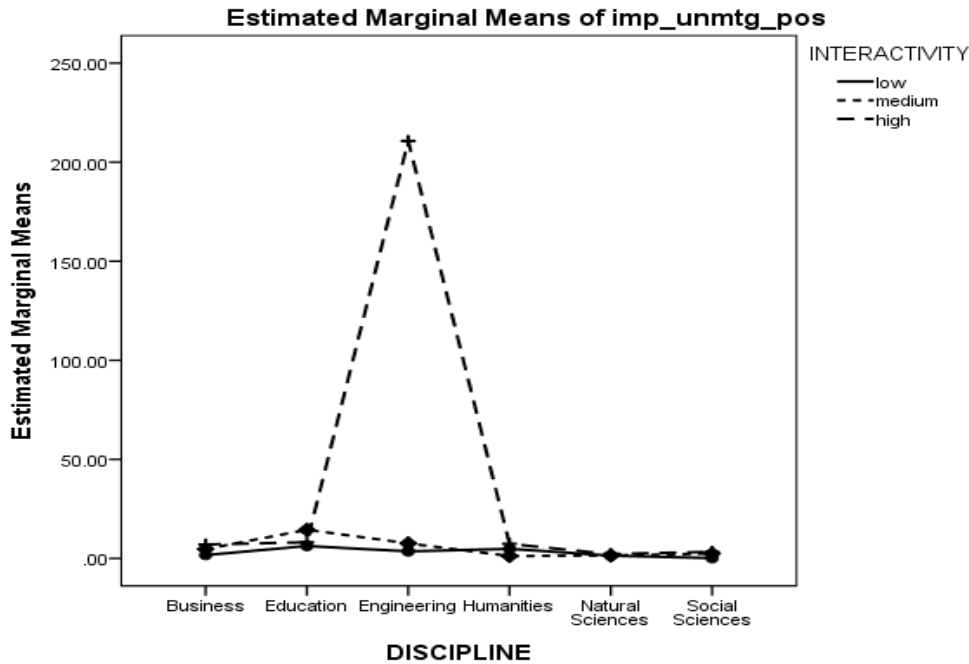
Figure 5.1 Marginal means of positive unmitigated imperatives across disciplines and interactivity

Simple main effects analyses were also run for interactivity (see Table C4 in Appendix C) and not surprisingly, there was a significant difference across levels of interactivity in engineering lectures, $F (2, 142) = 26.532$, $p = .000 < .008$ (.05/6), partial $\eta^2 = .272$. Simple comparisons of Type 1 mean scores across levels of interactivity in engineering lectures revealed that high interactivity engineering lectures ($M = 210.73$, $SD = 360.90$) were significantly different from both low interactivity ($M = 3.59$, $SD = 4.31$) and medium interactivity engineering lectures ($M = 7.60$, $SD = 2.90$). Table 5.4 indicates the results of the simple comparisons of Type 1 (positive unmitigated imperative) mean scores between levels of interactivity in engineering lectures.

Table 5.4 *Pairwise Comparisons of Type 1 Mean Scores across Levels of Interactivity in Engineering*

Discipline	Interactivity (I)	Interactivity (J)	Mean Difference (I-J)	Std. Error	p [1]
Engineering	Low	Medium	0.434	19.730	1.000
		High	-194.932[*]	26.935	0.000[*]
	Medium	Low	-0.434	19.730	1.000
		High	-195.366[*]	31.573	0.000[*]
	High	Low	194.932[*]	26.935	0.000[*]
		Medium	195.366[*]	31.573	0.000[*]

* *p* value < 0.05
[1] Bonferroni adjustment for multiple comparisons

After analyzing high interactivity texts, it was revealed that the significant difference was led by only one text among the high interactivity lectures. Overall, there were only 3 high interactivity lectures in engineering, one of which had 16 instances of directives in only 153 words. The small number of words used by the teacher and the comparatively large norming criterion resulted in an inflated rate of occurrence which showed up as significant. Despite this issue, the large use of imperatives and the small portion of teacher talk in this text is worth analyzing.

The outlier high interactivity engineering text was a class in electrical engineering. Based on the information provided in the transcripts, in this class, the professor is teaching the students how to communicate effectively in their field by writing abstracts, research articles, and so on. Therefore, directives involve many consecutive short directions. Excerpt 5.1 provides an example from the same text, including 4 directive utterances which are in bold: (1) *synthesize it*, (2) *summarize it*, (3) *tell us the sentence*, (4) *give us the gist of it*. All 4 directives are unmitigated positive imperatives, which are short and functional.

Excerpt 5.1. Engeeleudhi054.txt

> T: you should have at least the first one - what's the purpose of this study? you know it's not the first sentence because that's just situating it. what's the what's the purpose of this study?
>
> S: the second sentence.
>
> T: OK. **synthesize it summarize it.**
>
> S: um, OK well it's a report on *[unclear]*
>
> T: and?
>
> S: *[unclear]*
>
> T: OK, to get a report to *[produ]* to do a study between your, subject relationship between *[unclear]* or the beginning. um, methodology? yeah
>
> S: *[unclear]* studies that they did were pretty much boring, but basically they make sense
>
> T: OK **tell us the sentence give us the gist of it.** what was the methodology?

Regarding Type 3 (positive mitigated imperative) directives, results of the simple main effects for discipline (see Table C3 in Appendix C) showed that there was a significant difference across disciplines in medium interactivity lectures, $F (5, 142) = 4.917$, $p = .000 < .0167$ $(.05/3)$, partial $\eta^2 = .148$. Pairwise comparisons of Type 3 mean scores across disciplines in medium interactivity lectures revealed that medium interactivity education lectures ($M = 14.46$, $SD = 9.08$) were significantly different from medium interactivity lectures in all 5 other disciplines: business ($M = 4.73$, $SD = 4.69$), engineering ($M = 7.60$, $SD = 2.90$), humanities ($M = 1.20$, $SD = 2.28$), natural sciences ($M = 1.48$, $SD = 1.34$), and social sciences ($M = 2.44$, $SD = 4.62$). Table 5.5 indicates the results of the simple comparisons of Type 3 (positive mitigated imperative) mean scores between education lectures and other disciplines in medium interactivity lectures.

Table 5.5 *Pairwise Comparisons of Type 3 Mean Scores across Disciplines in Medium Interactivity Lectures*

Interactivity	Discipline (I)	Discipline (J)	Mean Difference (I-J)	Std. Error	p [1]
Medium	Education	Business	3.693[*]	0.888	0.001[*]
		Engineering	4.051[*]	1.013	0.002[*]
		Humanities	4.061[*]	0.957	0.001[*]
		Natural Sciences	4.042[*]	0.922	0.000[*]
		Social Sciences	3.869[*]	0.884	0.000[*]

* *p* value < 0.05
[1] Bonferroni adjustment for multiple comparisons

Simple main effects analyses were also run for interactivity (see Table C4 in Appendix C) and not surprisingly, there was a significant difference across levels of interactivity in education lectures, $F (2, 142) = 13.648$, $p = .000 < .008$ (.05/6), partial $\eta^2 = .161$. Simple comparisons of Type 3 mean scores across levels of interactivity in education lectures revealed that medium interactivity education lectures ($M = 4.15$, $SD = 9.28$) had significantly higher use of Type 3 directives than high interactivity education lectures ($M = .04$, $SD = 139$). Table 5.6 indicates the results of the simple comparisons of Type 3 (positive mitigated imperative) mean scores between levels of interactivity in education lectures.

Table 5.6 *Pairwise Comparisons of Type 3 Mean Scores across Levels of Interactivity in Education*

Discipline	Interactivity (I)	Interactivity (J)	Mean Difference (I-J)	Std. Error	p [1]
Education	Low	Medium	-1.959	1.995	0.983
		High	3.157	2.076	0.392
	Medium	Low	1.959	1.995	0.983
		High	5.116[*]	0.980	0.000[*]
	High	Low	-3.157	2.076	0.392
		Medium	-5.116[*]	0.980	0.000[*]

* *p* value < 0.05
[1] Bonferroni adjustment for multiple comparisons

Estimated Marginal Means of imp_mtg_pos
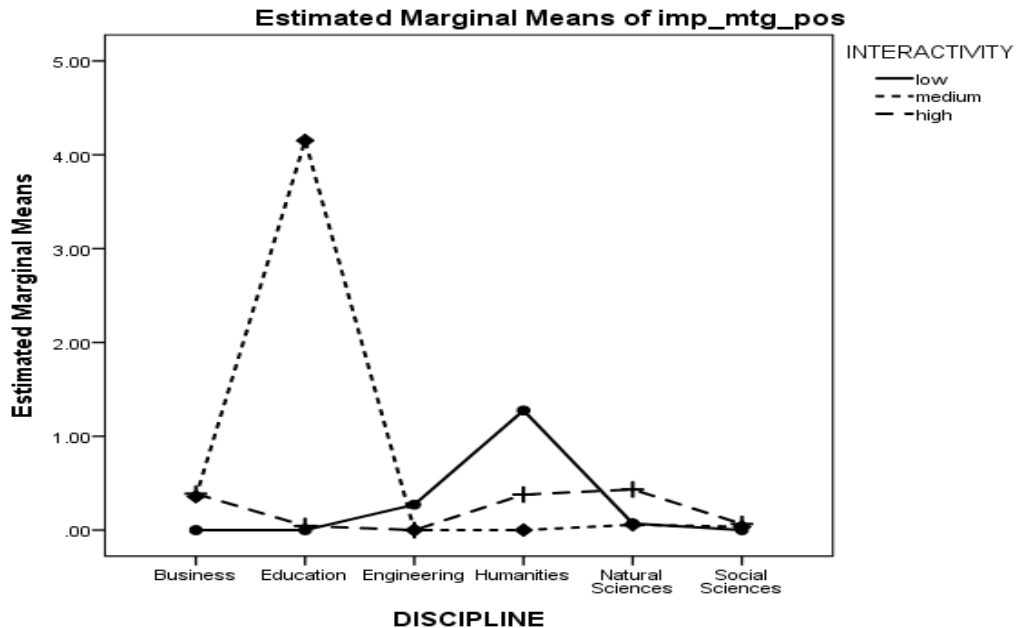
Figure 5.2 Marginal means of positive mitigated imperatives across disciplines and interactivity levels

The plot in Figure 5.2 confirms the results by showing the striking difference between medium level education lecture and other disciplines, as well as the difference across levels of interactivity in education. Locating the text in medium interactivity education helped us detect the issue. There was only one text and one directive utterance (see Excerpt 5.2) with positive mitigated imperatives in medium interactivity education and since the teacher turn was only 289 words, the rate of occurrence became significantly higher than medium interactivity lecture in other disciplines.

Excerpt 5.2. edubelegrmn188.txt

1: Now I hoped, I hope our audience there in [one unclear syllable] made us, appreciated this, our show. We're going to go on this [one unclear syllable] hour, and we'll just, just run through the, the whole series of presentations tonight.

3: [sound of distress]

*1: **please start jotting down some good questions** for the next couple of presentations.*

As for Type 5 (positive personal unmitigated obligation modal) directives, results of the simple main effects for discipline (see Table C3 in Appendix C) showed that there was a significant difference across disciplines in high interactivity lectures, F (5, 142) = 4.293, p = .001 < .0167 (.05/3), partial η^2= .131. Simple comparisons of Type 5 mean scores across disciplines in high interactivity lectures revealed that high interactivity engineering lectures (M = 210.73, SD =360.90) were significantly different from high interactivity lectures in all other 5 disciplines: business (M = 7.01, SD = 4.17), education (M = 8.16, SD = 5.04), humanities (M = 7.36, SD = 10.26), natural sciences (M = 2.21, SD = 2.18), and social sciences (M = 3.35, SD = 4.04). Table 5.7 indicates the results of the simple comparisons of high interactivity lectures between engineering and other disciplines.

Table 5.7 *Pairwise Comparisons of Type 5 Mean Scores across Disciplines in High Interactivity Lectures*

Interactivity	Discipline (I)	Discipline (J)	Mean Difference (I-J)	Std. Error	p [1]
High	Engineering	Business	18.089[*]	4.141	0.000[*]
		Education	19.318[*]	4.499	0.000[*]
		Humanities	16.691[*]	4.399	0.003[*]
		Natural Sciences	17.078[*]	5.656	0.045[*]
		Social Sciences	15.255[*]	4.473	0.013[*]

[*] p value < 0.05
[1] Bonferroni adjustment for multiple comparisons

Simple main effects analyses were also run for interactivity (see Table C3 in Appendix C) and not surprisingly, there was a significant difference across levels of interactivity in engineering lectures, F (2, 142) = 9.167, p = .000 < .008 (.05/6), partial η^2= .114. Simple comparisons of Type 5 mean scores across levels of interactivity in engineering lectures exposed similar results to Type 1 directives. The results showed that high interactivity engineering lectures (M = 210.73, SD = 360.90) had significantly higher use of Type 5 directives than low

interactivity ($M = 3.59$, $SD = 4.31$) and medium interactivity engineering lectures ($M = 7.60$, $SD = 2.90$). Table 5.8 indicates the results of the simple comparisons across levels of interactivity in engineering lectures.

Table 5.8 *Pairwise Comparisons of Type 5 Mean Scores across Levels of Interactivity in Engineering*

Discipline	Interactivity	Interactivity (J)	Mean Difference (I-J)	Std.	p [1]
Engineering	Low	Medium	4.547	3.002	.396
		High	-15.626[*]	4.099	.001[*]
	Medium	Low	-4.547	3.002	.396
		High	-20.173[*]	4.804	.000[*]
	High	Low	15.626[*]	4.099	.001[*]
		Medium	20.173[*]	4.804	.000[*]

* p value < 0.05
[1] Bonferroni adjustment for multiple comparisons

Figure 5.3 illustrates the estimated marginal means for positive personal unmitigated obligation modals across disciplines and levels of interactivity. The plot illustrates the significant differences between high interactivity engineering lectures and those of other disciplines or other interactivity levels.
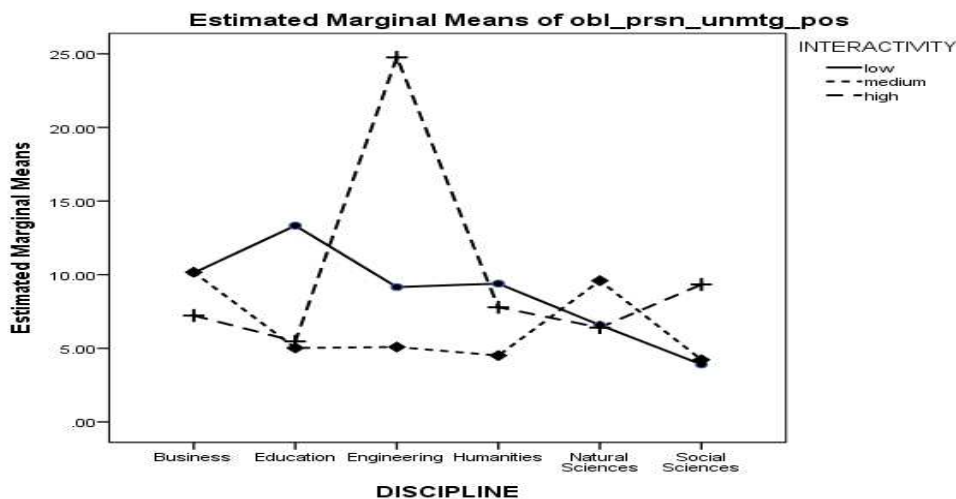
Figure 5.3 Marginal means of positive unmitigated personal obligation modals across disciplines and interactivity levels

Following is an example Excerpt from a medium interactivity engineering lecture with the highest rate of occurrence of positive personal unmitigated obligation modals. The course was in Electrical Engineering and during the lecture, the professor was using the board to draw circuits and was giving directives on how to do things simultaneously (see Excerpt 5.3).

Excerpt 5.3. engeeleldmn271

> *T: ... somewhere else in the circuit we have some I x (exploring) somewhere else in the current in the circuit and down here **we have to have some constant of proportionality times** that I sub x to tell us what the voltage source is going to put out . . . without regards to anything else what were the units of that constant have to be?*

5.3 Conclusion

This chapter answered the first research question on the effects of situational factors of lectures (discipline, level of instruction, level of interactivity) on the use of directives with different structural types. Based on the results of the factorial MANOVA, there was a significant interaction between discipline and level of interactivity on predicting the rate of occurrence of positive unmitigated imperatives, positive mitigated imperatives, and positive unmitigated personal obligation modals. Despite the significance of the interaction and simple main effects, only results related to the latter structural type (type 5: positive unmitigated personal obligation modals) seem to be trustable. The reason is that findings related to type 1 and type 3 seemed to have had resulted from unbalanced and not sufficient data in each cell.

CHAPTER 6: PRAGMATIC ANALYSIS OF DIRECTIVES ACROSS STRUCTURAL

AND SITUATIONAL FACTORS

6.1 Introduction

This chapter analyzes the patterns of use of directives with different pragmatic forces (i.e., obligation and imposition strength) across structural types and situational factors (i.e., discipline, levels of instruction, and levels of interactivity), in response to RQ 2 and RQ 3. Results will be presented quantitatively by reporting descriptive and inferential statistics and qualitatively by analyzing texts and concordance lines.

6.2 RQ 2: Descriptive Analysis of Pragmatic Forces of Directives across Structural and Situational Features

RQ 2 examines the perceived obligation and imposition strength of directives in university lectures across structural types (15 levels), disciplines (engineering and humanities), levels of instruction (lower division, upper division, and graduate) and levels of interactivity (low, medium, and high). To answer this research question, four subsections will be assigned to each variable—structural type (section 6.2.1), discipline (section 6.2.2), level of instruction (section 6.2.3), and level of interactivity (section 6.2.4)—and in each subsection, normed rates of occurrence of directives, as well as the variation in strength of obligation and level of imposition of directives across levels of the variable will be presented. It is important to note that in the following subsections, results will be provided in the form of distributional bar charts; thus, tables with raw frequencies and rates of occurrence of directives across structural and situational features (Appendix D), as well as means and standard deviations of strength of obligation (Appendix E) and imposition level (Appendix F) of directives across structural and situational factors will be presented in Appendices.

6.2.1 Mean obligation and imposition level of directives across structural types.

Overall, 518 directives were identified in a corpus of 14 texts (83,725 words). This section will discuss the rates of occurrence of directives across 15 structural types. Moreover, mean strength of obligation and imposition of directives associated with each structural type of directives are explained. Figure 6.1 indicates the distribution of structural types of directives that emerged in the corpus. As shown in Figure 6.1, the four major and most frequent structural types of directives in engineering and humanities lectures are imperatives, permission, possibility modals, intention/desire verbs, and obligation modals. The other structural categories occur with considerably lower frequencies. If we were to interpret the results solely based on the structural types of directives, we might have assumed that strikingly high frequency of structures, such as imperatives and obligation modals suggests that these lectures are filled with directives of high pragmatic force. However, analysis of perceived strength of obligation and imposition of directives does not necessarily agree with this assumption. Figures 6.2 and 6.3 show the pragmatic force of directives across structural types.
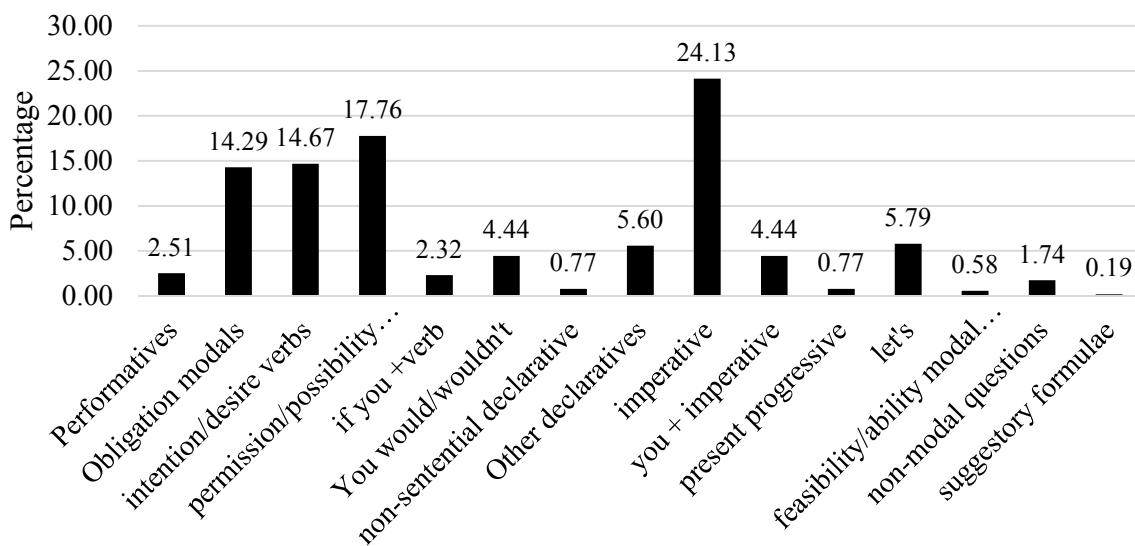
Figure 6.1 Distribution of structural types of directives in lectures

An overall look at Figures 6.2 and 6.3 shows that there is more variation in the obligation strength of directives as a function of structural types compared to the imposition level. While the obligation strength ranges from .52 (for non-modal questions) to 2.43 (for obligation modals), the range of imposition level starts from .42 (for non-sentivials) to 1.42 (for obligation modals). This could suggest that structural types have a stronger effect on the perceived obligation level of a directive than on the level of imposition of it (this pattern will be further investigated and discussed in section 6.3.3 and 6.3.4).

A more detailed look at the figures reveals more interesting patterns; imperatives which are the most frequent structural types in the data have a medium level of obligation and a low level of imposition. This is an interesting finding and it can be explained by analysis of the discourse. Analysis of directives in context revealed that many of the directive utterances with imperative structures were accompanied by mitigating devices, such as conditionals or mitigating words (just, only, please).
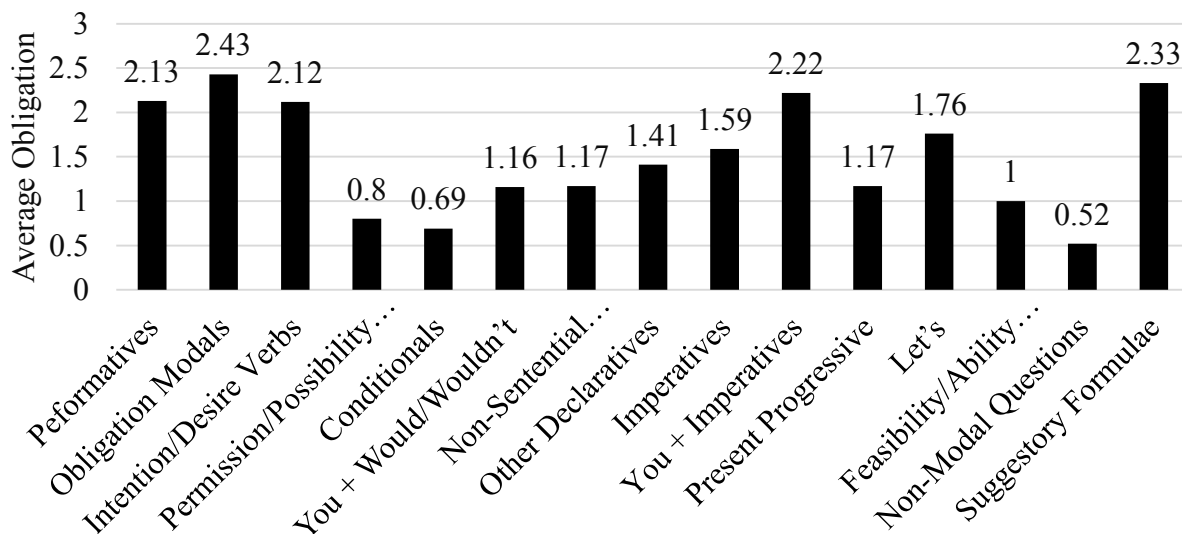
Figure 6.2 Mean strength of obligation of directives across structural types

In case of intention/desire verbs, directives seem to be perceived with high obligation; however, the imposition level is still in the medium level. As for the obligation modals, the strength of obligation and imposition are both relatively higher than those of intention and desire verbs. This could propose that obligation modals seem to be used for clear statement of expectations in cases where what is being asked from the students has major course-related consequences. This assumption could also be made about other structural types such as intention/desire verbs, performatives, you + imperatives and suggestory formulae. Although, the latter structural type only had one instance; thus, no reliable interpretations should be made about that. On the opposite side of the obligation spectrum were feasibility/ability modal questions, permission/possibility modals, conditionals, and non-modal questions. Permission/possibility modals are the interesting types in this category, since they accounted for almost 18% of directives in lectures. The mean obligation proposes that students perceive these directive types with a low level of obligation, indicating that they do not see any course-related consequences for not following these directives. This finding holds an important pedagogical implication. That is, teachers should probably avoid using permission/possibility modal directives when they are assigning important tasks.
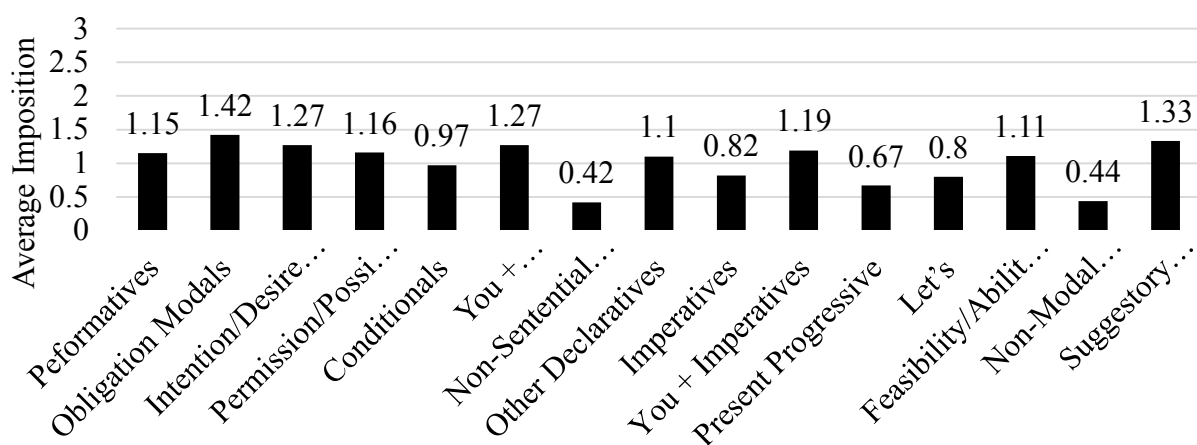
Figure 6.3 Mean imposition level of directives across structural types

The fact that mean level of imposition ranged from very low to moderate suggests that, regardless of the structural type, students do not perceive a high obligation directive with the same level of imposition. This might reflect the students' attitudes in taking in directives. They seem to account for the position of the professor and that as students, they are supposed to do the tasks directed to them. A more detailed description of other factors affecting students perceived level of imposition is offered in section 6.3.4.

6.2.2 Mean obligation and imposition level of directives across disciplines. This section discusses the distribution of directives and the perceived strength of obligation and imposition across disciplines. Figure 6.4 shows that 60% of the total number of directives occurred in engineering and 40% in humanities. This pattern can be explained by the nature of directives in engineering lectures.
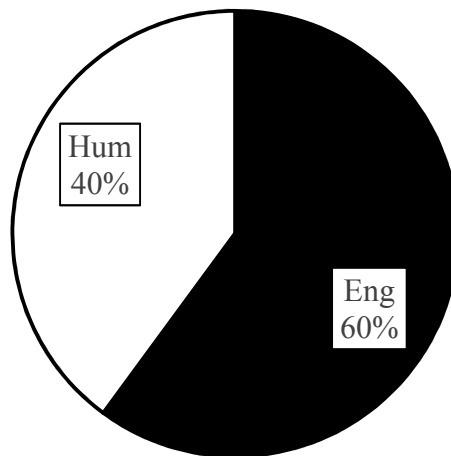
Figure 6.4 Normed distribution of directives in engineering and humanities

As observed in Engineering texts, many of these lectures were similar to a lab class in that the teacher would train students on how to work with circuits in an Electrical Engineering class (IEE 188) as in excerpt 6.1 or the teacher would review the content of an upcoming exam

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for the whole class time in a Computer Science class, as in excerpt 6.2 (directives are in bold letters); as a result, directive forms were happening in short forms and in a sequence for major part of the lecture. For instance, in excerpt 6.1, the instructor uses several directives in imperative form (you + base form of the verb) to give students sequential directions on how to work with circuit board.

Excerpt 6.1. engeeleldmn261

> *T: ...but for right now we'll restrict ourselves to conductors and dc sources.. and **you** **(grab) any two nodes from that circuit**.. you got this circuit board, you don't know what it is... but **you go in and you get two points on there**.. and **you determine what the open circuit voltage is between those two points**.. if you ran a voltmeter, **you can go under the voltmeter and measure the voltage between those two points**... and then **you go in and you throw an ampmeter on there** which creates a short circuit and **you measure the short circuit current**, now when you do that this is no longer the open circuit voltage, this is now zero.. **but you make two measurements**.. **you measure the open circuit** voltage, **you measure the short circuit current**.. if you know those two quantities, and you wanted to do a V - I relationship of the output of the circuit, here's what it would look like... [writing on board] when V is open circuit, how much current is flowing?*

In excerpt 6.2, the whole lecture is a review for an upcoming quiz. That is, the instructor is going through the book chapters with the students and letting the students know what pages they should or should not study for the test. Therefore, there are so many repetitious directive forms in this text. On the other hand, in majority of texts in humanities, the instructor would lecture for a long time on a topic and the directives are mostly given for classroom management, i.e., assigning homework, etc.

Excerpt 6.2. engcsleudhn208

> *T: ... so like when we get to using N.W. [unclear words] dot N.L.M. on page two seventy-seven, no **you don't need to know step by step** on uh how to use the utilities same with the*

*N.S.S. utility. OK? um **let's go over also (you know) repairing prep** in N.S.S. volumes, again that I don't know if I asked a question I can't remember but what (B) repair is for to a traditional volume, rebuilt is to an N.S.S. volume. OK? file compression, know what it is um you don't need to **you don't need to worry about things** like uh on page two eighty-five you know those different set commands for compression**, don't waste your time there**. uh [unclear words] know what it is but again **don't waste your time memorizing** default block sizes you know for different volume sizes and that sort of thing. **you need to know what purging and salvaging files are**. uh so **you might want to read through that**. **you need to know what name space is**. **you might want to read through that**.*

Figure 6.5 visualizes the mean strength of obligation and imposition of directives across engineering and humanities. There seems to be no difference in the way directives are perceived in engineering and humanities. However, this is an overall view of the mean pragmatic force across texts in engineering and humanities and for a more detailed analysis, we will look at individual texts across these disciplines (see Figures 6.6 and 6.7).
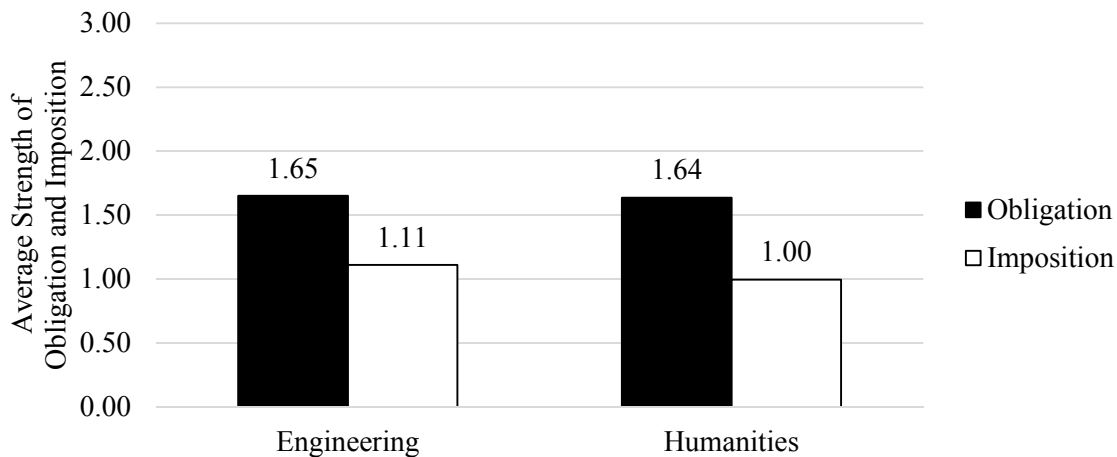
Figure 6.5 Mean strength of obligation and imposition of directives across disciplines

According to Figure 6.6, the only text that has a strikingly different pattern across the 14 texts in engineering and humanities is a graduate level computer systems course. Discourse analysis of the text revealed that the high obligation of the text reflects the purpose of directives

uttered. In this lecture, all directives that are being given are related to one or two future assignments and therefore, not doing them will have major course-related consequences. As a result, the students feel highly obliged to perform the directives. As Figure 6.7 shows, the same text also has the highest level of imposition ($M = 1.47$) among all the texts. Further information on this text and sample excerpts are presented in section 6.3.1.1.
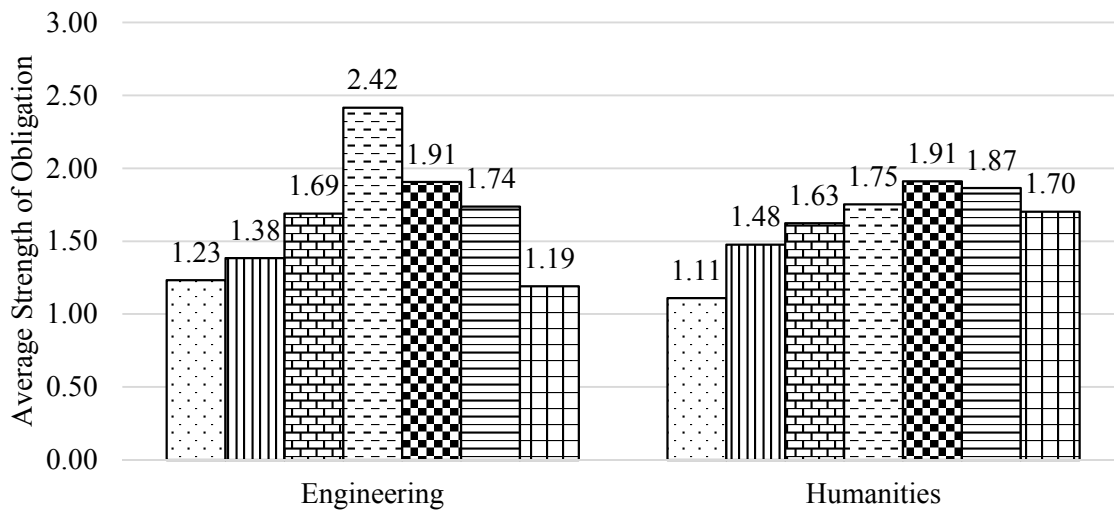
Figure 6.6 Mean strength of obligation of directives per text across disciplines
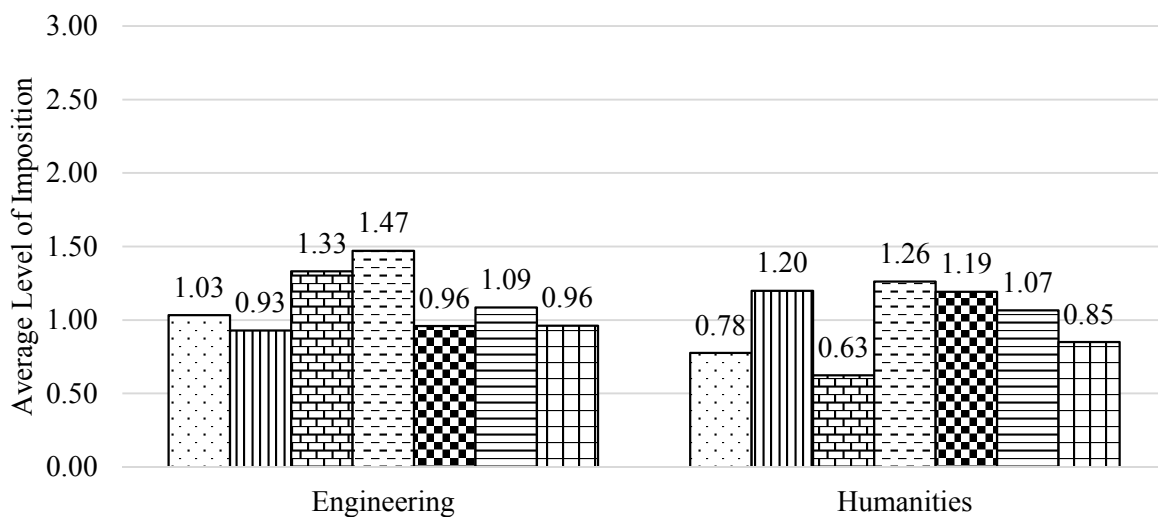
Figure 6.7 Mean level of imposition of directives per text across disciplines

6.2.3 Mean obligation and imposition level of directives across levels of instruction.

Figure 6.8 indicates that lower-division and graduate level lectures had almost similar rates of

occurrence, whereas upper-division lectures accounted for relatively higher rates of occurrence.
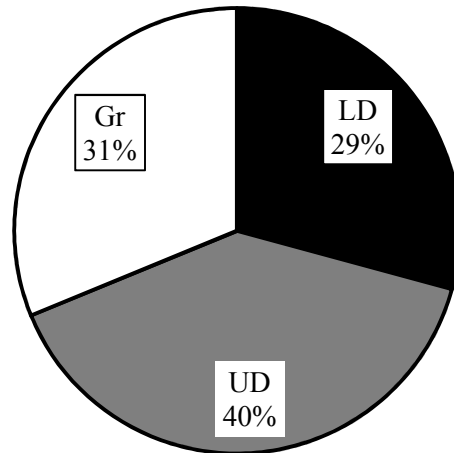
Figure 6.8 Normed distribution of directives across levels of instruction

Figure 6.9 demonstrates the mean strength of obligation and imposition across levels of

instruction. It is clear that graduate level directives have a slightly higher strength of obligation.

This is in line with what we would expect, since graduate students are supposed to be more

serious in their academic pursuit and more motivated to meet the expectations set by the

professor (also see section 6.3.1.1). As for the imposition level, there is a slight difference across

the levels and lower-division and graduate level directives are very close in level of imposition,

followed by upper-division directives with relatively lower level of imposition.
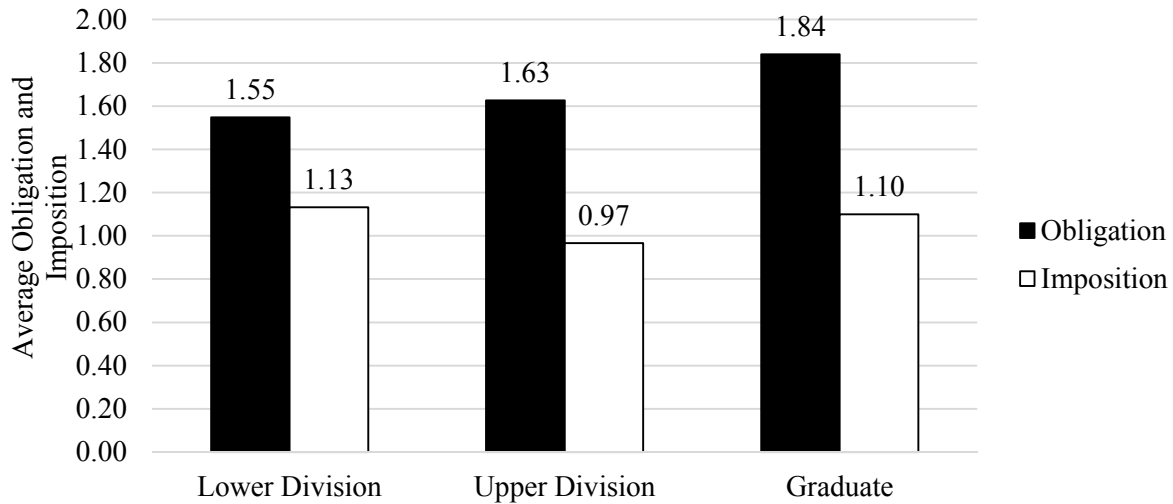
Figure 6.9 Mean strength of obligation and imposition of directives across levels of instruction

Considering the level of obligation and imposition of directives across levels of instruction per text shows that one text in upper division with 1.11 mean level of imposition and one in graduate level with 2.42 mean imposition are the extremes across levels. Reviewing these texts revealed the possible explanation for their extreme values. The text in upper division was happening in humanities and there were only 3 directives in this text. The directives happened at the beginning of the lecture when the professor was determining the order of students for doing the presentations. The low level of obligation reflects the optionality of the task and that there were minor consequences in not performing the directive (see Excerpt 6.3). The low imposition level of directives in this lecture is also reflective of the cost of doing the task which is very low, as expected.

Excerpt 6.3. humclleudmi079
Mean obligation = .67, mean imposition = .33

> T: [unclear words] Thank you. So, **do you want to be next Erin**?
> S: Sure. I think that would follow nicely after that.
> T: OK. Oh yeah it would [laugh] ... [unclear words] Let's pull this over [unclear words]
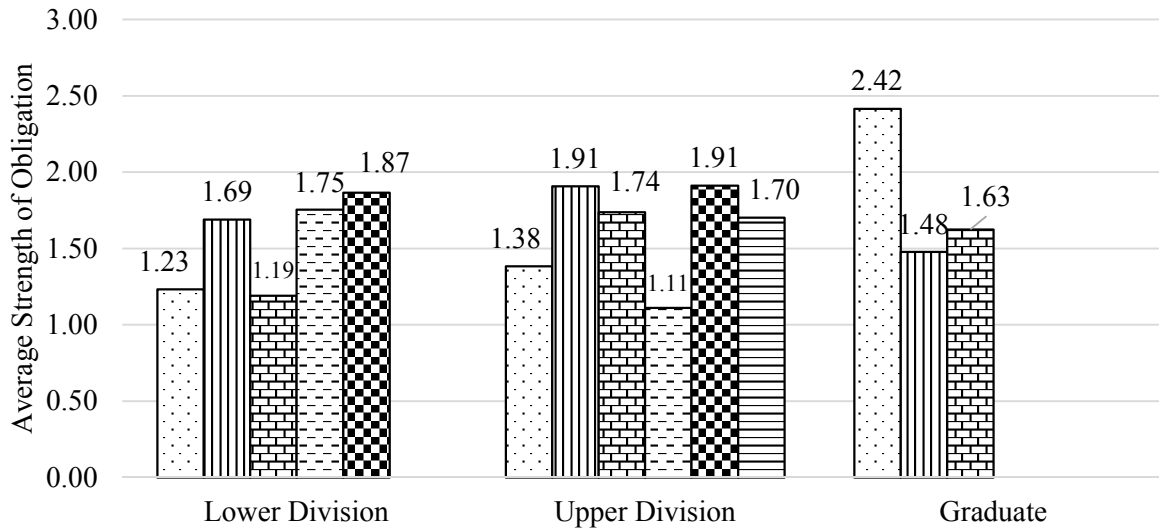
Figure 6.10 Mean strength of obligation per text across levels of instruction

As for the graduate level, the text that is strikingly higher than others in terms of strength of obligation and imposition is the same text that stood out in the comparison across disciplines. As previously mentioned, in this graduate level lecture, directives were all regarding important assignments and therefore, were perceived with high obligation and medium imposition level.
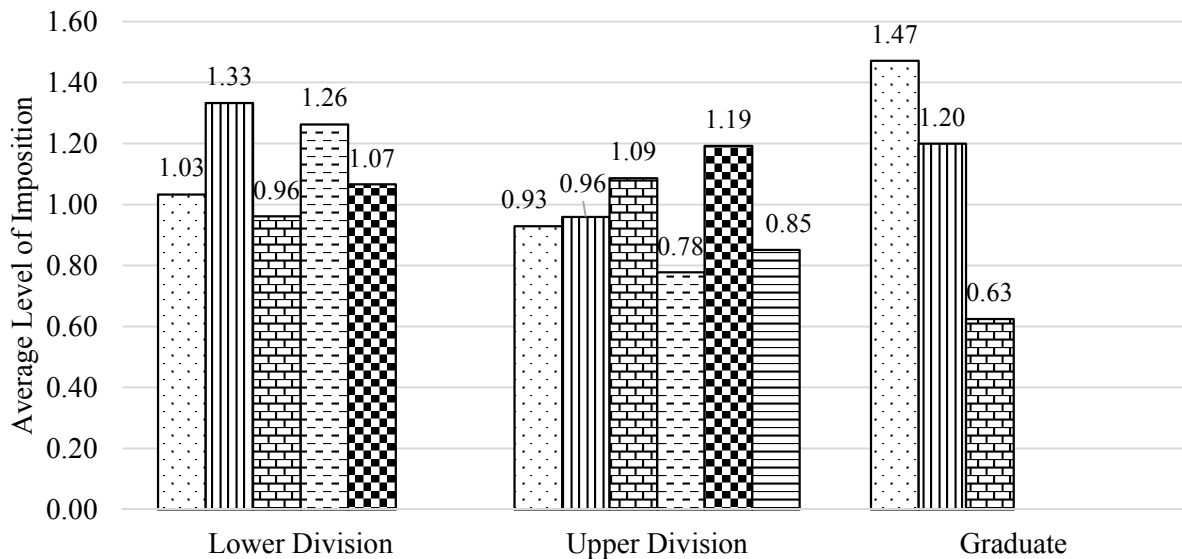
Figure 6.11 Mean level of imposition per text across levels of instruction

6.2.4 Mean obligation and imposition level of directives across levels of interactivity.

Figure 6.12 indicates that low and high interactivity lectures together account for 88% of the total identified directives, whereas medium interactivity only accounts for 12% of the total directive utterances. The high frequency of directives in low interactivity lectures could be explained by the amount of teacher talk. In low interactivity lectures, the professor lectures majority of the class time; more teacher talk could result in more directives. In case of high interactivity lectures, a possible explanation for the large number of directives is that these classes have a higher pace which might result in shorter and more direct structures. Moreover, having sequences of turns between the professor and the students might lead to uttering more directives.
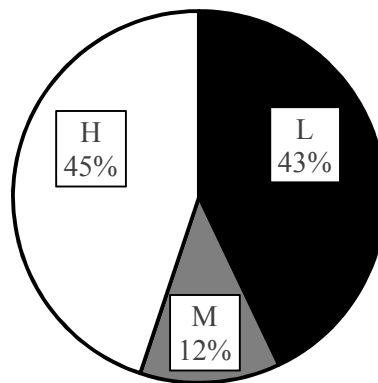
Figure 6.12 Normed distribution of directives across levels of interactivity

Figure 6.13 demonstrates the mean obligation and imposition level of directives across levels of interactivity. According to the chart, with regard to mean strength of obligation, low interactivity directives have a high medium level of obligation, followed by high interactivity directives with slightly lower obligation and medium interactivity directives with a lower

medium level of obligation. As for imposition level of directives, levels of interactivity do not show an important difference.
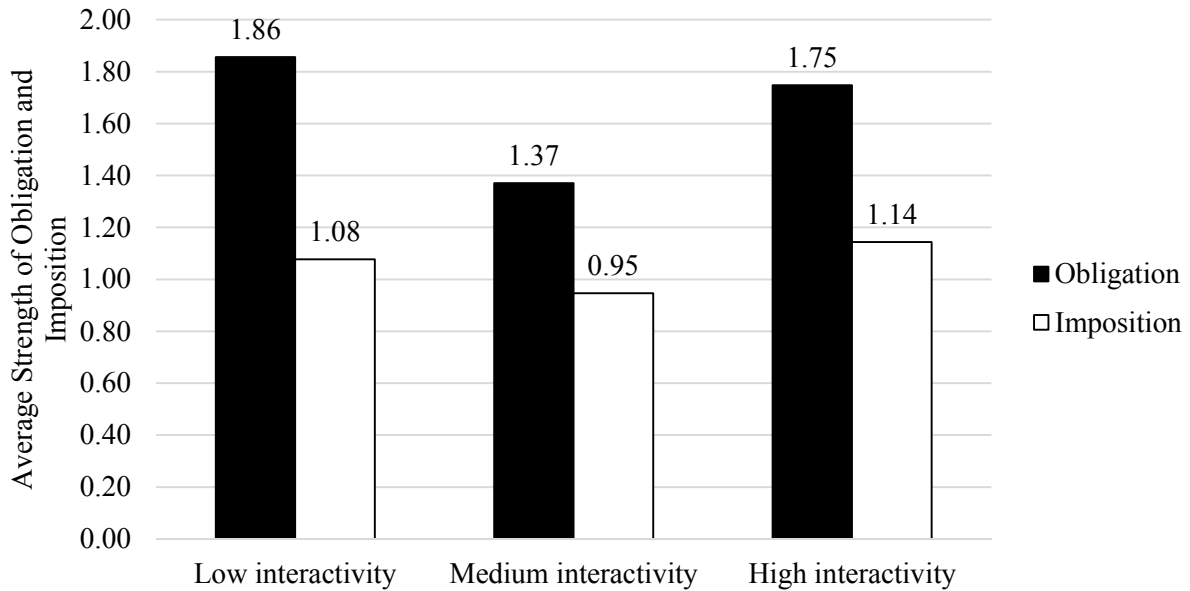
Figure 6.13 Mean strength of obligation and imposition across levels of interactivity

Figure 6.14 and 6.15 show the strength of obligation and level of imposition of directives across levels of interactivity of the lectures in which they occurred per text. It seems that texts in different levels of interactivity have an obligation strength of low medium to high medium, except for one text in high interactivity classroom ($M = 2.42$) which happens to be the same outlier text in graduate level engineering which was discussed in the previous sections. According to Figure 6.15, directives across levels of interactivity have a medium low to low medium level of imposition, except for the same outlier just mentioned.
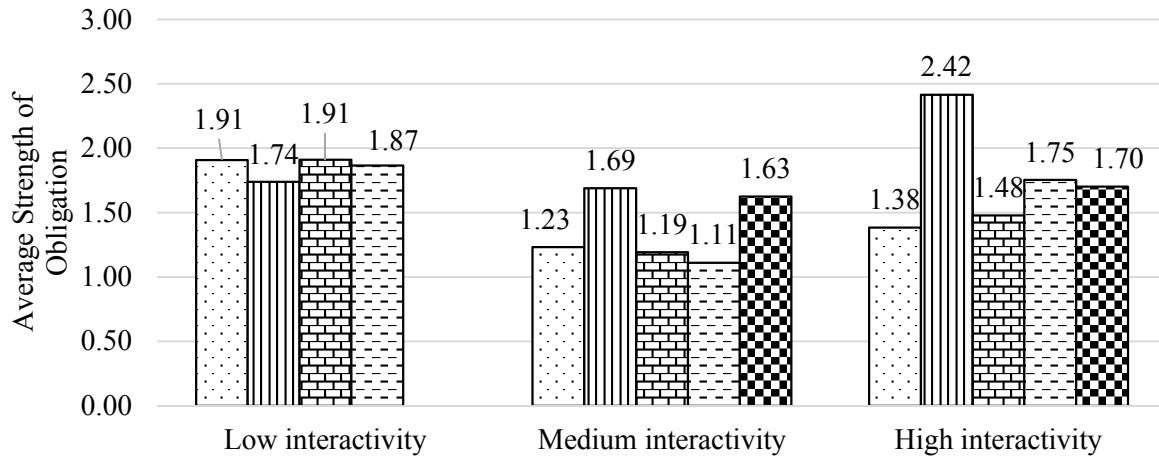
Figure 6.14 Mean strength of obligation per text across levels of interactivity
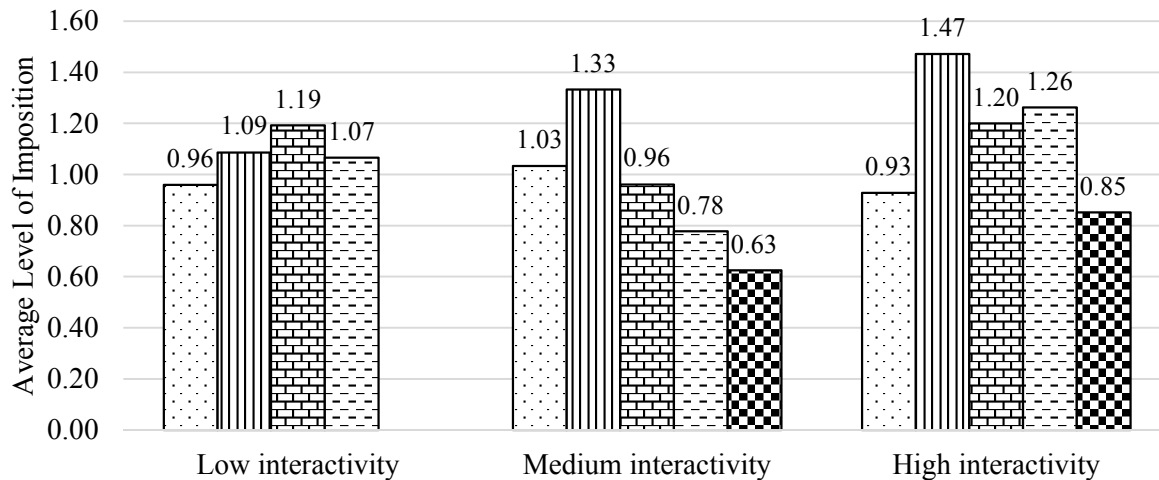
Figure 6.15 Mean level of imposition per text across levels of interactivity

6.3 RQ 3: Interaction between Structural and Situational Features in Predicting Pragmatic Force of Directives

The main goal of research question 3 is to examine the effects of structural types of directives and situational features of lectures on the strength of obligation and imposition of directives. In other words, RQ 3 tests whether the structural types of directives and situational features of lectures can predict the strength of obligation or imposition of directives. The independent variables in this question are structural type (15 levels), discipline (2 levels),

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instruction level (3 levels), and level of interactivity (3 levels) and the dependent variables are

perceived strength of obligation and level of imposition. It is worth restating that the strength of

obligation and imposition of a directive were calculated by averaging three university students'

coding on their perception of these two constructs; therefore, the variables were measured on an

interval scale.

RQ3 was broken down into four sub-questions. While the first two sub-questions—RQ

3.1 and RQ 3.2—examine the effects of situational features on strength of obligation and

imposition of directives respectively, RQ 3.3 and RQ 3.4 test the effects of structural types of

directives in interaction with the situational features on predicting the strength of obligation and

imposition of directives. A series of 2-way ANOVAs were run between situational features, as

well as between structural type and the situational features. The reason for not conducting 4-way

ANOVAs—including all three situational features and the structural type—instead of 2-way

ANOVAs is three-fold: (1) having a small unbalanced sample with multiple groupings, (2) lack

of degrees of freedom for 3-way and 4-way interactions, and (3) lack of a theoretical background

for a 3-way or a 4-way interaction between structural types and situational factors in predicting

the pragmatic force of directives. In the following, quantitative and qualitative results are

presented to answer each research question. As for the quantitative results, two tables and a

figure are presented for each 2-way ANOVA. The first table reports the means and standard

deviations of pragmatic force of directives within levels of the independent variables included in

the interaction model (the mean and standard deviation table for RQ 3.3 and RQ 3.4 are

displayed in Appendix E and F respectively). The second table presents the results of the two-

way ANOVA for the main effects model and the interaction model. In addition to significant

differences, effect sizes are reported from the omnibus ANOVA, using partial $\eta2$ (eta squared), a

measure of variance similar to R^2 [2] which explains the variance by the variable that is being examined. Finally, the figure plots the marginal means of the pragmatic force of directives across levels of the two factors. Marginal means are means of a factor adjusted for any other variables in the model. Qualitative interpretations, including sample excerpts from the corpus follow the quantitative results of the ANOVAs.

The test for normality, examining the Shapiro-Wilks test indicated the strengths of obligation of directives were not normally distributed ($p < .05$), except for three groups (humanities with medium interactivity, $p = .217$; lower division level with low interactivity, $p = .071$; and graduate level with medium interactivity, $p = .128$). The test for homogeneity of variance was also significant, Levene's $F (5, 512) = 2.69$, $p = .021$, indicating that the assumption underlying the application of the two-way ANOVA was not met. Despite violations of assumptions, ANOVAs were run relying on the robustness of the test (Schminder, Ziegler, Danay, Beyer, & Bühner, 2010). An alpha level of .05 was used for the initial analyses.

6.3.1 RQ 3.1: interaction between situational features in predicting strength of obligation. Research question 3.1 examines the extent to which situational features (viz., discipline, level of instruction, and level of interactivity) predict the perceived strength of obligation of directives. Three two-way ANOVAs were conducted to examine the interaction effect of three pairs—disciplines and levels of instruction (2 x 3), disciplines and levels of interactivity (2 x 3), levels of instruction and levels of interactivity (3 x 3)—on predicting the perceived strength of obligation of directives. Results of the ANOVAs, as well as the qualitative interpretations are described in the following subsections. It is worth noting that only interaction effects and main effects were reported in the results of the ANOVAs. As an accepted practice in discourse studies, simple effects and pairwise comparisons were not conducted, and further

interpretation of the results were made by analyzing the means and standard deviations of directives with various structural types and were supported by analyzing excerpts from the data.

6.3.1.1 Interaction between disciplines and instruction levels on predicting obligation strength of directives. The first two-factor (2 x 3) ANOVA was conducted to evaluate the effects of levels of instruction of the lectures on the strength of obligation of directives in engineering and humanities. The two independent variables in this procedure were discipline (engineering and humanities) and levels of instruction (lower division, upper division, and graduate). The dependent variable is the mean strength of obligation of directives (ranging from 0 to 3) as perceived by university students. The means and the standard deviations for the mean strength of obligation as a function of the two factors are presented in Table 6.1.

Table 6.1 *Means and Standard Deviations of Obligation Strength across Disciplines and Instruction Levels*

	Lower Division M (SD)	Upper Division M (SD)	Graduate M (SD)	Total M (SD)
Engineering	1.39 (.99)	1.59 (1.08)	2.42 (.77)	1.57 (1.06)
Humanities	1.77 (.93)	1.83 (1.0)	1.49 (.96)	1.68 (.97)
Total	1.57 (.98)	1.66 (1.06)	1.59 (.98)	1.62 (1.02)

Based on the results of the two-way ANOVA (see Table 6.2), there is a significant interaction between discipline and level of instruction, $F(2, 512) = 7.39$, $p = .001 < .05$, partial $\eta^2 = .028$, indicating that any differences in strength of obligation of directives in engineering and humanities are dependent upon the level of instruction in which directives occurred. Although the interaction between disciplines and levels of instruction is significant, only 3% ($\eta^2 = .03$) of the total variance in the strength of obligation of directives is attributed to this interaction.

Table 6.2 *Two-way Analysis of Variance for Obligation Strength across Disciplines and Instruction Levels*

Source	SS	df	MS	F	p	Partial η^2
Discipline	.651	1	.651	.642	.423	.001
Level of Instruction	4.722	2	2.361	2.327	.099	.009
Discipline × Instruction	14.775	2	7.387	7.280	.001*	.028
Within (Error)	519.555	512	1.015			
Total	1900.825	518				

$R^2 = .034$ (Adjusted $R^2 = .025$)
* *p* value < 0.05

       Figure 6.16 below displays the marginal means of the mean obligation of directives in engineering and humanities across levels of instruction. The plot shows a clear difference in the way students perceive the strength of obligation of directives in engineering and humanities lectures within levels of instruction. While in both lower-division and upper-division lectures, directives in humanities show a higher strength of obligation compared to those in engineering, there is a drastically conflicting trend in the graduate level lectures.
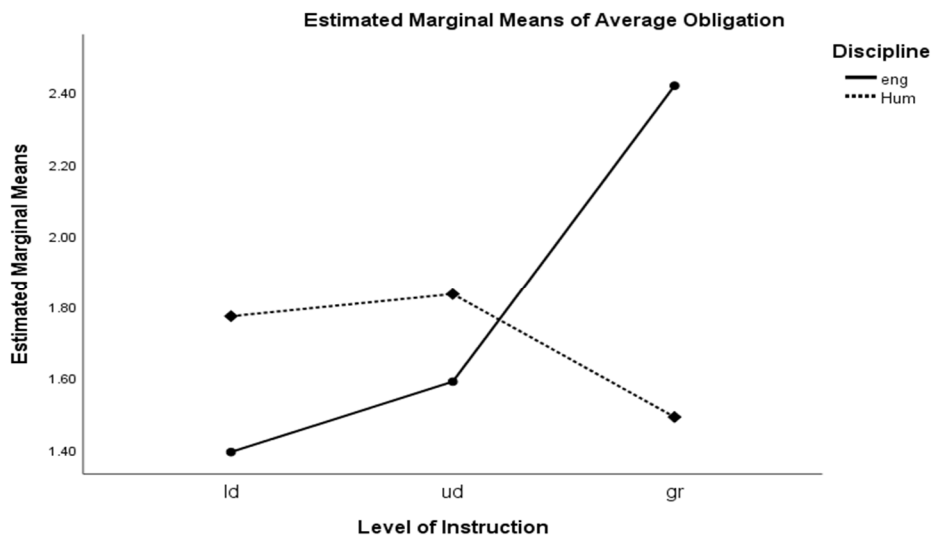
Figure 6.16 Mean strength of obligation in engineering and humanities across levels of instruction

A review of the engineering and humanities means in the graduate level indicates that engineering ($M = 2.42$, $SD = .77$) has a higher strength of obligation than humanities ($M = 1.49$, $SD = .96$). However, closer analysis of texts revealed that higher obligation of directives in graduate level engineering resulted from idiosyncratic features of the only text that existed in this level in engineering. There were 12 directives total in this text which were all used for the same purpose. In this computer information systems lecture, the teacher was stating clear expectations of the upcoming assignment; therefore, not performing the directives in the way expected would have resulted in major course-related consequences. As a result, all the directives were perceived with high obligation strength by the students (see Excerpts 6.4 and 6.5).

Excerpt 6.4. engcslegrhn217
Engineering graduate level; mean obligation = 2.67

> *T: you know what your (flows) are which windows are gonna come up whether you chose to use primary verses secondary dialogs and why.*
> *S: maybe (that should be my Powerpoint)*
> *T: what ?*
> *S: maybe [five unclear words]*
> *S: [laughter]*
> *T: and then after you show that then y**ou're gonna have to bring your model up and show it running right ?** somewhat that is and uh*
> *S: you have to have a model*

Excerpt 6.5. engcslegrhn217
Engineering graduate level; mean obligation = 3

> *S: you have to have a model*
> *S: somewhat*
> *T: **you get until next week Friday at five o'clock to get** to the finish point right? at that time you need to send me an email by five o'clock to tell me where your data files are. you know the sub directory you put them in and the this is the one you want me to grade that you want me to grade right?*

The lower obligation strength of directives in engineering compared to humanities in lower division and upper division could be explained by the nature of lectures in humanities and engineering. In many of engineering lectures in both lower division and upper division (Excerpt 6.6), directives are used by the instructor to guide the students on performing a mathematical analysis or working with a function in an engineering software. In other words, these engineering lectures were similar to lab courses, although they were not happening in laboratories. In these types of lectures, the directives were usually short in length and they were given for students' future reference. For instance, in Excerpt 6.6 (Obligation M = .67) which is happening in an electrical engineering course, the professor is explaining about the input of the analysis and is recommending a model that is being shown to the students. Many of such examples are perceived with low obligation strength and that is due to the fact that students feel that they have a high level of choice on doing the task the way that they want and there seems to be minimal course-related consequences with not performing the directive the way that the teacher states.

Excerpt 6.6. engeeleudli022
Engineering upper-division; mean obligation = .67
> *Um. Talk about using uh, uh, the simple analytical [2 sylls]. OK what do you need for input well, we need something that's gonna be a volt, or something that changes with time, so **I recommend something that looks like this**. OK?*

6.3.1.2 Interaction between disciplines and levels of interactivity on predicting obligation strength of directives.
A two-factor (2 x 3) ANOVA was conducted to evaluate the effects of levels of interactivity of the lectures on the strength of obligation of directives in engineering and humanities. The two independent variables in this analysis are discipline (engineering and humanities) and levels of interactivity (low, medium, and high). The dependent variable is the mean strength of obligation of directives (ranging from 0 to 3) as perceived by

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university students. The means and standard deviations for the mean strength of obligation as a function of the two variables are presented in Table 6.3.

Table 6.3 *Means and Standard Deviations of Obligation Strength across Disciplines and Levels of Interactivity*

	Low M (SD)	Medium M (SD)	High M (SD)	Total M (SD)
Engineering	1.86 (.83)	1.39 (.99)	1.49 (1.20)	1.57 (1.06)
Humanities	1.91 (1.03)	1.48 (.72)	1.60 (.95)	1.68 (.97)
Total	1.88 (.92)	1.40 (.95)	1.55 (1.06)	1.62 (1.02)

Based on the results of the two-way ANOVA (see Table 6.4), there is no significant interaction between discipline and level of interactivity, $F (2, 512) = .050$, $p = .952 > .05$, meaning that any differences in strength of obligation of directives in engineering and humanities does not depend on the interactivity level of the lecture in which those directives occur. Unlike the interaction effect, the main effect of the interactivity level was significant, $F (2, 512) = 6.319$, $p = .002 < .05$, Partial $\eta^2 = .024$, although only 2% of total variance was attributed to this factor.

Table 6.4 *Two-way Analysis of Variance for Obligation Strength across Disciplines and Levels of Interactivity*

Source	SS	df	MS	F	p	Partial η^2
Discipline	.421	1	.421	.414	.520	.001
Interactivity Levels	12.875	2	6.437	6.319	.002[*]	.024
Discipline × interactivity	.101	2	.051	.050	.952	.000
Within (Error)	521.622	512	1.019			
Total	1900.825	518				

$R^2 = .031$ (Adjusted $R^2 = .021$)
* p value < 0.05

The marginal means plot (Figure 6.17) of the mean obligation of directives in engineering and humanities across levels of interactivity verifies the results on Table 6.4. While there is a

similar pattern of obligation strength in both engineering and humanities across levels of interactivity, there is a notable difference in the obligation strength of directives within levels of interactivity. The directives uttered in lectures with low interactivity seem to have considerably higher level of obligation compared to those in medium interactivity lectures.
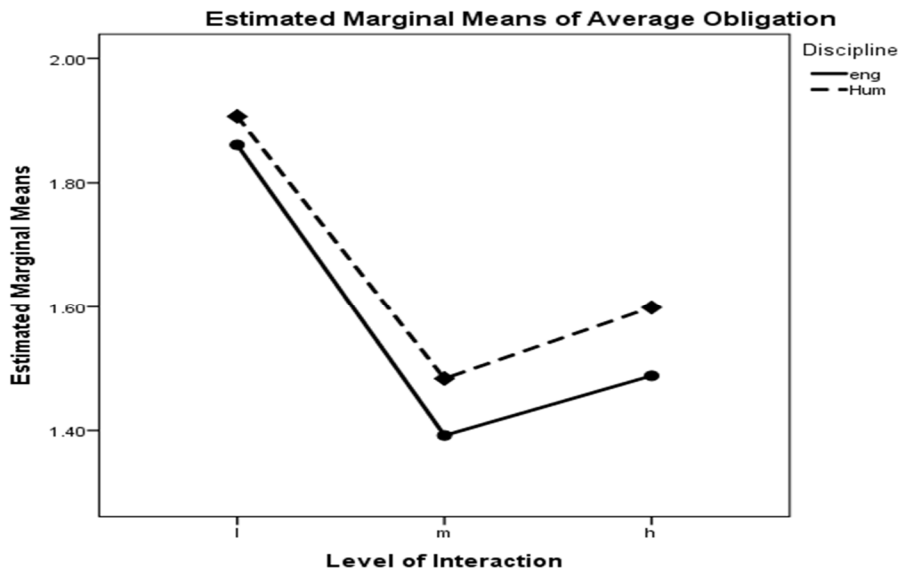
Figure 6.17 Mean strength of obligation in engineering and humanities across levels of interactivity

A review of the group means indicates that directives in low interactivity lectures in engineering and humanities are respectively perceived .47 and .43 higher in strength of obligation compared to those in medium interactivity lectures (see Table 6.3). This seems to reflect the nature of interaction between teachers and students in a low interactivity classroom. Low interactivity lectures are usually large-section classes in which the teacher is the main speaker of the classroom and it is not possible for teachers to involve a large number of students in discussions in an auditorium. What is expected from the teacher though is to be clear in expectations to avoid any misunderstandings for the students. Also, based on the obligation rubric in this project, clarity in expectations is linked with high obligation strength. Excerpts 6.7

to 6.10 are examples of directives used in low interactivity lectures. In all of these examples, we see a clear statement of expectation by the teacher and all of these directives are marked with direct structures and in Excerpt 6.9, with an intensifier—"immediately".

Excerpt 6.7. humhileudln070
Low interactivity (mean obligation = 3)

> T: the take home essay will be part of every exam, I'll give you the question a week before the exam, **you'll have to take it home, write it up, type it, and bring it in on the day of the** test.

Excerpt 6.8. humhileudln070
Low interactivity; mean obligation = 2.67

> T: which you've had history classes before you've probably had these, a term, and **you'll have to write a paragraph explaining who what wh**en where why and how this is important.

Excerpt 6.9. humhileudln070
Low interactivity; mean obligation = 3

> T: um, let's see, if a student misses more than one week of classes **you should talk to me immediately, if you** know you're gonna be gone.

Excerpt 6.10. humplleldlg029
Low interactivity; mean obligation = 3

> T: I will stay down here for a couple of minutes if anybody needs to chat about anything. see you on Wednesday. **please try to get here on time.**

6.3.1.3 Interaction between levels of instruction and interactivity on predicting obligation strength of directives.

A two-factor (3 x 3) ANOVA was conducted to evaluate the effects of levels of instruction of the lectures on the strength of obligation of directives across different levels of interactivity. The two independent variables in this analysis are levels of instruction (lower-division, upper-division, and graduate) and levels of interactivity (low,

medium, and high). The dependent variable is the mean strength of obligation of directives (ranging from 0 to 3), as perceived by university students. The means and standard deviations for the mean strength of obligation as a function of the two variables are presented in Table 6.5.

Table 6.5 *Means and Standard Deviations of Obligation Strength across Instruction and Interactivity Levels*

	Low M (SD)	Medium M (SD)	High M (SD)	Total M (SD)
Lower Division	1.87 (1.07)	1.39 (.99)	1.76 (.92)	1.57 (.98)
Upper Division	1.88 (.92)	1.11 (.77)	1.43 (1.16)	1.66 (1.06)
Graduate	N/A	1.62 (.70)	1.59 (1.0)	1.59 (.98)
Total	1.88 (.92)	1.40 (.95)	1.55 (1.06)	1.62 (1.02)

Based on the results of the two-way ANOVA (see Table 6.6), there is no significant main effects or interaction effects of instruction and interactivity levels on predicting the obligation strength of directives. Regardless of having non-significant effects, analyzing the marginal means plot (Figure 6.18), as well as the means and standard deviations across groups provides us with valuable information. Similar to what we discussed in section 6.3.1.2, there is a notable difference within levels of interactivity, i.e., directives in low interactivity lectures are perceived with the highest level of obligation ($M = 1.88$, $SD = .92$), whereas directives in medium interactivity lectures are perceived with the lowest level of obligation ($M = 1.40$, $SD = .95$). However, this trend is only happening in lower division and upper division lectures. Directives in medium and high interactivity graduate lectures, on the other hand, almost have the same level of obligation. No conclusion can be made about directives in low interactivity graduate lectures since there is no data available in that level.

Table 6.6 *Two-way Analysis of Variance for Obligation Strength across Instruction and Interactivity Levels*

Source	SS	df	MS	F	p	Partial η²
Instruction Levels	.894	2	.447	.440	.644	.002
Interactivity Levels	4.095	2	2.048	2.017	.134	.008
Instruction × Interactivity	1.653	3	.551	.543	.653	.003
Within (Error)	517.618	510	1.015			
Total	1900.825	518				

$R^2 = .038$ (Adjusted $R^2 = .025$)
* *p* value < 0.05
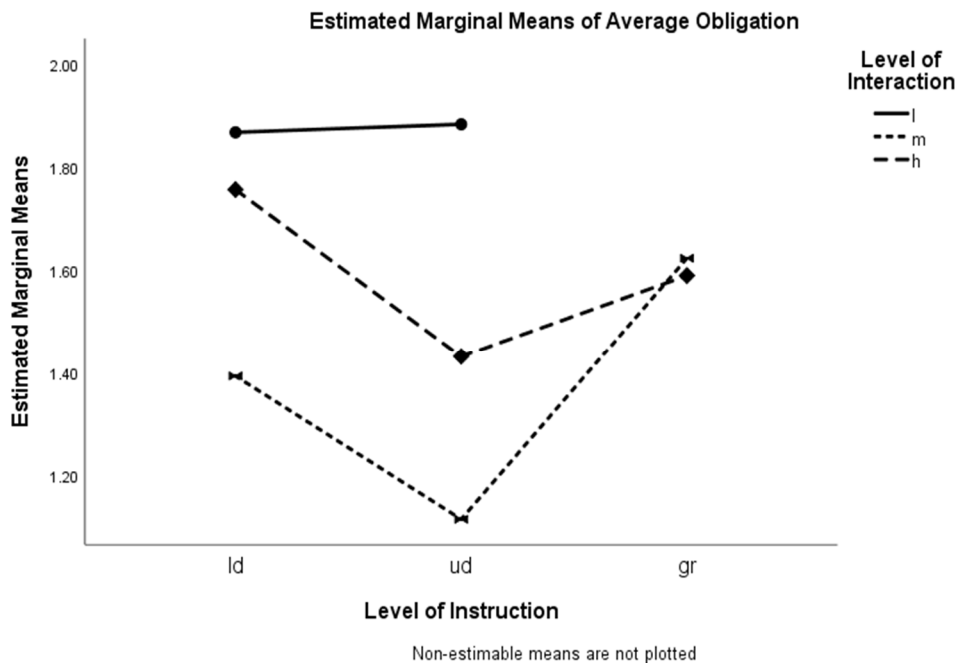
Figure 6.18 Mean strength of obligation across levels of instruction and interactivity

6.3.2 RQ 3.2: interaction between situational features in predicting level of imposition. Research question 3.2 investigates the extent to which situational features (viz., discipline, level of instruction, and level of interactivity) predict the perceived level of imposition of directives. Three two-way ANOVAs were run to examine the interaction effects of three pairs—discipline and level of instruction (2 x 3), discipline and level of interactivity (2 x

3), and level of instruction and level of interactivity (3 x 3)—on predicting the perceived level of imposition of directives. Results of the ANOVAs, as well as the qualitative interpretations are described in the following subsections.

6.3.2.1 Interaction between disciplines and levels of instruction on predicting imposition level of directives. A two-factor (2 x 3) ANOVA was conducted to evaluate the effects of level of instruction of lectures on the level of imposition of directives in engineering and humanities. The two independent variables in this procedure are discipline (engineering and humanities) and level of instruction (lower division, upper division, and graduate). The dependent variable is the mean level of imposition of directives (ranging from 0 to 3) as perceived by university students. The means and standard deviations for the mean level of imposition as a function of the two factors are presented in Table 6.7.

Table 6.7 *Means and Standard Deviations of Imposition Level across Disciplines and Instruction Levels*

	Lower-Division M (SD)	Upper-Division M (SD)	Graduate M (SD)	Total M (SD)
Engineering	1.12 (.53)	.96 (.65)	1.47 (.50)	1.02 (.63)
Humanities	1.23 (.52)	1.10 (.52)	1.15 (.61)	1.16 (.56)
Total	1.18 (.52)	1.00 (.62)	1.19 (.61)	1.09 (.60)

Based on the results of the two-way ANOVA (see Table 6.8), there is no significant interaction between discipline and level of instruction, $F (2, 512) = 2.787$, $p = .063 > .05$, partial $\eta^2 = .011$. However, the instruction level main effect on predicting the level of imposition is significant, $F (2, 512) = 5.567$, $p = .004 < .05$, partial $\eta^2 = .021$. The marginal means plot in Figure 6.19 also clearly shows a difference in how directives are perceived in terms of level of imposition in engineering and humanities across levels of instruction. While in lower-division and upper-division levels, directives are perceived with slightly higher imposition level in

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humanities as opposed to engineering, directives uttered in graduate level show a considerably

different pattern. That is, directives in graduate level engineering lectures ($M = 1.47$, $SD = .50$)

are perceived with higher imposition than those in humanities ($M = 1.15$, $SD = .61$). This is a

similar pattern to that of obligation strength and its interaction with discipline and instruction

level, except for the fact that the interaction effect of discipline and level of instruction on the

obligation strength of directives was significant.

Table 6.8 *Two-way Analysis of Variance for Imposition Level across Disciplines and Instruction Levels*

Source	SS	df	MS	F	p	Partial η^2
Discipline	.031	1	.031	.090	.764	.000
Instruction Levels	3.879	2	1.940	5.567	.004[*]	.021
Discipline × Instruction	1.942	2	.971	2.787	.063	.011
Within (Error)	178.409	512	.348			
Total	796.941	518				

$R^2 = .037$ (Adjusted $R^2 = .028$)
* p value < 0.05

Another pattern that emerged in the plot (Figure 6.19) is within the levels of instruction

of engineering lectures. Directives in graduate level engineering lectures ($M = 1.47$, $SD = .50$)

seem to be perceived with significantly higher imposition than those in upper-division

engineering lectures ($M = .96$, $SD = .65$). On the contrary, directives in upper-division ($M = 1.10$,

$SD = .52$) and graduate level ($M = 1.15$, $SD = .61$) lectures in humanities appear to have very

similar levels of imposition. This seems to be reflective of the graduate level lecture in the

current data. As previously explained in section 6.3.1.1, there was only one text in the category

of engineering graduate lectures and the striking variance between engineering and humanities in

graduate level seems to be resulting from the specific features of that text (for further

explanations refer to section 6.3.1.1). Since all the directives in the engineering graduate text

were related to an upcoming assignment in class, the cost of doing the tasks or the mean imposition level of directives were relatively higher [.67–2.33] than those of graduate level humanities (see Excerpt 6.11).
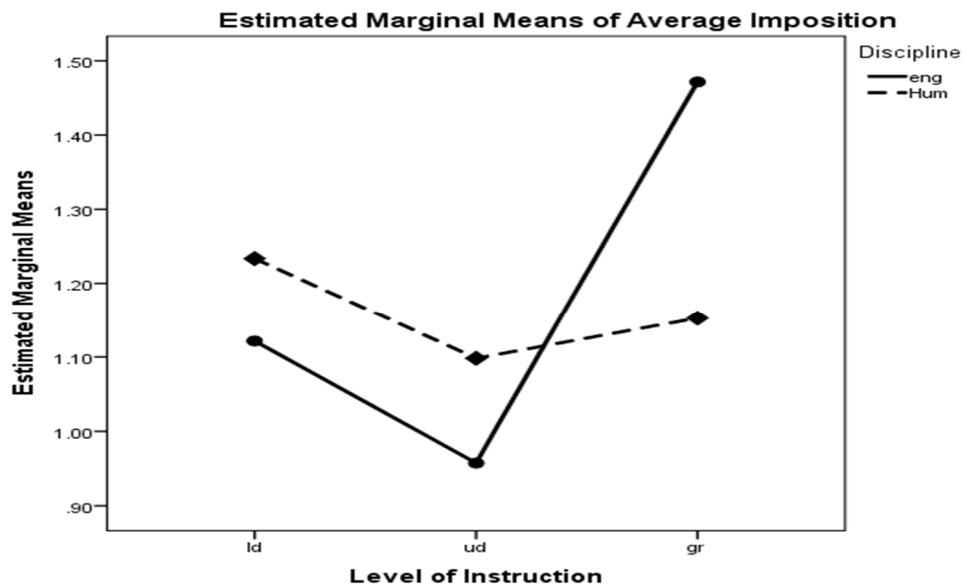
Figure 6.19 Mean level of imposition in engineering and humanities across levels of instruction

In Excerpt 6.11, the professor is getting the students to send an email to her/him by a certain time. This example is coded with high level of obligation (3) and mean level of imposition (1.33), since sending an email at a certain time including certain information is moderately time-consuming.

Excerpt 6.11. engcslegrhn217
Engineering graduate level; mean imposition 1.33

> *T: you get until next week Friday at five o'clock to get to the finish point right? at that*
> *time **you need to send me an email by five o'clock to tell me where** your data files are.*
> *you know the sub directory you put them in and the this is the one you want me to grade*
> *that you want me to grade right?*

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6.3.2.2 Interaction between disciplines and levels of interactivity on predicting

imposition level of directives. A two-factor (2 x 3) ANOVA was conducted to evaluate the

effects of levels of interactivity of the lectures on the level of imposition of directives across

engineering and humanities. The two independent variables in this analysis are disciplines

(engineering and humanities) and levels of interactivity (low, medium, and high). The dependent

variable is the mean level of imposition of directives (ranging from 0 to 3) as perceived by

university students. The means and standard deviations for the mean level of imposition as a

function of the two factors are presented in Table 6.9.

Table 6.9 *Means and Standard Deviations of Imposition Level across Disciplines and Levels of Interaction*

	Low M (SD)	Medium M (SD)	High M (SD)	Total M (SD)
Engineering	1.00 (.48)	1.12 (.53)	.98 (.75)	1.02 (.63)
Humanities	1.17 (.53)	.66 (.52)	1.18 (.56)	1.16 (.56)
Total	1.08 (.51)	1.06 (.55)	1.10 (.66)	1.09 (.60)

The ANOVA results in Table 6.10 indicate that there is a significant interaction between

discipline and level of interactivity, $F(2, 512) = 5.314$, $p = .005 < .05$, Partial $\eta^2 = .020$, meaning

that any differences in level of imposition of directives in engineering and humanities depends

on the interactivity level of the lecture in which directives occur.

Based on the marginal means plot (Figure 6.20) of the mean imposition of directives in

engineering and humanities across levels of interactivity, the imposition level of directives in

medium interactivity engineering lectures is considerably higher than those in medium

interactivity humanities lectures. As for the differences within levels of interactivity, directives in

low and high interactivity lectures seem to have a similar level of imposition (see Table 6.9 for

means and standard deviations of the groups).

Table 6.10 *Two-way Analysis of Variance for Imposition Level across Disciplines and Levels of Interactivity*

Source	SS	df	MS	F	p	Partial η^2
Discipline	.042	1	.042	.119	.730	.000
Level of Interactivity	1.280	2	.640	1.828	.162	.007
Discipline × Interactivity	3.720	2	1.860	5.314	.005[*]	.020
Within (Error)	179.246	512	.350			
Total	796.941	518				

$R^2 = .033$ (Adjusted $R^2 = .023$)
* *p* value < 0.05
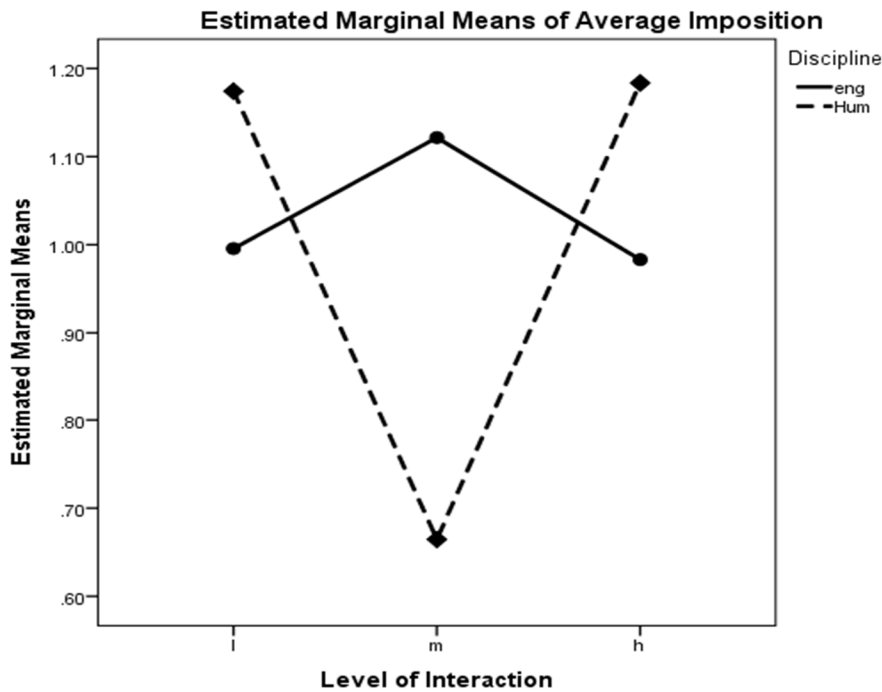
Figure 6.20 Mean level of imposition in engineering and humanities across levels of interactivity

One possible explanation for higher imposition level of directives in medium interactivity engineering lectures was revealed by analyzing the texts and the nature of the directives. Looking at three texts in engineering and two in humanities with medium level of interactivity revealed that majority of directives in medium interactivity engineering lectures are telling the students what to do with an analysis, engineering procedure or else and the students perceive

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those with medium level of imposition. On the other hand, directives in medium interactivity humanities lectures seem to be asking for mental tasks such as thinking, pausing, and talking, which are perceived with low level of imposition or costliness. Excerpts 6.13 and 6.14 offer examples of directives from medium interactivity lectures in engineering and humanities, respectively.

Excerpt 6.13. engcsleldmn047
Medium interactivity engineering; mean level of imposition = 2.00

> T: I'm not gonna put any current source into [4 syl] . . . **we've got to adjust the loss on these structures** so that we can move those poles back (and the left have flight) so the pur [incomplete word] for the purpose of comparison I will . . not include

Excerpt 6.14. humpllegrmg092
Medium interactivity humanities; mean level of imposition = .67

> S: [coughs]
>
> T: **talk to me about it some time next week.** I wont be in the office for the remainder of this week but I will be back on Monday and I'll be uh here [unclear word] the next week and the weeks that follow.

6.3.2.3 Interaction between levels of instruction and interactivity on predicting imposition level of directives. A two-factor (3 x 3) ANOVA was conducted to evaluate the effects of levels of instruction of the lectures on the level of imposition of directives across levels of interactivity. The two independent variables in this analysis are levels of instruction (lower division, upper division, and graduate) and levels of interactivity (low, medium, high). The dependent variable is the mean level of imposition of directives (ranging from 0 to 3) as perceived by university students. The means and standard deviations for the mean level of imposition as a function of the two factors are presented in Table 6.11.

Table 6.11 *Means and Standard Deviations of Imposition Level across Levels of Instruction and Interactivity*

	Low M (SD)	Medium M (SD)	High M (SD)	Total M (SD)
Lower Division	1.07 (.56)	1.12 (.53)	1.26 (.51)	1.17 (.52)
Upper Division	1.08 (.50)	.78 (.77)	.92 (.72)	1.00 (.62)
Graduate	N/A	.62 (.45)	1.23 (.60)	1.19 (.61)
Total	1.08 (.51)	1.06 (.55)	1.10 (.66)	1.09 (.60)

Based on the results of the two-way ANOVA (see Table 6.12), there are no significant main effects or interaction effects of instruction and interactivity levels on predicting the imposition level of directives. Analyzing the marginal means plot (Figure 6.21), as well as the means and standard deviations across groups (Table 6.11) indicate a big gap between the level of imposition of directives in lower division ($M = 1.12$, $SD = .53$) and graduate level ($M = .62$, $SD = .45$) in medium interactivity lectures. Overall, the level of imposition is decreasing as the instruction level of the lecture is increasing. A completely different pattern emerged in the other two levels of interactivity; in high interactivity classes, the level of imposition is similarly high in lower-division and graduate level classes, whereas it is relatively lower in the upper-division lectures.

Table 6.12 *Two-way Analysis of Variance for Imposition Level across Levels of Instruction and Interactivity*

Source	SS	df	MS	F	p	Partial η^2
Level of Instruction	1.890	2	.945	2.743	.065	.011
Level of Interactivity	1.776	2	.888	2.578	.077	.010
Instruction × interactivity	2.565	3	.855	2.482	.060	.014
Within (Error)	175.697	510	.345			
Total	796.941	518				

$R^2 = .052$ (Adjusted $R^2 = .039$)
* p value < 0.05

Estimated Marginal Means of Average Imposition
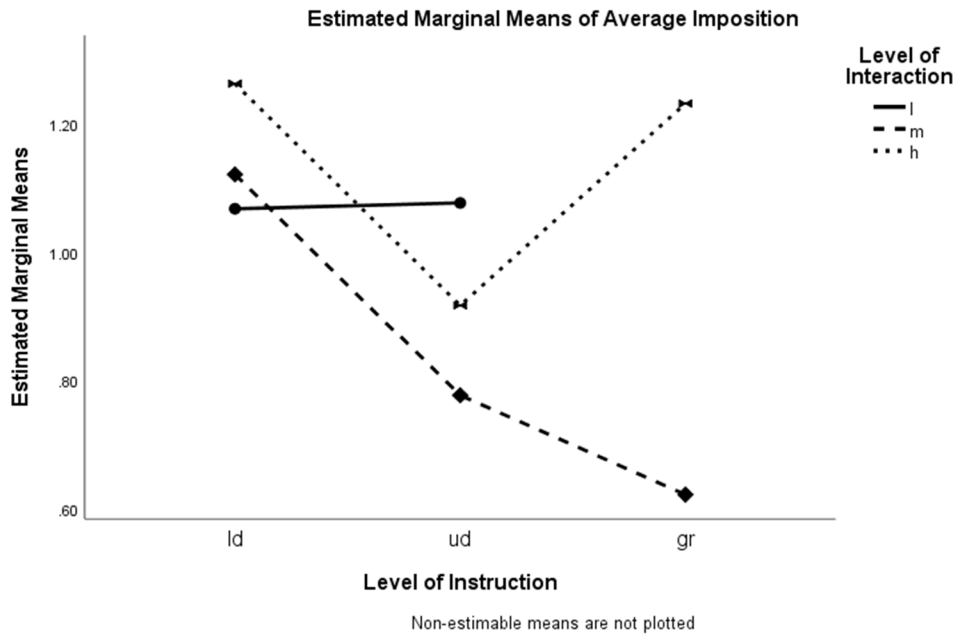
Figure 6.21 Mean level of imposition across levels of instruction and interactivity

6.3.3 RQ 3.3: interaction between structural and situational factors in predicting strength of obligation. Research question 3.3 tests the extent to which the structural type of directives interacts with situational features of lectures as a predictor of perceived strength of obligation of directives. Three two-way ANOVAs were run to examine the interaction effect of three pairs—structural types and disciplines (15 x 2), structural types and levels of instruction (15 x 3), structural types and levels of interactivity (15 x 3)—on predicting the perceived strength of obligation of directives. The means and standard deviations for the mean strength of obligation as a function of structural types and the situational features (discipline, level of instruction and level of interactivity) are presented in Appendix E. Results of the ANOVAs, as well as the qualitative interpretations are discussed in the following subsections.

6.3.3.1 Interaction between structural types and disciplines on predicting strength of obligation of directives. A two-factor (15 x 2) ANOVA was conducted to evaluate the effects of structural types of directives on the strength of obligation of directives across disciplines. The

two independent variables in this analysis are structural types of directives and disciplines (engineering and humanities). The dependent variable is the mean strength of obligation of directives (ranging from 0 to 3) as perceived by university students. Figure 6.22 demonstrates the mean strength of obligation across structural types and disciplines.

Figure 6.22 Mean strength of obligation across structural types and disciplines

Based on the results of the ANOVA (see Table 6.13), there is a significant interaction between structure and discipline, $F(13, 489) = 3.639$, $p = .000 < .05$, partial $\eta^2 = .088$, indicating that any differences in strength of obligation of directives in engineering and humanities are dependent upon the structural types of the directives and 9% (partial $\eta^2 = .09$) of the total variance in the strength of obligation of directives is attributed to this interaction. In addition, both main effects (structure and discipline) are also significant with 33% and 3% of effect sizes respectively. This is an interesting finding as it suggests that structural type of a directive can predict the obligation strength of it by 33%.

Table 6.13 *Two-way Analysis of Variance for Obligation Strength across Structural Types and Disciplines*

Source	SS	df	MS	F	p	Partial η^2
Structure	159.291	14	11.378	17.045	.000*	.328
Disciplines	8.966	1	8.966	13.431	.000*	.027
Structure × Disciplines	31.574	13	2.429	3.639	.000*	.088
Within (Error)	326.416	489	.668			
Total	199.825	518				

$R^2 = .393$ (Adjusted $R^2 = .359$)

* *p* value < 0.05

Figure 6.23 plots the marginal means of obligation as a function of structural types and discipline. Figure 6.23 shows that directives in engineering lectures are perceived with relatively lower obligation strength than those in humanities. This could be explained by the nature of lectures in humanities and engineering (see section 6.3.1.1 for an interpretation of the main effect of discipline on the strength of obligation of directives). This pattern is consistent across 10 different structural types—performatives, obligation modals, intention/desire verbs, conditionals, you + would/wouldn't, non-sentential declaratives, imperatives, you + imperatives, feasibility/ability modal questions, and non-modal questions. However, the difference between humanities and engineering is more extreme in some categories. For example, Figure 6.22 and 6.23 indicate a large difference in the obligation strength of directives across engineering and humanities when the directives are made of performatives, non-sentential declaratives and feasibility/ability modal questions. Since the number of directives with the last two were very low and they had occurred in the same lectures (see Appendix D for the raw and normed rates of occurrences of directives with different structural types), making any interpretations on those

might reflect the idiosyncratic styles of the speakers (teachers); thus, I will only present examples from the first category—performatives.

Estimated Marginal Means of Average Obligation
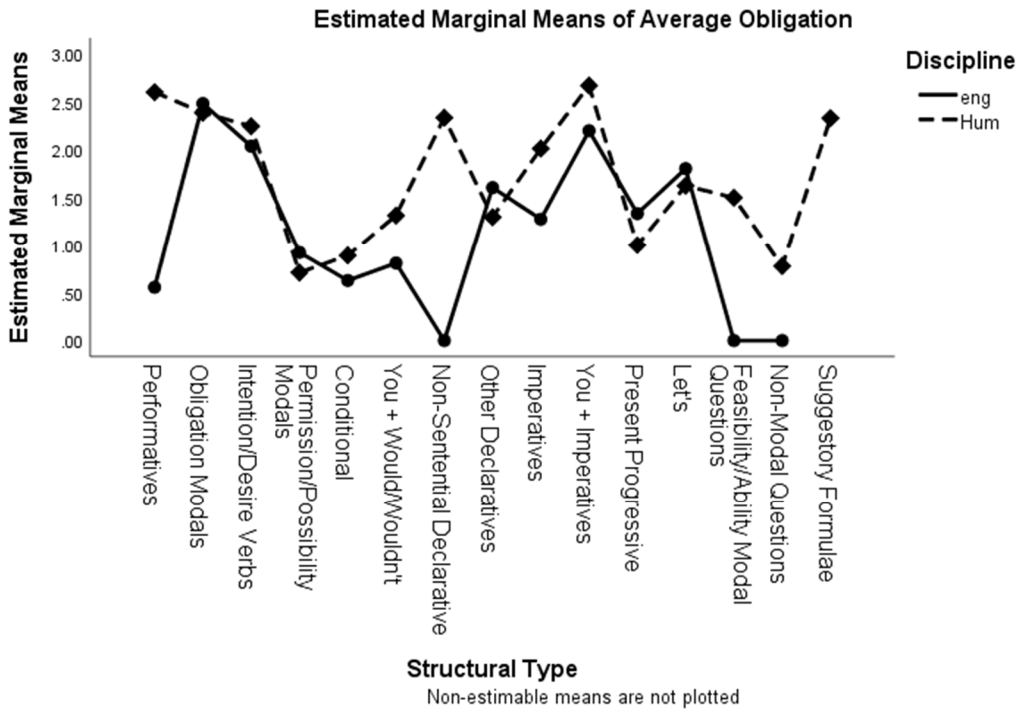
Figure 6.23 Estimated marginal means of obligation across structural types and disciplines

Excerpts 6.15 and 6.16 from humanities lectures (6.15 is an English major course and 6.16 is a History course) are reflective of the lectures in humanities, in which majority of directives are regarding the students reading or writing assignments or a review of quizzes. Not surprisingly, there is a high obligation strength attached to these directives, simply because of major course-related consequences. Often, the directives that are produced with these purposes involve clear statements of expectations which is another reason for the students to perceive them with high level of obligation. Performatives as they emerged in the data are great devices for stating clear expectations (see Excerpts 6.15 and 6.16). However, if they are used in negative forms, they lose their strength of obligation, since the task that is being asked or is expected is to ignore something or not do it. Excerpt 6.17 from a computer information systems lecture has an

example of the performatives in the negative form which is perceived with zero level of obligation.

Excerpt 6.15. humenlegrhi003
Performative; mean obligation = 3

>T: I'm not, especially not, asking for a real specific methods section. And especially with the corpus based stuff **I expect you to, understand where the, figures came from and that kind of stuff.** But, not to explain the computer programs exactly or any of that.

Excerpt 6.16. humhileudln070
Performative; Mean obligation = 3

>T: and in fact on your web page I think there's a direct link to that. any questions about the reading? OK, um, as you read **I would highly recommend that you take notes**, either in the margin, or on a separate piece of paper

Excerpt 6.17. engcsleudhn208
Performatives; mean obligation = 3

>T: um intruder detection you need to know what intruder detection is, what it does um N.C.P. packet signatures once again you need to (and) this has been on a quiz before. uh you need to know what it is. **I don't expect you to memorize the tables that have the different work station server levels.**

Another interesting pattern that emerged in the data was regarding the main effect of the structural types (regardless of the discipline) and how certain structural types are associated with certain levels of obligation. Figures 6.22 and 6.23 show that directives with obligation modals and you + imperative modals are perceived with very high obligation strength, followed by those with intention/desire verbs and imperatives with fairly high obligation level. In contrast, non-modal questions (M = .52), conditionals (M = .69), and permission/possibility modal directives (M = .80) are on the other end of the continuum, with relatively low obligations. Excerpts 6.18, 6.19, 6.20, and 6.21 present examples of each structural type.

Excerpt 6.18. engeeleldmn262

Mean obligation = 0

> T: **comments or questions about any of the homework that you couldn't figure o**ut or couldn't quite follow or . . Yeah
>
> S: on uh one twenty nine [4 syl] answer at the back of the book

Excerpt 6.19. engcsleldmn047

Mean obligation = .33

> T: and the spread sheet I handed out last time didn't break the the (parastitics) into the in part in the P. component of the (parastitics) **so if you throw away that that first page I ga**ve you last time that had the same information but it didn't have these columns right in the middle here and **replace it with this first sheet here that that would be fine**

Excerpt 6.20. engcsleldmn047

Mean obligation = 0

> T: by the way there is one structure that might that that might still be worth looking at um we didn't talk about a structure where (she) put a a (trioregion) device in for the lode introduce the [2 syl] saturation device **so it might be nice to go back and look at that structure and see what** it's what it's performance is as well . .

Excerpt 6.21. engcsleudhn208

Mean obligation = .33

*T: alright? alright (so) we're not going to go through step by step instructions. alright? so the first part of that chapter is real good, uh you might you might read uh **you might read setting up the server hardware and volume [unclear word] which is** on page thirty-eight and thirty-nine, and forty.*

Directives with non-modal questions were mostly used in non-sentential formats, such as Excerpt 6.18, and they were perceived with zero to low level of obligation. Directives with conditionals which had the second to lowest mean strength of obligation were in most cases used with mental verbs (e.g., looking) or verbs that do not involve complex work (e.g., going to the

next page). For instance, in Excerpt 6.19, the professor is asking the students to replace an old paper with the new one since the new one has some extra information. The directive is perceived with a very low strength of obligation since the task being asked does not involve any course-related consequences and the students have complete choice in doing or not doing it. Expectedly, the structural types with permission/possibility modals are perceived with low strength of obligation. The use of "might" in Excerpts 6.20 and 6.21 gives the students the option of not doing the task without being apprehended.

6.3.3.2 Interaction between structural types and levels of instruction on predicting strength of obligation of directives. A two-factor (15 x 3) ANOVA was conducted to evaluate the effects of structural types of directives on the strength of obligation of directives across levels of instruction of lectures. The two independent variables in this analysis are structural types of directives and levels of instruction (lower division, upper division, and graduate). The dependent variable is the mean strength of obligation of directives (ranging from 0 to 3) as perceived by university students. Figure 6.24 demonstrates the mean strength of obligation across structural types and levels of instruction.
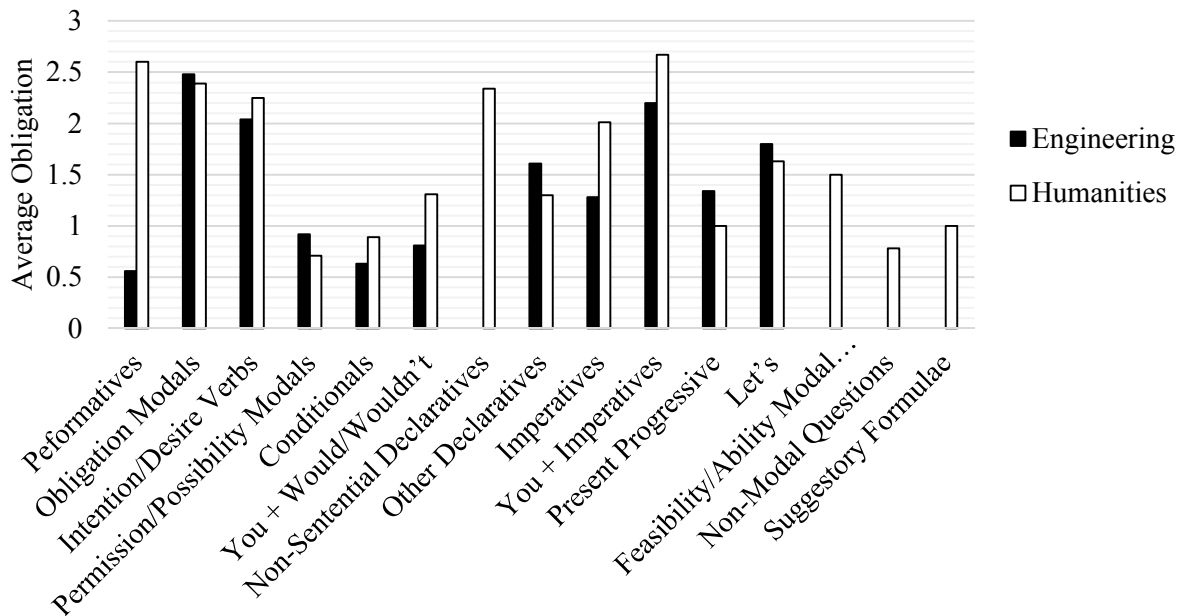

Figure 6.24 Mean strength of obligation across structural types and instruction levels

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Based on the results of the ANOVA (see Table 6.14), there is a significant interaction between structure and instruction level, $F(20, 481) = 2.608$, $p = .000 < .05$, partial $\eta^2 = .098$, indicating that any differences in strength of obligation of directives with different structural types is dependent upon the level of instruction of the lecture in which the directives occur and 10% ($\eta^2 = .10$) of the total variance in the strength of obligation of directives is attributed to this interaction. In addition, the structure main effect is also significant with 31% of effect size.

Table 6.14 *Two-way Analysis of Variance for Obligation Strength across Structural Types and Instruction Levels*

Source	SS	df	MS	F	p	Partial η^2
Structure	143.849	14	10.275	15.042	.000*	.305
Instruction Levels	2.475	2	1.237	1.812	.165	.007
Structure × Instruction	35.623	20	1.781	2.608	.000*	.098
Within (Error)	328.558	481	.683			
Total	1900.825	518				

$R^2 = .389$ (Adjusted $R^2 = .344$)
* p value < 0.05

Figure 6.25 plots the marginal means of obligation as a function of structural types and instruction levels. Figure 6.25 shows that, surprisingly, directives in graduate level lectures are perceived with slightly lower obligation strength than those in lower-division and upper-division levels across 6 structural types—obligation modals, intention/desire verbs, permission/possibility modals, other declaratives, you + imperatives, and present progressive. This is in contrast with what we might think of graduate level courses, since graduate students are expected to be highly motivated in pursuing their degree and thus, they should take directives with a more serious attitude. It should be noted, however, that the differences within the three levels is very slight. One factor affecting the obligation strength of directives in graduate level classes might be the purpose of directives in these classes. This study does not examine this factor and therefore,

further interpretations are not possible. The lower obligation in graduate level directives does not seem true for directives with performatives and imperatives.
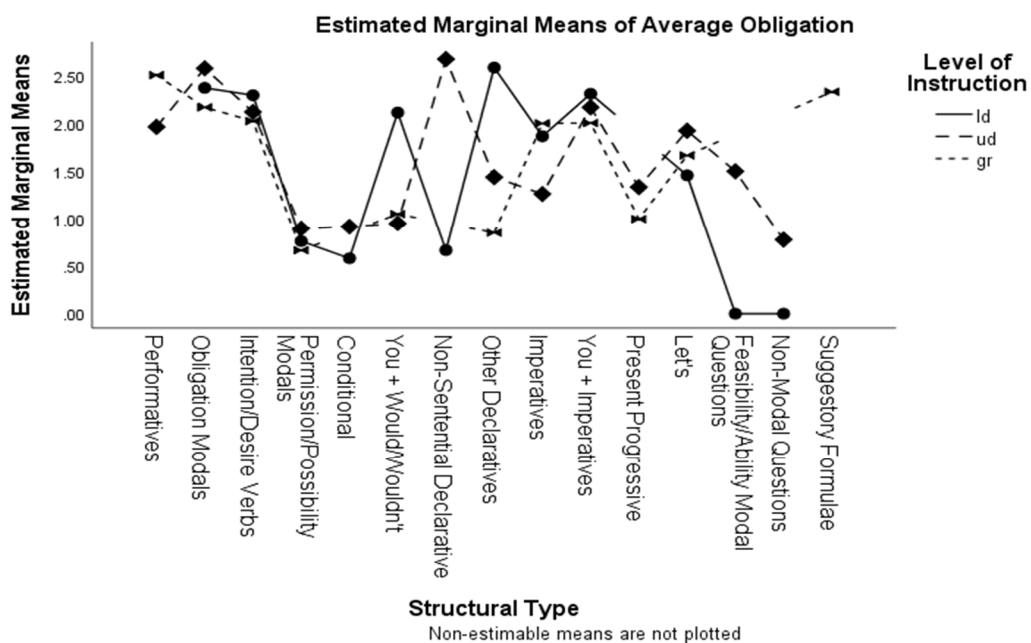
Figure 6.25 Estimated marginal means of strength of obligation across structural types and instruction levels

As for the performatives, the higher obligation strength in graduate levels is resulted by only 4 directives—three of which happened in the same text—so any interpretations should be made with a grain of salt (see Excerpts 6.22 and 6.23). In both examples in an English major graduate level lecture, the professor is trying to set the expectations for the final paper; thus, the directives are extremely clear in their statement of expectations so that there is no misunderstandings or doubts for the students in interpreting them.

Excerpt 6.22. humenlegrhi003
Mean obligation = 3

> *T: I'm not, especially not, asking for a real specific methods section. And especially with the corpus based stuff **I expect you to, understand where the, figures came from and that kind of stuff.** But, not to explain the computer programs exactly or any of that.*

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Excerpt 6.23. humenlegrhi003

Mean obligation = 2.67

> S: *What are we gonna do with (that)?*
>
> T: *Or chapter four.* **I said, be prepared with some item, concept, something, methodology that you had a question about.**

As expected by the ANOVA results (see Figure 6.25), there is little variation across many different types of structural types within instruction levels (see Appendix E for means and standard deviations of obligation strength across the structural types and levels of the situational factors). In other words, directives with obligation modals, intention/desire verbs, permission/possibility modals, you +imperatives, and let's showed very similar obligation strength within instruction levels. This suggests that these structural types could predict the strength of obligation to some extent; obligation modals, intention/desire verb and you +imperatives are associated with very high obligation levels, followed by let's structures which are associated with medium obligation and finally permission/possibility modals which are located at the opposite end of the spectrum with quite low level of obligation. Excerpts 6.24 to 6.28 provide sample directives with each of the structural types and the mean strength of obligation.

Excerpt 6.24. engcsleudhn208

Obligation modal; mean obligation = 2.67

> T: *charging customers for server usage, don't waste your time with that uh synchronizing server time uh over on page a hundred and nine once again, uh* **you should know that the four types of time servers and basically what they do**. *OK?*

Excerpt 6.25. engcsleudhn208

Intention/desire verbs; mean obligation = 3

> T: *um monitoring and optimizing server performance,* **you need to know what monitor is you know** *and some of the things that is does. but as far as specifics like when you get*

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into monitoring cash buffers, monitoring packet receive buffers, monitoring memory

usage, don't worry about that stuff.

Excerpt 6.26. engeeleldmn261

You + imperative; mean obligation = 2.67

> *T: but you make two measurements.. **you measure the open circuit voltage,** you measure*
>
> *the short circuit current.. if you know those two quantities, and you wanted to do a V - I*
>
> *relationship of the output of the circuit, here's what it would look like...*

Excerpt 6.27. humenleldhg049

Let's; mean obligation = 1.67

> *T: Or to problematic, more specifically, to the, to the reading and interpretation and the*
>
> *use to which this text could and would be put? OK? Now, **let's look at some of Civil,***
>
> ***Civil Disobedience.** I guess my favorite sentence is in fact the opening sentence. The*
>
> *gov, of government governs best that does what?*
>
> *S: governs least*

Excerpt 6.28. humenlegrhi003

Permission/possibility modals; mean obligation = 1

> *T: Uh, the only things, Carol's teaching five eleven, and I'm teaching two twenty. And So*
>
> *they [unclear remainder] That's all I It's two twenty and [unclear remainder] Gonna be*
>
> *four weeks, from June twentieth through July twentieth, or whatever. For four weeks. I*
>
> *hope it's after the stench. When does that go? I think it starts the week after we get out*
>
> *of spring semester. Then it should, yeah, it'll be after. Beginning. Yeah if you are*
>
> *interested in getting your language requirement done, in an intensive way, t**hat three***
>
> ***week Spanish intensive course may be the way to do it.** But they only offer it the first,*
>
> *one year. They don't offer the second year that way. No.*
>
> *S: Yeah.*
>
> *S: But we only need one year for, T.E.S.O.L.*
>
> *T: Oh right. I thought you needed two.*

> ***6.3.3.3 Interaction between structural types and interactivity on predicting strength of***

***obligation of directives.** A two-factor (15 x 3) ANOVA was conducted to evaluate the effects of

structural types of directives on the strength of obligation of directives across levels of interactivity. The two independent variables in this analysis are structural types of directives and levels of interactivity (low, medium, and high). The dependent variable is the mean strength of obligation of directives (ranging from 0 to 3), as perceived by university students. Figure 6.26 illustrates the mean strength of obligation across structural types and levels of interactivity.
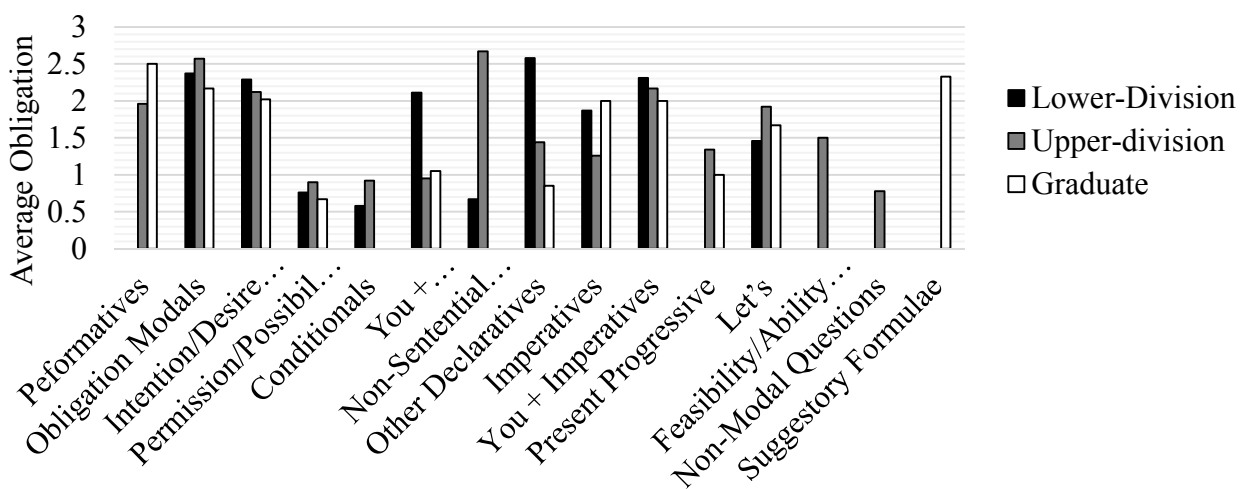
Based on the results of the ANOVA (see Table 6.15), there is no significant interaction between structure and levels of interactivity, $F (21, 480) = .629$, $p = .898 > .05$, partial $\eta^2 = .027$, showing that differences in strength of obligation of directives with different structural types is not dependent upon the level of interactivity of the lecture in which the directives occur. This is clearly shown in Figure 6.26, in which there is little variation in strength of obligation across structural types within levels of interactivity, except for only two categories—you + would/wouldn't and non-sentential directives.
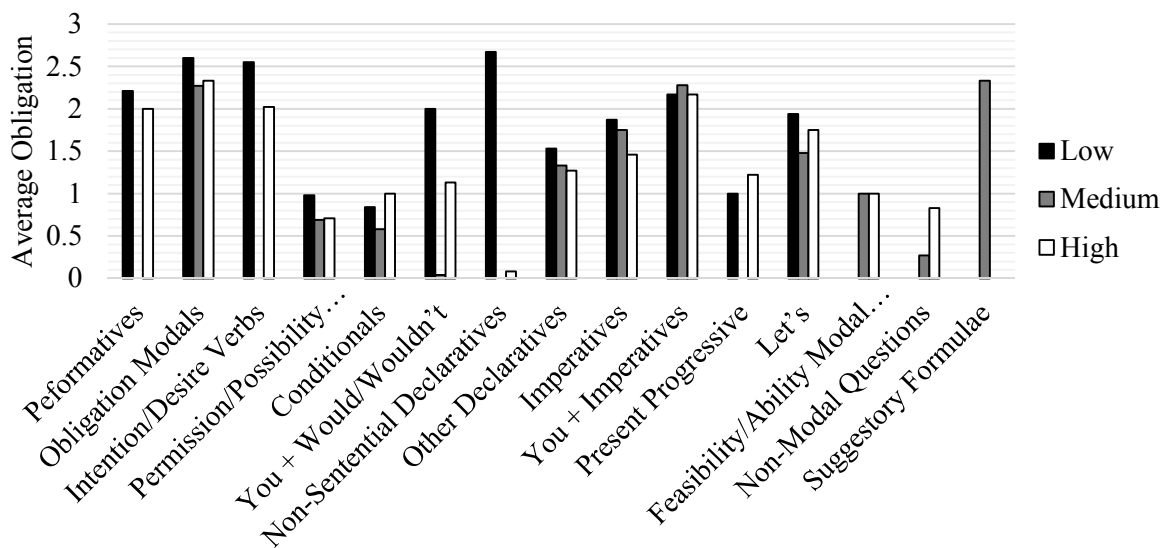
Figure 6.26 Mean strength of obligation across structural types and levels of interactivity

The variation across levels of interactivity in you + would/wouldn't and non-sentential directives sprung from the very few number of directives that were representing the mean

strength of obligation. For example, directives with non-sentential directives only occurred once in low interactivity and high interactivity and twice in medium interactivity lectures (Appendix E for normed rates of occurrences). While the "you + would/wouldn't" category had a better representativeness compared to the non-sententials, the frequencies were uneven—1 in low, 1 in medium and 21 in high interactivity lectures—therefore, comparing the means will not give us an accurate picture of what might usually happen with these structural types. Unlike the interaction effect, level of interactivity main effect—$F(2, 480) = 3.696$, $p = .026 < .05$, partial $\eta^2 = .015$—and structural type main effect—$F(14, 480) = 12.014$, $p = .000 < .05$, partial $\eta^2 = .259$—were both significant. Since we have discussed the main effect of structural types in sections 6.3.3.1 and 6.3.3.2, we will only discuss the variance in strength of obligation within levels of interactivity.

Table 6.15 *Two-way Analysis of Variance for Obligation Strength across Structural Types and Interactivity Levels*

Source	*SS*	*df*	*MS*	*F*	*p*	Partial η^2
Structure	121.364	14	8.669	12.014	.000[*]	.259
Interactivity Levels	5.333	2	2.666	3.696	.026[*]	.015
Structure × Interactivity	9.538	21	.454	.629	.898	.027
Within (Error)	346.335	480	.722			
Total	1900.825	518				

$R^2 = .356$ (Adjusted $R^2 = .307$)
* *p* value < 0.05

As it is reflected in the effect size, the interactivity level main effect only accounts for 2% of the total variance. Looking at Figure 6.27 and the means and standard deviations (Appendix E) indicates that directives in low interactivity lectures have much higher obligation levels than those in medium and high interactivity lectures. For an interpretation of the interactivity main effect and examples refer to section 6.3.1.2.
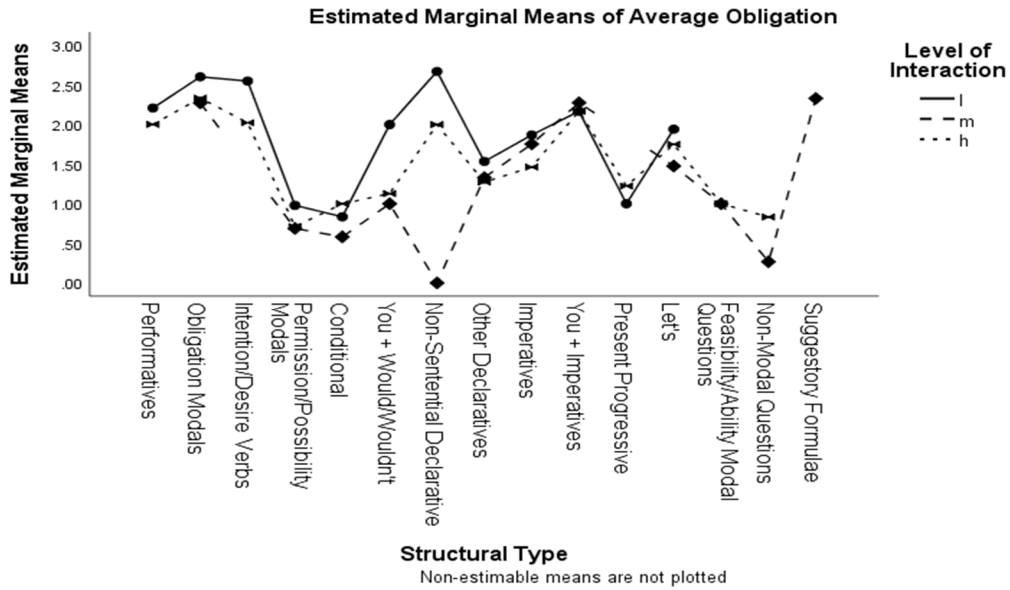
Figure 6.27 Estimated marginal means of obligation across structural types and levels of interactivity

6.3.4 RQ 3.4: interaction between structural and situational factors in predicting level of imposition. Research question 3.4 tests the extent to which the structural type interacts with situational factors as a predictor of perceived level of imposition of directives. Three two-way ANOVAs were run to examine the interaction effect of three pairs—structural types and discipline (15 x 2), structural types and level of instruction (15 x 3), structural types and level of interactivity (15 x 3)—on predicting the perceived level of imposition of directives. The means and standard deviations for the mean level of imposition as a function of structural types and the situational factors (discipline, level of instruction and level of interactivity) are presented in Appendix F. Results of the ANOVAs, as well as the qualitative interpretations are described in the following subsections.

6.3.4.1 Interaction between structural types and disciplines on predicting imposition level of directives. A two-factor (15 x 2) ANOVA was conducted to evaluate the effects of structural types of directives on the level of imposition of directives across disciplines. The two

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independent variables in this analysis are structural types of directives and disciplines (engineering and humanities). The dependent variable is the mean level of imposition of directives (ranging from 0 to 3) as perceived by university students. Figure 6.28 demonstrates the mean level of imposition across structural types and disciplines.
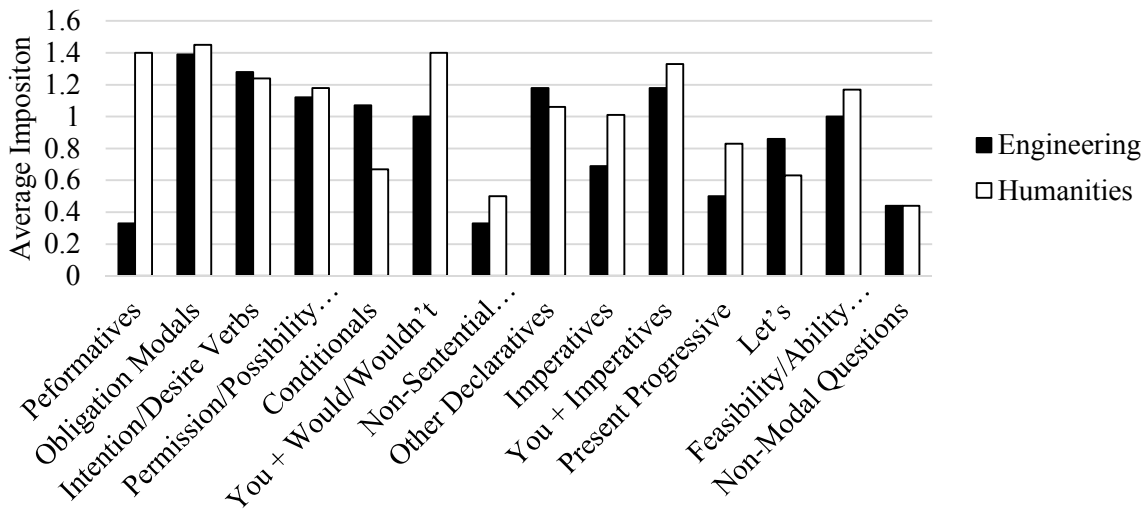
Figure 6.28 Mean level of imposition across structural types and disciplines

Based on the results of the ANOVA (see Table 6.16), there is no significant interaction effect between structure and discipline, $F (13, 489) = 1.581$, $p = .087 > .05$, partial $\eta^2 = .040$, indicating that differences in level of imposition of directives in engineering and humanities does not depend on the structural types of directives. The discipline main effect is also not significant. Structural type main effect, on the other hand, was significant with 16% of effect size, $F (14, 489) = 6.494$, $p = .000 < .05$, partial $\eta^2 = .157$. This finding suggests that structural types of a directive can predict the level of imposition of it by 16%.

Table 6.16 *Two-way Analysis of Variance for Imposition Level across Structural Types and Disciplines*

Source	SS	df	MS	F	p	Partial η^2
Structure	27.471	14	1.962	6.494	.000*	.157
Discipline	.555	1	.555	1.836	.176	.004
Structure × Discipline	6.211	13	.478	1.581	.087	.040
Within (Error)	147.760	489	.302			
Total	796.315	518				

$R^2 = .203$ (Adjusted $R^2 = .157$)
* *p* value < 0.05

Figure 6.28 plots the marginal means of imposition as a function of structural types and discipline. The plot shows that certain structural types of directives—obligation modals, intention/desire verbs, permission/possibility modals, non-sentential declaratives, other declaratives, you +imperatives, feasibility/ability modal questions, and non-modal questions—are better predictors of imposition level regardless of the discipline in which they occur. In these types of directives, mean level of imposition in engineering and humanities are either exactly similar or they have minimum variance. As shown in Figures 6.28 and 6.29, directives with obligation modals ($M = 1.42$), intention/desire verbs ($M = 1.27$), you + imperatives ($M = 1.19$), permission possibility modals ($M = 1.16$), feasibility/ability modal questions ($M = 1.11$), and other declaratives ($M = 1.10$) are perceived with medium level of imposition, while non-modal questions ($M = .44$) and non-sentential declaratives ($M = .42$) are perceived with low level of imposition.

Estimated Marginal Means of Average Imposition
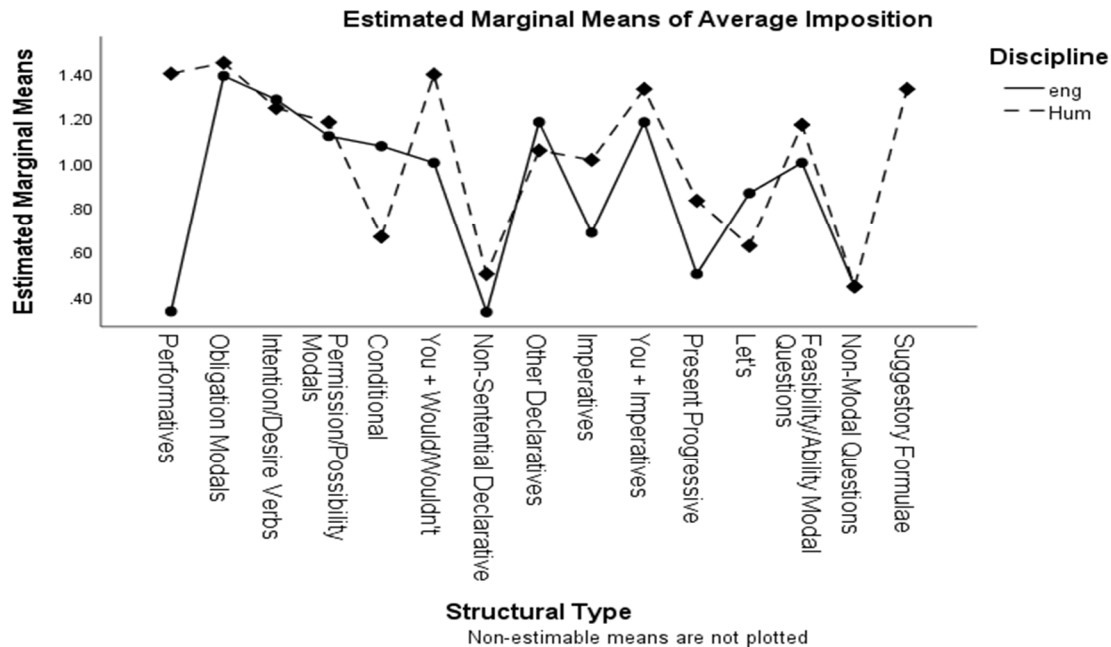
Figure 6.29 Estimated marginal means of imposition across structural types and disciplines

The following Excerpts provide examples of directives with obligation modals (Excerpt 6.29), intention/desire verbs (Excerpt 6.30), you + imperative (Excerpt 6.31), and permission/possibility modals (Excerpt 6.32) and the mean level of obligation and imposition assigned to them.

Excerpt 6.29. engcsleudhn208

Obligation modal; mean imposition = 1.67, Mean obligation = 2.67

> T: so that's just that's uh [unclear words] services D.S. services. I mean **you ought to know what D and S services are.** does anybody not know what D and S services are?

Excerpt 6.30. humenlegrhi003

Intention/desire verb, mean imposition = 1.67, Mean obligation = 2.67

> S: So is that to say then when we look at the dispreferred, we're gonna find, adverbials, as compliments less often?
>
> T: well **you're gonna need to explain why, if** the place adverbial is a compliment, the author would stick, the time adverbial between the verb and its compliment.

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Excerpt 6.31 engeeleudli022

You + imperative; mean imposition = 1; mean obligation = 2.67

> T: Let's take this line here. [4 sylls] for. OK. **You tell me, now,** if A. is equal to zero, is this transistor off or on?
>
> S: Off.

Excerpt 6.32 engcsleudhn208

Permission/possibility modals; mean imposition = 1.33; mean obligation = .33

> T: alright? alright (so) we're not going to go through step by step instructions. alright? so the first part of that chapter is real good, uh you might you might read uh **you might read setting up the server hardware and volume [unclear word] which is** on page thirty-eight and thirty-nine, and forty.

These results exposed interesting contrasts between perceived strength of obligation and imposition in relation to the structural types of directives. As previously discussed in section 6.3, overall, structural types accounted for 30% to 33% of total variance in the strength of obligation of directives, whereas in case of variance in the level of imposition, they only account for 11% to 16% of the total variance. This is an important finding, as it proposes that structural types are better predictors of obligation than imposition. Moreover, comparing the mean level of imposition of certain structural types with the strength of obligation associated with them indicates that there is no direct relationship between the obligation and imposition level of a directive. For instance, as previously seen in section 6.3.3, obligation modals, intention/desire verbs, imperatives, you + imperatives were linked with a high level of obligation, whereas the same structural types have low to medium level of imposition. In Excerpts 6.29, 6.30, and 6.31, the students feel highly obliged to do the task, but they do not feel as strongly imposed. This can be explained by the difficulty and costliness of the tasks. Conversely, in Excerpt 6.32 with permission/possibility modals, although the students do not feel obliged since they have

complete optionality in doing the task, they feel imposed due to timeliness of reading about setting up the hardware and volume.

6.3.4.2 Interaction between structural types and levels of instruction on predicting imposition level of directives. A two-factor (15 x 3) ANOVA was conducted to evaluate the effects of structural types of directives on the level of imposition of directives across levels of instruction of lectures. The two independent variables in this analysis are structural types of directives and levels of instruction (lower division, upper division, and graduate). The dependent variable is the mean level of imposition of directives (ranging from 0 to 3) as perceived by university students. Figure 6.30 demonstrates the mean level of imposition across structural types and instruction levels.
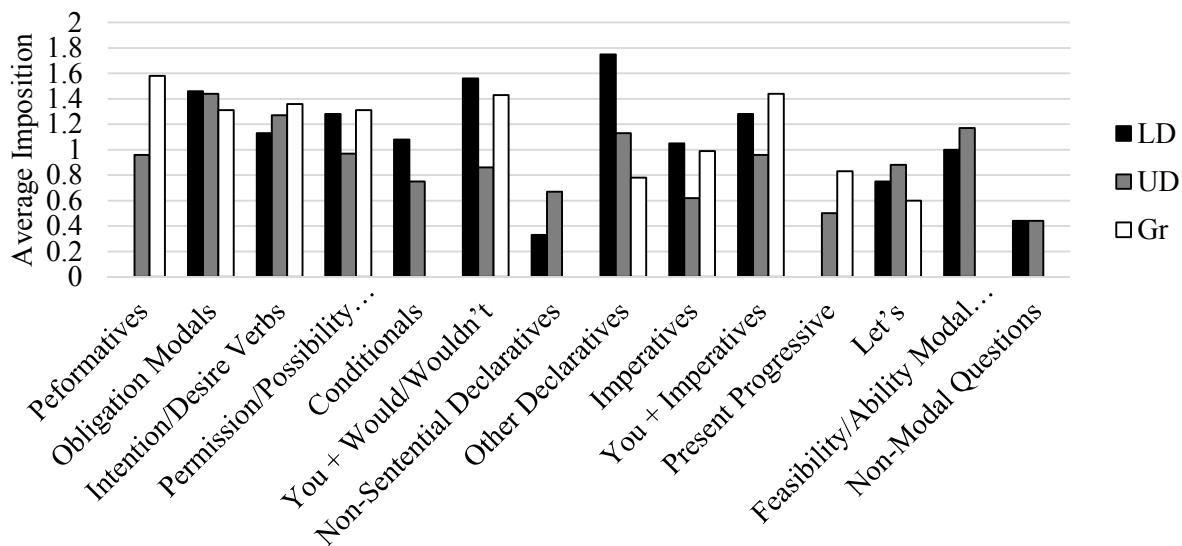
Figure 6.30 Mean level of imposition across structural types and levels of instruction

Based on the results of the ANOVA (see Table 6.17), there is a significant interaction effect between structure and instruction level, $F(20, 481) = 1.700$, $p = .030 < .05$, partial $\eta^2 = .066$, indicating that differences in level of imposition of directives across structural types depends on the instruction level in which they occurred, although with a very small effect size

(3%). The structural type main effect was also significant, $F(14, 481) = 5.321$, $p = .000 < .05$,

partial $\eta^2 = .134$. This finding says that structural type of a directive can predict the level of

imposition of it by 13%.

Table 6.17 *Two-way Analysis of Variance for Imposition Level across Structural Types and Levels of Instruction*

Source	SS	df	MS	F	p	Partial η^2
Structure	21.747	14	1.553	5.321	.000[*]	.134
Level of Instruction	1.267	2	.634	2.170	.115	.009
Structure × Instruction	9.928	20	.496	1.700	.030[*]	.066
Within (Error)	140.422	481	.292			
Total	796.941	518				

$R^2 = .242$ (Adjusted $R^2 = .186$)
* *p* value < 0.05
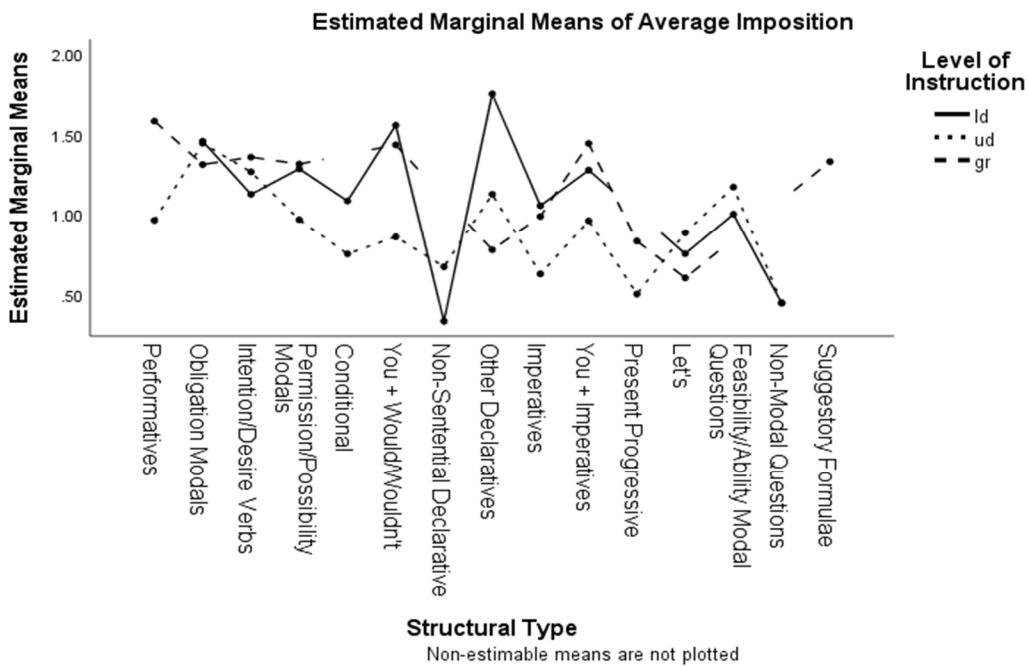
Figure 6.31 Estimated marginal means of imposition across structural types and levels of instruction

Figure 6.31 plots the marginal means of imposition as a function of structural types and

levels of instruction. The plot shows noteworthy variance in the imposition level of directives

with certain structural types—other declaratives, you + would/wouldn't, performatives, and you + imperatives—across levels of instruction (see Appendix F for means and standard deviations of level of imposition across structural types and situational features).

Analyzing directives in upper-division and graduate level lectures with performatives exposed an interesting finding; majority of directives with performatives in upper-division lectures were asking the students to do tasks such as taking notes, reading, finding sources, not plagiarizing, not using web as the main source, and not memorizing certain information. Not surprisingly, students coded these directives with zero to low medium level of imposition as the tasks are not time-consuming or costly. The presence of directives with negative forms affected the mean level of imposition in upper-division classes. Excerpt 6.33 is an example of a negative directive with performative structural form in an upper-division lecture. On the other hand, directives with performatives in graduate level lectures are getting the students to understand figures and tables, or clearly explain things in their final papers (see Excerpt 6.34).

Excerpt 6.33 engcsleudhn208
Mean imposition = 0

> *T: um intruder detection you need to know what intruder detection is, what it does um N.C.P. packet signatures once again you need to (and) this has been on a quiz before. uh you need to know what it is.* ***I don't expect you to memorize the tables that have the different work station server levels.***

Excerpt 6.34 humenlegrhi003
Mean imposition: 2.33

> *T: I'm not, especially not, asking for a real specific methods section. And especially with the corpus based stuff* ***I expect you to, understand where the, figures came from and that kind of stuff.*** *But, not to explain the computer programs exactly or any of that.*

As for the "other declarative" category, the variation across levels of instruction seems to reflect the types of tasks that were asked in the directive. Based on Figures 6.30 and 6.31, directives in lower-division lectures have strikingly higher level of imposition compared to those in graduate level lectures. This is surprising, as we might assume that graduate students are expected of more difficult and time-consuming tasks. However, we should note that this pattern only occurs with "other declaratives" and in most of the other structural categories, lower-division directives have a comparable level of imposition to graduate level directives. Also, upper-division directives have the lowest level of imposition. Excerpts 6.35, 6.36, and 6.37 offer examples of directives with "other declarative" structures in lower-division, upper-division, and graduate level lectures, respectively.

Excerpt 6.35. humenleldhg049
Lower-division; mean imposition = 3

> *T: yeah. But, um, **you're to read as many as is feasibly** possible so that you can get a feel for her. OK?*

Excerpt 6.36. humhileudln070
Upper-division; mean imposition = 2

> *T: and so one of the last, uh topic or the last requirement is to do a movie re review, **basically what you do is you go and watch a movie, and then write about how it relates to history.***

Excerpt 6.37. humenlegrhi003
Graduate, mean imposition = .33

> *S: It's in New York.*
> *S: And the hotels are really expensive, so if a bunch of students wanted to go, share a room*
> *T: [3 sylls] to bring my sleeping bag, cos it's, yeah,*
> *S: Even the cheapest one was like one thirty a night or something.*

S: How open are those two conferences to student papers? When they, do the call for papers do they,

T: very. They never know you're a student.

S: Right.

T: And, um, I presented papers when I was getting my Master's degree. Um, and, if you write a good abstract, it, yeah.

S: And, if you're presenting a paper you can get funding, to go. But just to go for yourself you don't. But if you can be on a panel, present a paper.

*T: Not much, but it helps. Yeah. Even if you don't go this year, **it's something to keep in mind for next year,** the call for papers usually comes out in, April or, March actually.*

6.3.4.3 Interaction between structural types and interactivity on predicting imposition level of directives. A two-factor (15 x 3) ANOVA was conducted to evaluate the effects of structural types of directives on the level of imposition of directives across levels of interactivity. The two independent variables in this analysis are structural types of directives and levels of interactivity (low, medium, and high). The dependent variable is the mean level of imposition of directives (ranging from 0 to 3) as perceived by university students. Figure 6.32 demonstrates the mean level of imposition across structural types and instruction levels.
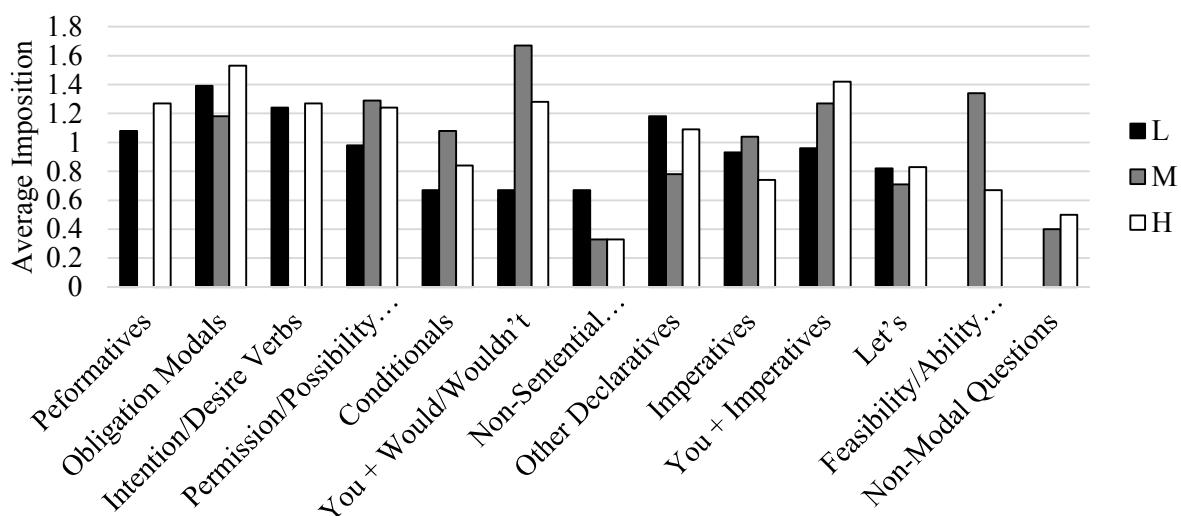
Figure 6.32 Mean level of imposition across structural types and interactivity levels

Based on the results of the ANOVA (see Table 6.18), there is no significant interaction effect between structural type and interactivity, $F(21, 480) = 1.052$, $p = .398 > .05$, partial $\eta^2 = .044$, indicating that differences in level of imposition of directives with different structural types does not depend on the interactivity of the lecture in which they occur. The interactivity main effect was also not significant. Structural type main effect, on the other hand, was significant with 11% of effect size, $F(14, 480) = 4.426$, $p = .000 < .05$, partial $\eta^2 = .114$. Since the structural type main effect has been discussed in sections 6.3.4.2 and 6.3.4.3, no more explanations will be provided in this section (see Figure 6.33 for an estimated marginal means of mean imposition across structural types and interactivity).

Table 6.18 *Two-way Analysis of Variance for Imposition Level across Structural Types and interactivity Levels*

Source	SS	df	MS	F	p	Partial η^2
Structure	19.128	14	1.366	4.426	.000*	.114
Level of Interactivity	.727	2	.363	1.177	.309	.005
Structure × Interactivity	6.821	21	.325	1.052	.398	.044
Within (Error)	148.160	480	.309			
Total	796.941	518				

$R^2 = .200$ (Adjusted $R^2 = .139$)
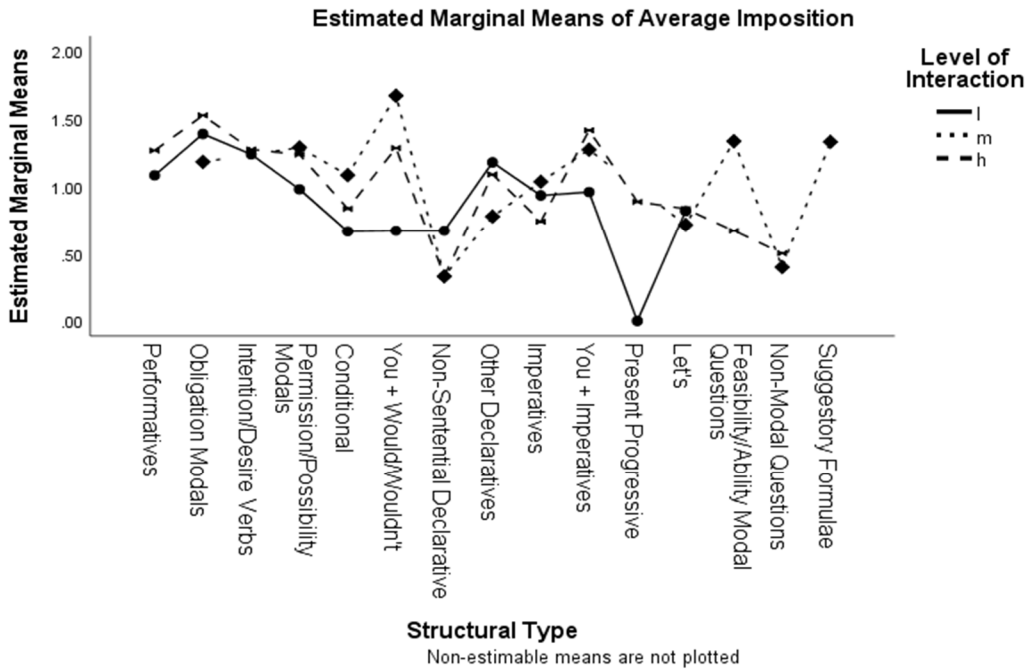
Figure 6.33 Estimated marginal means of imposition across structural types and interactivity

CHAPTER 7: CONCLUSION

7.1 Summary and Contributions of the Study

This dissertation project has attempted to explore the variation in the use of directives and their pragmatic force in lectures with respect to two main factors: structural and situational. In this section, selected findings of the study and relevant implications are discussed. Overall, structural types were found to be better predictors of the pragmatic force of directive compared to the situational factors. Regarding the structural variation of directives as a function of the obligation and imposition strength of directives, it was found that structural types are better predictors of the obligation strength rather than the imposition level of directives. This pattern was significant for certain structural types. For instance, it was found that obligation modals, as well as intention and desire verbs, and performatives are linked with clear statement of expectations and are perceived with high level of obligation from the students' perspectives. On the other hand, permission/possibility modals and feasibility/ability modal questions are on the opposite side of the spectrum, as they are perceived with a low level of obligation. These findings have important pedagogical implications. International teaching assistants (ITAs) and ITA trainers can greatly benefit from these findings. We can advise ITAs to use obligation modals, intention and desire verbs, and performative structures for significant course-related tasks with great impact and probably avoid using permission/possibility modals and feasibility/ability modal questions for assigning important tasks with course-related consequences. Another important finding of this study is that there is no direct relationship between the obligation and imposition level of a directive. For instance, structures with high level of obligation—obligation modals, intention/desire verbs, imperatives, you + imperatives— are perceived with low to medium level of imposition.

Another overall finding of the study is that imperatives, obligation modals, permission/possibility modals, and intention and desire verbs are among the most frequent structural types of directives. Imperatives which are among the most direct structural types were surprisingly perceived by the students with a medium level of obligation and a low level of imposition. Further exploration of the discourse explained this interesting finding. It was found that imperatives are highly used in engineering lectures, where the nature of discourse is procedural and requires more condensed language to cope with the fast pace of the course. These directives are used to navigate the students through mathematical analyses, an engineering software, or similar procedures; thus, they do not have immediate course-related consequences and provide students with options for future actions. There was also a low level of imposition linked to these structural types, which refers to the costliness of the tasks that were assigned using imperatives. This finding has implications for ITAs in engineering majors. Use of imperative directives could be encouraged in engineering lectures for procedural purposes.

As for the variation in pragmatic force of directives as a function of the situational factors, although the effect sizes were really small, two exploratory patterns are worth mentioning. First, directives in engineering showed a lower strength of obligation compared to those in humanities. This pattern was explained by the purpose of majority of directives in engineering. As explained above, majority of directives in engineering are used for navigating students through procedure and therefore, do not have major course-related consequences. Second, directives in low interactivity lectures showed a considerably higher obligation strength compared to the other interactivity levels. This was explained by the nature of these classrooms and the relationship between the teachers and the students. Low interactivity lectures are usually large-section classes in which the teacher is the sole speaker and there is very little engagement

of the students in class. Teachers tend to use directives which clearly state their expectations (with high obligation strength) to avoid any misunderstanding by the students.

In addition to the pedagogical contributions, this study had two major methodological contributions: (1) development of a computer program to catch lexicogrammatically explicit directives, (2) development of scales for coding pragmatic force of directives (strength of obligation and imposition) from the students' perspectives. The computer program developed for this study could be modified and used in future large scale studies of directives in various registers. This computerized technique greatly benefits large corpus-based studies by increasing coding speed. It is recommended that researchers use the program script for initial coding of large data and extracting initial findings and subsequently, analyze the extracted utterances using manual coding to increase precision and reliability. The use of scales for coding obligation and imposition strength of directives from the students' perspectives was also a success in this project, as it is believed to have captured a better understanding of directives and their pragmatic functions.

7.2 Limitations and Directions for Future Research

This section presents limitations of the study and makes suggestions for future research. This study attempted to automatically identify lexicogrammatically explicit directives. While the development of a comprehensive list of linguistic algorithms and the computer program scripts to automatically identify directives was a major methodological contribution to this area of study, it is suggested that future research accompany the automatic annotation with manual coding for achieving more precise results. In this study, precision statistics were only calculated for the functionality of the program, due to time limitations. That is, it was examined whether all the instances that the program locates match the algorithms that were given to the program.

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Analyzing the annotated data revealed that automatic annotation works better with some structural types (obligation modals) than others (e.g., permission possibility modals). Utterances with permission/possibility modals (e.g., you can) appeared in many cases as non-directives, with the meaning of ability.

One last limitation of the automatic analysis of directives in this study is inclusion of a limited set of mitigating devices (e.g., please, just, only, may, might). This was because of difficulty of finding mitigating devices that could be easily coded through automatic analysis. Further research is needed to explore the possible mitigating devices and to incorporate more of these features in the program scripts.

With respect to the pragmatic analysis of directives, one of the limitations of the current dissertation study is that the data that was used for the analysis was based on a small sample of lectures, including 14 texts, from just two of the six disciplines available in the corpus. Moreover, controlling for two other situational variables (level of instruction, and level of interactivity) with three levels each made the sample rather smaller and unbalanced for each substratum (one to three texts in each substratum). Accordingly, caution must be taken in assuming we can generalize from these findings. Linguistic patterns of directives that emerged in these texts might have resulted from individual differences, such as professors' idiosyncratic features of speech. This limitation calls for future research on larger samples, including more disciplines. It is also suggested that future studies conduct a random effects model instead of an ANOVA to account for individual differences in the data.

Another limitation is that the three pragmatic coders of this study were all senior students in humanities, while the directives were from three levels of study (freshman/sophomore, junior/senior, and graduate) and two disciplines (humanities and engineering). During the

norming sessions, coders expressed concern about their lack of familiarity with the nature of assignments in engineering lectures and level of difficulty or costs of performing the engineering tasks. This mostly affected their perception of imposition level of directives. In addition, while coding specific directive examples, the students added that their perception of obligation or imposition force of the directive might change depending on the level of instruction of the lecture. For instance, they might code the same directive with high obligation in graduate level and low/medium obligation in lower levels. In this study, the situational features of lectures were anonymous to the students based on two reasons: (1) adding more variables to coding would have complicated the coder's task, and (2) introducing these factors to coders could have affected their decisions and conflated the variables (i.e., obligation/imposition force and situational variables). Future research in this area could greatly benefit from recruiting raters from various disciplines and study levels and matching the status of the raters with the situational features of the lecture they are coding.

The independent variables that were controlled for in this study were discipline, level of instruction, and level of interactivity. Considering the size and scope of the current dissertation, it was not possible to include more variables. However, the following variables have the potential to be investigated in lectures: size of the classroom, gender of the instructor, gender of raters, location of directives in the lecture (beginning, middle, end), and course names.

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Appendix A: Breakdown of Lectures across Disciplines with Different Levels of Instruction and Interaction in T2K-SWAL

Disciplines	Instruction Level # of texts (# of words)								
	Lower Division			Upper Division			Graduate		
	L[*]	M[*]	H[*]	L	M	H	L	M	H
Business	1 (1,984)	4 (22,207)	3 (21,154)	2 (13,273)	5 (44,085)	13 (79,611)	0 (0)	4 (26,601)	4 (43,674)
Engineering	4 (20,717)	4 (26,838)	0 (0)	10 (51,562)	2 (10,978)	2 (12,844)	6 (40,868)	1 (13,439)	1 (1,025)
Humanities	2 (7,049)	2 (16,500)	6 (45,215)	5 (35,559)	5 (38,441)	2 (20,346)	1 (10,618)	2 (18,251)	6 (63,714)
Social Sciences	6 (53,607)	5 (42,970)	4 (30,200)	3 (19,213)	10 (79,296)	2 (12,830)	2 (16,753)	2 (11,786)	4 (35,491)
Natural Sciences	5 (24,595)	3 (13,165)	1 (11,941)	4 (27,384)	2 (10,284)	1 (4,390)	2 (16,982)	5 (36,530)	2 (23,158)
Education	1 (8,347)	2 (14,523)	1 (3,732)	0 (0)	1 (6,077)	3 (20,597)	0 (0)	2 (25,429)	6 (63,080)
Total across Interactivity	19 (116,299)	20 (136,203)	15 (112,242)	24 (146,991)	25 (189,161)	23 (150,618)	11 (85,221)	16 (132,036)	23 (230,142)
Total across Instruction Level	54 (364,744)			72 (486,770)			50 (447,399)		

[*]L, M, and H refer to low, medium, and high levels of interactivity respectively

Appendix B: Target Structural Types, Linguistic Patterns, and Linguistic Algorithms of Lexico-Grammatically Explicit

Directives

Imperatives	
Structural Type 1: Unmitigated Positive Imperatives	
Linguistic Pattern	**Regular Expressions**
Punctuation + base form of the verb	1) \^.\+clp\S+\s \w+ \^vb\+
Structural Type 2: Unmitigated Negative Imperatives	
Linguistic Pattern	**Regular Expressions**
Punctuation + negativizer + base form of the verb	1) \^.\+clp\S+\s do \^\S+\s n't \^\S+\s \S+\s\^vb 2) \^.\+clp\S+\s do \^\S+\s not \^\S+\s \S+\s\^vb
Structural Type 3: Mitigated Positive Imperatives	
Linguistic Pattern	**Regular Expressions**
Punctuation + please/just + base form of the verb	1) \^.\+clp\S+\s (please|just) \^\S+\s \S+ \^vb
Structural Type 4: Mitigated Negative Imperatives	
Linguistic Pattern	**Regular Expressions**
Punctuation + please/just + negativizer + base form of the verb	1) \^.\+clp\S+\s (please|just) \^\S+\s do \^\S+\s n't \^\S+\s \S+\s\^vb 2) \^.\+clp\S+\s (please|just) \^\S+\s do \^\S+\s not \^\S+\s \S+\s\^vb
Obligation Modals	
Structural Type 5: Personal Unmitigated Positive Obligation Modals	
Linguistic Pattern	**Linguistic Algorithms**
Personal subject pronoun + (will/would/be going to) + (really/also) + obligation modals	1) we|you|everyone|everybody + have|has|ought|got + to 2) we|you|everyone|everybody + really|also + have|has|ought|got + to

3) we|you|everyone|everybody + have|has|ought|got + to + really|also
4) we|you|everyone|everybody + really|also + oughta|gotta|must|should
5) we|you|everyone|everybody + oughta|gotta|must|should + really|also
6) we|you|everyone|everybody + oughta|gotta|must|should
7) we've|you've|everyone's|everybody's + got + to + really|also
8) we've|you've|everyone's|everybody's + really|also + got + to
9) we've|you've|everyone's|everybody's + got + to
10) we've|you've|everyone's|everybody's + gotta
11) we've|you've|everyone's|everybody's + really|also + gotta
12) we've|you've|everyone's|everybody's + gotta + really|also
13) we|you|everyone|everybody + have|has + really|also + got + to
14) we|you|everyone|everybody + have|has + got + to + really|also
15) we|you|everyone|everybody + have|has + got + to
16) we|you|everyone|everybody + have|has + really|also + gotta
17) we|you|everyone|everybody + have|has + gotta + really|also
18) we|you|everyone|everybody + have|has + gotta
19) we're|you're|everyone's|everybody's + really|also + going + to + have + to
20) we're|you're|everyone's|everybody's + going + to + have + to + really|also
21) we're|you're|everyone's|everybody's + going + to + have + to
22) we're|you're|everyone's|everybody's + really|also + gonna + have + to
23) we're|you're|everyone's|everybody's + gonna + have + to + really|also
24) we're|you're|everyone's|everybody's + gonna + have + to
25) we|you|everyone|everybody + is|are + really|also + going + to + have + to
26) we|you|everyone|everybody + is|are + going + to + have + to + really|also
27) we|you|everyone|everybody + is|are + going + to + have + to
28) we|you|everyone|everybody + is|are + really|also + gonna + have + to
29) we|you|everyone|everybody + is|are + gonna + have + to + really|also
30) we|you|everyone|everybody + is|are + gonna + have + to
31) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + really|also + have + to
32) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + have + to + really|also
33) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + have + to
34) we|you|everyone|everybody + will|would + have + to + really|also
35) we|you|everyone|everybody + will|would + really|also + have + to

	36) we|you|everyone|everybody + will|would + have + to
	37) you'd + better
	38) you + had + better

Structural Type 6: Personal Unmitigated Negative Obligation Modals

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + negativizer + (will/would/be going to) + (really/also) + obligation modals	1) we|you + don't|won't + really + have + to
	2) we|you + don't|won't + have + to + really
	3) we|you + don't|won't + have + to
	4) we|you + do|will|would + not + really + have + to
	5) we|you + do|will|would + not + have + to + really
	6) we|you + do|will|would + not + have + to
	7) we'll|you'll|we'd|you'd + not + really + have + to
	8) we'll|you'll|we'd|you'd + not + have + to + really
	9) we'll|you'll|we'd|you'd + not + have + to
	10) no + one + will|would + really + have + to
	11) no + one + will|would + have + to + really
	12) no + one + will|would + have + to
	13) nobody + will|would + really + have + to
	14) nobody + will|would + have + to + really
	15) nobody + will|would + have + to
	16) we|you + wouldn't + really + have + to
	17) we|you + wouldn't + have + to + really
	18) we|you + wouldn't + have + to
	19) no + one|one'll|one'd + really + has|have + to
	20) no + one|one'll|one'd + has|have + to + really
	21) no + one|one'll|one'd + has|have + to
	22) nobody|nobody'll|nobody'd + really + has|have + to
	23) nobody|nobody'll|nobody'd + has|have + to + really
	24) nobody|nobody'll|nobody'd + has|have + to
	25) we|you + really|also + must|should + not
	26) we|you + must|should + not + really
	27) we|you + must|should + not
	28) we|you + really|also + mustn't|shouldn't
	29) we|you + mustn't|shouldn't + really
	30) we|you + mustn't|shouldn't

31) no + one + must|should + really
32) no + one + must|should
33) nobody + must|should + really
34) nobody + must|should
35) we|you + ought + not + to
36) we|you + are + not + really + going + to + have + to
37) we|you + are + not + going + to + have + to + really
38) we|you + are + not + going + to + have + to
39) we|you + are + not + really + gonna + have + to
40) we|you + are + not + gonna + have + to + really
41) we|you + are + not + gonna + have + to
42) we|you|we're|you're + aren't|not + really + going + to + have + to
43) we|you|we're|you're + aren't|not + going + to + have + to + really
44) we|you|we're|you're + aren't|not + going + to + have + to
45) we|you|we're|you're + aren't|not + really|also + gonna + have + to
46) we|you|we're|you're + aren't|not + gonna + have + to + really
47) we|you|we're|you're + aren't|not + gonna + have + to
48) no + one's + really + going + to + have + to
49) no + one's + going + to + have + to + really
50) no + one's + going + to + have + to
51) no + one + is + really + going + to + have + to
52) no + one + is + going + to + have + to + really
53) no + one + is + going + to + have + to
54) no + one's + really + gonna + have + to
55) no + one's + gonna + have + to + really
56) no + one's + gonna + have + to
57) no + one + is + really + gonna + have + to
58) no + one + is + gonna + have + to + really
59) no + one + is + gonna + have + to
60) nobody's + really + going + to + have + to
61) nobody's + going + to + have + to + really
62) nobody's + going + to + have + to
63) nobody + is + really + going + to + have + to
64) nobody + is + going + to + have + to + really
65) nobody + is + going + to + have| + to
66) nobody's + really|also + gonna + have + to

	67) nobody's + gonna + have + to + really
	68) nobody's + gonna + have + to
	69) nobody + is + really + gonna + have + to
	70) nobody + is + gonna + have + to + really
	71) nobody + is + gonna + have + to
	72) you'd + better + not
	73) you + had + better + not

Structural Type 7: Personal Mitigated Positive Obligation Modals

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + (will/would/be going to/may/might) + only/just + obligation modals	1) we|you|everyone|everybody + only|just + have|has|ought + to 2) we|you|everyone|everybody + have|has|ought + to + only|just 3) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + only|just + have + to 4) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + have + to + only|just 5) we|you|everyone|everybody + will|would + only|just + have + to 6) we|you|everyone|everybody + will|would + have + to + only|just 7) we|you|everyone|everybody + may|might + only|just + have|ought + to 8) we|you|everyone|everybody + may|might + have|ought + to + only|just 9) we|you|everyone|everybody + may|might + have|ought + to 10) we|you|everyone|everybody + only|just + oughta|must|should 11) we|you|everyone|everybody + oughta|must|should + only|just 12) we|you|everyone|everybody + have|has + only|just + got + to 13) we've|you've|everyone's|everybody's + only|just + got + to 14) we|you|everyone|everybody + have|has + got + to + only|just 15) we've|you've|everyone's|everybody's + got + to + only|just 16) we|you|everyone|everybody + have|has + only|just + gotta 17) we've|you've|everyone's|everybody's + only|just + gotta 18) we|you|everyone|everybody + have|has + gotta + only|just 19) we've|you've|everyone's|everybody's + gotta + only|just 20) we|you|everyone|everybody + may|might + have + only|just + got + to 21) we|you|everyone|everybody + may|might + only|just + have + got + to 22) we|you|everyone|everybody + may|might + have + got + to + only|just 23) we|you|everyone|everybody + may|might + have + only|just + gotta 24) we|you|everyone|everybody + may|might + only|just + have + gotta

	25) we|you|everyone|everybody + may|might + have + gotta + only|just
	26) we're|you're|everyone's|everybody's + only|just + going + to + have + to
	27) we're|you're|everyone's|everybody's + going + to + have + to + only|just
	28) we're|you're|everyone's|everybody's + only|just + gonna + have + to
	29) we're|you're|everyone's|everybody's + gonna + have + to + only|just
	30) we|you|everyone|everybody + are|is + only|just + going + to + have + to
	31) we|you|everyone|everybody + are|is + going + to + have + to + only|just
	32) we|you|everyone|everybody + are|is + only|just + gonna + have + to
	33) we|you|everyone|everybody + are|is + gonna + have + to + only|just

Structural Type 8: Personal Mitigated Negative Obligation Modals

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + may/might + negativizer + obligation modals	1) we|you + may|might + not + have + to 2) no + one + may|might + have + to 3) nobody + may|might + have + to 4) we|you + may|might + not + have + got + to 5) we|you + may|might + not + have + gotta

Structural Type 9: Impersonal Unmitigated Positive Obligation Modals

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + (will/would/be going to) + (really/also) + obligation modals	1) this|these|this'll|these'll|this'd|these'd + really|also + have|has|ought + to 2) this|these|this'll|these'll|this'd|these'd + have|has|ought + to + really|also 3) this|these|this'll|these'll|this'd|these'd + have|has|ought + to 4) this|these + will|would + really|also + have + to 5) this|these + will|would + have + to + really|also 6) this|these + will|would + have + to 7) this|these + really|also + must|should|oughta 8) this|these + must|should|oughta + really|also 9) this|these + must|should|oughta 10) this|these|this's|these've + really|also + got + to 11) this|these|this's|these've + got + to + really|also 12) this|these|this's|these've + got + to 13) this|these|this's|these've + really|also + gotta 14) this|these|this's|these've + gotta + really|also 15) this|these|this's|these've + gotta

	16) this|these + has|have + really|also + got + to
	17) this|these + has|have + got + to + really|also
	18) this|these + has|have + got + to
	19) this|these + has|have + really|also + gotta
	20) this|these + has|have + gotta + really|also
	21) this|these + has|have + gotta
	22) this's|these're + really|also + going + to + have + to
	23) this's|these're + going + to + have + to + really|also
	24) this's|these're + going + to + have + to
	25) this's|these're + really|also + gonna + have + to
	26) this's|these're + gonna + have + to + really|also
	27) this's|these're + gonna + have + to
	28) this|these + is|are + really|also + going + to + have + to
	29) this|these + is|are + going + to + have + to + really|also
	30) this|these + is|are + going + to + have + to
	31) this|these + is|are + really|also + gonna + have + to
	32) this|these + is|are + gonna + have + to + really|also
	33) this|these + is|are + gonna + have + to

Structural Type 10: Impersonal Unmitigated Negative Obligation Modals

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + (will/would/be going to) + (really/also) + negativizer + obligation modals	1) this|these + doesn't|don't|won't|wouldn't + really + have + to
	2) this|these + doesn't|don't|won't|wouldn't + have + to + really
	3) this|these + doesn't|don't|won't|wouldn't + have + to
	4) this|these + will|would + not + really + have + to
	5) this|these + will|would + not + have + to + really
	6) this|these + will|would + not + have + to
	7) this'll|these'll|this'd|these'd + not + really + have + to
	8) this'll|these'll|this'd|these'd + not + have + to + really
	9) this'll|these'll|this'd|these'd + not + have + to
	10) this|these + ought + not + to
	11) this|these + really + must|should + not
	12) this|these + must|should + not + really
	13) this|these + must|should + not
	14) this|these + really + mustn't|shouldn't
	15) this|these + mustn't|shouldn't + really

16) this|these + mustn't|shouldn't
17) this's|these're + not + really + going + to + have + to
18) this's|these're + not + going + to + have + to + really
19) this's|these're + not + going + to + have + to
20) this's|these're + not + really + gonna + have + to
21) this's|these're + not + gonna + have + to + really
22) this's|these're + not + gonna + have + to
23) this|these + is|are + not + really + going + to + have + to
24) this|these + is|are + not + going + to + have + to + really
25) this|these + is|are + not + going + to + have + to
26) this|these + is|are + not + really + gonna + have + to
27) this|these + is|are + not + gonna + have + to + really
28) this|these + is|are + not + gonna + have + to
29) this|these + aren't + really + going + to + have + to
30) this|these + aren't + going + to + have + to + really
31) this|these + aren't + going + to + have + to
32) this|these + aren't + really + gonna + have + to
33) this|these + aren't + gonna + have + to + really
34) this|these + aren't + gonna + have + to

Structural Type 11: Impersonal Mitigated Positive Obligation Modals

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + (will/would/be going to/may/might) + only/just + obligation modals	1) this|these|this'll|these'll|this'd|these'd + only|just + have|has|ought + to 2) this|these|this'll|these'll|this'd|these'd + have|has|ought + to + only|just 3) this|these + will|would + only|just + have + to 4) this|these + will|would + have + to + only|just 5) this|these + may|might + only|just + have|ought + to 6) this|these + may|might + have|ought + to + only|just 7) this|these + may|might + have|ought + to 8) this|these + only|just + oughta|must|should 9) this|these + oughta|must|should + only|just 10) this|these|this's|these've + got + to + only|just 11) this|these|this's|these've + only|just + got + to 12) this|these|this's|these've + gotta + only|just 13) this|these|this's|these've + only|just + gotta 14) this|these + has|have + only|just + got + to

15) this|these + has|have + got + to + only|just
16) this|these + has|have + only|just + gotta
17) this|these + has|have + gotta + only|just
18) this's|these're + only|just + going + to + have + to
19) this's|these're + going + to + have + to + only|just
20) this's|these're + only|just + gonna + have + to
21) this's|these're +gonna + have + to + only|just
22) this|these + is|are + only|just + going + to + have + to
23) this|these + is|are + going + to + have + to + only|just
24) this|these + is|are + only|just + gonna + have + to
25) this|these + is|are + gonna + have + to + only|just
26) this|these + may|might + have + only|just + got + to
27) this|these + may|might + only|just + have + got + to
28) this|these + may|might + have + got + to + only|just
29) this|these + may|might + have + only|just + gotta
30) this|these + may|might + only|just + have + gotta
31) this|these + may|might + have + gotta + only|just

Structural Type 12: Impersonal Mitigated Negative Obligation Modals

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + may/might + negativizer + obligation modals	1) this|these + may|might + not + have + to 2) this|these + may|might + not + have + got + to 3) this|these + may|might + not + have + gotta

Intention and Desire Verbs

Structural Type 13: Personal Unmitigated Positive Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + (will/would/be going to) + (really/also) + need/want + to	1) we|you|everyone|everybody + need|needs|want|wants + to 2) we|you|everyone|everybody + really|also + need|needs|want|wants + to 3) we|you|everyone|everybody + need|needs|want|wants + to + really|also 4) we're|you're|everyone's|everybody's + really|also + going + to + need|want + to 5) we're|you're|everyone's|everybody's + going + to + need|want + to + really|also 6) we're|you're|everyone's|everybody's + going + to + need|want + to 7) we're|you're|everyone's|everybody's + really|also + gonna + need|want + to

8) we're|you're|everyone's|everybody's + gonna + need|want + to + really|also
9) we're|you're|everyone's|everybody's + gonna + need|want + to
10) we|you|everyone|everybody + is|are + really|also + going + to + need|want + to
11) we|you|everyone|everybody + is|are + going + to + need|want + to + really|also
12) we|you|everyone|everybody + is|are + going + to + need|want + to
13) we|you|everyone|everybody + is|are + really|also + gonna + need|want + to
14) we|you|everyone|everybody + is|are + gonna + need|want + to + really|also
15) we|you|everyone|everybody + is|are + gonna + need|want + to
16) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + really|also + need|want + to
17) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + need|want + to + really|also
18) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + need|want + to
19) we|you|everyone|everybody + will|would + need|want + to + really|also
20) we|you|everyone|everybody + will|would + really|also + need|want + to
21) we|you|everyone|everybody + will|would + need|want + to

Structural Type 14: Personal Unmitigated Negative Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + (will/would/be going to) + negativizer + (really/also) + need/want + to	1) we|you + don't|won't + really + need|want + to 2) we|you + don't|won't + need|want + to + really 3) we|you + don't|won't + need|want + to 4) we|you + do|will|would + not + really + need|want + to 5) we|you + do|will|would + not + need|want + to + really 6) we|you + do|will|would + not + need|want + to 7) we'll|you'll|we'd|you'd + not + really + need|want + to 8) we'll|you'll|we'd|you'd + not + need|want + to + really 9) we'll|you'll|we'd|you'd + not + need|want + to 10) no + one + will|would + really + need|want + to 11) no + one + will|would + need|want + to + really 12) no + one + will|would + need|want + to 13) nobody + will|would + really + need|want + to 14) nobody + will|would + need|want + to + really 15) nobody + will|would + need|want + to 16) we|you + wouldn't + really + need|want + to

17) we|you + wouldn't + need|want + to + really
18) we|you + wouldn't + need|want + to
19) no + one|one'll|one'd + really + need|needs|want|wants + to
20) no + one|one'll|one'd + need|needs|want|wants + to + really
21) no + one|one'll|one'd + need|needs|want|wants + to
22) nobody|nobody'll|nobody'd + really + need|needs|want|wants + to
23) nobody|nobody'll|nobody'd + need|needs|want|wants + to + really
24) nobody|nobody'll|nobody'd + need|needs|want|wants + to
25) we|you + really|also + need|want + not
26) we|you + need|want + not + really
27) we|you + need|want + not
28) we|you + are + not + really + going + to + have + to
29) we|you + are + not + going + to + need|want + to + really
30) we|you + are + not + going + to + need|want + to
31) we|you + are + not + really + gonna + need|want + to
32) we|you + are + not + gonna + need|want + to + really
33) we|you + are + not + gonna + need|want + to
34) we|you|we're|you're + aren't|not + really + going + to + need|want + to
35) we|you|we're|you're + aren't|not + going + to + need|want + to + really
36) we|you|we're|you're + aren't|not + going + to + need|want + to
37) we|you|we're|you're + aren't|not + really|also + gonna + need|want + to
38) we|you|we're|you're + aren't|not + gonna + need|want + to + really
39) we|you|we're|you're + aren't|not + gonna + need|want + to
40) no + one's + really + going + to + need|want + to
41) no + one's + going + to + need|want + to + really
42) no + one's + going + to + need|want + to
43) no + one + is + really + going + to + need|want + to
44) no + one + is + going + to + need|want + to + really
45) no + one + is + going + to + need|want + to
46) no + one's + really + gonna + need|want + to
47) no + one's + gonna + need|want + to + really
48) no + one's + gonna + need|want + to
49) no + one + is + really + gonna + need|want + to
50) no + one + is + gonna + need|want + to + really
51) no + one + is + gonna + need|want + to
52) nobody's + really + going + to + need|want + to

	53) nobody's + going + to + need|want + to + really
	54) nobody's + going + to + need|want + to
	55) nobody + is + really + going + to + need|want + to
	56) nobody + is + going + to + need|want + to + really
	57) nobody + is + going + to + need|want + to
	58) nobody's + really|also + gonna + need|want + to
	59) nobody's + gonna + need|want + to + really
	60) nobody's + gonna + need|want + to
	61) nobody + is + really + gonna + need|want + to
	62) nobody + is + gonna + need|want + to + really
	63) nobody + is + gonna + need|want + to

Structural Type 15: Personal Mitigated Positive Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + (will/would/be going to/may/might) + only/just + need/want + to	1) we|you|everyone|everybody + only|just + need|want + to 2) we|you|everyone|everybody + need|want + to + only|just 3) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + only|just + need|want + to 4) we'll|you'll|everybody'll|everyone'll|we'd|you'd|everyone'd|everybody'd + need|want + to + only|just 5) we|you|everyone|everybody + will|would + only|just + need|want + to 6) we|you|everyone|everybody + will|would + need|want + to + only|just 7) we|you|everyone|everybody + may|might + only|just + need|want + to 8) we|you|everyone|everybody + may|might + need|want + to + only|just 9) we|you|everyone|everybody + may|might + need|want + to 10) we're|you're|everyone's|everybody's + only|just + going + to + need|want + to 11) we're|you're|everyone's|everybody's + going + to + need|want + to + only|just 12) we're|you're|everyone's|everybody's + only|just + gonna + need|want + to 13) we're|you're|everyone's|everybody's + gonna + need|want + to + only|just 14) we|you|everyone|everybody + are|is + only|just + going + to + need|want + to 15) we|you|everyone|everybody + are|is + going + to + need|want + to + only|just 16) we|you|everyone|everybody + are|is + only|just + gonna + need|want + to 17) we|you|everyone|everybody + are|is + gonna + need|want + to + only|just

Structural Type 16: Personal Mitigated Negative Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + may/might + negativizer + need/want + to	1) we|you + may|might + not + need|want + to 2) no + one + may|might + need|want + to 3) nobody + may|might + need|want + to

Structural Type 17: Impersonal Unmitigated Positive Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + (will/would/be going to) + (really/also) + need + to	1) this|these|this'll|these'll|this'd|these'd + really|also + need|needs + to 2) this|these|this'll|these'll|this'd|these'd + need|needs + to + really|also 3) this|these|this'll|these'll|this'd|these'd + need|needs + to 4) this|these + will|would + really|also + need + to 5) this|these + will|would + need + to + really|also 6) this|these + will|would + need + to 7) this's|these're + really|also + going + to + need + to 8) this's|these're + going + to + need + to + really|also 9) this's|these're + going + to + need + to 10) this's|these're + really|also + gonna + need + to 11) this's|these're + gonna + need + to + really|also 12) this's|these're + gonna + need + to 13) this|these + is|are + really|also + going + to + need + to 14) this|these + is|are + going + to + need + to + really|also 15) this|these + is|are + going + to + need + to 16) this|these + is|are + really|also + gonna + need + to 17) this|these + is|are + gonna + need + to + really|also 18) this|these + is|are + gonna + need + to

Structural Type 18: Impersonal Unmitigated Negative Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + (will/would/be going to) + (really) + negativizer + need + to	1) this|these + doesn't|don't|won't|wouldn't + really + need + to 2) this|these + doesn't|don't|won't|wouldn't + need + to + really 3) this|these + doesn't|don't|won't|wouldn't + need + to 4) this|these + will|would + not + really + need + to 5) this|these + will|would + not + need + to + really 6) this|these + will|would + not + need + to 7) this'll|these'll|this'd|these'd + not + need + have + to

8) this'll|these'll|this'd|these'd + not + need + to + really
9) this'll|these'll|this'd|these'd + not + need + to
10) this|these + need + not + to
11) this's|these're + not + really + going + to + need + to
12) this's|these're + not + going + to + need + to + really
13) this's|these're + not + going + to + need + to
14) this's|these're + not + really + gonna + need + to
15) this's|these're + not + gonna + need + to + really
16) this's|these're + not + gonna + need + to
17) this|these + is|are + not + really + going + to + need + to
18) this|these + is|are + not + going + to + need + to + really
19) this|these + is|are + not + going + to + need + to
20) this|these + is|are + not + really + gonna + need + to
21) this|these + is|are + not + gonna + need + to + really
22) this|these + is|are + not + gonna + need + to
23) this|these + aren't + really + going + to + need + to
24) this|these + aren't + going + to + need + to + really
25) this|these + aren't + going + to + need + to
26) this|these + aren't + really + gonna + need + to
27) this|these + aren't + gonna + need + to + really
28) this|these + aren't + gonna + need + to

Structural Type 19: Impersonal Mitigated Positive Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + (will/would/be going to/may/might) + only/just + need + to	1) this|these|this'll|these'll|this'd|these'd + only|just + need + to 2) this|these|this'll|these'll|this'd|these'd + need + to + only|just 3) this|these + will|would + only|just + need + to 4) this|these + will|would + need + to + only|just 5) this|these + may|might + only|just + need + to 6) this|these + may|might + need + to + only|just 7) this|these + may|might + need + to 8) this's|these're + only|just + going + to + need + to 9) this's|these're + going + to + need + to + only|just 10) this's|these're + only|just + gonna + need + to 11) this's|these're +gonna + need + to + only|just 12) this|these + is|are + only|just + going + to + need + to

	13) this|these + is|are + going + to + need + to + only|just
	14) this|these + is|are + only|just + gonna + have + to
	15) this|these + is|are + gonna + need + to + only|just

Structural Type 20: Impersonal Mitigated Negative Intention and Desire Verbs

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + may/might + negativizer + need + to	1) this|these + may|might + not + need + to

Permission/Suggestion/Possibility Modals

Structural Type 21: Personal Positive Permission/Suggestion/Possibility Modals

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + permission/suggestion/possibility modals	1) you|we + can|could|might

Structural Type 22: Personal Negative Permission/Suggestion/Possibility Modals

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + permission/suggestion/possibility modals + negativizer	1) you|we + cannot|can't|couldn't 2) you|we + can|could|might + not

Structural Type 23: Impersonal Positive Permission/Suggestion/Possibility Modals

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + (will/would/might) + be + due/nice + (to/if)	1) This|these + will + be + due 2) This'll|these'll + be + due 3) Might + be + nice + to 4) That|it + would + be + nice + to|if 5) That'd|it'd + be + nice + to|if

Directive Vocabulary

Structural Type 24: Personal Positive Directive Vocabulary

Linguistic Pattern	Linguistic Algorithms
Personal subject pronoun + (will/be verb) + directive vocabulary	1) I + expect|suggest|recommend 2) I + will|woud + expect|suggest|recommend 3) I + encourage|discourage + you + to|from 4) I + will|would + encourage|discourage + you + to|from 5) I + am + asking + you + to 6) you + will + be + required + to 7) you'll + be + required + to 8) You|students|everyone|everybody + are|is + expected + to 9) You're|everyone's|everybody's + expected + to

Structural Type 25: Personal Negative Directive Vocabulary

Linguistic Pattern	Linguistic Algorithms
Personal pronoun + (will/would/am/are) + negativizer + directive vocabulary	1) I + don't|won't|wouldn't + expect|suggest|recommend 2) I + do|will|would + not + expect|suggest|recommend 3) I + don't|won't|wouldn't + encourage|discourage + you + to|from 4) I + do|will|would + not + encourage|discourage + you + to|from 5) I + am + not + asking + you + to 6) I'm + not + asking + you + to 7) you + will + not + be + required + to 8) you'll + not + be + required + to 9) you + won't + be + required + to 10) You|students + are + not + expected + to 11) You're|students're + not + expected + to 12) You|students + aren't + expected + to 13) No + one + is + expected + to 14) No + one's + expected + to 15) Nobody + is + expected + to 16) Nobody's + expected + to

Structural Type 26: Impersonal Positive Directive Vocabulary

Linguistic Pattern	Linguistic Algorithms

| Impersonal subject pronoun + is + words of necessity + to | 1) it + is + necessary\|essential\|important\|vital + to
2) it's + necessary\|essential\|important\|vital + to |

Structural Type 27: Impersonal Negative Directive Vocabulary

Linguistic Pattern	Linguistic Algorithms
Impersonal subject pronoun + is + negativizer + words of necessity + to	1) it + is + not + necessary|essential|important|vital + to 2) it's + not + necessary|essential|important|vital + to 3) it + isn't + necessary|essential|important|vital + to

Appendix C: Descriptive Statistics and Significance Testing of the Distribution of Directives with Various Structural Types across Disciplines, levels of Instruction and Levels of Interactivity (RQ 1)

Table C1. Means and Standard Deviations of 16 Structural Types of Directives across Situational Features

	Type 1: Unmitigated Positive Imperative								
	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	3.07 (-)	4.35 (3.77)	4.70 (3.16)	.99 (.39)	4.74 (4.44)	8.38 (4.70)	N/A	5.10 (6.86)	5.10 (1.61)
Education	6.27 (-)	13.62 (14.69)	4.16 (-)	N/A	6.56 (-)	10.45 (4.88)	N/A	19.26 (2.12)	7.68 (5.45)
Engineering	3.94 (2.41)	7.88 (2.75)	N/A	4.42 (5.69)	6.63 (4.99)	316.10 (440.32)	1.97 (2.04)	8.46 (-)	0 (-)
Humanities	12.60 (13.25)	.99 (1.40)	4.05 (2.59)	1.17 (1.68)	1.60 (3.04)	7.36 (2.82)	0 (-)	.40 (.57)	10.12 (15.01)
Natural Sciences	.78 (1.08)	1.40 (1.22)	4.70 (-)	1.87 (1.82)	1.89 (2.47)	N/A	1.73 (2.44)	1.24 (.30)	.96 (.40)
Social Sciences	.11 (.24)	1.86 (1.40)	6.44 (4.93)	.35 (.61)	3.15 (5.80)	2.53 (1.76)	0 (0)	0 (0)	.67 (.96)
Total	3.54 (6.35)	4.58 (5.59)	4.93 (3.20)	2.50 (4.00)	3.40 (4.61)	37.33 (135.29)	1.39 (1.87)	4.87 (7.14)	5.70 (8.37)
	Type 2: Unmitigated Negative Imperative								
	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	.64 (1.27)	0 (0)	0 (0)	0 (0)	0 (0)	N/A	.70 (1.39)	.70 (.68)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (-)	0 (0)	N/A	0 (0)	.85 (1.44)
Engineering	0 (0)	.23 (.46)	N/A	0 (0)	0 (0)	.95 (1.34)	0 (0)	0 (-)	0 (-)
Humanities	0 (0)	0 (0)	0 (0)	.84 (.86)	0 (0)	1.01 (1.42)	0 (-)	0 (0)	.33 (.80)
Natural Sciences	.17 (.38)	0 (0)	0 (-)	0 (0)	.74 (.78)	N/A	0 (0)	.14 (.29)	0 (0)
Social Sciences	0 (0)	0 (0)	.93 (1.85)	0 (0)	.07 (.22)	0 (0)	0 (0)	0 (0)	0 (0)
Total	.04 (.19)	.17 (.59)	.26 (.99)	.17 (.49)	.11 (.34)	.19 (.59)	0 (0)	.22 (.72)	.44 (.89)
	Type 3: Mitigated Positive Imperative								
	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	.48 (.96)	0 (0)	0 (0)	.55 (.5)	.47 (1.00)	N/A	0 (0)	.42 (.59)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (-)	0 (0)	N/A	10.38 (14.68)	.07 (.18)
Engineering	1.01 (1.16)	0 (0)	.50 (.93)	.14 (.45)	0 (0)	0 (0)	0 (0)	0 (-)	0 (-)
Humanities	.70 (1.21)	0 (0)	0 (0)	1.88 (3.56)	0 (0)	0 (0)	0 (-)	0 (0)	.82 (2.01)

	Low	Medium	High	Low	Medium	High	Low	Medium	High
Natural Sciences	.17 (.38)	0 (0)	0 (-)	0 (0)	0 (0)	N/A	0 (0)	.14 (.29)	.65 (.04)
Social Sciences	0 (0)	0 (0)	0 (0)	0 (0)	.06 (.19)	0 (0)	0 (0)	0 (0)	.16 (.33)
Total	.37 (.77)	.10 (.43)	0 (0)	.43 (1.65)	.12 (.32)	.27 (.78)	0 (0)	1.42 (5.35)	.39 (1.03)

Type 5: Personal Unmitigated Positive Obligation Modals

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	3.07 (-)	7.41 (3.13)	3.61 (1.05)	13.65 (.31)	13.39 (7.92)	7.14 (5.22)	N/A	8.90 (6.81)	9.60 (3.81)
Education	13.33 (-)	10.02 (14.16)	0 (-)	N/A	0 (-)	2.93 (2.63)	N/A	2.54 (3.59)	7.66 (7.34)
Engineering	6.67 (2.77)	6.72 (1.57)	N/A	11.32 (6.96)	1.55 (2.19)	24.36 (21.02)	7.21 (8.17)	5.64 (-)	25.57 (-)
Humanities	6.22 (5.50)	5.30 (1.90)	9.83 (2.01)	9.80 (9.44)	4.46 (3.74)	7.52 (5.89)	16.88 (-)	3.85 (2.04)	6.17 (6.93)
Natural Sciences	6.95 (3.62)	6.77 (.80)	9.41 (-)	5.08 (3.70)	27.74 (16.15)	N/A	9.36 (2.51)	5.60 (1.93)	4.91 (1.67)
Social Sciences	4.03 (2.11)	6.34 (3.41)	6.60 (5.98)	4.35 (2.56)	2.97 (2.90)	12.16 (8.11)	2.91 (3.05)	5.82 (3.75)	10.66 (14.83)
Total	6.14 (3.66)	6.96 (4.08)	6.84 (4.43)	9.12 (6.77)	6.60 (8.28)	8.69 (8.66)	7.70 (6.97)	5.87 (4.21)	8.71 (8.36)

Type 6: Personal Unmitigated Negative Obligation Modals

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	1.75 (2.40)	.96 (.84)	1.06 (1.50)	.94 (.63)	.80 (1.28)	N/A	.68 (.46)	.57 (.83)
Education	3.14 (-)	.65 (.91)	0 (-)	N/A	0 (-)	.35 (.61)	N/A	0 (0)	.62 (.80)
Engineering	1.59 (3.19)	.95 (.77)	N/A	.58 (1.00)	0 (0)	0 (0)	.56 (.66)	.94 (-)	0 (-)
Humanities	1.10 (1.91)	1.11 (1.56)	1.50 (1.60)	.20 (.46)	2.60 (3.01)	2.34 (3.30)	8.44 (-)	1.47 (.21)	.97 (1.08)
Natural Sciences	.44 (.98)	0 (0)	1.05 (-)	.55 (.78)	.87 (1.51)	N/A	2.47 (1.39)	.76 (1.51)	.99 (.52)
Social Sciences	.26 (.37)	1.05 (1.50)	1.22 (2.05)	1.17 (2.02)	.32 (.71)	1.76 (1.15)	.38 (.53)	0 (0)	.51 (1.02)
Total	.86 (1.72)	.98 (1.39)	.17 (1.42)	.61 (1.02)	.88 (1.62)	.90 (1.40)	1.59 (2.49)	.64 (.87)	.68 (.85)

Type 7: Personal Mitigated Positive Obligation Modals

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	.82 (1.64)	0 (0)	0 (0)	.34 (.49)	.32 (.49)	N/A	.49 (.98)	0 (0)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (-)	0 (0)	N/A	0 (0)	1.09 (1.70)
Engineering	.27 (.53)	.44 (.51)	N/A	.23 (.48)	0 (0)	0 (0)	.30 (.46)	0 (-)	0 (-)
Humanities	0 (0)	0 (0)	0 (0)	.63 (.92)	.49 (.76)	0 (0)	8.44 (-)	0 (0)	7.15 (16.11)
Natural Sciences	.52 (1.16)	.67 (1.17)	0 (-)	.32 (.72)	.44 (.76)	N/A	.37 (.52)	0 (0)	.31 (.44)
Social Sciences	.15 (.34)	.14 (.31)	0 (0)	0 (0)	0 (0)	.64 (.91)	0 (0)	0 (0)	0 (0)

	Low	Medium	High	Low	Medium	High	Low	Medium	High
Total	.23 (.64)	.39 (.85)	0 (0)	.28 (.60)	.20 (.47)	.24 (.46)	1.00 (2.50)	.13 (.51)	2.09 (8.14)

Type 9: Impersonal Unmitigated Positive Obligation Modals

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	.24 (.48)	0 (0)	.36 (.50)	.52 (.59)	.31 (.59)	N/A	.23 (.45)	0 (0)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (-)	0 (0)	N/A	0 (0)	0 (0)
Engineering	1.01 (1.16)	.23 (.47)	N/A	.33 (1.03)	0 (0)	.48 (.67)	.20 (.48)	0 (-)	0 (-)
Humanities	.55 (.95)	0 (0)	.13 (.29)	0 (0)	0 (0)	0 (0)	0 (-)	0 (0)	0 (0)
Natural Sciences	.25 (.56)	0 (0)	1.57 (-)	0 (0)	.44 (.76)	N/A	.37 (.52)	1.14 (2.27)	.31 (.44)
Social Sciences	.15 (.34)	0 (0)	0 (0)	0 (0)	.23 (.44)	0 (0)	.38 (.53)	0 (0)	.15 (.30)
Total	.41 (.74)	.09 (.29)	.16 (.44)	.16 (.66)	.24 (.45)	.22 (.49)	.24 (.43)	.36 (1.18)	.05 (.17)

Type 13: Personal Unmitigated Positive Intention and Desire Verbs

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	6.13 (-)	6.10 (3.88)	9.59 (3.10)	8.00 (8.31)	8.92 (6.67)	5.53 (3.92)	N/A	3.94 (1.99)	7.66 (4.88)
Education	7.84 (-)	3.23 (4.57)	0 (-)	N/A	0 (-)	15.40 (18.31)	N/A	6.34 (8.97)	9.58 (8.66)
Engineering	8.31 (4.56)	8.39 (3.53)	N/A	8.60 (5.78)	6.63 (4.99)	15.66 (22.14)	5.38 (2.67)	6.58 (-)	8.52 (-)
Humanities	8.84 (4.52)	1.11 (1.56)	7.28 (5.96)	4.65 (3.68)	4.49 (2.14)	8.52 (4.47)	25.32 (-)	5.03 (5.98)	5.48 (6.18)
Natural Sciences	7.84 (5.86)	7.78 (4.44)	3.14 (-)	5.26 (6.73)	3.66 (.46)	N/A	5.28 (3.26)	1.87 (1.59)	4.29 (2.55)
Social Sciences	1.73 (1.41)	2.42 (1.48)	5.06 (2.00)	.62 (1.08)	3.74 (2.46)	1.58 (.42)	1.46 (1.00)	7.06 (9.98)	4.14 (5.47)
Total	6.40 (4.73)	5.10 (3.96)	6.33 (4.53)	6.14 (5.70)	4.90 (3.99)	7.81 (9.45)	6.46 (6.80)	4.44 (4.54)	6.76 (6.12)

Type 14: Personal Unmitigated Negative Intention and Desire Verbs

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	.23 (.46)	0 (0)	.36 (.50)	1.02 (1.22)	.36 (.66)	N/A	.23 (.45)	1.17 (1.08)
Education	0 (-)	.33 (.46)	0 (-)	N/A	0 (-)	1.76 (3.04)	N/A	0 (0)	.77 (.92)
Engineering	1.04 (.87)	1.64 (3.28)	N/A	.27 (.85)	0 (0)	4.27 (6.04)	.42 (.78)	0 (-)	0 (-)
Humanities	1.65 (2.86)	0 (0)	1.21 (.77)	.62 (.92)	.76 (.84)	0 (0)	0 (-)	0 (0)	1.14 (2.37)
Natural Sciences	0 (0)	.88 (1.52)	1.57 (-)	.38 (.53)	.52 (.90)	N/A	.37 (.52)	0 (0)	.34 (.48)
Social Sciences	.13 (.30)	.57 (.94)	0 (0)	.29 (.50)	.57 (.61)	.47 (.66)	0 (0)	0 (0)	.51 (1.02)
Total	.51 (1.21)	.68 (1.57)	.55 (.79)	.37 (.71)	.62 (.79)	.91 (2.13)	.30 (.60)	.06 (.23)	.83 (1.37)

Type 15: Personal Mitigated Positive Intention and Desire Verbs

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	.65 (.80)	.88 (1.52)	1.26 (1.78)	.11 (.24)	.32 (.60)	N/A	0 (0)	.24 (.54)
Education	0 (-)	.97 (1.37)	0 (-)	N/A	0 (-)	0 (0)	N/A	0 (0)	.07 (.18)
Engineering	1.07 (1.23)	1.53 (1.94)	N/A	.35 (.56)	0 (0)	4.27 (6.04)	.10 (.24)	0 (-)	0 (-)
Humanities	1.65 (2.86)	0 (0)	1.11 (1.28)	0 (0)	.35 (.49)	0 (0)	0 (-)	.40 (.57)	1.46 (1.66)
Natural Sciences	0 (0)	.44 (.76)	1.05 (-)	.32 (.71)	0 (0)	N/A	.69 (.98)	0 (0)	1.02 (1.44)
Social Sciences	.15 (.34)	0 (0)	.18 (.36)	.29 (.50)	.07 (.22)	0 (0)	0 (0)	.80 (1.12)	0 (0)
Total	.53 (1.27)	.60 (1.09)	.71 (1.05)	.34 (.67)	.11 (.28)	.59 (1.88)	.18 (.43)	.16 (.45)	.52 (1.06

Type 21: Personal Positive Permission/Suggestion/Possibility Modals

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	22.70 (25.38)	16.21 (6.51)	9.28 (1.13)	12.77 (4.83)	18.03 (10.34)	N/A	22.60 (9.68)	15.92 (6.54)
Education	12.54 (-)	6.46 (9.14)	12.48 (-)	N/A	13.13 (-)	33.44 (24.51)	N/A	40.83 (28.38)	16.96 (9.35)
Engineering	11.90 (4.33)	19.73 (6.53)	N/A	23.55 (12.54)	29.12 (26.83)	9.49 (13.42)	31.26 (7.59)	20.68 (-)	8.52 (-)
Humanities	13.53 (8.28)	7.77 (1.60)	24.34 (13.09)	17.12 (9.23)	16.88 (9.21)	7.01 (9.91)	16.88 (-)	14.23 (1.44)	16.44 (15.97)
Natural Sciences	17.57 (11.18)	22.60 (9.46)	16.72 (-)	20.86 (5.14)	20.06 (4.22)	N/A	25.63 (3.71)	24.77 (4.56)	11.48 (4.81)
Social Sciences	12.93 (4.48)	13.80 (7.77)	15.36 (6.96)	7.92 (7.95)	10.68 (5.83)	16.09 (11.87)	16.93 (2.43)	17.02 (3.89)	14.31 (5.71)
Total	13.33 (7.64)	16.75 (13.11)	18.64 (9.53)	18.71 (10.77)	14.71 (9.31)	18.19 (13.97)	26.32 (8.49)	23.62 (12.07)	15.36 (9.58)

Type 22: Personal Negative Permission/Suggestion/Possibility Modals

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	3.07 (-)	1.51 (1.76)	1.26 (1.32)	4.44 (2.72)	1.79 (1.42)	1.51 (1.93)	N/A	1.13 (1.14)	1.24 (.84)
Education	.78 (-)	.65 (.91)	0 (-)	N/A	0 (-)	.96 (.92)	N/A	1.27 (1.80)	1.78 (2.51)
Engineering	1.59 (3.19)	2.53 (1.98)	N/A	1.62 (1.50)	21.08 (27.62)	21.98 (24.38)	2.81 (1.69)	.94 (-)	0 (-)
Humanities	1.39 (2.41)	.99 (1.40)	1.83 (.99)	.78 (1.43)	2.70 (2.70)	.34 (.47)	0 (-)	8.52 (2.70)	3.21 (3.96)
Natural Sciences	3.07 (1.97)	4.95 (2.41)	1.57 (-)	1.37 (1.66)	.96 (.84)	N/A	3.21 (.34)	4.51 (4.29)	.34 (.48)
Social Sciences	1.02 (1.89)	2.08 (2.23)	2.27 (1.74)	1.91 (2.45)	2.44 (2.53)	.47 (.66)	2.23 (2.13)	4.41 (1.75)	.78 (.92)
Total	1.84 (2.19)	2.23 (2.15)	1.69 (1.28)	1.66 (1.81)	3.49 (7.71)	3.17 (8.44)	2.52 (1.64)	3.46 (3.46)	1.66 (2.47)

Type 23: Impersonal Positive Permission/Suggestion/Possibility Modals

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High

	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	0 (0)	0 (0)	0 (0)	.12 (.27)	.11 (.38)	N/A	0 (0)	0 (0)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (-)	0 (0)	N/A	0 (0)	0 (0)
Engineering	0 (0)	0 (0)	N/A	0 (0)	0 (0)	.95 (1.34)	.13 (.32)	0 (-)	0 (-)
Humanities	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (-)	0 (0)	0 (0)
Natural Sciences	0 (0)	0 (0)	0 (-)	0 (0)	0 (0)	N/A	0 (0)	0 (0)	0 (0)
Social Sciences	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	0 (0)	0 (0)	0 (0)	0 (0)	.02 (.12)	.15 (.49)	.07 (.24)	0 (0)	0 (0)

Type 24: Personal Positive Directive Vocabulary

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	0 (0)	0 (0)	0 (0)	.50 (.70)	.24 (.45)	N/A	.21 (.42)	.29 (.66)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (0)	2.40 (2.56)	N/A	2.54 (3.59)	.45 (1.11)
Engineering	0 (0)	0 (0)	N/A	.51 (.74)	.78 (1.10)	0 (0)	.29 (.45)	0 (-)	0 (-)
Humanities	0 (0)	0 (0)	.13 (.29)	.64 (1.44)	.20 (.46)	1.17 (1.65)	0 (-)	.40 (.57)	.15 (.37)
Natural Sciences	1.11 (1.58)	.36 (.63)	.52 (-)	.16 (.35)	0 (0)	N/A	0 (0)	.14 (.29)	.31 (.44)
Social Sciences	0 (0)	.35 (.50)	3.56 (7.12)	0 (0)	0 (0)	0 (0)	0 (0)	1.41 (1.99)	1.02 (2.04)
Total	.29 (.90)	.14 (.36)	1.10 (3.79)	.36 (.80)	.19 (.47)	.59 (1.25)	.16 (.35)	.67 (1.43)	.41 (1.01)

Type 25: Personal Negative Directive Vocabulary

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	N/A	0 (0)	0 (0)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (-)	0 (0)	N/A	0 (0)	0 (0)
Engineering	0 (0)	0 (0)	N/A	0 (0)	0 (0)	.48 (.67)	0 (0)	0 (-)	0 (-)
Humanities	0 (0)	.50 (.70)	0 (0)	0 (0)	.20 (.46)	0 (0)	0 (-)	0 (0)	.15 (.37)
Natural Sciences	.52 (1.16)	.36 (.63)	0 (-)	0 (0)	0 (0)	N/A	0 (0)	.14 (.29)	0 (0)
Social Sciences	0 (0)	.14 (.31)	0 (0)	0 (0)	.07 (.22)	0 (0)	0 (0)	0 (0)	.51 (1.02)
Total	0.14 (.59)	.14 (.34)	0 (0)	0 (0)	.06 (.24)	.05 (.21)	0 (0).	.04 (.15)	.12 (.45)

Type 26: Impersonal Positive Directive Vocabulary

	Lower Division			Upper Division			Graduate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Business	0 (-)	0 (0)	.39 (.67)	0 (0)	0 (0)	0 (0)	N/A	0 (0)	0 (0)
Education	0 (-)	0 (0)	0 (-)	N/A	0 (-)	0 (0)	N/A	0 (0)	.39 (.96)

Engineering	0 (0)	0 (0)	N/A	.52 (1.34)	0 (0)	0 (0)	0 (0)	0 (-)	0 (-)
Humanities	0 (0)	0 (0)	0 (0)	.22 (.49)	.14 (.32)	0 (0)	0 (-)	0 (0)	0 (0)
Natural Sciences	.34 (.75)	0 (0)	0 (-)	.16 (.36)	0 (0)	N/A	1.09 (.56)	0 (0)	0 (0)
Social Sciences	0 (0)	0 (0)	0 (0)	0 (0)	.12 (.40)	.64 (.91)	.73 (1.03)	1.41 (1.99)	0 (0)
Total	.09 (.39)	0 (0)	.08 (.31)	.28 (.88)	.08 (.29)	.06 (.28)	.33 (.60)	.19 (.73)	.10 (.48)

Table C2. ANOVAs between the 16 Structural Types and the Situational Features

Source of variation		SS	*df*	MS	*F*	*p*	Partial η²
Discipline * Interactivity	imp_unmtg_pos	83469.374	10	8346.937	4.871	0.000*	0.255
	imp_unmtg_neg	3.542	10	0.354	0.984	0.460	0.065
	imp_mtg_pos	77.299	10	7.730	2.813	0.003	0.165
	obl_prsn_unmtg_pos	1193.909	10	119.391	3.009	0.002*	0.175
	obl_prsn_unmtg_neg	15.635	10	1.564	0.788	0.640	0.053
	obl_prsn_mtg_pos	21.257	10	2.126	0.215	0.995	0.015
	obl_imprsn_unmitig_pos	2.174	10	0.217	0.631	0.785	0.043
	intent_prsn_unmtg_pos	321.681	10	32.168	1.026	0.425	0.067
	intent_prsn_unmtg_neg	15.626	10	1.563	1.033	0.419	0.068
	intent_prsn_mtg_pos	17.640	10	1.764	1.798	0.066	0.112
	permiss_prsn_pos	1130.288	10	113.029	1.017	0.432	0.067
	permiss_prsn_neg	442.313	10	44.231	2.537	0.008	0.152
	permiss_imprsn_pos	0.696	10	0.070	2.079	0.030	0.128
	dirvocb_prsn_pos	13.476	10	1.348	0.726	0.699	0.049
	dirvocb_prsn_neg	0.607	10	0.061	0.636	0.781	0.043
	dirvocb_imprsn_pos	1.408	10	0.141	0.529	0.867	0.036
Discipline * Study Level	imp_unmtg_pos	15683.043	10	1568.304	0.915	0.521	0.061
	imp_unmtg_neg	6.074	10	0.607	1.687	0.089	0.106
	imp_mtg_pos	47.375	10	4.738	1.724	0.081	0.108
	obl_prsn_unmtg_pos	265.980	10	26.598	0.670	0.750	0.045
	obl_prsn_unmtg_neg	18.736	10	1.874	0.945	0.495	0.062
	obl_prsn_mtg_pos	117.354	10	11.735	1.188	0.304	0.077
	obl_imprsn_unmitig_pos	2.685	10	0.269	0.780	0.648	0.052
	intent_prsn_unmtg_pos	297.827	10	29.783	0.950	0.490	0.063
	intent_prsn_unmtg_neg	10.758	10	1.076	0.711	0.713	0.048
	intent_prsn_mtg_pos	10.356	10	1.036	1.055	0.401	0.069
	permiss_prsn_pos	1139.631	10	113.963	1.026	0.425	0.067

	permiss_prsn_neg	360.002	10	36.000	2.065	0.031	0.127
	permiss_imprsn_pos	0.079	10	0.008	0.235	0.992	0.016
	dirvocb_prsn_pos	18.696	10	1.870	1.008	0.440	0.066
	dirvocb_prsn_neg	0.822	10	0.082	0.862	0.571	0.057
	dirvocb_imprsn_pos	3.083	10	0.308	1.158	0.324	0.075
Study Level * interactivity	imp_unmtg_pos	11690.787	4	2922.697	1.706	0.152	0.046
	imp_unmtg_neg	0.190	4	0.048	0.132	0.970	0.004
	imp_mtg_pos	6.869	4	1.717	0.625	0.646	0.017
	obl_prsn_unmtg_pos	102.340	4	25.585	0.645	0.631	0.018
	obl_prsn_unmtg_neg	17.650	4	4.412	2.225	0.069	0.059
	obl_prsn_mtg_pos	15.042	4	3.760	0.381	0.822	0.011
	obl_imprsn_unmitig_pos	1.081	4	0.270	0.784	0.537	0.022
	intent_prsn_unmtg_pos	73.758	4	18.439	0.588	0.672	0.016
	intent_prsn_unmtg_neg	3.596	4	0.899	0.594	0.667	0.016
	intent_prsn_mtg_pos	0.600	4	0.150	0.153	0.961	0.004
	permiss_prsn_pos	718.297	4	179.574	1.616	0.173	0.044
	permiss_prsn_neg	130.616	4	32.654	1.873	0.118	0.050
	permiss_imprsn_pos	0.149	4	0.037	1.111	0.354	0.030
	dirvocb_prsn_pos	6.582	4	1.646	0.887	0.473	0.024
	dirvocb_prsn_neg	0.305	4	0.076	0.800	0.527	0.022
	dirvocb_imprsn_pos	0.479	4	0.120	0.450	0.773	0.013
Discipline	imp_unmtg_pos	44879.002	5	8975.800	5.238	0.000*	0.156
	imp_unmtg_neg	0.611	5	0.122	0.339	0.888	0.012
	imp_mtg_pos	15.616	5	3.123	1.136	0.344	0.038
	obl_prsn_unmtg_pos	474.175	5	94.835	2.390	0.041	0.078
	obl_prsn_unmtg_neg	26.158	5	5.232	2.638	0.026	0.085
	obl_prsn_mtg_pos	69.128	5	13.826	1.399	0.228	0.047
	obl_imprsn_unmitig_pos	2.443	5	0.489	1.418	0.221	0.048
	intent_prsn_unmtg_pos	521.030	5	104.206	3.324	0.007	0.105

	intent_prsn_unmtg_neg	13.605	5	2.721	1.799	0.117	0.060
	intent_prsn_mtg_pos	17.675	5	3.535	3.603	0.004	0.113
	permiss_prsn_pos	699.577	5	139.915	1.259	0.285	0.042
	permiss_prsn_neg	333.168	5	66.634	3.823	0.003	0.119
	permiss_imprsn_pos	0.474	5	0.095	2.830	0.018	0.091
	dirvocb_prsn_pos	8.024	5	1.605	0.865	0.506	0.030
	dirvocb_prsn_neg	0.229	5	0.046	0.480	0.790	0.017
	dirvocb_imprsn_pos	0.664	5	0.133	0.499	0.777	0.017
Study Level	imp_unmtg_pos	589.567	2	294.783	0.172	0.842	0.002
	imp_unmtg_neg	0.227	2	0.114	0.315	0.730	0.004
	imp_mtg_pos	12.117	2	6.059	2.204	0.114	0.030
	obl_prsn_unmtg_pos	11.902	2	5.951	0.150	0.861	0.002
	obl_prsn_unmtg_neg	1.585	2	0.792	0.400	0.671	0.006
	obl_prsn_mtg_pos	23.174	2	11.587	1.172	0.313	0.016
	obl_imprsn_unmitig_pos	0.219	2	0.109	0.318	0.728	0.004
	intent_prsn_unmtg_pos	1.517	2	0.758	0.024	0.976	0.000
	intent_prsn_unmtg_neg	1.524	2	0.762	0.504	0.605	0.007
	intent_prsn_mtg_pos	3.828	2	1.914	1.951	0.146	0.027
	permiss_prsn_pos	875.711	2	437.856	3.941	0.022	0.053
	permiss_prsn_neg	25.682	2	12.841	0.737	0.481	0.010
	permiss_imprsn_pos	0.018	2	0.009	0.265	0.768	0.004
	dirvocb_prsn_pos	0.974	2	0.487	0.263	0.769	0.004
	dirvocb_prsn_neg	0.088	2	0.044	0.464	0.630	0.006
	dirvocb_imprsn_pos	0.610	2	0.305	1.145	0.321	0.016
Interactivity	imp_unmtg_pos	26563.707	2	13281.854	7.751	0.001*	0.098
	imp_unmtg_neg	1.278	2	0.639	1.775	0.173	0.024
	imp_mtg_pos	8.581	2	4.291	1.561	0.213	0.022
	obl_prsn_unmtg_pos	283.901	2	141.950	3.578	0.030	0.048
	obl_prsn_unmtg_neg	9.294	2	4.647	2.343	0.100	0.032

obl_prsn_mtg_pos	3.098	2	1.549	0.157	0.855	0.002
obl_imprsn_unmitig_pos	0.050	2	0.025	0.073	0.930	0.001
intent_prsn_unmtg_pos	153.097	2	76.549	2.442	0.091	0.033
intent_prsn_unmtg_neg	8.934	2	4.467	2.953	0.055	0.040
intent_prsn_mtg_pos	8.564	2	4.282	4.365	0.014	0.058
permiss_prsn_pos	397.409	2	198.704	1.789	0.171	0.025
permiss_prsn_neg	10.533	2	5.266	0.302	0.740	0.004
permiss_imprsn_pos	0.241	2	0.121	3.602	0.030	0.048
dirvocb_prsn_pos	1.069	2	0.534	0.288	0.750	0.004
dirvocb_prsn_neg	0.052	2	0.026	0.274	0.761	0.004
dirvocb_imprsn_pos	0.307	2	0.154	0.577	0.563	0.008

* p value< 0.003

Note. Structural sub-type names have been abbreviated based on the following criteria: imp = imperative; obl = obligation modal; intent = intention and desire verbs; permiss = permission/possibility modal; dirvcb = directive vocabulary; unmtg = unmitigated; mtg = mitigated; prsn = personal; imprsn = impersonal; pos = positive; neg = negative.

Table C3. Discipline Simple Main Effects for Structural Types 1, 3, and 5

Structural Type	Interactivity		SS	df	MS	F	p	Partial η^2
Type 1 imp_unmtg_pos	low	Contrast	1406.695	5	281.339	0.164	0.975	0.006
		Error	243320.401	142	1713.524			
	medium	Contrast	472.683	5	94.537	0.055	0.998	0.002
		Error	243320.401	142	1713.524			
	high	Contrast	89616.683	5	17923.337	10.460	0.000[*]	0.269
		Error	243320.401	142	1713.524			
Type 3 imp_mtg_pos	low	Contrast	11.735	5	2.347	0.854	0.514	0.029
		Error	390.253	142	2.748			
	medium	Contrast	67.561	5	13.512	4.917	0.000	0.148
		Error	390.253	142	2.748			
	high	Contrast	13.026	5	2.605	0.948	0.452	0.032
		Error	390.253	142	2.748			
Type 5 obl_prsn_unmtg_pos	low	Contrast	219.575	5	43.915	1.107	0.360	0.038
		Error	5634.202	142	39.677			
	medium	Contrast	429.939	5	85.988	2.167	0.061	0.071
		Error	5634.202	142	39.677			
	high	Contrast	851.742	5	170.348	4.293	0.001	0.131
		Error	5634.202	142	39.677			

* *p* value <.0167

Note. Structural sub-type names have been abbreviated based on the following criteria: imp = imperative; obl = obligation modal; intent = intention and desire verbs; permiss = permission/possibility modal; dirvcb = directive vocabulary; unmtg = unmitigated; mtg = mitigated; prsn = personal; imprsn = impersonal; pos = positive; neg = negative.

Table C4. Levels of Interactivity Simple Main Effects for Structural Types 1, 3, and 5

Structural Type	Interactivity		SS	*df*	MS	*F*	*p*	Partial η²
Type 1 imp_unmtg_pos	Business	Contrast	541.042	2	270.521	0.158	0.854	0.002
		Error	243320.401	142	1713.524			
	Education	Contrast	36.236	2	18.118	0.011	0.989	0.000
		Error	243320.401	142	1713.524			
	Engineering	Contrast	90927.939	2	45463.970	26.532	0.000*	0.272
		Error	243320.401	142	1713.524			
	Humanities	Contrast	666.286	2	333.143	0.194	0.824	0.003
		Error	243320.401	142	1713.524			
	Natural Sciences	Contrast	522.948	2	261.474	0.153	0.859	0.002
		Error	243320.401	142	1713.524			
	Social Sciences	Contrast	156.633	2	78.317	0.046	0.955	0.001
		Error	243320.401	142	1713.524			
Type 3 imp_mtg_pos	Business	Contrast	0.764	2	0.382	0.139	0.870	0.002
		Error	390.253	142	2.748			
	Education	Contrast	75.018	2	37.509	13.648	0.000*	0.161
		Error	390.253	142	2.748			
	Engineering	Contrast	0.544	2	0.272	0.099	0.906	0.001
		Error	390.253	142	2.748			
	Humanities	Contrast	5.967	2	2.984	1.086	0.340	0.015
		Error	390.253	142	2.748			
	Natural Sciences	Contrast	0.690	2	0.345	0.126	0.882	0.002
		Error	390.253	142	2.748			
	Social Sciences	Contrast	0.268	2	0.134	0.049	0.952	0.001
		Error	390.253	142	2.748			
Type 5 obl_prsn_unmtg _pos	Business	Contrast	115.288	2	57.644	1.453	0.237	0.020
		Error	5634.202	142	39.677			
	Education	Contrast	53.683	2	26.841	0.676	0.510	0.009
		Error	5634.202	142	39.677			
	Engineering	Contrast	727.482	2	363.741	9.167	0.000*	0.114
		Error	5634.202	142	39.677			
	Humanities	Contrast	115.233	2	57.616	1.452	0.238	0.020
		Error	5634.202	142	39.677			
	Natural Sciences	Contrast	63.619	2	31.809	0.802	0.451	0.011
		Error	5634.202	142	39.677			
	Social Sciences	Contrast	156.343	2	78.171	1.970	0.143	0.027
		Error	5634.202	142	39.677			

* *p* value < 0.008
Note. Structural sub-type names have been abbreviated based on the following criteria: imp = imperative; obl = obligation modal; intent = intention and desire verbs; permiss = permission/possibility modal; dirvcb = directive vocabulary; unmtg = unmitigated; mtg = mitigated; prsn = personal; imprsn = impersonal; pos = positive; neg = negative.

Appendix D: Rates of Occurrence of Structural Types of Directives across Levels of Situational Factors in 14 Lectures

Structural Type	Discipline		Instruction Level			Interaction Level		
	Eng	Hum	LD	UD	Gr	L	M	H
	Raw (*10,000)	Raw (*10,000)	Raw (*10,000)	Raw (*10,000)	Raw (*10,000)	Raw (*10,000)	Raw (*10,000)	Raw (*10,000)
Peformatives	3 (.84)	10 (2.09)	0 (0)	9 (2.41)	4 (2.05)	8 (4.65)	0 (0)	5 (1.58)
Obligation Modals	36 (10.02)	38 (7.95)	19 (7.10)	39 (10.42)	16 (8.19)	30 (17.42)	11 (3.16)	33 (10.41)
Intention/Desire Verbs	46 (12.81)	30 (6.28)	8 (2.99)	54 (14.43)	14 (7.16)	14 (8.13)	0 (0)	62 (19.55)
Permission/Possibility Modals	39 (10.86)	53 (11.09)	35 (13.08)	39 (10.42)	18 (9.21)	32 (18.58)	15 (4.31)	45 (14.19)
Conditionals	9 (2.51)	3 (.63)	8 (2.99)	4 (1.07)	0 (0)	2 (1.16)	8 (2.30)	2 (.63)
You + Would/Wouldn't	7 (1.95)	16 (3.35)	3 (1.12)	7 (1.87)	13 (6.65)	1 (.58)	1 (.29)	21 (6.62)
Non-Sentential Declaratives	2 (.56)	2 (.42)	3 (1.12)	1 (.27)	0 (0)	1 (.58)	2 (.57)	1 (.32)
Other Declaratives	11 (3.06)	18 (3.77)	4 (1.49)	16 (4.28)	9 (4.60)	15 8.71)	3 (.86)	11 (3.47)
Imperatives	72 (20.05)	53 (11.09)	37 (13.83)	63 (16.84)	25 (12.79)	25 (14.52)	19 (5.46)	81 (25.54)
You + Imperatives	22 (6.13)	1 (.21)	12 (4.48)	8 (2.14)	3 (1.53)	8 (4.65)	11 (3.16)	4 (1.26)
Present Progressive	2 (.56)	2 (.42)	0 (0)	2 (.53)	2 (1.02)	1 (.58)	0 (0)	3 (.95)
Let's	22 (6.13)	8 (1.67)	8 (2.99)	17 (4.54)	5 (2.56)	11 (6.39)	7 (2.01)	12 (3.78)
Feasibility/Ability Modal Questions	1 (.28)	2 (.42)	1 (.37)	2 (.53)	0 (0)	0 (0)	2 (.57)	1 (.32)
Non-Modal Questions	3 (.84)	6 (1.26)	3 (1.12)	6 (1.60)	0 (0)	0 (0)	5 (1.44)	4 (1.26)
Suggestory Formulae	0 (0)	1 (.21)	0 (0)	0 (0)	1 (.51)	0 (0)	1 (.29)	0 (0)
Total	275 (76.56)	243 (50.83)	141 (52.69)	267 (71.35)	110 (56.28)	148 (85.94)	85 (24.43)	285 (89.86)

Appendix E: Means and Standard Deviations of Obligation Strength across Structural Types and Situational Features in 14 Lectures

Structural Type	Discipline M (SD)		Instruction Level M (SD)			Interaction Level M (SD)		
	Eng	Hum	LD	UD	Gr	L	M	H
Peformatives	.56 (.51)	2.60 (.47)	N/A	1.96 (1.14)	2.50 (.58)	2.21 (.92)	N/A	2.00 (1.23)
Obligation Modals	2.48 (.44)	2.39 (.70)	2.37 (.60)	2.57 (.45)	2.17 (.78)	2.60 (.43)	2.27 (.44)	2.33 (.71)
Intention/Desire Verbs	2.04 (1.05)	2.25 (.76)	2.29 (.88)	2.12 (1.00)	2.02 (.82)	2.55 (.38)	N/A	2.02 (1.01)
Permission/Possibility Modals	.92 (.70)	.71 (.49)	.76 (.40)	.90 (.60)	.67 (.85)	.98 (.59)	.69 (.53)	.71 (.60)
Conditionals	.63 (.39)	.89 (.19)	.58 (.39)	.92 (.17)	N/A	.84 (.23)	.58 (.39)	1.00 (0.00)
You + Would/Wouldn't	.81 (1.03)	1.31 (.86)	2.11 (.96)	.95 (1.13)	1.05 (.71)	2.00 (-)	1.00 (-)	1.13 (.95)
Non-Sentential Declaratives	0.00 (0.00)	2.34 (.47)	.67 (1.15)	2.67 (-)	N/A	2.67 (-)	0.00 (0.00)	2:00 (-)
Other Declaratives	1.61 (1.08)	1.30 (1.13)	2.58 (.50)	1.44 (1.07)	.85 (.99)	1.53 (1.17)	1.33 (1:00)	1.27 (1.12)
Imperatives	1.28 (1.13)	2.01 (.84)	1.87 (.92)	1.26 (1.17)	2.00 (.78)	1.87 (.89)	1.75 (.94)	1.46 (1.15)
You + Imperatives	2.20 (.68)	2.67 (-)	2.31 (.64)	2.17 (.59)	2.00 (1.15)	2.17 (.59)	2.28 (.66)	2.17 (1.00)
Present Progressive	1.34 (.47)	1.00 (.47)	N/A	1.34 (.47)	1.00 (.47)	1.00 (-)	N/A	1.22 (.51)
Let's	1.80 (.63)	1.63 (.33)	1.46 (.31)	1.92 (.65)	1.67 (.41)	1.94 (.76)	1.48 (.33)	1.75 (.43)
Feasibility/Ability Modal Questions	0.00 (-)	1.50 (.71)	0.00 (-)	1.50 (.71)	N/A	N/A	1.00 (1.41)	1.00 (-)
Non-Modal Questions	0.00 (0.00)	.78 (.50)	0.00 (0.00)	.78 (.50)	N/A	N/A	.27 (.37)	.83 (.64)
Suggestory Formulae	N/A	2.33 (-)	N/A	N/A	2.33 (-)	N/A	2.33 (-)	N/A
Total	1.57 (1.06)	1.68 (.97)	1.57 (.98)	1.66 (1.06)	1.59 (.98)	1.88 (.92)	1.40 (.95)	1.55 (1.06)

Appendix F: Means and Standard Deviations of Imposition Level across Structural Types and Situational Features

Structural Type	Discipline M (SD)		Instruction Level M (SD)			Interaction Level M (SD)		
	Eng	Hum	LD	UD	Gr	L	M	H
Performatives	.33 (.34)	1.40 (.52)	N/A	.96 (.63)	1.58 (.57)	1.08 (.56)	N/A	1.27 (.86)
Obligation Modals	1.39 (.60)	1.45 (.58)	1.46 (.58)	1.44 (.55)	1.31 (.68)	1.39 (.55)	1.18 (.72)	1.53 (.56)
Intention/Desire Verbs	1.28 (.62)	1.24 (.44)	1.13 (.44)	1.27 (.58)	1.36 (.50)	1.24 (.36)	N/A	1.27 (.59)
Permission/Possibility Modals	1.12 (.54)	1.18 (.52)	1.28 (.47)	.97 (.39)	1.31 (.76)	.98 (.38)	1.29 (.63)	1.24 (.56)
Conditionals	1.07 (.36)	.67 (.34)	1.08 (.39)	.75 (.32)	N/A	.67 (.47)	1.08 (.39)	.84 (.23)
You + Would/Wouldn't	1.00 (.79)	1.40 (.62)	1.56 (.20)	.86 (.74)	1.43 (.66)	.67 (-)	1.67 (-)	1.28 (.70)
Non-Sentential Declaratives	.33 (0.00)	.50 (.24)	.33 (0.00)	.67 (-)	N/A	.67 (-)	.33 (0.00)	.33 (-)
Other Declaratives	1.18 (.75)	1.06 (.77)	1.75 (.96)	1.13 (.67)	.78 (.69)	1.18 (.63)	.78 (.77)	1.09 (.93)
Imperatives	.69 (.64)	1.01 (.44)	1.05 (.49)	.62 (.65)	.99 (.31)	.93 (.51)	1.04 (.46)	.74 (.62)
You + Imperatives	1.18 (.32)	1.33 (-)	1.28 (.31)	.96 (.21)	1.44 (.20)	.96 (.21)	1.27 (.33)	1.42 (.17)
Present Progressive	.50 (.71)	.83 (.71)	N/A	.50 (.71)	.83 (.71)	0.00 (-)	N/A	.89 (.51)
Let's	.86 (.34)	.63 (.22)	.75 (.24)	.88 (.35)	.60 (.28)	.82 (.41)	.71 (.30)	.83 (.26)
Feasibility/Ability Modal Questions	1.00 (-)	1.17 (.71)	1.00 (-)	1.17 (.71)	N/A	N/A	1.34 (.47)	.67 (-)
Non-Modal Questions	.44 (.20)	.44 (.18)	.44 (.20)	.44 (.18)	N/A	N/A	.40 (.15)	.50 (.20)
Suggestory Formulae	N/A	1.33 (-)	N/A	N/A	1.33 (-)	N/A	1.33 (-)	N/A
Total	1.02 (.63)	1.16 (.56)	1.17 (.52)	1.00 (.62)	1.19 (.61)	1.08 (.51)	1.06 (.55)	1.10 (.66)