A Corpus–Based Study of Lexical Bundles and Moves by English L1 and L2 Writers in Medical Journal Abstracts

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Kim, Eun-Soo and Eun-Joo Lee. (2020). A corpus–based study of lexical bundles and moves by English L1 and L2 writers in medical journal abstracts. Korean Journal of English Language and Linguistics 20, 768–800. Many English L2 writers in the field of medicine encounter difficulties when writing English-medium journal abstracts. Previous studies have shown a need to improve the quality of medical journal abstracts when reporting randomized controlled trials (RCTs). Thus, it is important to gain sensitivity to the use of lexical bundles commonly shared by community members. However, little research has been conducted to explore the characteristics of lexical bundles between English L1 and L2 writers in medical journal abstracts. This study aims to investigate the use of lexical bundles and those with keywords between native speakers of English (NSE) writers and Korean non-native speakers of English (NNSE) writers by examining essential items connected to the moves of medical journal abstracts. The study extracted three to nine-word lexical bundles occurring at least five times across five different texts from prestigious medical journals published in English-speaking countries and Korea, respectively. Types and tokens of lexical bundles, including those with keywords, extracted at 0.0001 were examined between the corpora in accordance with each item of medical journal abstracts. It was observed that lexical bundles related to signals of research objectives, there-patterns, and hedges were frequently used by NNSE writers. On the other hand, NSE writers prominently used lexical bundles to report items related to research methodology, results with statistical markers, and negative events. The findings of the study show that NNSE writers lack awareness of discipline-specific conventions and essential items to include in medical journal abstracts.

Keywords: lexical bundles, medical journal abstracts, a corpus–based analysis, English L2 writers, randomized controlled trials (RCTs)

* The article is based on part of the first author’s doctoral dissertation.
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1. Introduction

An abstract is considered as a part-genre of research articles (Swales and Feak 2009) because it has obligatory moves (Hyland 2004) and controlled words and syntax (Huckin 2006) that conform to international standards (Friginal and Mustafa 2017). In the field of medicine particularly, editors are inundated with an enormous number of submissions and have little time to read the entire articles. They tend to read abstracts exclusively to make a quick decision on whether to reject or send manuscripts to content experts for peer review (Groves and Abbasi 2004). Abstracts serve as screening devices (Huckin 2006) to validate the quality of research. For that reason, it is important to write well-structured abstracts that are fully packed with essential information.

To increase the “quality, visibility, and retrievability” (Van Bonn and Swales 2007, p. 94) of medical journal abstracts, structured abstracts with eight headings (objective, design, setting, patients, interventions, main outcome measures, results, and conclusion) for clinical trials were provided by researchers (Haynes, Mulrow, Huth, Altman and Gardner 1990). Especially when reporting randomized controlled trials (RCTs) as one type of clinical trial, Consolidated Standards of Reporting Trials (CONSORT) groups recommend including essential items in medical journal abstracts. In addition to including the eight aforementioned items as the eight headings, six more items (randomization, blinding, numbers randomized, recruitment, numbers analyzed, and harms) were proposed by CONSORT groups. There have been several studies to examine the quality of medical journal abstracts based on the degree of adherence to CONSORT guidelines (Ghimire, Kyung, Kang and Kim 2012, Hays et al. 2016, Kyung, Kim and Kim 2012, Mbuagbaw et al. 2014, Shin, Kim, Oh, Chung and Kim 2015). As a result, many abstracts still do not adhere to CONSORT statements, demonstrating an inadequate reporting of some items. It is possible that writers were not explicitly aware of what information was required according to each item. Furthermore, keywords and phrases commonly used by community members when reporting items might not have been used by the writers in that they failed to adequately report items.

Many English L2 writers have difficulties in writing English-medium research articles. Particularly, writers are concerned about the linguistic elements and discourse organization expected by the journals in which they seek to have their manuscripts published (Cho 2009, Martin, Rey-Rocha, Burgess and Moreno 2014). Lexical bundles defined as the high frequency of multi-word sequences occurring across different texts in a given register (Biber and Barbieri 2007) help writers become familiar with rhetorical
structures and discourse functions commonly shared by community members in academic settings, gaining sensitivity to language use in a specific discipline (Hyland 2008). Despite the fact that an investigation of lexical bundles is valuable for writers and researchers to gain a better understanding of language use when reporting essential items in medical journal abstracts, no research has examined lexical bundles in medical journal abstracts based on items proposed by CONSORT groups. One of the ways English L2 writers can improve their medical writing proficiency and increase the chance to have their articles published in the prestigious international medical journals is to figure out the essential phraseology in the field of medicine (Saber 2012). However, little is known about the use of lexical bundles between English L1 writers and Korean writers as English L2 writers when reporting clinical trials or RCTs in medical journal abstracts.

This study aims to explore the use of lexical bundles, including those with keywords, between English L1 and L2 writers by examining essential items connected to the moves of medical journal abstracts. The keywords were salient words connected to key rhetorical steps of each move of medical journal abstracts. Types and tokens of lexical bundles and lexical bundles with keywords by essential items connected to the moves of medical journal abstracts were investigated between a native speakers of English (NSE) corpus and a Korean non-native speakers of English (NNSE) corpus.

The research question of the present study is as follows:

What are the characteristics of the use of lexical bundles and those with keywords between the NSE corpus and the Korean NNSE corpus when reporting essential items connected to the moves of medical journal abstracts?

2. Literature Review

2.1 Characteristics of Medical Journal Abstracts

2.1.1 Importance of medical journal abstracts

Medical journal abstracts are defined as "a packet of information" (Salager-Meyer 2006, p. 717) containing essential information about the whole article and "the window of work
available for easy evaluation” (McIntosh 1997, p. 3). Huckin (2006) asserted that medical journal abstracts serve as a summary, a navigator, a filtering device, and a quick retriever; they help the reader to save time, have a preview of the article, decide to read the article or not, and keep up with the most up-to-date research articles. Before reaching the content experts, the desk rejection or acceptance of research articles is first made by an editor’s decision based on reading medical journal abstracts. It was reported that editors in *BMJ (British Medical Journals)* routinely screened research articles by exclusively reading medical journal abstracts rather than reading the whole article (Groves and Abbasi 2004). For that reason, it is doubtless important to carefully write abstracts to contain the most essential information about the research purpose, methods, results, and discussion of an article in the field of medicine. As indicated by Huckin (2006), controlled words and specifically selected keywords are displayed in the format of medical journal abstracts; thus, the knowledge of language use including specialized terms is highly valued by members of the medical community.

According to Martín et al. (2014), multilingual scholars whose first language was not English experienced difficulties when writing English-medium research articles and were concerned about their lack of knowledge on writing conventions expected by community members in international medical journals as well lexical and grammatical errors. Even though the researchers indicated flaws of content-based features related to the methodology of their articles—not language usage—was not the main reason for their rejection, they agreed that many of the negative comments made by peer reviewers in the international community were associated with language usage, considering it as a secondary reason for rejection. Cho’s (2009) study also reported that Korean scholars in the field of science and engineering sometimes felt at a disadvantage due to language elements when writing research articles in English. In the study, one professor mentioned that reviewers negatively commented on his language use and that he felt that the reviewers were biased against non-native speakers of English. Flowerdew (2008) asserted the need to understand the characteristics of particular disciplinary communities and acceptable forms of English for community members rather than standard English. The reviewers mentioned in Cho’s study might have expected the professor to show language usage that includes technical terms commonly shared by community members rather than the use of general academic English. Researchers in previous studies claimed that English L2 writers needed explicit instruction to be familiar with writing conventions and language elements expected by specific disciplinary communities and journals from which they wished to get their manuscripts to be published. Since the present study investigates the use of lexical bundles
in journal abstracts when reporting clinical trials or RCTs based on guidelines by CONSORT groups, the findings of this study can be a valuable source when exploring the language usage and technological terms preferred by the medical community.

2.1.2 Characteristics of structured abstracts

Structured abstracts provide key contents under explicit headings (e.g., Introduction, Methods, Results, Discussion) in bold, as shown in Figure 1. Most medical journals strictly followed the IMRD format.

In the Introduction-Methods-Results-Discussion (IMRD) format, eight headings (objective, design, setting, participants, interventions, main outcome measures, results, and conclusion) for clinical trials were proposed by Haynes et al. (1990). The number and
names of headings could slightly differ depending on journals. Four headings were used in the New England Journal of Medicine, Lancet and American Journal of Medicine, whereas eight headings were used in the Journal of American Medical Association, Annals of Internal Medicine, and British Medical Journal. Furthermore, the names of headings were slightly different across journals (e.g., background or importance, objective or aim or purpose, results or findings, and discussion or conclusion or interpretation). Depending on the journal, the research importance and objective were provided separately or together under the heading “background.”

In terms of advantages, structured abstracts are easier to read and allow the reader to efficiently assess the validity and reliability of research findings, facilitate peer-review, and quickly determine the high quality of a research article (Van Bonn and Swales 2007). Aside from the text structuring, the careful use of linguistic elements helps to increase the readability of structured abstracts. Accordingly, the exploration of lexical bundles under the IMRD format can be worthy of understanding what language features authors commonly used to write well-structured medical journal abstracts.

2.1.3 Quality of medical journal abstracts based on CONSORT statements

The international Committee of Medical Journal Editors (ICMJE) defined clinical trials as “any research project that prospectively assigns human subjects to intervention or comparison groups to study the cause-and-effect relationship between a medical intervention and a health outcome” (De Angelis et al. 2004, p. 1250). As a type of clinical trial, RCTs “represent the gold standard in evaluating healthcare interventions” (Schulz, Altman and Moher 2010, p. 698). RCTs are specifically designed “to minimize bias and maximize objectivity” (Millar, Salager-Meyer and Budgell 2019, p. 141) by randomly allocating patients to a new treatment and a standard treatment to evaluate the efficacy and safety of the new treatment (Hackshaw 2009).
Guidelines with a list of items for reporting RCTs in medical journal abstracts were proposed by Consolidated Standards of Reporting Trials (CONSORT) groups. Apart from the eight items (objective, design, setting, participants, interventions, main outcome measures, main outcome, and conclusions) previously provided for reporting clinical trials, as shown in Figure 2, the CONSORT group specified six items (randomization, blinding, numbers randomized, recruitment, numbers analyzed, and harms) in the guidelines. The three additional items (authors, trial registration, funding) were not considered in the present study.

Based on the degree of adherence to CONSORT guidelines, previous studies investigated the quality of medical journal abstracts when reporting RCTs. The quality of abstracts in five journals (New England Journal of Medicine, Journal of the American Medical Association, Lancet, British Medical Journal, and Annals of Internal Medicine) was investigated and researchers concluded that there are still many abstracts where some items are poorly reported and that the quality of abstracts must be improved (Hays et al. 2016, Mbuagbaw et al. 2014). Ghimire et al. (2012) examined four of the abovementioned journals, with the exception of Annals of Internal Medicine, and concluded that several items were inadequately reported in the medical journal abstracts. As for the items that were poorly reported, four items (randomization, blinding, numbers randomized, and harms)
have been observed in previous studies. Other than the items, the numbers analyzed in Hays et al. (2016) and Ghimire et al. (2012), and conclusions in Mbuagbaw et al. (2014) and Ghimire et al. (2012) were found to be in common. In the case of reporting conclusions, researchers asserted that discussions of both benefits and negatives in a balanced way were not observed in many journal abstracts, heavily relying on positive results. In addition to the international medical journals, the quality of abstracts of journals published in Korea was evaluated based on CONSORT statements as well. Shin et al. (2015) examined abstracts in the Korean Journal of Anesthesiology, and Kyung et al. (2012) investigated those in the Archives of Pharmacal Research, Journal of Korean Medical Science, Journal of Korean Academy of Nursing, and Yonsei Medical Journal. Both studies indicated a lack of reporting of randomization, blinding, numbers analyzed, and harms. Compared to the abstracts in the New England Journal of Medicine, Kyung et al. (2012) indicated that the main outcome measures, recruitment, effect size and its precision, and harms were less frequently reported in the four Korean journals.

The previous findings showed that both writers in international medical journals and local journals (Korea) poorly reported randomization, blinding, and harms. Furthermore, the local journals were less likely to adhere to CONSORT guidelines compared to guidelines of the international journals. It remains possible that many authors do not know that there are guidelines proposed by CONSORT groups for when reporting RCTs in medical journal abstracts. Even if they realized the kinds of items, they might not have clearly understood what information the items required. Otherwise, keywords related to items were not detected by researchers who evaluated the quality of abstracts. By exploring lexical bundles in medical journal abstracts published in the USA, the UK, and Korea according to items in CONSORT guidelines, writers and researchers would have an opportunity to cultivate a better understanding of items and of which language features were commonly used by community members to report items in medical journal abstracts.

2.2 Previous Studies

2.2.1 Studies of lexical bundles in the field of medicine

There have been several studies of lexical bundles in the field of medicine. Gledhill (2000), Marco (2000), and Saber (2012) mainly focused on keywords, collocations, and then phraseological patterns of medical journal articles. Jalali and Moini (2014) mainly considered structures of lexical bundles based on a corpus of medical research articles.
Entire sections of medical research articles were investigated by Marco (2000) and Saber (2012), respectively, whereas Gledhill (2000) and Jalali and Moini (2014) only examined the introduction sections of articles.

There were only two studies to investigate phraseology in medical journal abstracts (Abdollahpour and Gholami 2018; López-Arroyo and Méndez-Cendón 2007). The researchers neither mainly examine clinical trials or RCTs nor connect phraseological units to rhetorical steps based on CONSORT statements. Although Saber (2012) matched phraseological patterns with some of the essential items proposed by CONSORT groups for journal articles, there has been no research to investigate lexical bundles in journal abstracts for clinical trials or RCTs as well as the connection of those to essential items for journal abstracts when reporting RCTs. As asserted by Cortes (2013), more focused corpora are needed; thus, corpora comprising a specific research design such as RCTs seem to be needed in further research. Given the publication dates and kinds of journals, no studies included the most up-to-date journals and only a few studies investigated high impact general medical journals such as the New England Journal of Medicine, Journal of the American Medical Association, Lancet, British Medical Journal, and Annals of Internal Medicine. The present study comprised one of the corpora to include medical journal abstracts for reporting clinical trials or RCTs published between 2008 and 2019 from the abovementioned high-impact medical journals, investigating lexical bundles and those with keywords related to items in the CONSORT guidelines.

2.2.2 Studies of lexical bundles between English L1 and L2 writers

Based on an analysis of corpora comprising research articles written by English L1 and L2 writers, Chen and Baker (2010) and Pérez-Llantada (2014) investigated lexical bundles in multiple disciplines, whereas Esfandiari and Barbary (2017) and Pan, Reppen, and Biber (2016) examined those in psychology and telecommunications, respectively. Lu and Deng (2019) analyzed corpora consisting of doctoral dissertation abstracts written by English L1 and L2 writers in the field of science and engineering. Although life science in Chen and Baker (2010) and urology, hematology, and oncology in Pérez-Llantada (2014) were included in the corpora, there has been no published research to explore the use of lexical bundles between English L1 and L2 writers that focuses exclusively on the field of medicine. As English L2 writers, Chinese (Chen and Baker 2010, Lu and Deng 2019, Pan et al. 2016), Persian (Esfandiari and Barbary 2017), and Spanish (Pérez-Llantada 2014) speakers have been targeted in previous studies. However, little research has been
conducted on Korean writers as English L2 writers. The present study thus aims to explore the use of lexical bundles between English L1 and L2 writers (Korean) in journal abstracts for reporting clinical trials or RCTs in the field of medicine based on the essential items proposed by CONSORT groups.

3. Method

3.1 Corpora

The study used two corpora comprising medical journal abstracts where clinical trials or randomized RCTs were reported by NSE writers and Korean NNSE writers. The authors were medical experts such as doctors, nurses, pharmacists, and other types of professionals in clinical settings targeting humans.

<table>
<thead>
<tr>
<th>Corpora</th>
<th>NSE corpus</th>
<th>NNSE corpus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article types</td>
<td>RCTs</td>
<td>RCTs</td>
</tr>
<tr>
<td></td>
<td>326</td>
<td>326</td>
</tr>
<tr>
<td></td>
<td>(105,504 words)</td>
<td>(70,811 words)</td>
</tr>
<tr>
<td>Clinical Trials</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>(31,206 words)</td>
<td>(23,234 words)</td>
</tr>
<tr>
<td></td>
<td>280</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>(93,480 words)</td>
<td>(62,118 words)</td>
</tr>
<tr>
<td></td>
<td>151</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td>(43,230 words)</td>
<td>(31,927 words)</td>
</tr>
<tr>
<td>Total no. of abstracts</td>
<td>431</td>
<td>431</td>
</tr>
<tr>
<td></td>
<td>(136,710 words)</td>
<td>(94,045 words)</td>
</tr>
<tr>
<td>Mean lengths</td>
<td>317 words</td>
<td>218 words</td>
</tr>
<tr>
<td>(word limit)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As proposed by Wood (2001), each of the writers’ first and last names originated from English L1 countries and Korea, respectively, and were either affiliated with an English–speaking country (USA and UK) or Korea. When it was difficult to determine whether they were native speakers of English because of questionable names, we searched their L1 background on the website. If no information was available, the articles written by them were excluded from this study. The present study minimized bias by controlling the number of texts (431), article types (clinical trials or RCTs), publication dates (2008–
2019), and species (humans) between the corpora, as shown in Table 1.

According to the criteria—representativity, reputation, and accessibility (Nwogu 1997)—prestigious journals were selected for the construction of the two corpora. In addition to these three criteria, the present study prioritized journals adopting structured abstracts and containing a high percentage of clinical trials or RCTs. Medical journal abstracts written by the NSE writers were excerpted from six leading journals (the *New England Journal of Medicine, Journal of the American Medical Association, Lancet, British Medical Journal, Annals of Internal Medicine, and American Journal of Medicine*) and those written by the NNSE writers were from eight leading journals (the *Yonsei Medical Journal, Journal of Korean Medical Science, Korean Journal of Internal Medicine, Korean Journal of Anesthesiology, Cancer Research and Treatment, Gut liver, Clinical and Molecular Hepatology*, and *Korean Journal of Gastroenterology*). Although the *Journal of Korean Medical Science* did not fully adopt structured abstracts between 2008 and 2017, it was one of the leading medical journals, with a large number of clinical trials or RCTs in Korea and abstracts following an Introduction-Methods-Results-Discussion (IMRD) format as well, such that the journal was included in the present study. All the journals were indexed in the Science Citation Index (SCI) and recommendations by the International Committee of Medical Journal Editors (ICMJE) were mentioned in the guidelines for authors to submit manuscripts. The ICMJE recommended that journals follow guidelines proposed by the Consolidated Standards of Reporting Trials (CONSORT) groups when reporting RCTs.

3.2 Identification of Lexical Bundles and Keywords

The present study set the word length of lexical bundles at three to nine words because of the maximum length of lexical bundles at the threshold of cut off points (at least 5 times). Based on the methodology of previous studies (Biber and Barbieri 2007, Cortes 2013), three to nine-word strings were defined as lexical bundles if they occurred at least five times across five different texts. Extracted lexical bundles from *AntConc 3.5.7* (Anthony 2018) were manually filtered based on exclusion criteria—lexical bundles that 1) ended with determiners (e.g., *patients in the*); 2) started with of (e.g., *of the trial*); 3) started or ended with and/or (e.g., *the safety and*); 4) subsumed in longer bundles whose frequency was below five after the exclusion of the same frequency (e.g., *a dose of* [24 times] subsumed in *at a dose of* [22 times]); 5) were considered as subject-specific technical terms (e.g., *coronary artery disease*); and 6) contained inserted numbers (e.g., *aged # to # years*). As indicated by Appel and Trofimovich (2017), lexical bundles ending
with determiners are not stored in language users’ long-term memory in general and those kinds of lexical bundles could have multiple functions. The present study attempted to include lexical bundles as meaningful phrases commonly used by community members in the field of medicine. For example, academic words or sub-technical words such as randomized controlled trial, double blind placebo controlled, the primary end point, the primary outcome, the primary care practices, serious adverse events, intention-to-treat were included in this study by referring to a glossary of medical terms. In addition to lexical bundles, we investigated keywords subsumed in lexical bundles in the moves of medical journal abstracts. Keywords were extracted at a keyword statistic threshold of 0.0001 as conservative values using the same software, AntConc 3.5.7. Types and tokens of lexical bundles were primarily investigated and the use of lexical bundles with keywords was secondly examined between the writers by each move of medical journal abstracts.

### 3.3 Essential Items in the Moves of Medical Journal Abstracts

This study mainly adopted checklist items suggested by CONSORT groups (Moher et al. 2010) with slight modifications. In addition to the checklist items (objectives, design, participants, interventions, main outcome measures, randomization, blinding, numbers randomized, recruitment, numbers analyzed, main outcome, harms, and general interpretation), detailed items of the checklist items were specified based on guidelines by CONSORT groups, and journals’ guidelines for authors to submit manuscripts. These are as follows: 1. background under the introduction section; 2. setting under the methods section; 3. effect size and precision under the results section, and; 4. positives, negatives, and further research under the discussion section. The essential items are shown in Table 2.

| Table 2. Essential Items in the Moves of Medical Journal Abstracts |
|------------------|------------------|------------------|------------------|
| Moves 1 and 2 (Introduction) | Move 3 (Methods) | Move 4 (Results) | Move 5 (Discussion) |
| Background | Design | Numbers randomized | General interpretation |
| Objectives | Setting | Recruitment | Positives |
| Participants | Participants | Numbers analyzed | Negatives |
| Interventions | Interventions | Main outcome | Further research |
| Main outcome measures | Main outcome measures | Effect size & Precision |
| Randomization | Randomization | Harms |
| Blinding | Blinding | | |
Lexical bundles associated with research importance and gaps were connected to background whereas those associated with research aims were matched to objectives. When specifying main outcomes, lexical bundles related to kinds of statistical markers were categorized into effect size and precision. Of the general interpretation, lexical bundles associated with benefits, harms, and additional studies were classified into positives, negatives, and further research.

3.4 Data Analysis

Lexical bundles finally selected from the study were connected to essential items in the moves of medical journal abstracts. As a second coder, a field expert independently categorized lexical bundles, and discrepancies between coders were discussed by focusing on the primary functions of lexical bundles in context. Inter–coder reliability was interpreted as “substantial agreement” based on Kappa values above 0.75 (Landis and Koch 1977) on average. Since the locations of statements associated with the follow–up and intention–to–treat analysis were not mentioned in guidelines, those identified in methods sections were connected to the participants rather than the design because the primary function was closely associated with patients randomized and included in the trial. Furthermore, those observed in the results were categorized into number randomized and number analyzed, respectively. Such lexical bundles as multicenter, open–label, and double–blind were connected to the design rather than the setting and blinding. Lexical bundles exclusively used for the description of the number of centers and blindness were connected to the setting and blinding because the CONSORT guidelines recommended detailing who was blinded to assignments rather than using the terms. By discussing discrepancies mentioned above, the coders reached a 100% agreement for the connection of lexical bundles to essential items in the moves of medical journal abstracts. After the categorization, lexical bundle types and tokens were examined between the corpora by essential items in the moves of medical journal abstracts to identify any significant difference in the use of lexical bundles between the writers. As Lu and Deng (2019) and Pan et al. (2016) used a Log–likelihood calculator to indicate statistical significance between the corpora, Log–likelihood (LL) values were computed at http://ucrel.lancs.ac.uk/llwizard.html. A LL of 10.83 or higher is significant at $p < 0.001$ and a LL of 15.13 or higher is significant at $p < 0.0001$. Of the lexical bundles used by the NSE and NNSE writers, shared/unshared keywords and lexical bundles with keywords were examined to investigate the use of those between the writers when reporting essential items in the moves of medical journal abstracts.
4. Results and Discussion

This paper builds on the results of Kim (2020). The frequency of the whole lexical bundles can be explored in Kim’s study. Tokens of lexical bundles associated with background were significantly higher in the NSE corpus than the NNSE corpus, as shown in Table 3. The finding suggests that NSE writers are more likely to provide a research background in terms of research importance and gaps to justify their research than their NNSE counterparts. On the other hand, types and tokens of lexical bundles associated with objectives were significantly higher in the NNSE corpus. The findings are consistent with those of Lu and Deng (2019) and Esfandiari and Barbary (2017). The findings suggest that English L2 writers tend to repeatedly use certain types of lexical bundles when reporting research objectives.

### Table 3. Types and Tokens of Lexical Bundles in Moves 1 and 2

<table>
<thead>
<tr>
<th>Essential items</th>
<th>Types (per 100,000 words)</th>
<th>Tokens (per 100,000 words)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NSE</td>
<td>NNSE</td>
</tr>
<tr>
<td>Background (e.g., has not been)</td>
<td>18 (93)</td>
<td>11 (61)</td>
</tr>
<tr>
<td>Objectives (e.g., we aimed to)</td>
<td>26 (135)</td>
<td>59 (326)****</td>
</tr>
</tbody>
</table>

***p < 0.001, ****p < 0.0001

Higher tokens of lexical bundles in research gaps in hard disciplines and research purposes in soft disciplines were found in the study of Omidian, Shahriari, and Siyanova–Chanturia (2018). The findings of their study suggest that Korean writers are more familiar with conventions in soft disciplines than hard disciplines. The use of lexical bundles by the NSE and the NNSE writers are shown in examples. The numbers in parenthesis next to the lexical bundles underlined are the frequency of the lexical bundles. To indicate research importance and gaps (Background), both writers used two shared lexical bundles (is associated with, has not been) with three shared keywords (is, has, been). Writers used the present tense (is, has, have, reduces) and present perfect tense forms (has not been, has been reported, have not been). The results lend support to findings from Gledhill (2000) and Saber (2012), who asserted that has and have in the passive voice were most often used to provide research context in the field of medicine. NSE writers focused on the research niche, whereas NNSE writers emphasized what has been known so far. Compared to NNSE writers, NSE writers more frequently indicated the
relationship between treatment and the reduction of the risk of patients’ health conditions by exclusively using *reduces* as a keyword.

1) **Background (Examples)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSE</td>
<td>… improve survival in patients with … but <strong>have not been</strong> (5) tested in …, a condition in which little progress has <strong>been</strong> made during the past decade.</td>
<td>It is unclear whether … <strong>reduces</strong> the risk (5) of … disease, and data … <strong>are limited.</strong></td>
</tr>
<tr>
<td>NNSE</td>
<td>… <strong>has been reported</strong> (6) to have anti-inflammatory and anti-bacterial effects.</td>
<td>… <strong>is a common</strong> (6) problem …</td>
</tr>
</tbody>
</table>

When specifying research purposes (Objectives), *to determine whether, we aimed to, to evaluate the effect of, to investigate whether, and we aimed to investigate* were found as the shared lexical bundles with the shared keywords (*determine, whether, we, aimed, evaluate, investigate, effect*). Other than those signals, the others were associated with research properties by using *the* *of* with fillers (*effectiveness, efficacy, safety*) as the shared keywords. Of the shared ones, *determine, whether, and effectiveness* were more frequently used by NSE writers, whereas *evaluate, compare, investigate, we, safety, efficacy, and effect* were more prominently employed by NNSE writers. The findings of the more frequent use of *determine* and exclusive use of *assess* by the NSE writers, as well as the exclusive use of *investigated* as a keyword by the NNSE writers, show that NNSE writers are more familiar with verbs prevalent in soft disciplines because *determine* and *assess* were prominently found in the field of medicine (Cavalieri 2014; Saber 2012) whereas *investigate* was frequently observed in the field of applied linguistics (Cavalieri 2014). Inconsistent with Lu and Deng’s (2019) findings, we followed by active verbs was more frequently observed in the NNSE corpus than in the NSE corpus. The finding could be due to the characteristics of medical disciplines, where many researchers are involved as a team in the process of medical research. Interestingly, NNSE writers exclusively used *the aim of this study was to, the purpose of this study was to, and this study aimed to* with unshared keywords (*this, study, aim, purpose, to, of*). On the other hand, NSE writers preferred an incomplete sentence starting with the *to-*clause (e.g., *To determine whether*) and employed *we aimed to and we hypothesized that* rather than using such lexical bundles as *this and study.*
2) **Objectives (Examples)**

**NSE**
- Ex.1 To **determine whether** (40) treatment ... results in ... improvement in patients with ...  
- Ex.2 **We aimed to** (32) assess the efficacy and safety of ...  
- Ex.3 **We hypothesized that** (5) ... could inhibit ...  

**NNSE**
- Ex.1 The **aim of this study** was **to** (45) evaluate the **effects of** (36) ...  
- Ex.2 The **purpose of this study was to** (20) evaluate the effect of ...  
- Ex.3 **This study aimed to** (10) evaluate the efficacy and safety of ...  

The use of structuring bundles such as the **aim/purpose of** in the field of psychology and the more frequent use of **this study** by English L2 writers (Persians) were reported in Esfandiari and Barbary’s (2017) study. NNSE writers appear to be more confident in the use of lexical bundles prevalent in soft disciplines than hard disciplines. Although the structuring bundles were observed in research articles published in the 1990s in the field of medicine (Gledhill 2000), they were rarely found in the NSE corpus. The finding suggests that NNSE writers could be insensitive to language usage preferred by present-day communities. Compared with findings of previous studies (Cortes 2013, Esfandiari and Barbary 2017, Hyland 2008), the use of the past tense in research objectives seems to reflect some different characteristics of medical disciplines because the present tense (e.g., **the purpose of this study is to**) was commonly found in soft disciplines. Furthermore, the more frequent use of **this study** by Persians and Koreans could be due to L1 transfer. In Saber’s (2012) study, the use of **to determine** and **we hypothesized that** were reported in the introduction and seemed to reflect community members’ preferences when reporting clinical trials or RCTs. Although **the effects of** was found as a shared lexical bundle, it was more frequently used by NNSE writers, and the plural noun (**effects**) was found as a keyword in the NNSE corpus. This finding shows that NNSE writers are more likely to use plural nouns than their counterparts.

Given the types and tokens of lexical bundles in the description of the methodology (Move 3), tokens of lexical bundles in setting, main outcome measures, randomization, and blinding were significantly higher in the NSE corpus. Partially consistent with the fact that community members in hard disciplines more frequently used lexical bundles in the description of methods compared to those in soft disciplines (Omidian et al. 2018), the findings show that NSE writers are more likely to detail their research procedures than their NNSE counterparts. NSE writers thus appear to be more explicitly aware of conventions in hard disciplines than NNSE writers.
Table 4. Types and Tokens of Lexical Bundles in Move 3

<table>
<thead>
<tr>
<th>Essential items</th>
<th>Types (per 100,000 words)</th>
<th>Tokens (per 100,000 words)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NSE</td>
<td>NNSE</td>
</tr>
<tr>
<td>Design (e.g., randomized controlled trial)</td>
<td>23 (47)</td>
<td>20 (67)</td>
</tr>
<tr>
<td>Setting (e.g., centers in the usa)</td>
<td>19 (39)</td>
<td>3 (10)</td>
</tr>
<tr>
<td>Participants (e.g., were randomized to)</td>
<td>76 (155)</td>
<td>53 (177)</td>
</tr>
<tr>
<td>Intervention (e.g., twice daily for)</td>
<td>16 (33)</td>
<td>21 (70)</td>
</tr>
<tr>
<td>Main outcome measures (e.g., the primary outcome was)</td>
<td>48 (98)</td>
<td>30 (100)</td>
</tr>
<tr>
<td>Randomization (e.g., a web based)</td>
<td>12 (24)</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Blinding (e.g., were masked to)</td>
<td>6 (12)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

****p < 0.0001

Considering the use of lexical bundles associated with the research setting, there were no shared lexical bundles between the corpora. The lexical items such as primary, practices and sites were found as keywords in the NSE corpus and were used to indicate the level of care medical centers provide. Words related to the level of care (primary, secondary, tertiary) were more frequently observed in the NSE corpus. NSE writers specified both the number of centers and the level of care, whereas NNSE writers indicated only the number of centers. The findings suggest that NSE writers are more explicitly aware of what should be reported in the description of the research setting following guidelines by CONSORT groups.

3) Setting (Examples)

NSE  Ex.1  The cluster-randomized trial ... was conducted at (5) 573 primary care practices (5) across the United Kingdom.

Ex.2  In this double-blind, placebo-controlled, crossover trial, we enrolled patients aged 18–79 years with ... from 12 secondary and two primary care sites in the UK (9)

NNSE Ex.1  A double-blind, randomized control study was conducted in (5) 39... subjects from May 2011 through August 2013.

Ex.2  This was a multicenter, randomized open-label trial performed at nine centers in Korea (5)
When specifying the research setting, both writers started with the description of the research design using conducted. Conducted at followed by locations was observed, where the keywords conducted and at were found exclusively in the NSE corpus. On the other hand, conducted in followed by the number of patients was observed in the NNSE corpus. Lexical bundles related to geographical locations (the UK and Korea) were identified in both corpora. The finding of the exclusive use of conducted as a keyword in the NSE corpus shows that NSE writers tend to use the word in describing their research designs and settings in a combined way in Move 3. Likewise, NNSE writers used conducted followed by a to-clause (conducted to) in research objectives. For that reason, conducted could not have qualified as a keyword in the NNSE corpus in Move 3.

The shared lexical bundles associated with main outcome measures were the primary outcome was, the primary end point was, and the primary endpoint was, with the shared keywords primary, end, point, and endpoint. Both groups of writers commonly started with the signals to indicate pre-planned results to be measured. With the use of the primary was, outcome and end point were more frequently used by NSE writers than endpoint, and outcome was exclusively observed as a keyword in the NSE corpus. On the other hand, NNSE writers more frequently used endpoint than the other fillers. Given the use of general academic English, endpoint seems to be recommended in general; moreover, it was frequently observed in medical books and research articles published in the 1990s. The finding of the higher frequency of outcome and end point rather than endpoint could be community members' preferences when reporting clinical trials or RCTs seeing as outcome and end point were more frequently used than endpoint. The terms interchangeably. Although primary and secondary were found as shared keywords, outcome and outcomes were exclusively found in the NSE corpus. NNSE writers seem to be less familiar with the use of outcome and outcomes with the signals of showing the hierarchy of pre-specified results than their counterparts, as observed in the study of Kyung et al. (2012).

4) Main outcome measures (Examples)

NSE Ex.1 The primary outcome was (93) 6-week mortality; secondary outcomes included (33) 12-week mortality, mortality in major subgroups, and safety measures.
Lexical bundles associated with the methods of randomization were more frequently observed in the NSE corpus than the NNSE corpus. Although there were shared keywords (were, randomly, assigned, by), there were no shared lexical bundles. In the NSE corpus, randomisation, stratified, done, web, computer, generated, random, and via were exclusively found as keywords. Congruent with Kyung et al.’s (2012) findings, NNSE writers seem to report randomization more poorly than their counterparts.

5) Randomization (Examples)

NSE      Ex.1  The randomisation was stratified by (8) the use of … medication (yes or no) and was carried out using an interactive web response system (5) that was accessed by each clinical site.

Ex.2    We randomly assigned participants (1:1:1) using a computer-generated (15) list of random numbers to one of three … interventions: …

Ex.3    … were randomly assigned via (9) a computer-generated sequence …

NNSE    Ex.1  … patients were divided into three groups according to (10) disease severity (mild, moderate, and severe). This … group was further divided into two groups by age (< 13 years, ≥ 13 years).

While NSE writers frequently used lexical bundles to indicate specific types of randomization (e.g., stratified randomization) and allocation concealment (e.g., computer-generated randomization), lexical bundles associated with allocation concealment were not found in the NNSE corpus. In the description of types of randomization, NSE writers used was stratified by to indicate how participants were allocated to groups depending on factors such as age, gender, and the severity of the disease, whereas NNSE writers used according to rather than the terms NSE writers frequently employed. The findings suggest that NNSE writers lack awareness of how to report randomization and seem to be less familiar with terms preferred by community members in the international medical journal abstracts.

Considering the use of lexical bundles related to blinding, there were lexical bundles with
the shared keyword *were* in the NSE corpus. However, no lexical bundles were found in the NNSE corpus. In the NSE corpus, *masked* and *blinded* were exclusively found as keywords. Although the term, *double-blind* was frequently observed in both corpora in the description of research design, NSE writers seemed to be more explicitly aware of how to report blinding because they frequently detailed who was masked to treatment assignments compared to NNSE writers. The results of the deficient reports of blinding by Korean writers are congruent with the findings of Shin et al. (2015) and Kyung et al. (2012).

6) **Blinding (Examples)**

**NSE**

Ex.1  Patients, investigators, clinical trial site staff, and pathologists *were masked* to treatment assignment throughout the study.

Ex.2  Patients, caregivers, and those assessing *were blinded* to randomisation assignments.

**NNSE**

Ex.1  *None*

When reporting findings (Move 4), NNSE writers repeatedly used certain types of lexical bundles to report the main outcome. By contrast, NSE writers used lexical bundles associated with the other items more frequently than the NNSE writers.

<table>
<thead>
<tr>
<th>Essential items</th>
<th>Types (per 100,000 words)</th>
<th>Tokens (per 100,000 words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers randomized (e.g., a total of)</td>
<td>35 (69)</td>
<td>392 (772)</td>
</tr>
<tr>
<td></td>
<td>13 (39)</td>
<td>115 (345)***</td>
</tr>
<tr>
<td>Recruitment (e.g., the study was)</td>
<td>1 (2)</td>
<td>5 (10)</td>
</tr>
<tr>
<td></td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Numbers analyzed (e.g., intention to</td>
<td>11 (22)</td>
<td>122 (240)</td>
</tr>
<tr>
<td>treat analysis)</td>
<td></td>
<td>46 (138)***</td>
</tr>
<tr>
<td>Main outcome (e.g., there were no)</td>
<td>131 (258)</td>
<td>1857</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3656)</td>
</tr>
<tr>
<td>Effect size &amp; Precision (e.g., hazard</td>
<td>17 (33)</td>
<td>195 (384)</td>
</tr>
<tr>
<td>ratio hr)</td>
<td></td>
<td>(5440)****</td>
</tr>
<tr>
<td>Harms (e.g., no serious adverse events)</td>
<td>25 (49)</td>
<td>344 (677)</td>
</tr>
<tr>
<td></td>
<td>7 (21)</td>
<td>63 (189)****</td>
</tr>
</tbody>
</table>

***p < 0.001, ****p < 0.0001

The findings are partially consistent with those of Shin et al. (2015) and Kyung et al. (2012), suggesting that NSE writers are more likely to mention the number of patients randomized and analyzed in the final analysis before reporting the main findings in Move 4.
Moreover, they seem to be more explicitly aware of how to report findings in medical journal abstracts, providing both effect size and its precision (e.g., 95% confidence interval) as well as the specification of the presence or absence of harms. Shared lexical bundles associated with numbers randomized were a total of, patients were enrolled, and completed the study, with the shared keyword the. Other shared keywords were median, mean, was, and in. In common, median was followed by age (e.g., median age was) and follow up (e.g., median follow up). Although the number of patients who originally randomized and completed the study was reported in both corpora, total, patients, participants, were, and to were exclusively found as keywords in the NSE corpus. The finding shows that NSE writers are more likely to briefly report the number of patients randomized in Move 4 before reporting the main findings than the NNSE writers.

7) **Number randomized (Examples)**

| NSE | Ex.1 | Among the 509 patients randomized (mean age [6], 56.6 [SD, 16.8] years; 226 [44.4%] women), 480 (94.3%) completed the trial (18). |
| NSE | Ex.2 | Between Dec 7, 2010, and April 25, 2013, 560 participants were randomly assigned to (21) ... group, ... |
| NNSE | Ex.1 | Sixty patients were enrolled (16) and randomized to the ... group (28 of 29 patients completed the study [10]) or the control group (26 of 31 patients completed the study). |
| NNSE | Ex.2 | ...20 patients (13 males and 7 females) were enrolled in the study (6). |

While lexical bundles associated with patients’ age using mean (e.g., randomized mean age, mean sd age, mean age of) were found in the NSE corpus, those kinds of lexical bundles were not found in the NNSE corpus. Despite that patients’ demographic information should be specified when reporting one of the essential items, i.e., patients in Move 3 according to CONSORT statements, lexical bundles related to this item were frequently observed in Move 4 in the NSE corpus. The result might have been caused by characteristics of one of the journals, *JAMA*, where patients’ age needed to be reported in Move 4 before reporting the main results. While NSE writers used trial as frequently as study, NNSE writers exclusively used study, which shows NNSE writers’ tendency to use a certain type of word repeatedly and their lack of exposure to language usage by NSE writers in the international medical journals. Although lexical bundles related to enrollment (e.g., patients were enrolled) before randomization were found in both corpora, NSE writers were more likely to directly report the number of patients randomized (e.g., were
randomly assigned to) than the NNSE writers. Compared to NNSE writers, NSE writers appeared to have a better understanding of how to report numbers randomized and seemed to more economically deliver information, focusing on essential information in journal abstracts.

Shared lexical bundles associated with number analyzed were the intention to treat with the shared keyword the. With the use of were as a keyword, NSE writers frequently used were included in to indicate the number of patients included in the analysis. Lexical bundles such as intention to treat and were included in were more repeatedly observed in the NSE corpus than the NNSE corpus. The findings suggest that NSE writers are more likely to specify the number of patients analyzed in Move 4 than the NNSE writers.

8) Number analyzed (Examples)

NSE
Ex.1 We randomly assigned 4384 smokers to the ... group (n =2636) or the control group (n =1748); 4383 participants comprised the intention to treat (29) population.

Ex.2 Among 1650 patients who were randomized (mean age, 72.1 years; 1049 women [63.6%]; 1502 white [91.0%]), 1597 (96.8%) received at least 1 dose of ... and were included in (19) the primary analysis.

NNSE
Ex.1 A total of 138 patients were enrolled... After excluding patients ..., 59 and 58 patients from the ... and ... groups, respectively, were included in the per-protocol analysis (6).

The more frequent use of the term intention to treat by NSE writers could have been caused by the guidelines from one of the journals, JAMA, where all RCTs should include findings based on intention-to-treat analysis. Aside from the use of the terms, NSE writers detailed how many patients were finally included in a trial to be analyzed. NNSE writers seemed to be less explicitly aware of such terms as intention-to-treat analysis than their counterparts. Otherwise, journals collected in the NSE corpus could have contained a larger number of trials where results were thoroughly analyzed to avoid bias due to patients’ withdrawal after the original random assignments.

When reporting main outcomes, shared lexical bundles between the corpora were there was no, there were no, no significant difference, no significant differences, did not differ, between the groups, the two groups, group compared with, in the placebo group, the control group, was significantly lower, was higher in, group than in, and so on. Shared keywords were there, was, no, significant, significantly, than, differ, between, in, the, group, and...
Both groups of writers used those lexical bundles repeatedly to indicate a difference between groups with statistical significance. However, those lexical bundles were more frequently used by NNSE writers, and the lexical bundles were not significantly different, showed no significant, and group compared to with the keywords not, different, showed were exclusively found in the NNSE corpus. Compared to NNSE writers, there was no, did not differ, the placebo group, and groups compared with were more frequently used by NSE writers, and the primary outcome and between group difference were exclusively found in the NSE corpus.

9) Main outcome (Examples)

NSE
Ex.1 ... there was no (35) significant difference ... between the groups (15) ...
Ex.2 ... did not differ (54) between groups (mean difference, 2.34 [95% CI, −5.27 to 9.96]).
Ex.3 ... was 0.37% lower in the ... group than in (29) the placebo group (116) (95% CI, ...)
Ex.4 The primary outcome (28) of ... occurred in 51 of 106 patients (48.1%) in the ... group compared with (19) 34 of 103 patients (33.0%) in the usual care group (between-group difference (17). 15.1% [95% CI, 2.0%−28.3%]: relative risk, 1.46 [95% CI, 1.04−2.05]; P = ..

NNSE
Ex.1 There were no (78) significant differences between ... and ... for the median overall survival..
Ex.2 Normalization of ... level (p = 0.53) and change in ... (p = 0.703) were not significantly different (13) between the two groups (90).
Ex.3 ... was significantly lower (30) in ... group than in (50) the control group (66) ...
Ex.4 ... showed a significant decrease in the ... group compared to (14) those of the control group..
Ex.5 ... showed no significant (6) difference between the two groups (78) (P = 0.066).

When lexical bundles were used to indicate differences, NNSE writers more frequently used there—patterns with a plural noun (there were no significant differences (#41) vs. there was no significant difference (#23)) and lexical bundles consisting of be verbs with
adjectives (were not significantly different), whereas NSE writers more prominently used lexical bundles consisting of active verbs (did not differ) and there—patterns with a singular noun (there was no significant difference (#12)) vs. there were no significant differences (#7)). There—patterns with differences and be verbs with adjectives seemed to be more preferred by NNSE writers than NSE writers. Saber (2012) also found there was more than there were in the result section. There is a possibility that there were patterns to indicate significance are less frequent in clinical trials or randomized controlled trials. Except for this case, there were (#64) (there were 1387 patients, there were no adverse events) was more than there was (#56) (there was no evidence) in the NSE corpus. NNSE writers mostly used there—patterns to indicate significant differences and they used there were (#95) more than there was (#76). While NNSE writers tended to indicate the exact number of groups (between the two groups), the tendency was not found in the NSE corpus showing the use of between the groups and between groups rather than two groups. Another difference was that NNSE writers more frequently used lexical bundles including showed, compared to, and control group. The use of there—patterns and showed was observed in Esfandiari and Barbary's (2017) study. The high frequency of showed by English L2 writers was observed in Lu and Deng's (2019) study. The findings suggest that NNSE writers are familiar with the use of lexical bundles preferred by writers in soft disciplines. Moreover, Koreans, Persians, and Chinese as English L2 writers tend to repeatedly use there—patterns and showed as resultative signals when reporting findings.

As observed in Saber's (2012) study, NSE writers mostly used compared with (#147) in clinical trials or RCTs in the international medical journals. On the other hand, NNSE writers used compared to (#71) more than compared with (#57). Given the grammatical rules, compared to is used to point out similarities between things in different classification, whereas compared with is to indicate differences between things in similar classification. It is unclear whether NSE writers strictly followed the rule or if they showed their preferences. Due to the journals published in the UK, compared with could be more frequently observed in the internal medical journals. The more frequent use of compared to by NNSE writers could be that Korean writers are more familiar with American English. There is a possibility that compared to is used for making a comparison between only two groups, whereas compared with is for more than three groups because a comparison between two groups was more frequently observed in the NNSE corpus than the NSE corpus. The more frequent use of placebo group than control group might be due to the characteristics of the NSE corpus containing a larger number of placebo—controlled studies by chance. The use of the primary outcome by NSE writers shows that NSE writers are
more likely to use the bundle to confirm the consistency of results with pre-planned results. The exclusive use of between group difference by NSE writers seems to show another way of reporting a difference between groups instead of there-patterns.

The shared lexical bundles associated with effect size and its precision were confidence interval ci and hazard ratio hr, with the shared keywords confidence, interval, and ci. Although hazard ratio hr was shared between the corpora, hazard, ratio, and hr were exclusively found as keywords in the NSE corpus. Other types were found with such keywords as odds, adjusted, absolute, and relative in the NSE corpus. Despite the shared keywords (in, between, the, group, groups, p) between the corpora, lexical bundles with those were exclusively found in the NNSE corpus.

10) Effect size & Precision (Examples)

NSE

Ex.1  ... had a significantly lower risk of ... than did the ... group (hazard ratio [20], 0.83; 95% confidence interval [CI] (51), 0.70 to 0.99; P = 0.04) ...

Ex.2  ... rates were significantly higher in the ... group, 46% for the ... group (age and sex adjusted odds ratio (11) [OR], 1.8, 95% confidence interval [CI], 1.3–2.5; P = .001) ...

NNSE

Ex.1  There was no significant difference in ...-between ... and ...-(median, 6.4 months vs. 4.7 months; hazard ratio [HR] (6), 0.84; 95% confidence interval [CI] (26), 0.63 to 1.11; p = 0.84).

Ex.2  The incidence of ...... of the ... group was 8.7%, compared to 18.8% in the control group (p (9) = 0.137), during the study period.

Ex.3  ... were significantly different between the two groups (p (8) = 0.036)

Aside from the lexical bundle related to the degree of certainties (e.g., 95% confidence interval), lexical bundles associated with effect size (e.g., group hazard ratio, adjusted odds ratio, adjusted mean difference, group relative risk, group absolute difference) were more frequently observed in the NSE corpus than the NNSE corpus. The findings show that NSE writers are more likely to report both effect size and its precision, whereas NNSE writers are more likely to report p-values only. Compared to NNSE writers, NSE writers appeared to be more explicitly aware of how to report findings as proposed by CONSORT groups. As observed in Esfandiary and Barbary’s (2017) study, where existential there-patterns followed by p-values were found in the field of psychology, NNSE writers seemed to be familiar with conventions in soft disciplines and to lack awareness of international medical

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journal conventions when reporting clinical trials or RCTs.

When reporting harms, shared lexical bundles were *adverse events were, the most common, were reported in, no serious adverse events, and more common in*, with shared keywords *no, adverse, events, in, and the*. Exclusively, *serious, were, reported, and more* were found as keywords in the NSE corpus. Although *occurred* was found as the shared keyword, lexical bundles with the keyword were exclusively found in the NSE corpus.

11) Harms (Examples)

| NSE | Ex.1 | ... serious adverse events (58) were reported in (15) 70 (11%) of 610 patients in ... |
| NSE | Ex.2 | Adverse events occurred (18) in 45 patients (24.7%) in the ... group compared with ... |
| NSE | Ex.3 | The most common (30) treatment−related adverse events were (50) diarrhea (in 59% of the patients), hypertension (56%), fatigue (46%), and weight loss (40%). |

| NNSE | Ex.1 | The most common (19) drug−related treatment−emergent adverse events were (16) diarrhea, rash, stomatitis, pruritus, and anorexia. |
| NNSE | Ex.2 | The most frequent adverse events (AEs) (7) were ... |

Both writers used *adverse events were* to indicate the types of harm with the use of *the most common*. However, a difference was that NSE writers more frequently specified the presence or absence of adverse events in advance by using *reported* in the passive or *occurred* in the active voice, and they also specified the reports of the number and percentage of patients who had unintentional events. The active voice was not used by NNSE writers. In this context, the use of active voice using *occurred* seems to indicate the presence of adverse events more clearly and deliver information more economically than the use of passive voice considering the word limits in journal abstracts. Further research is needed to examine which voice is more clearly and economically delivered to readers depending on a specific context.

When discussing findings (Move 5), tokens of lexical bundles associated with negatives and further research were significantly higher in the NSE corpus than the NNSE corpus. The findings show that NSE writers are more likely to report negatives and the need for further research than their counterparts when providing a general interpretation of reported results.
Table 6. Types and Tokens of Lexical Bundles in Move 5

<table>
<thead>
<tr>
<th>Essential items</th>
<th>Types (per 100,000 words)</th>
<th>Tokens (per 100,000 words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation (e.g., <em>in patients with</em>)</td>
<td>NSE 18 (102)</td>
<td>NSE 253 (1430)</td>
</tr>
<tr>
<td>Positives (e.g., <em>be effective in</em>)</td>
<td>NNSE 18 (141)</td>
<td>NNSE 173 (1359)</td>
</tr>
<tr>
<td>Negatives (e.g., <em>should not be</em>)</td>
<td>NSE 2 (11)</td>
<td>NSE 37 (209)</td>
</tr>
<tr>
<td>Further research (e.g., <em>are needed to</em>)</td>
<td>NNSE 8 (63)</td>
<td>NNSE 48 (377)</td>
</tr>
<tr>
<td></td>
<td>NSE 9 (51)</td>
<td>NSE 76 (430)</td>
</tr>
<tr>
<td></td>
<td>NNSE 3 (24)</td>
<td>NNSE 17 (133)***</td>
</tr>
<tr>
<td></td>
<td>NSE 5 (28)</td>
<td>NSE 33 (186)</td>
</tr>
<tr>
<td></td>
<td>NNSE 1 (8)</td>
<td>NNSE 5 (39)***</td>
</tr>
</tbody>
</table>

***p < 0.001, ****p < 0.0001

Although no lexical bundles were shared between the corpora, *not, reduce, may, should,* and *be* were shared keywords when providing negative interpretations. Regarding the use of lexical bundles with the keywords, *did not reduce the risk of* and *should not be* were found in the NSE corpus while *reduce the incidence of* and *may not be* were observed in the NNSE corpus.

12) Negatives (Examples)

NSE

| Ex.1 | treatment ... did not reduce the risk of ... or death ... |
| Ex.2 | ... should not be (8) used for ... symptoms in adults without ... because they do not reduce symptom duration or severity. |

NNSE

| Ex.1 | combined with ... did not reduce the incidence of ... |
| Ex.2 | These findings suggest that ... may not be (6) beneficial for patients with ... |

Together with *reduce*, NSE writers frequently used *the risk of* with the keyword (*risk*), whereas NNSE writers prominently used *the incidence of*. NSE writers seemed to focus more on the possibility of bad results while NNSE writers appeared to emphasize a rate of occurrence. Another difference was that NSE writers advised not to use drugs or treatment for a certain type of patient by using *should*, thereby engaging readers toward propositions. On the other hand, NNSE writers implied a possibility of no positive effects of treatment using *may*, thus hedging their propositions. The finding of the more frequent use of hedges by NNSE writers than NSE writers is supported by Lu and Deng (2019) and Pan et al. (2016). Considering the findings of Hyland (2008), which show that epistemic bundles are more frequently observed in soft disciplines but engagement bundles are more prominently found in hard disciplines, NNSE writers seem to be more familiar with conventions in soft
disciplines than those in hard disciplines. Otherwise, given the reputation of the international journals collected in the present study, the validity and reliability of methodology are highly appreciated around the world in that NSE writers are less likely to use hedges, having more confidence in their findings compared to NNSE writers.

When specifying the need for additional studies, further and is were found as the shared keywords. However, there were no shared lexical bundles between the corpora. As keywords, studies, needed, long, and term were exclusively found in the NSE corpus. By contrast, only one lexical bundle (are needed to) was found in the NNSE corpus with no keywords. In Saber’s (2012) study, future was found as a keyword, and studies and research were collocated with the keyword. The frequent use of further rather than future seems to reflect community members’ preferences in the present corpus.

13) Further research (Examples)

NSE Ex.1 Further research is needed to (9) determine the long-term (6) effect of the intervention and assess its efficacy in other settings.

Ex.2 Further studies are needed to (7) assess the long-term risks and benefits of such therapy in patients with ...

NNSE Ex.1 Further multicenter and large scale studies are needed to (5) confirm these findings.

Given the kinds of limitations, the need for long-term studies was suggested in the NSE corpus, whereas multicentered, large-sized studies were suggested in the NNSE corpus. In other words, short-term follow-up in the NSE corpus and a single-center and a small sample size of studies in the NNSE corpus were specified as limitations. The finding that lexical bundles related to further research were more frequently observed in the NSE corpus than the NNSE corpus shows that NSE writers are more likely to indicate whether further research is needed than the NNSE writers in Move 5.

5. Conclusion

This study investigated the types and tokens of lexical bundles between an NSE corpus and a NNSE corpus as well as the use of lexical bundles with keywords between the writers by essential items connected to the moves of medical journal abstracts. The fact
that NNSE writers more frequently used certain types of lexical bundles repeatedly to signal research objectives, group differences with there-patterns, and hedge their assertions shows that they are more familiar with conventions in soft disciplines by promoting introduction and discussion of medical journal abstracts. On the other hand, NSE writers more prominently used lexical bundles to detail the research methodology and increase the reliability of results by promoting the methods and results of medical journal abstracts in that they tend to follow conventions in hard disciplines. The findings of the less frequent lexical bundles or absence of lexical bundles in the NNSE corpus compared to the NSE corpus when reporting setting, main outcome measures, randomization, blinding, numbers randomized, numbers analyzed, effect size and its precision, harms, negatives, and further research suggest that NNSE writers are less likely to adhere to CONSORT guidelines than NSE writers. The findings of this study have some pedagogical implications for teaching English for research publication purposes in the field of medicine. Educators and researchers need to be explicitly aware of what information each item requires and what language elements are commonly used by community members in the international medical journal abstracts when reporting RCTs to help English L2 writers increase the quality of their medical journal abstracts. One limitation of this study is that lexical bundles with number slots were not investigated; thus, it is insufficient to provide an explicit explanation of the items deficiently reported by the writers. Further research should include lexical bundles with number slots—especially when reporting items where numbers are required such as patients’ age, dosage amount, time, number and percentage of patients, effect size and its precision, and rate of bad results.

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Examples in: English
Applicable Languages: English
Applicable Level: Tertiary

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