

Effect of Explicit vs. Meaning-Focused Instruction on Implicit and Explicit Knowledge of Lexical Bundles: Focus on Research Articles' Discussions in Applied Linguistics

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Research Paper

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Abstract: Despite the evidenced discipline-specificity and significance of lexical bundles (LBs) for academic reading and writing, interventionist research into the development of implicit and explicit knowledge of LBs in applied linguistics research reports, specifically the discussion section, is limited. Employing a quasi-experimental design, this study investigated how exposure to LBs through meaning-focused instruction of discussion sections of applied linguistics' research articles compared with their explicit instruction in terms of their effect on LBs' implicit and explicit knowledge. For this purpose, 53 intermediate proficiency MA students of English Language Teaching, comprising 2 intact "academic writing" classes were designated as two experimental groups: explicit instruction group (EIG; N = 27) and meaning-focused instruction group (MFG; N = 26). EIG was explicitly instructed on the structure and function of graphically enhanced LBs contained in the discussion section of 13 research articles. MFG, on the other hand, received meaning-focused instruction on the same texts. A set of pre- and post-tests comprising a timed grammaticality judgment test (GJT) and an oral elicited imitation test for gauging implicit knowledge of LBs, and an untimed GJT and a metalinguistic knowledge test (MKT) for measuring explicit knowledge of them were designed and deployed. One-way ANOVA results indicated EIG's significant gain over MFG in terms of explicit LBs knowledge for both untimed GJT and MKT; however, no significant difference was detected for implicit knowledge measures between the two groups. The findings underscore the potential of explicit instruction for the development of explicit knowledge of LBs, and have implications for academic English instruction.

Keywords: Explicit Instruction, Explicit Knowledge, Implicit Knowledge, Lexical Bundles, Meaning-Focused Instruction

Introduction

LBs are recurrent word combinations (e.g., take a look at; on the one hand; as a consequence of), which are empirically detected in natural language corpora (Cortes, 2006). They possess unique linguistic and functional attributes that make them distinct from other types of formulaic language (Zare & Valipouri, 2022). Additionally, they have been shown to constitute a considerable portion of discourse (Erman, 2009) and vary in their forms and functions across disciplines (O'Flynn, 2022). The significance of this form of formulaic language for English for Academic Purposes (EAP) lies in (a) their copious frequency in both spoken and written academic discourse, (b) claims as to their association with high proficiency language use in academic contexts, and (c) their rarity in students' academic writing (Li et al., 2023). Research into LBs has mainly addressed their variant use across different genres, research article sections, or disciplines (e.g., O'Flynn, 2022); Features of LBs in the written discourse of applied

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linguistics, particularly different sections of research articles, have also been delineated in several studies (e.g., Hassanzadeh & Tamleh, 2023; Shirazizadeh & Amirfazlian, 2021); however, studies of approaches to instructing LBs in the field of applied linguistics are at a premium, likely owing to the belief in the possibility of their incidental learning in naturally occurring discourse (e.g., Biber & Conrad, 1999). This is despite the fact that applied linguistics students experience difficulty in the writing of different sections of research reports, especially the discussion section (Jin, 2021). Jalilifar (2011) pointed to learners' little awareness of the discourse features of discussions, LBs included, and lack of planned instruction of such features as the main causes of this difficulty.

Opinions on the necessity of LBs instruction are divided. The first supposition is that LBs are so common in natural language corpora that their targeted instruction is unlikely to merit discussion. Biber and Conrad (1999) posited the possibility of incidental development of LBs through simple exposure thanks to their pervading occurrence in academic discourse. Corpus-based studies of LBs have shown functional, structural, paradigmatic, and frequency differences in various disciplinary discourse domains (e.g., Cao, 2021), including applied linguistics (e.g., Hassanzadeh & Tamleh, 2023; Shirazizadeh & Amirfazlian, 2021); however, whether these idiosyncratic features will be in place as implicit and/or explicit knowledge of LBs through meaning-focused instruction alone begs the question. The presumed adequacy of exposure for LBs' learning might account for the paucity of research into LBs instruction (e.g., Biber & Conrad, 1999). The second hypothesis resonates the recent call for the instructional treatment of this form of formulaic language. Proponents of this second viewpoint (see Cortes, 2006) support their surmise on two grounds. Firstly, formulaic sequences other than LBs, e.g., collocations, have been extensively researched and shown to be in place through focused instruction. Secondly, studies have substantiated the infrequency of LBs in the academic English production of university students despite exposure to a prodigious body of naturally LBs-rich academic discourse produced by native speakers. In her interventionist study, Cortes (2006) found history students' disciplinary writing to be replete with simple conjunctions and adverbs, rather than LBs, functioning as discourse organizers and referential expressions.

Against this backdrop, the present study was designed to compare meaning-focused instruction of LBs in the discussion section of research articles in applied linguistics with their explicit instruction for the development of implicit and explicit knowledge of these sequences. While meaning-focused instruction capitalizes on content-based treatment of the materials through exposure, explicit instruction involves the direct instruction of targeted forms through explanation of their structural and functional attributes (Celik, 2015). To date, studies of LBs in applied linguistics academic discourse have been mainly descriptive, aiming to unearth their intradisciplinary structural and/or functional features as well as frequency in and comparatively across various academic genres, including research articles' abstracts (Shahriari Ahmadi et al., 2013), discussion of the findings (Hassanzadeh & Tamleh, 2023), introductions (Mirzaei, 2019), and theses, articles, and textbooks (Shirazizadeh & Amirfazlian, 2021). These and other studies allude to the significance of such phraseology for EAP; despite this, there are very few studies into how to aid learners develop knowledge of LBs (e.g., Razmjoo & Montasseri, 2018). In addition, the demarcation between implicit and explicit knowledge of LBs can be rationalized with reference to the evidenced significance of implicit knowledge as "the ultimate goal of L2 acquisition" (Doughty, 2003; cited in Gutiérrez, 2013, p. 21) and of explicit knowledge as "additional collaborative conscious support" when implicit knowledge fails to adequately function (N. C. Ellis, 2005, p. 308).

Literature Review

The ever increasing demand for the production and comprehension of academic English texts has turned EAP into a vibrant research area over the years. As "specialized English-language teaching grounded in the social, cognitive, and linguistic demands of academic target situations" (Hyland, 2006, p. 2), EAP has been widely researched in terms of its idiosyncratic linguistic attributes both within and across disciplines, and academic genres and registers. Among these attributes, LBs have received special descriptive research attention in recent years owing to their high frequency as well as interdisciplinary

and cross-generic variation in academic discourse. LBs are essentially non-idiomatic, pattern-free and continuous-form multiword sequences with a minimum prerequisite frequency of 10 per million words (Biber & Conrad, 1999), and a minimum prerequisite use dispersion of three texts in a natural language corpus (Adel & Erman, 2012). Irrespective of their disciplinary and generic variation, Biber et al. (1999; cited in Shirazizadeh & Amirfazlian, 2021) initially classified LBs into 12 categories, namely prepositional phrases plus of, other prepositional phrases, noun phrases plus of, other noun phrases, passive verbs plus prepositional phrase fragment, anticipatory it plus verbs/adjectives, be plus noun/adjectival phrases, verb phrases plus that-clause fragment, verb/adjective plus to-clause fragment, adverbial phrases, pronoun/noun phrases plus be, and other expressions. These were later grouped into the three main categories of noun phrase-, prepositional phrase-, and verb phrase-based sequences by Biber et al. (2004). They further attributed three main functions to LBs: those that indicate certainty assessments over propositions (AKA stance LBs), those that designate intratextual links (AKA discourse organizing LBs), and those that specify parts of discourse (AKA referential LBs).

Research into LBs in EAP has upsurged in the past two decades, owing to the benefits associated with their effective use. Effectual “meaning construction, fluent linguistic production, text comprehension with the least processing time and effort, and discourse coherence, naturalness, distinctiveness, and predictability” are but some of affordances of proficient use of LBs in academic discourse (Azadnia, 2023, p. 2). Despite their potency, since Meunier and Granger’s (2008, p. 249) “urgent” call for research into “a phraseological approach” in EAP, very few studies have capitalized on LBs from a pedagogical perspective. Existing research is principally descriptive and corpus-based, aiming to create lists of LBs, along with their structural and functional attributes, within and across disciplines and academic genres (e.g., Zare & Valipouri, 2022). To exemplify, in a discipline-focused study, Hyland (2008) posited a three-way classification of LBs based on their function in academic texts: research-oriented LBs (comprising location, topic, description, procedure, and quantification indicators), text-oriented LBs (comprising transition, resultative, structure, and framing signals), and participant-oriented LBs (comprising stance and engagement features).

In applied linguistics, too, the bulk of research on LBs has mainly looked into their frequency, structure and function. Shirazizadeh and Amirfazlian (2020) explored LBs use in a 5.7-million-word corpus of applied linguistics theses, articles, and textbooks. Setting a minimum frequency requirement of 20% per million words and a minimum document-based dispersion of 10%, they located 167 LBs that made up 1.91% of the total number of words. They detected both similarities and variation in LBs use across the three investigated genres, which, according to them, questions the discipline specificity-generality dichotomy mindset around LBs. Similarly, from a generic angle, Hassanzadeh and Tamleh (2023) investigated LBs in the discussion section of native English speakers’ research articles, and found phrasal and referential LBs extensively used in their corpus. Capitalizing on EFL and ESL learner corpora, Azadnia (2023) investigated LBs in Iranian M.A and Ph.D students’ research reports, and found them to be structurally similar in the two corpora; as to their function, they grouped the LBs as either text-oriented or research-oriented, following Hyland (2008). These and other similar studies allude to the idiosyncratic frequency, structure and function of LBs in applied linguistics discourse, which rationalizes their targeted treatment in the EAP class. This proposition finds support in Cortes’ (2006) presumption as to the low likelihood of LBs’ learning through simple exposure alone.

Despite their evidenced significance for effective EAP production and comprehension, LBs have rarely served as the target of interventionist EAP research. This is explicable in view of the prevailing belief in LBs’ incidental learning possibility, given their recurrence in natural language corpora, including academic discourse (see Biber & Conrad, 1999). The few existing interventionist studies have implemented either explicit instruction or exposure in the form of extensive reading, and targeted the use of LBs in students’ writing, irrespective of whether each induces implicit or explicit knowledge of these sequences. Theoretically, exposure-only studies fall in the category of meaning-focused instruction, which attribute a seminal role to the communication of messages devoid of any deliberate focus on targeted forms. Celik (2015) pointed to content coverage and meaning negotiation with minimal error correction or form-related awareness raising as the core features of meaning-focused instruction. On the other hand, explicit instruction, as an instantiation of form-focused instruction,

underscores attention to forms paired with metalinguistic discussion of their structural and functional attributes (R. Ellis, 2008). In this respect, Cortes' (2006) five-session explicit instruction of LBs in an intensive writing course proved too short to exert any influence on their use in students' writing samples. Ranjbar et al. (2012) found context-based instruction of LBs effective for the writing fluency of EFL learners studying at a language institute in Iran; however, they presented inadequate detail on the instructional approach they adopted. Kazemi et al. (2014) explicit treatment of 40 most frequent LBs in applied linguistics' research articles with a group of advanced proficiency EFL learners proved to enhance their use in the learners' essays. Their experimental condition involved the contextualized introduction of LBs through teacher-fronted and subsequent paired discussion of their importance, frequency and functions. Birhan (2021), too, found her explicit instruction approach to the teaching of LBs contained in computer science research articles' abstracts effective for their use in student-written abstracts. Instruction involved modelling, a perception task, a production task, and an error correction task (involving the detection of errors in one's own abstracts written throughout the study period). In a similar vein, Razmjoo and Montasseri (2018) investigated the comparative effects of adaptive and authentic texts' extensive reading on EFL learners' use of LBs in the same texts' summaries. They found instruction of LBs in adaptive texts more effective. They further call for more research into the implicit and explicit treatment of this type of phraseological language.

Interventionist studies aimed at the use of LBs in a specific section of research reports, including the discussion section, are literally non-existent. Potency of the discussion section, which has always posed a challenge to EAP learners (Jin, 2021), is contingent upon the effective use of LBs. More specifically, authors are required to explain and evaluate their findings against existing theory and research. In so doing, they are compelled to hedge and boost their statements, situate their results in the context of similar or contradictory findings, draw connections among ideas, and sketch implications of their findings (Nundy et al., 2022). There are LBs that feature in the main discussion moves: theoretical grounding of the findings (e.g., *theoretical justification comes from; could have contributed to*), presenting concurring evidence (e.g., *are in line with*), and sketching contradictory research findings (e.g., *while previous research showed*) (Peacock, 2002; example LBs were retrieved from the present study's corpus for clarification). Additionally, to verbalize discussion-specific functions, adeptness with the use of a range of LBs that are specific to these functions is necessary. Evidence comes from Hassanzadeh and Tamleh (2023), who found LBs to be highly frequent in the discussion section of applied linguistics research articles authored by native speakers. They showed noun-phrase and prepositional-phrase LBs (e.g., *the results of the; on the other hand*) and referential bundles (e.g., *in the current study*) to be the most frequent in their corpus.

Regarding the implicit/explicit knowledge dichotomy, the distinction is significant owing to its implications for the extent to which L2 knowledge is learnable, verbalisable, and available for immediate use. Explicit knowledge, AKA analyzed or metalinguistic knowledge, is conscious, declarative, and verbalisable, whereas implicit knowledge is unconscious, procedural, and available for automatic retrieval in the course of interaction (R. Ellis, 2005). According to Gutiérrez (2013), while implicit L2 knowledge has been concertedly envisioned as the quintessential end of all L2 learning, its explicit counterpart has been assigned such lesser roles as monitoring implicit knowledge, fortifying form-meaning connections, facilitating linguistic problem solving, or at best serving among the exigencies of L2 writing. Given this functional demarcation, "it is necessary to have the learner acquire/learn not ONE but TWO grammars: an internal grammar (in the form of an implicit competence) and an external grammar (in the form of explicit knowledge)" (Germain, 2018, p.18). Insofar as LBs are concerned, implicit knowledge can contribute to their whilst-communication accessibility, while explicit knowledge can come of aid in their formulation and generic and functional monitoring. A scrutiny of research into implicit and explicit L2 knowledge reveals a contention in terms of their measurement; however, time pressure, as in untimed grammaticality judgment tasks and oral elicited imitation tasks, has been generally viewed as an instigator of automatic processing in procedural memory. This is while lack of time pressure, as in untimed grammaticality judgment tasks and metalinguistic knowledge tests, has been shown to call for controlled processing in declarative memory (see R. Ellis, 2005). This is psycholinguistically evidenced in Godfroid et al.'s (2015) study, which showed lack of time pressure to induce more frequent eye regressions. There is also psychometric

evidence for this claim in R. Ellis' (2005) investigation; this stated, there exists some counterevidence in very few studies for the validity of GJTs as measures of implicit knowledge (e.g., Vafae et al., 2017) and also for time pressure as an adequate measure of implicitness/explicitness (e.g., Gutiérrez, 2013).

In view of the (a) divergence of opinions regarding the necessity of focused LBs instruction, (b) literal absence of comparative studies of meaning-focused instruction and targeted LBs treatment, and (c) significance of distinguishing between implicit and explicit L2 knowledge while evaluating the effectiveness of L2 instruction, this study was designed to compare meaning-focused instruction with explicit instruction of LBs in applied linguistics research articles' discussion section in terms of their potential to enhance implicit and/or explicit knowledge of LBs. Accordingly, the following research questions were formulated:

Research Question One: Do meaning-focused and explicit instruction of LBs differ in terms of their effectiveness for developing implicit knowledge of LBs?

Research Question Two: Do meaning-focused and explicit instruction of LBs differ in terms of their effectiveness for developing explicit knowledge of LBs?

Methodology

Participants

For the purpose of this comparison groups study, 53 MA students majoring in applied linguistics at Islamic Azad University (South Tehran Branch), comprising two intact coeducational academic writing classes, were convenience sampled. They ranged in age from 22 to 27 and were all at the intermediate proficiency level, as shown in Oxford Placement Test results (see Instruments). They had never taken an academic writing course as they had graduated BA in other than English language majors. Following the participants' completion of a research participation consent form, the researcher randomly assigned them into a meaning-focused instruction group (MFG; $N_{total} = 27$; $N_{male} = 5$; $N_{female} = 22$) and an explicit instruction group (EIG; $N_{total} = 26$; $N_{male} = 7$; $N_{female} = 19$). Subsequently, their homogeneity in terms of implicit and explicit LBs knowledge was statistically ensured at the pre-treatment phase (see Results).

Instruments

An oral elicited imitation test (OEIT) and a timed grammaticality judgment test (TGJT) were developed to measure implicit LBs' knowledge. Explicit LBs knowledge was, on the other hand, measured through an untimed grammaticality judgment test (UGJT) and a metalinguistic knowledge test (MKT). It should be noted that sentences included in all the four tests were retrieved (and adapted where needed) from existing research articles in applied linguistics. Moreover, scoring was based solely on the use of LBs. Proficiency level homogeneity was also ensured through Oxford Placement Test. These are explicated in this section.

Oxford Placement Test (OPT)

Scores on the online version of OPT (falling within the range of 39-47) were used to obtain a homogeneous sample of intermediate participants. The test, developed by Oxford University Press and Syndicate of Cambridge ESOL Examinations Syndicate includes, 60 receptive-response items on reading, grammar, and vocabulary (see Geranpayeh, 2003). It was completed in 40 minutes by the participants. Reliability of OPT scores in this study was ensured in a Cronbach's alpha coefficient of .76.

Timed and Untimed Grammaticality Judgment Test (GJT)

Four parallel GJT versions, targeting LBs' structural and functional attributes were developed by the researcher to measure implicit and explicit knowledge of LBs. Each contained 25 frequent four-word LBs in applied linguistics academic texts tabulated by Hassanzadeh and Tamleh (2023), and occurring at least three times in the collected corpus but not enlisted by the mentioned researchers. Of these, 10 were grammatical and appropriate (e.g., "*It is important to note* that the study involved only pre-intermediate students."), eight were functionally inappropriate (e.g., "*In line with* the existing research, the present study investigated an under-researched variable.), and seven were grammatically incorrect (e.g., *Despite the fact this study*, their investigation was only concerned with meta-discourse markers.). Each of the four tests encompassed a roughly equal number of items on research-, text-, and participant-oriented LBs based on Hyland (2008) (i.e., eight, eight, and nine items respectively). Moreover, pre and post TGJTs contained an identical set of LBs, as did pre and post UGJTs, and both were presented on screen; however, TGJTs involved an item-by-item screen play with a five sec time limit for each, while UGJTs appeared on the screen in the test's full form, and could be answered in no more than 30 minutes. Psychometric evidence for the construct validity of TGJTs as a measure of implicit linguistic knowledge and UGJT as a measure of explicit linguistic knowledge was provided by R. Ellis (2005). Given the idiosyncratic structural and functional features of LBs, they could be regarded as grammatical phenomena, and measured through GJTs. LBs sampling for inclusion in the tests was done on the basis of an initial informal survey with a similar 28-member group of intermediate English-major MA students, in which all LBs detected by Hassanzadeh and Tamleh (2023) contained in the corpus (irrespective of their frequency) ($N = 89$) as well as corpus-contained LBs with a minimum dispersion of three ($N = 56$) was presented in print. The students marked them as either known or unknown. Those LBs that were unknown to more than 50% of the learners were selected. This condition was set to make sure the participants had not incidentally learnt them through exposure. In the subsequent item writing phase, contextual adequacy, intermediate proficiency level suitability, and rough equality of items' length were three main considerations. Items were then proofread by two applied linguistics assistant professors specializing in discourse analysis for context adequacy, appropriacy, and grammaticality, and their comments were applied. Items were also given to three intermediate proficiency MA students to check for comprehensibility and level appropriateness. The four versions were then piloted with a 23-member group of MA English-major students to test parallelness. Similar mean scores on the four GJTs was shown in non-significant F values obtained from two one-way ANOVAs ($F_{TGJTs} = 2.85$; $p > .05$; $F_{UGJTs} = 1.59$; $p > .05$). This showed the tests' parallelness. All four GJTs were scored out of 25, and Cronbach's alpha coefficients of .87, .79, .91, .93, run on pretest scores, showed the internal consistency of pretest UGJT, posttest UGJT, pretest TGJT, and posttest TGJT scores respectively.

Oral Elicited Imitation Test (OEIT)

Two parallel 25-item versions of OEIT, with an identical set of LBs randomly sampled from this study's LBs set (see Timed and Untimed Grammaticality Judgment Test (GJT)), were developed as the second measure of implicit LBs knowledge. OEIT was shown to be a construct valid measure of implicit linguistic knowledge in R. Ellis' (2005) study. Each OEIT version comprised 12 simple and 13 clause complexes. Of these, 10 were grammatical and functionally appropriate (e.g., "*For the most part*, studies have shown similar findings."), eight were ungrammatical (e.g., "*There could be argued* that instruction was offered over a short period of time."), and the remaining seven were functionally inappropriate (e.g., *The findings are mixed* as almost all research has produced similar results.") These were screened for context adequacy, grammaticality, appropriateness, and proficiency level suitability by two applied linguistics assistant professors. Items were also piloted for level suitability and comprehensibility with four intermediate EFL learners at a language school in Tehran. Parallelness of the pre- and posttests was shown in a statistically insignificant independent samples t value run on pre- and posttest means ($t = 1.75$; $p > .05$) with a group of 21 intermediate English-major students. Following Erlam (2006), to make sure the test measured implicit knowledge, the participants were instructed to focus on the meaning of each item before repeating it in its correct and appropriate form with a 10 sec

time limitation. The items were played on an MP4 player headphone into the respondents' ears. The test was scored out of 25, and hesitations over LBs' repetition or partial or total regression over them was taken as lack of implicit knowledge of them. Finally, a Cronbach's alpha coefficient of .83 on pretest scores showed OEIT's reliability.

Metalinguistic Knowledge Test (MKT)

In addition to UGJT, MKT was used to measure explicit LBs knowledge. R. Ellis (2005) investigated the construct validity of MKT, and found scores to load along with UGJT scores on one factor. The two parallel (pre- and posttest) 25-item researcher-made MKTs represented an identical randomly sampled set of LBs from the pool of 51 unknown LBs detected in an earlier stage (see Timed and Untimed Grammaticality Judgment Test (GJT)). Respondents were required to read items presented in printed form, detect grammatically and/or functionally problematic ones, indicate the problems, and write the correct version of each at their leisure in no more than 60 minutes. Each MKT contained 16 simple and nine complex clauses; of these, 10 were correct, which were not scored; of the remaining 15 items that were scored, eight were structurally incorrect (e.g., "The results can be interpreted in terms of *the extent in which* instruction affected short-term memory."), and seven were functionally inappropriate (e.g., "We speculate that the treatment was definitely effective."). Items were reviewed by two assistant professors of applied linguistics for form, context, and proficiency level suitability. The tests were subsequently piloted with four intermediate EFL learners for proficiency level suitability. Pre- and post-test MKTs were shown to be parallel in a non-significant independent samples' t value ($t = 1.72$; $p > .05$) based on scores obtained from a group of 18 intermediate English-major students. A Cronbach's alpha coefficient of .79 run on pretest MKT scores showed the test's internal consistency.

Corpus Compilation and LBs Identification

Prior to expediting the experiment, the researcher compiled a corpus of 13 research articles' discussions, published in four reputable applied linguistics journals, indexed in the Web of Science with an impact factor above 2, namely Applied Linguistics (N = 4); TESOL Quarterly (N = 4); Journal of English for Academic Purposes (N = 4); and Assessing Writing (N = 4). All the articles had been authored by native English speakers, which was ensured through a scrutiny of their names, nationalities, and affiliations. This precaution was made to make sure authors' first languages other than English had no bearing on the study's results. Moreover, the articles reported quantitative research, which was important owing to the discursive associations of research methodology (e.g., Bagherkazemi et al., 2023). The corpus totaled 2376 words and addressed aspects of academic writing to ensure its compatibility with the "academic writing" syllabus objectives. Subsequent to corpus compilation, four-word LBs with a minimum frequency of three were located through Antconc (Version 3.5.2.0). LBs' inclusion in the study was made on the basis of three reservations. Firstly, delimiting LBs distribution to only four-word LBs was intentional owing to research evidence as to their greater frequency than five-word strings, greater structural and functional clarity than three-word LBs, and their prevalent incorporation of three-word LBs (e.g., "as a result" in "as a result of") (Cortes, 2006; Hyland, 2008). Secondly, the basis of analysis was the 144 four-word LBs that Hassanzadeh and Meimeh (2023) detected in their 300000-word corpus of applied linguistics research articles' discussions; however, among these and other four-word strings located in the study's corpus, only those that had clear structural and functional attributes were taken into consideration to ensure their amenability to instruction. To exemplify, "this was not the" was discarded, and "it is likely that" was included. Regarding functions, some were directly related to the discussion section's main moves (e.g., "there is some counterevidence" to present contradictory findings), while others were of a more general nature (e.g., "the extent to which"). Thirdly, only those LBs with a frequency of three or more in the corpus were included. The LBs' frequency in the corpus ranged from 3 to 14. For the second and third points just mentioned, the list produced by AntConc was jointly scrutinized by the researcher and an assistant professor of applied linguistics, who was also a published author in discourse analysis. Those LBs that met the inclusion criteria made up a list of 62 LBs, of the frequency, structure, and function were designated and explained to EIG (see Appendix for the list of targeted LBs).

Data Collection Procedure

The study was embarked with the convenience sampling of the participants, and their random assignment into MFG and EIG, following their research participation consent form completion. The course they had both enrolled on was “academic writing,” as an optional MA English language teaching course, and was run by the researcher in both groups. TJGT, OEIT, UGJT, and MKT were given in the first session of the course, while OPT was taken online by the participants on the same day after university. Instruction spanned 13 30-min sessions, offered as an extension of the regular class time. In the first five minutes, both groups were presented with a PowerPoint presentation of the purpose and results of the study reported in the article by the researcher-instructor, so that they would be familiarized with its content. MFG was subsequently presented with the discussion section in printed form. The instructor read it aloud, and elaborated on its concepts and ideas. In other words, the main purpose was to discuss the content of the discussion section of each article, and to intentionally avoid awareness raising in relation to LBs. No emphasis was made on LBs and their attributes, and only the content was examined in view of the main discussion moves. Move-oriented content instruction was followed by the learners’ re-reading of the text and writing of a one-paragraph summary of it. Feedback on the students’ writing, which was offered the next session in written form, was entirely focused on content. On the other hand, EIG was presented with the same texts, though the targeted LBs were boldfaced. The instructor explained the structural and functional attributes of the graphically enhanced LBs while reading the texts, focusing learners’ attention on the move-based functions of the discussion section. To exemplify, upon reading the sentence containing “contradictory findings were reported ...” as a boldfaced LB, the instructor explained its structure and function as a noun-phrase and descriptive research-oriented LB, used in a main move of the discussion section, namely, “contradictory findings presentation” (see Peacock, 2015). Alternatives including “counterevidence comes from the ...” were also presented and discussed. This explanatory phase was followed by a summary paragraph writing task in which the participants were required to use at least three of the LBs instructed in the respected session. Next-session written feedback exclusively addressed LBs’ structural felicity and functional appropriateness in the students’ writing. Finally, in the last session of the course, the parallel versions of TGJT, OEIT, UGJT, and MKT were administered. Order of test administration was alternated between implicit and explicit measures at pre- and post-treatment phases to counter order effect as a validity threat.

Data Analysis Procedure

To analyze the data, pretest, posttest, and gain scores on the following six measures were designated:

1. TGJT [score range: 0-25]
2. OEIT [score range: 0-25]
3. Averaged aggregate implicit knowledge measures (AIKMs; defined as an equally weighted combined score on both TGJT and OPI) [score range: 0-25]
4. UGJT [score range: 0-25]
5. MKT [score range: 0-25]
6. Averaged aggregate explicit knowledge measures (AEKMs; defined as an equally weighted combined score on UGJT and MKT) [score range: 0-25]

The research questions were answered through three one-way ANOVAs on (a) pretest scores, (b) posttest scores, and (c) gain scores of the two groups.

Results

This study addressed the question of whether meaning-focused and explicit instruction of LBs contained in the discussion section of research articles differentially affected EFL learners’ implicit and explicit knowledge of them. Table 1 presents descriptive statistics of the six pretest and posttest score sets (i.e., TGJT, OEIT, AIKMs, UGJT, MKT, and AEKMs scores) for EIG and MFG. Univariate normality of

all score sets was ensured in ratios of skewness and kurtosis to their related standard error values falling within the range of ± 2 (Field, 2009). Descriptives showed EIG's greater increase of mean scores, particularly in explicit LBs knowledge measures from the pre-treatment to the post-treatment phase.

Table 1*Descriptive Statistics of EIG and MFG's Pretest and Posttest Score Sets*

Group	Test		Min	Max	Mean	SD	Skewness Statistic	SE	Kurtosis Statistic	SE
EIG	Pretest	TGJT	4	12	7.85	2.87	.13	.44	-1.13	.87
		OPI	6	14	9.40	2.27	.469	.44	-.549	.87
		AIKMs	5	13	8.62	2.22	.448	.44	-.603	.87
		UGJT	4	14	7.70	3.07	.542	.44	-.583	.87
		MKT	2	8	4.44	1.78	.230	.44	-.594	.87
		AEKMs	3	9	6.07	1.41	-.141	.44	-.101	.87
	Posttest	TGJT	8	22	17.22	3.42	-.515	.44	.486	.87
		OPI	12	24	18.44	2.73	-.142	.44	.040	.87
		AIKMs	13	23	17.83	2.58	-.028	.44	-.459	.87
		UGJT	8	24	17.14	3.98	-.491	.44	-.059	.87
		MKT	6	16	11.11	2.56	-.489	.44	.082	.87
		AEKMs	10	18	14.16	2.09	.256	.44	-.409	.87
	Gain	TGJT	4	14	9.37	2.64	-.11	.44	.04	.87
		OPI	6	14	9.03	2.37	.17	.44	-.95	.87
		AIKMs	7	14	9.20	1.84	.80	.44	.21	.87
		UGJT	-2	18	9.44	4.31	-.38	.44	1.29	.87
		MKT	0	14	6.66	2.93	.00	.44	.85	.87
		AEKMs	5	14	8.09	2.17	.48	.44	.49	.87
MFG	Pretest	TGJT	4	12	9.03	2.02	-.89	.45	.04	.88
		OPI	4	13	10.15	1.80	-.83	.45	.40	.88
		AIKMs	4	11	9.59	1.64	-.68	.45	.13	.88
		UGJT	4	14	8.84	2.83	-.19	.45	-.86	.88
		MKT	2	8	4.30	1.76	.44	.45	-.27	.88
		AEKMs	3	10	6.57	1.94	-.09	.45	-.20	.88
	Posttest	TGJT	8	22	15.84	3.83	-.69	.45	-.29	.88
		OPI	12	22	18.84	2.66	-.64	.45	.29	.88
		AIKMs	14	20	17.34	2.36	-.29	.45	-1.56	.88
		UGJT	4	14	9.00	2.89	.12	.45	-.66	.88
		MKT	0	8	4.84	1.89	-.37	.45	.58	.88
		AEKMs	6	15	10.34	2.33	-.18	.45	-.32	.88
	Gain	TGJT	-3	16	6.80	5.14	-.49	.45	-.52	.88
		OPI	3	14	8.69	2.57	.11	.45	-.05	.88
		AIKMs	3	13	7.75	3.07	-.22	.45	-1.24	.88
		UGJT	-4	6	.15	2.64	.18	.45	-.56	.88
		MKT	-4	4	.53	1.74	-.19	.45	1.10	.88
		AEKMs	-1	10	3.76	2.74	.28	.45	-.20	.88

In order to answer the research questions, pretest, posttest, and gain scores were separately compared through three one-way ANOVAs. Firstly, the assumption of variance homogeneity was checked through Levene's test. Levene's statistic was not significant for pretest TGJT, AIKMs, UGJT, MKT, and AEKMs ($p > .05$), indicating homogeneity; however, it was significant for OEIT ($p < .05$), which led the researcher to report Welch's more robust measure of means equality (see Sullivan & Fein, 2012) (see Table 2). With adjusted degrees of freedom, Welch was not significant for any of the six pretest measures, indicating inter-group homogeneity in terms of both implicit and explicit LBs knowledge [$F_{TGJT}(1, 46.80) = 3.02, p > .05$; $F_{OEIT}(1, 49.22) = 1.75, p > .05$; $F_{AIKMs}(1, 46.96) = 3.06, p > .05$; $F_{UGJT}(1, 50.91) = 1.97, p > .05$; $F_{MKT}(1, 50.96) = .07, p > .05$; $F_{AEKMs}(1, 45.57) = 1.15, p > .05$].

Table 2*Welch Results for Pretest Implicit and Explicit Score Sets*

Pretest		Levene's Statistic		Between-Groups Welch Results			
		Value	Sig.	Statistic	df1	df2	Sig.
Implicit	TGJT	2.31	.13	3.02	1	46.80	.08
	OEIT	4.24*	.04	1.75	1	49.22	.19
	AIKMs	3.52	.06	3.06	1	46.96	.08
Explicit	UGJT	.11	.73	1.97	1	50.91	.16
	MKT	.12	.72	.07	1	50.96	.78
	AEKMs	2.47	.12	1.15	1	45.57	.28

*Significant at .05 level

Two further ANOVAs were conducted on EIG and MFG's posttest and gain scores. All the posttest score sets enjoyed variance homogeneity, as shown in non-significant Levene's statistics (see Table 3). The F statistic was significant for posttest explicit knowledge measures [$F_{UGJT} = 71.94$, $p < .05$; $F_{MKT} = 101.95$, $p < .05$; $F_{AEKMs} = 39.37$, $p < .05$], but not for posttest implicit knowledge measures [$F_{TGJT} = 1.90$, $p > .05$; $F_{OEIT} = .29$, $p > .05$; $F_{AIKMs} = .51$, $p > .05$]. This showed EIG's greater improvement in terms of explicit LBs knowledge.

Table 3*ANOVA Results for Posttest Implicit and Explicit Score Sets*

Pretest		Levene's Statistic		Between-Groups ANOVA Results for 1 degree of freedom			
		Value	Sig.	Sum of Squares	Mean Square	F	Sig.
Implicit	TGJT	.15	.69	25.08	25.08	1.90	.17
	OEIT	.02	.97	2.13	2.13	.29	.59
	AIKMs	.01	.89	3.14	3.14	.51	.47
Explicit	UGJT	2.10	.15	879.38	879.38	71.94*	.00
	MKT	1.88	.17	519.87	519.87	101.95*	.00
	AEKMs	.60	.44	193.33	193.33	39.37*	.00

*Significant at .05 level

A scrutiny of ANOVA results run on gains scores yielded similar results (see Table 4). Lack of variance homogeneity in the case of TGJT, AIKMs, and MKT gain scores was evident in significant Levene's statistics ($p < .05$). Accordingly, Welch statistics, which are reported for adjusted degrees of freedom, would provide a more stringent measure of means' equality. Welch's statistic was significant for UGJT, MKT, and AEKMs [$F_{UGJT}(1, 43.40) = 89.89$, $p < .05$; $F_{MKT}(1, 42.67) = 85.99$, $p < .05$; $F_{AEKMs}(1, 47.61) = 40.16$, $p < .05$], but not significant for TGJT, OEIT, and AIKMs [$F_{TGJT}(1, 37.05) = 5.13$, $p > .05$; $F_{OEIT}(1, 50.30) = .25$, $p > .05$; $F_{AIKMs}(1, 40.57) = 4.31$, $p > .05$]. In other words, EIG's gain scores on explicit knowledge measures were significantly greater than those of MFG. To recapitulate, despite pretest homogeneity, EIG's posttest and gain scores on explicit LBs knowledge measures were significantly higher; however, no significant difference was observed regarding scores on implicit LBs knowledge measures.

Table 4*Welch Results for Implicit and Explicit Gain Score Sets*

Gain scores		Levene's Statistic		Between-Groups Welch Results			
		Value	Sig.	Statistic	df1	df2	Sig.
Implicit	TGJT	12.33*	.00	5.13	1	37.05	.069
	OEIT	.00	.98	.25	1	50.30	.615
	AIKMs	9.93*	.00	4.31	1	40.57	.074
Explicit	UGJT	1.90	.17	89.89*	1	43.40	.000
	MKT	4.51*	.03	85.99*	1	42.67	.000
	AEKMs	1.51	.22	40.16*	1	47.61	.000

*Significant at .05 level

Discussion

This study was designed to compare effects of meaning-focused and explicit instruction of LBs in research articles' discussions on implicit and explicit knowledge of them. The results showed that the latter was significantly more effective for the development of explicit LBs knowledge, though no difference was detected regarding implicit LBs knowledge. The findings can be theoretically rationalized in terms of explicit instruction's potential to bring forms (the structure and function of each targeted LB) into the learners' conscious attention, and beyond that, create in them metalinguistic awareness of phraseological language that might have otherwise passed unnoticed. The former, which is the essence of the noticing hypothesis, was achieved through the graphic enhancement of LBs instances. The latter was induced by the instructor's focused explanation of structural and functional attributes of each targeted LB. The metalinguistic awareness could have probably equipped learners with a means of tackling the processing contingencies of performance on posttest UGJT and MKT. Moreover, in view of the difficulty learners experience with discussion writing, EIG might have taken on a more welcoming attitude to the treatment, compared with meaning-focused instruction, hence their superior performance on explicit measures. As the course was "academic writing," they probably found explicit instruction of discourse features more relevant to their needs and wants.

From a psycholinguistic perspective, treatment to EIG can be said to have facilitated LBs learning in declarative memory since all explicit learning is supposed to be initiated in this long-term memory system (R. Ellis, 2008). Following Ullman (2015, p. 139), "conscious attention to input stimuli and an attempt to understand underlying rules or patterns, can increase learning in declarative memory." This can be said to be particularly evident in the participants' performance on MKT, which compelled them to articulate why they rated some statements as ungrammatical (see R. Ellis, 2005). Conversely, treatment offered to MFG did not capitalize on LBs' forms. Accordingly, it failed to lead to metatalk and consequently enhance metalinguistic awareness and declarative knowledge of LBs, as essentials for thriving in explicit knowledge measures. Based on the declarative/procedural memory seesaw effect proposed by Ullman (2015), exposure to LBs in the absence of explicit instruction likely triggered reliance on procedural memory, at the expense of learning in declarative memory; however, given the low frequency of the targeted LBs in this study's corpus (3 or more), movement from there to implicit L1-like learning, which is considered the ultimate attainment in procedural processing, was inhibited. EIG and MFG's non-significant difference in terms of their scores on posttest implicit measures confirms this line of argumentation. It can be surmised that more frequent exposure could have led to MFG's significantly better performance on posttest implicit measures.

In addition, EIG's superior performance on only explicit measures can be discussed in terms of Germain's (2018) neurolinguistics account of language acquisition. He postulates that explicit instruction fails to launch learning in the limbic system and is accordingly demotivating. To him, all learning should begin in procedural memory in order for implicit knowledge to be in place. This

standpoint goes against the skill acquisition-based belief that explicit L2 knowledge can transform into implicit knowledge through practice (see Dekeyser, 1998). Regarding the concerns of the present study, lack of a between-groups difference in terms of implicit LBs knowledge could be taken as partial evidence for this explicit-to-implicit knowledge non-transformability and also for the dissociability of these two knowledge types proposed by Paradis (2004).

The nature of measures of implicit and explicit LBs knowledge could have had some bearing on the results. Dominance of explicit knowledge measures in Iran's educational system, including language assessment at both state and private sectors has been shown by researchers (e.g., Ghobadi Mohebbi & Khodadadi, 2011). Accordingly, familiarity with explicit measures, contra implicit measures, paired with explicit instruction offered to EIG could partly explain their significant improvement over MFG. In other words, unlike MFG, EIG enjoyed "teaching to the test," which has been shown to affect learning outcome (R. Ellis, 2008). Had both groups had some experience with TGJT and OEIT as implicit measures of linguistic knowledge, the results could have been different.

In line with the present study's finding, Kazemi et al. (2014) and Birhan (2021) found explicit instruction conducive to enhanced LBs use in students' writing; they both deployed the metalinguistic explanation of LBs' structure and function and a subsequent production task; however, whether the resultant use of LBs in learners' written production called upon implicit or explicit knowledge begs the question, considering these studies' lack of differentiation between the two knowledge types. On the other hand, meaning-focused treatment, as operationalized in this study, can be partially mapped onto Razmjoo and Montasseri's (2018) authentic texts' extensive reading condition, which proved to exert less influence than an adaptive texts' extensive reading condition on LBs use frequency in the learners' summaries. This study and the present research might indicate that the rather low frequency of LBs in authentic written academic discourse can impede their implicit learning in procedural memory.

Conclusion and Implications

Scarce interventionist research evidence into LBs has left the question of how to approach instructing them unanswered. This is while LBs constitute a main feature of written academic discourse, the discussion section included. As an instance of interventionist research, this study showed that the explicit instruction of graphically enhanced LBs contained in the discussion section of research articles in applied linguistics has a more significant effect on learners' explicit knowledge of them, compared with meaning-focused instruction. No difference was, however, detected between them in terms of their effect on implicit knowledge. A number of conclusions can be drawn from the findings. Firstly, metalinguistic awareness of LBs induced by targeted explicit instruction is significantly greater than that brought about through exposure or meaning-focused instruction alone. Secondly, it can be assumed that implicit LBs knowledge development is not directly mediated by the instruction's mode (i.e., its implicit/explicit nature); nonetheless, in the absence of a control group, interpretations as to the potential of each for inducing such knowledge should be made cautiously. Thirdly, explicit knowledge of LBs induced by explicit instruction does not transform into implicit knowledge through limited production practice, as operationalized in the paragraph writing practice task in this study. Fourthly, neither explicit nor meaning-focused instruction seems to have the capacity to equally effectuate both implicit and explicit knowledge development;

Theoretically, the findings of this study confirm the significance of form-focused instruction for the learning of low frequency language structures (i.e., LBs in this study). Instructional provision for noticing targeted forms through their typographic enhancement and developing metalinguistic awareness through language related episodes would pave the way for explicit knowledge development. Pedagogically, the results underscore the explicit treatment of LBs contained in various sections of research articles and other academic genres as a means of aiding learners develop explicit knowledge of them. The rationale is failure of meaning-focused instruction to compare with explicit instruction in bringing about this knowledge type. Instructors can explicitly raise learners' awareness of the structural and functional attributes of LBs in written academic discourse in the hopes of promoting their comprehension and production of EAP texts. This gains precedence in regard to the discussion section

with its functionally preordained generic moves and argumentative nature partly verbalized through LBs.

Last, but not least, since the study was conducted on the discussion section of 13 research articles, the minimum frequency of LBs with clear functional attributes was set at three. Had there been more instances of each treated LB, meaning-focused instruction might have produced significant results, at least in terms of implicit LBs knowledge. Accordingly, further research can be carried out with fewer LBs of higher frequency counts in the input to find out if this would be the case. Moreover, inclusion of a control group in the study's design would render creditable interpretations regarding the individual, rather than comparative, effects of the two treatment conditions on LBs knowledge. Future studies can also address frequency of exposure, practice amount and task types, and treatment length among potentially contributing factors to implicit LBs knowledge. An additional research thread could investigate whether explicit LBs knowledge is transformable into implicit LBs knowledge through intervention, and, if answered in the affirmative, what instruction and task features implicate in this transformability need to be researched in further studies. Finally, implementing an instructional module that aims at promoting both internal and external knowledge of LBs, e.g., Germain's (2018) neurolinguistics approach, could possibly add to the literature on LBs. This is important since declarative and procedural memories interact with each other in performing linguistic tasks (Ullman, 2015), including EAP reading and writing.

Declaration of Conflicting Interests

The authors hereby state that they do not have any conflicts of interest to declare.

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Appendix: LBs Included in the Study

Rank	LB	Frequency	General function	Structure
1.	in the present study	14	referential	PP
2.	it is possible that	11	participant-oriented	VP (sentence case)
3.	in the context of	11	research-oriented	PP
4.	is important to note	10	participant-oriented	VP
5.	despite the fact that	8	research-oriented	PP
6.	in contrast to the	8	research-oriented	PP
7.	in relation to the	8	research-oriented	PP
8.	with respect to the	8	research-oriented	PP
9.	could be argued that	7	participant-oriented	VP
10.	for the most part	7	research-oriented	PP
11.	in line with the	7	research-oriented	PP
12.	may be the case	7	participant-oriented	VP
13.	on the one hand	7	research-oriented	PP
14.	in the process of	7	research-oriented	PP
15.	it may be that	6	participant-oriented	VP (sentence case)
16.	the degree to which	6	research-oriented	NP
17.	in addition to the	6	research-oriented	PP
18.	contradictory findings were reported	6	research-oriented	NP
19.	along the same lines	6	research-oriented	PP
20.	could be attributed to	6	participant-oriented	VP
21.	it likely resulted in	6	participant-oriented	VP (sentence case)
22.	similar findings can be	5	research-oriented	NP
23.	theoretical justification comes from	5	research-oriented	NP
24.	it is questionable whether	5	participant-oriented	VP (sentence case)
25.	an issue to consider	5	participant-oriented	NP
26.	that more clearly represents	5	participant-oriented	NP
27.	it was previously noted	5	referential	VP (sentence case)
28.	are more likely to	4	participant-oriented	VP
29.	purpose of the study	4	research-oriented	NP
30.	concerning the fact that	4	research-oriented	VP
31.	was confirmed to be	4	research-oriented	VP
32.	yielded rather similar findings	4	research-oriented	VP
33.	prior research showed the	4	research-oriented	PP
34.	lay the groundwork for	4	research-oriented	VP
35.	is not without limitations	4	research-oriented	VP
36.	theory and research suggested	4	research-oriented	NP
37.	the findings are mixed	4	research-oriented	NP
38.	one possible explanation is	4	participant-oriented	NP
39.	may be due to	4	participant-oriented	VP
40.	in light of the	4	research-oriented	PP
41.	in terms of their	4	research-oriented	PP
42.	previous research indicated that	4	research-oriented	NP
43.	with regard to the	4	research-oriented	PP
44.	a wide range of	4	research-oriented	NP
45.	tend(s) to converge with	4	participant-oriented	VP
46.	results are incongruent with	4	research-oriented	NP
47.	another issue concerns the	3	research-oriented	NP
48.	might have resulted in	3	participant-oriented	VP
49.	may be considered as	3	participant-oriented	VP
50.	this may reflect the	3	participant-oriented	VP
51.	findings are compatible with	3	research-oriented	NP
52.	we speculate that the	3	participant-oriented	VP (sentence case)
53.	as a function of	3	research-oriented	PP
54.	could be viewed as	3	participant-oriented	VP
55.	this could suggest that	3	participant-oriented	NP
56.	they may reflect the	3	participant-oriented	VP (sentence case)
57.	has been largely studied	3	research-oriented	VP
58.	make any generalizations beyond	3	research-oriented	VP
59.	may have contributed to	3	participant-oriented	VP
60.	the extent to which	3	research-oriented	NP
61.	argument finds support in	3	research-oriented	NP
62.	there is some counterevidence	3	research-oriented	VP (sentence case)