



المملكة العربية السعودية
وزارة التعليم
جامعة أم القرى

مجلة جامعة أم القرى
لعلوم اللغات وآدابها

**Journal of Umm Al-Qura University
for Language Sciences and Literature**

علمية - دورية - محكمة - نصف سنوية

العدد (٢٦)

محرم ١٤٤٢هـ - أغسطس ٢٠٢٠م

معلومات التواصل

- ✿ للتواصل مع المجلة وإرسال الأعمال والاستفسارات توجه جميع المراسلات إلى رئيس تحرير مجلة جامعة أم القرى لعلوم اللغات وآدابها على أحد الوسائل التالية:
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✿ الاشتراكات:

يتم التنسيق بخصوص الاشتراكات مع إدارة المجلات العلمية بالجامعة.

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الرقم الدولي المعياري (ردمد - ISSN)

- ✿ النسخة المطبوعة (٤٦٩٤ - ١٦٥٨) رقم الإيداع: ١٤٣٠/٢٣٥٩ بتاريخ ١٤٣٠/٣/١٨ هـ
- ✿ النسخة الإلكترونية (٨١٢٦ - ١٦٥٨) رقم الإيداع: ٤٤٣٧ بتاريخ ١٤٤٠/٥/١٧ هـ



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**A contrastive study of theme types and patterns in
medical research article abstracts written in English
by native and Saudi scholars**

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A contrastive study of theme types and patterns in medical research article abstracts written in English by native and Saudi scholars

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(Received 22/02/2020; accepted 15/03/2020)

Abstract: Abstracts of research articles are dense in nature and require authors to pack information in a concise cohesive paragraph. One principle of cohesion is employing various theme types and thematic progression patterns. The study conducted qualitative contrastive analyses of these aspects in medical research article (RA) abstracts written in English by native and Saudi scholars. The findings revealed the predominance of constant and linear thematic progression patterns. Whereas the two patterns are almost equally used in the native scholars' data, the constant pattern prevailed in the non-native scholars' data. Non-native authors tended to simplify complex subject matter by using shorter clauses to exert less effort in processing them. They also relied on cohesive ties to achieve cohesion rather than using various thematic progression patterns. Due to the factual nature of the medical abstracts, unmarked topical and textual themes were the most used instead of interpersonal themes. Multiple themes were minimally employed due to the generic features of abstracts. The study findings may have implications for novice RA scholars of medicine, English for specific purpose instructors, and researchers interested in both second language acquisition and cross-cultural variations. Future studies could investigate themes in medical RA abstracts written in other languages.

Keywords: thematic progression, theme types, research article abstract, textual cohesion, systemic functional linguistics (SFL).



دراسة مقارنة لأنواع المبتدأ والتسلسل الموضوعي في المستخلصات الإنجليزية العلمية الطبية والتي كتبها باحثون ناطقين باللغة الإنجليزية وباحثين سعوديين

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(قدم للنشر في 28/06/1441هـ؛ وقبل للنشر في 20/07/1441هـ)

المستخلص: تعتبر المستخلصات العلمية مركزة في طبيعتها ويحتاج المؤلف إلى إيجاز المعلومات في كل قطعة بطريقة مختصرة ومتناسكة. ويعتبر تنوع استخدام أنواع المبتدأ وأنماط التسلسل الموضوعي أحد الأساسيات التي تساعد على الترابط النصي. وهدفت الدراسة إلى تحليل نوعي مقارنة لهذه الجوانب في المستخلصات الطبية العلمية والتي كتبها باحثون ناطقين باللغة الإنجليزية وباحثون سعوديين. وأظهرت النتائج كثرة استخدام النمط الموضوعي المتكرر والتسلسلي. بينما استخدم الباحثون الناطقين باللغة الإنجليزية النمطين الآنف ذكرهم بصورة متساوية، استخدم الباحثون السعوديين النمط المتكرر أكثر من النوع الآخر، حيث كانت نصوصهم مبسطة لاستخدامهم لعبارة قصيرة من أجل بذل مجهود أقل في فهمها. واعتمد الباحثون السعوديين على أدوات الربط لجعل النص متماسكاً عوضاً عن استخدام أنماط التسلسل الموضوعي المتنوعة. ونظراً لتركيز المستخلصات الطبية على حقائق علمية فأكثر أنواع المبتدأ استخداماً كانت الموضوعية والنصية الطبيعية عوضاً عن المبتدأ التفاعلي. وندر استخدام الخبر المتفرع نظراً لطبيعة المستخلصات والتي عادة تكون موجزة ومختصرة. وقد تسهم النتائج في تطوير كتابة المستخلصات البحثية من قبل الأطباء الباحثون الجدد. وقد تفيد أيضاً مدرسي اللغة الإنجليزية لأغراض مخصصة والباحثين المهتمين بتعلم اللغة الإنجليزية كلغة ثانية أو تعلم تنوع الاختلافات الثقافية. ويقترح الكاتب بدراسة المبتدأ في المستخلصات الطبية العلمية المكتوبة بلغات أخرى.

الكلمات المفتاحية: التعاقب الابتدائي، أنواع المبتدأ، مستخلص الورقة العلمية، التماسك النصي، علم اللغة الوظيفي.

1. Introduction

A research article (RA) is one of the most profound forms of scientific writing and an abstract is the most concise form of that scientific piece of writing. Its necessity stems from the fact that in addition to providing a precise content or a summary of the article, it enables readers to decide whether or not to read or disregard the article. According to Holtz (2011), the role of abstracts has changed for a number of reasons such as the vast number of RAs published annually and their immediate online availability. Writers express their scientific contribution by condensing information into a relatively small text. However, a balance must be achieved between packing information and producing a coherent piece of text that presents their work professionally. One of the underlying elements to ensure textual organization is the use of various theme types and thematic progression patterns.

A theme is an element of a clause that gives it a character. “It serves as the point of departure of the message; it is that which locates and orients the clause within its context” (Halliday, 2014, p. 64). Hence, it is the starting point of the message and has the function of organizing the flow of information within the discourse. Typically, it signals a departure from familiar or given information to new information. The remaining part of the clause is the rheme, and these two elements constitute the structure of the message. Halliday (2014) describes three types of themes: topical, interpersonal, and textual. The topical theme is the first element of the clause, which expresses an experiential meaning and receives a transitivity function; it can be a *participant*, *circumstance*, or *process*. The interpersonal theme is a constituent that will be assigned mood labels which are typically mood adjuncts, e.g., *maybe*, *I think*, *just*, or comment adjuncts, e.g., *unfortunately*, *luckily*. The textual theme is an element that functions as a cohesive tie relating a preceding clause to that which follows. Conjunctive adjuncts are the most typical textual themes, e.g., *but*, *and*, *so*. Halliday (2014) explains that the principle of a thematic structure is to have one topical theme which expresses an experiential meaning. The other elements that precede the topical theme are interpersonal or textual and do not contribute to the experiential

meaning. The interpersonal theme “indicates the relationship between participants in the text, or the position or point of view that is being taken in the clause” (Paltridge, 2006, p. 130). It can express probability, usuality, typicality, obviousness, opinion, admission, persuasion, entreaty, presumption, desirability, or prediction (Halliday, 2014).

Thematic progression or method of development contributes significantly to a text’s cohesion and coherence (Eggins, 2004). It is the process whereby a “theme of a clause may pick up, or repeat, a meaning from a preceding theme or rheme” (Paltridge, 2006, p. 131). The notion of thematic progression was first introduced by Daneš (1974) and later developed by Fries (1981) and Halliday (2014). Halliday (2014) identifies three main thematic progression patterns which can occur in a text: constant theme (or theme reiteration), linear (or zig-zag), and the fan (or split) rheme pattern.

The same theme is reiterated in the first pattern to create lexical cohesion and focus the text. However, if this pattern recurs, it may yield the text into becoming increasingly redundant and monotonous. Therefore, writers tend to vary the patterns by shifting to linear or fan rheme patterns. In the linear pattern, the subject matter, which is introduced in the rheme of a clause, becomes the theme of the following clause, thereby leading to the cumulative development of a text. The split rheme pattern introduces different pieces of (or classificatory) information in the rheme of a clause, which are then picked up as themes in the following clauses.

To the best of our knowledge, there is a lack of contrastive analysis studies investigating theme types and thematic progression patterns in medical RA abstracts written in English by native and Saudi scholars. This study, therefore, aimed to answer the following questions.

1. What are the most frequent thematic progression patterns in English medical RA abstracts?
2. What are the most frequent theme types in English medical RA abstracts?

3. Is there a difference in the use of theme types and thematic progression patterns between native and Saudi authors?

The reason for investigating medical journals is the vast number of medical journals published in Saudi Arabia. The support of the Saudi Ministry of Education to scientific research productivity and the government investment in research development has greatly influenced the annual publication output in the country which has outpaced many other Middle East countries. The analysis of this output by Al-Ohali and Shin (2013, p. 99) revealed that “the largest number of international publication is in the medical sciences.” This study is therefore pertinent since it may be valuable for novice RA scholars of medicine, English for specific purpose instructors, and researchers interested in both second language acquisition and cross-cultural variations. Next, we review previous studies on thematic analysis in scientific journals and studies on native versus non-native use of theme.

2. Literature review

Researchers are eager to establish if abstracts are a genre of their own and therefore have specific recurrent thematic patterns, or form part of the scientific article genre. Holtz (2011) investigated this question by analyzing RA abstracts of four disciplines: computer science, linguistics, biology, and mechanical engineering. The analysis revealed that an abstract is a distinct type of text. Consisting of features of abstract nouns, passivization, greater lexical density, nominalization, and longer sentences makes them an expository type of text which distinguishes them from the argumentative nature of RAs. The comparison between abstracts across four disciplines indicates that abstracts are different genres. Genre is typically related to the purpose of the discourse. Abstracts are expository texts and have a different purpose and, therefore, are a different genre. Ebrahimi's (2016) findings revealed the disciplinary differences in the use of theme types and thematic progression patterns. This indicates that a discipline's requirements influence the choice of a particular theme type or pattern. The researcher investigated these aspects in RA abstracts from four

disciplines: applied linguistics, economics, agriculture, and applied physics. All the examined disciplines employed more unmarked topical themes than the other types of theme with greater use of textual themes than interpersonal; soft sciences, however, seemed to use more marked themes than did the hard sciences. This was ascribed to the preference of soft sciences to employ textual themes in order to mark the rhetorical moves of the RA abstract. Swales (2004) considers abstracts to be a part of the RA genre, while others (Nwogu & Bloor, 1991) perceive abstracts to be a genre in their own right since they can appear independently of the RA.

One of the earliest studies on thematic structure and progression of abstracts was Nwogu's (1989) study where it was found that medical RA abstracts evenly employ constant and linear thematic progression patterns which occur more frequently. The split rheme pattern was not found in the abstracts. Since thematic progression is determined by factors such as purpose, audience, and context, the abstract is typically the most concise form. Nwogu and Bloor (1991) reported similar findings in their study of thematic structure in medical RA abstracts. The themes of constant thematic progression patterns are typically realized by one of the following: simple nominal group (Ng.) with a common noun as head; complex Ng. with a common noun as head; adverbial group (adjunct) plus Ng. with common noun as head; prepositional phrase (adjunct) plus nominal group with common noun as head; empty existential *there*. The researchers, however, did not investigate theme in RA abstracts written by non-native authors. In a similar study, Lorés (2004) found that constant and linear thematic patterns are the prevalent patterns in abstracts of RAs in the field of linguistics.

Leong (2016) analyzed 200 abstracts from science and humanities disciplines which comprised 37,083 words. The findings showed that topical themes of main clauses are used more often in science abstracts. With regard to thematic progression, linear was the general thematic pattern in the two fields. Thematic density was found to be low in all

abstracts, which contradicts Holtz's (2011) study. In relation to theme types of medical articles, Leong, Toh, and Chin (2018) found that the use of the topical theme *we* was predominant, reflecting an active voice. However, this authorial presence is a typical feature of scientific research writing.

He and Tian (2018) compared abstracts written by foreign authors in a scientific journal to abstracts produced by Chinese authors to identify similarities and differences in terms of their use of thematic patterns and structures. The analysis revealed that simple theme was predominant compared to multiple and clausal themes for the two groups of authors. With regard to markedness, both groups were found to use unmarked themes; however, Chinese authors slightly tended to use unmarked themes more often. The two groups were found to favor the constant theme pattern, followed by linear pattern. The findings of this study, however, may be valuable only to Chinese authors. Along similar lines, Rahmawati and Kurniawan (2015) examined thematic progression in thesis abstracts written in English by students at an Indonesian university. The constant theme pattern was predominant followed by linear, while the split theme was only found once. However, the corpus of the study was relatively small as it consisted of only five undergraduate students' thesis abstracts.

The reviewed literature confirms that an abstract is a genre of its own, characterized by the use of constant and linear theme patterns. None of these studies, however, have compared the findings with those in English medical RA abstracts written by Saudi scholars. It is hoped that the current study will add to the growing literature on the thematic structure of English medical RA abstracts with more focus on the differences between native and Saudi authors.

3. Methodology

The present qualitative contrastive study investigated thematic choices and thematic progression patterns in English medical RA abstracts. Two sets of data were compared and contrasted: native and

Saudi scholars. The native set comprised 15,000 words of abstracts from the *New England Journal of Medicine*, a reputable leading American medical journal with an ISI impact factor above 55 during the last five years. The other dataset consisted equally of 15,000 words and was derived from two Saudi medical journals: *Journal of Nature and Science of Medicine*, published by the College of Medicine at King Saud University, and the *Saudi Journal of Medicine and Medical Sciences*, published by the College of Medicine at Imam Abdulrahman Bin Faisal University. The latter journal is listed in the Emerging Sources Citation Index (ESCI). The selected RAs were published between 2015 and 2018. The abstracts in the two data groups are structured with the headings: background, aim, method, result, and conclusion. Hartley et al. (1996) found that structured abstracts are more effective and easier to read compared to traditional abstracts. Data analysis was framed by Halliday's (2014) SFL's categorization of theme and progression patterns discussed in Section 1. Following Halliday (2014) and Fries and Francis (1992), the basic unit of analysis used was a clause complex (or a T-unit), an independent clause along with all its dependent clauses. The reason for this selection and for not analyzing the dependent clause is that the thematic structure of a dependent clause is constrained by the independent clause. Thus the dependent clause "with respect to morbidity or health care costs" in the following example is considered part of the rheme: "A restrictive transfusion threshold after cardiac surgery [*theme*] was not superior to a liberal threshold with respect to morbidity or health care costs [*rheme*]" (*New England Journal of Medicine*, 2015, 372/11, 997). On the contrary, a dependent clause is identified as a marked theme along with the subject in the following independent clause when it occurs initially. Thus, the marked theme "In patients with acute heart failure" and the subject "early intervention with an intravenous vasodilator" are considered as theme in the following example: "In patients with acute heart failure, early intervention with an intravenous vasodilator [*theme*] has been proposed as a therapeutic goal to reduce cardiac-wall stress and, potentially, myocardial injury, thereby favorably affecting patients' long-term prognosis [*rheme*]" (*New England Journal of*

Medicine, 2017, 376, 1956). Theme types and thematic progression patterns were manually annotated. Although this study is qualitative, frequencies and percentages of theme types and thematic progression patterns were calculated using Excel in order to validate our claims when comparing the results of the two datasets in terms of their similarities and differences. The total frequency of occurrence of each thematic progression pattern was multiplied by 100 and then divided by the total number of T-units. The total frequency of occurrence of each theme type was multiplied by 1,000 and then divided by the total number of words in the data group, yielding the occurrence of a particular theme type per 1,000 words. Finally, each researcher revised the findings of one data group in order to make sure the results are reliable. Then we exchanged the data groups so that we all agreed on the analysis. We discussed any disagreements regarding the assignment of elided themes until we reached consensus before drawing conclusions.

4. Results and discussion

Though the two sets of data were equal in size, the non-native authors tended to use shorter clauses; therefore, their RA abstracts had many short clauses compared to those of the native authors. There were 795 main clauses in the non-native RA abstracts compared to 653 main clauses in the native abstracts (**Table 1**). The non-native authors used 21% more clauses compared to the native authors. This may explain the increase of constant (or the reiteration) thematic progression pattern in the non-native authors' abstracts. The analysis of the data indicated that the most predominant thematic progression patterns were the constant pattern, followed by the linear pattern. The non-native authors used the constant pattern 135 times compared to the linear pattern, which was used 72 times. The two patterns were almost equally used by the native authors. The constant thematic progression was used 81 times, whereas the linear pattern was employed 77 times.

Table 1. Thematic progression patterns in the two data groups

Group	T-Units	Constant		Linear		Split	
		Freq.	Percentage	Freq.	Percentage	Freq.	Percentage
Native	653	81	12.40%	77	11.79%	1	0.15%
Non-native	795	135	16.98%	72	9.05%	2	0.25%

Daneš (1974) considers these two patterns as the major or basic progression theme patterns. This finding is in line with Nwogu and Bloor's (1991) study of theme in medical RA abstracts where it was found that the use of constant pattern can be attributed to two factors. The authors assumed a mutual background knowledge with readers and tended to exploit this pattern instead of referring back to information mentioned in the rheme. Another justification is that one of the characteristics of scientific RAs is complexity. Authors are concerned with creating connections between objects and explaining matters that require the formulation of complex sentences. This will naturally lead to repeating the same object to simplify the processing of clauses. The following *complex* clauses were found to appear frequently in the abstracts of the native authors (*theme* is in italics).

- 1) "*The adjusted mean change from baseline in body weight in the surgery group was -45.0 kg (95% confidence interval [CI], -47.2 to -42.9; mean percent change, -35.0) at 2 years, -36.3 kg (95% CI, -39.0 to -33.5; mean percent change, -28.0) at 6 years, and -35.0 kg (95% CI, -38.4 to -31.7; mean percent change, -26.9) at 12 years*". (*New England Journal of Medicine*, 2017, 377, 1143)
- 2) "*Major secondary end points included the change in the pyramidal tracts on diffusion tensor imaging, the magnetization transfer ratio in normal-appearing brain tissue, the thickness of the retinal nerve-fiber layer, and cortical atrophy, all measures of tissue damage in multiple sclerosis*". (*New England Journal of Medicine*, 2018, 379, 846)
- 3) "*We used data from 2007 through 2015 from a large insurance database to compare the rate of ADHD diagnosis among children*

born in August with that among children born in September in states with and states without the requirement that children be 5 years old by September 1 for enrollment in kindergarten”. (*New England Journal of Medicine*, 2018, 379, 2122)

The linear theme pattern is recurrent in discourse that “draws heavily on information contained in the rheme of the previous utterance as a means of increasing the amount of mutual knowledge” (Nwogu & Bloor, 1991, p. 367). In an RA, the audience is expected to be acquainted with the subject matter, experiments, and procedures. Therefore, it is less likely that the author will employ this pattern more than a constant pattern in RAs. In relation to abstracts, the present study confirmed that both the constant and linear patterns were employed with the constant pattern being used more often by non-native authors.

The split rheme pattern was rarely used in the two datasets (**Table 1**). This confirms previous findings (He & Tian, 2018; Lorés, 2004; Nwogu, 1989; Nwogu & Bloor, 1991). This pattern “tends to occur in paragraphs involving classification” (Nwogu & Bloor, 1991, p. 379). Thus, this tendency of authors to prefer one pattern can be accounted for in terms of the purpose of the text and the intended audience. The abstract is an expository genre which aims to inform readers – who are specialists in the field – in a concise manner about the major sections of the RA, such as aims of the study, methodology, findings, results, and conclusion. This justifies the use of constant and linear patterns.

With regard to theme markedness, the analysis indicated that unmarked theme was more employed than marked theme in the two datasets (**Table 2**).

Table 2. Frequency and percentage of thematic markedness in the two datasets

Markedness	Native			Non-Native		
	Freq.	%	per 1000 words	Freq.	%	per 1000 words
Marked	115	18.31%	7.67	69	9.05%	4.6
Unmarked	513	81.69%	34.20	693	90.95%	46.20
Total	628	100%	n/a	762	100%	n/a

This finding is in line with Ebrahimi's (2016) study of theme in four disciplines: applied linguistics, economics, agriculture, and applied physics. The native scholars, however, employed more marked themes than the non-natives; 18.31% and 9.05% respectively.

Table 3 presents the frequency of theme types in the two sets of data. This finding complies with previous studies on theme types used in RA abstracts (Ebrahimi, 2016; Ebrahimi & Khedri, 2011; Gosden, 1993).

Table 3. Frequency and percentage of theme types in the two datasets

Theme Type	Native			Non-Native		
	Freq.	%	per 1000 words	Freq.	%	per 1000 words
Topical	628	89.20%	41.8	762	84.29%	50.8
Interpersonal	0	0.00%	0	2	0.22%	.13
Textual	76	10.80%	5.06	140	15.49%	9.33
Total	704	100%	n/a	904	100%	n/a

For example, Ebrahimi and Khedri (2011, p. 289) compared unmarked theme to marked theme in two disciplines and stated that topical theme occupied subject positions, arguing that "Theme/subject compliance may also be indicative of structural simplicity of article abstracts." They explained that the overuse of unmarked theme in research abstracts can be attributed to the non-argumentative nature of abstracts. Likewise, Gosden (1993) suggested that most topical themes in scientific and academic writing are realized as subjects. It can be implied that due to their simple structure non-native writers use shorter clauses; hence more themes appeared in the data. Similarly, the overuse of unmarked themes by non-native writers could be due to the simplicity of structure construction.

There are similarities between the two sets of data regarding the application of theme types (Table 3) and these can be attributed to the genre. The analysis of the two sets of RA abstracts indicated that the interpersonal theme was the least utilized type which confirms the nature of abstract genre being expository, with an impersonal tone

(Ebrahimi, 2016). Whittaker (1995) emphasized the fact that academic articles are expected to have a low number of interpersonal themes and do not exceed 10% of theme types. Textual themes were more frequently used and Ghadessy (1999) explained that this is because it is expected that RA writers rely on textual themes to create cohesion. The findings revealed that the non-native authors overused textual themes (9.33 per 100 words), compared to the native authors (5.06 per 100 words). This finding corresponds with a number of studies (Chang & Lee, 2019; Hůlková, Dontcheva-Navratilova, Jančaříková, & Schmied, 2019; Schmied, 2015; Wei, 2016). For example, Hůlková et al. (2019) found that Czech authors using English as an Additional Language (EAL) employed more textual themes than native writers. Three types of textual themes are identified by Halliday (2014): continuatives, conjunctions, and conjunctive adjuncts. The results in the present study showed that 85.3% of the conjunctions used by native authors are what Eggins (2004) refers to as tactic conjunctions, which link clauses within a complex clause such as *but* and *and*. This can be attributed to their tendency to produce complex clauses compared to non-native authors. The use of intricate clause complexes seems to be one of the main features of English scientific discourse where authors attempt to give it extra value “by marking it off as the discourse of an intellectual elite” (Halliday, 2004, p. 161). The following clauses are extracted from native authors’ abstracts (*Topical Theme* is in italics, Interpersonal underlined, and **Textual** in bold).

- 4) “*A total of 209 patients* underwent randomization, of whom 108 received pregabalin **and** 101 received placebo; *after randomization, 2 patients in the pregabalin group* were determined to be ineligible **and** were excluded from the analyses.” (*New England Journal of Medicine*, 2017, 376, 1111)
- 5) “*The Amish and Hutterites* are U.S. agricultural populations whose lifestyles are remarkably similar in many respects **but** *whose farming practices, in particular,* are distinct; *the former* follow traditional farming practices **whereas** *the latter* use industrialized

farming practices. *The populations* also show striking disparities in the prevalence of asthma, **and little** is known about the immune responses underlying these disparities.” (*New England Journal of Medicine*, 2016, 375, 411).

Non-native authors also used tactic conjunctions but these comprised 64.3% of the textual themes. The two datasets included the extension devices *or*, *whereas*, and *whether* which are typically used to add related/contrasted information. Non-native authors overused cohesive ties such as *however*, *therefore*, *in addition*, *furthermore*, *thus*, *on the other hand* and *overall* as they are concerned with creating cohesion within a concise piece of writing. In the non-native abstracts, the following extracted clauses are recurrent in the data where short clauses are constructed and cohesive ties are used.

- 6) “**However**, *serum TRX levels* were not significantly different between stroke patients and healthy controls ($P = 0.405$). **Moreover**, *we* observed a significant positive correlation between TRX and TXNIP levels ($R^2 = 0.476$, $P < 0.003$).” (*Journal of Nature and Science of Medicine*, 2018, 1/2, 55)
- 7) “**However**, *no statistical significance* was observed for the remaining risk factors. *The frequency of retinopathy in newly-diagnosed T2DM patients* was similar to previous reports. *Vision threatening maculopathy* was present in two of seven patients, requiring further intervention. **Therefore**, *early screening* is strongly recommended for all newly-diagnosed T2DM patients.” (*Saudi Journal of Medicine and Medical Sciences*, 2017, 5/1, 26)

The conjunctive adjunct *however* is among the most frequently used cohesive devices in the RA genre (Biber, Johansson, Leech, Conrad, & Finegan, 1999; Hůlková, 2017). Non-native writers typically prefer to use short clauses in order to avoid syntactic ambiguity and/or semantic discontinuity (Halliday, 2004). The two types of cohesive ties which appeared in the two sets of data were contrastive and additive.

Ebrahimi (2016) argues that these two types of cohesive ties appear frequently in abstracts to intrigue readers sufficiently to read further and to influence organizers of conference and journal reviewers to accept and publish the RAs.

With regard to simple and multiple themes, it was found that 13.45% of themes in the non-native authors' data were multiple, while native authors used multiple themes for not more than 7% of the total themes appearing in the data. The non-native authors used two textual themes *and thus* before the topical theme, as exemplified in Extracts 8–10 (*Topical Theme* is in italics, Interpersonal underlined, and **Textual** in bold).

- 8) “*Our data* suggest that the clinical use of MSC in therapy depend on MSC site of origin, **and thus**, *BM-hMSC* are better suited for clinical trials aiming at enhancing bone regeneration.” (*Journal of Nature and Science of Medicine*, 2018, 1/2, 48)
- 9) “*Seventy-one patients (70.3%)* mounted a response with HBsAb >10 mIU/ml 6 weeks following the fourth dose of vaccine, **and thus** were considered as adequate responders.” (*Saudi Journal of Medicine and Medical Sciences*, 2017, 5/3, 218)
- 10) “Significantly higher odds of pain were associated with visiting when in dental pain (odds ratio = 6.81) and never visiting a dentist (odds ratio = 3.44), **whereas significantly lower odds** were associated with regular checkups (odds ratio = 0.28).” (*Saudi Journal of Medicine and Medical Sciences*, 2018, 6/2, 89)

This tendency of non-native authors for multiple themes more than native authors can be justified in relation to the fact that the abstracts of the former had more clauses which would naturally lead to having more themes. Another reason is related to the fact that non-native authors overused textual themes, which appeared before the topical themes. Elements that appear after the topical theme were not counted in the theme analysis.

“If the first element is a topical element, you call that theme and all the rest of the clause rheme. If other elements (interpersonal, textual) come before the topical element, you include them in the theme up to the end of the first topical element.” (Eggins, 2004, p. 308)

Ebrahimi and Khedri (2011) state that the use of multiple themes in abstracts can lead to cohesive text. However, in examining abstracts from different disciplines, Ebrahimi (2016) found that in research abstracts, there were few combinations of topical themes with interpersonal and/or textual elements. He explained that “this could indicate that the multiple theme is not the norm in AL [applied linguistics] RA abstract writing” (Ebrahimi, 2016, p. 109). This may support the claim that an abstract can be treated as a genre of its own with its own features; however, it is beyond the scope of the study to prove that abstracts exhibit similar generic features and hence can be perceived as an independent genre. The finding that multiple themes are not the norm is in line with other studies; for instance, He and Tian (2018, p. 5) found that “simple theme is more likely to satisfy the requirements of scientific paper abstracts to be concise and direct.”

5. Conclusion and implications

The present study investigated thematic choices and thematic patterns in medical RA abstracts written in English by native and Saudi scholars. The data which consisted of 30,000 words was analyzed contrastively. Based on the results of analysis, the research questions have been answered.

The study provided a broader understanding of thematic choices in medical RA abstracts. It was found that topical and textual themes were the most used theme types by both native and non-native scholars. The findings are in line with previous studies that, due to the impersonal and factual nature of scientific research including its abstracts, interpersonal themes are rarely used whereas unmarked topical and textual themes are the basic types of theme. Both sets of data indicated that multiple themes are less likely to outweigh the single theme due to

the concise nature of the abstract. Non-native authors were found to use more multiple themes due to the overuse of textual themes. They appeared to be preoccupied with the fact that a text has to be cohesive through the use of conjunctions; whereas native speakers achieved cohesion by employing more complex clauses.

The equal use of constant and linear theme patterns by native authors supports previous studies which indicated that these two patterns are recurrent in scientific RAs and abstracts; however non-native authors used constant pattern 55.5% more than the linear pattern. The possible justifications are that non-native authors tended to simplify the complexity of the subject matter by using shorter clauses and exerting less effort in processing the abstract. The redundant use of constant theme pattern may retrieve a non-coherent text although this pattern provides a strong topical focus if used reasonably. Another possible reason for using one pattern of thematic progression is that non-native authors rely on cohesive ties to achieve cohesion rather than using thematic progression patterns which create unity within the texture of the text. Knowledge of theme types and thematic progression patterns help non-native authors construct cohesive and coherent RA abstracts. The study suggests that thematic progression patterns need to be emphasized in EFL courses. Despite the differences in the use of theme patterns, abstracts of native and non-native authors appeared to share common features. This finding may support the argument that an abstract is a genre of its own. Future research is needed to verify whether this is the case or whether it is a hybrid genre, with its features being blended with those of the RA genre.

Finally, it need to be noted that the difference in the use of thematic choices and thematic progression patterns between native and Saudi scholars was where the English RA abstracts of native speakers have been, or are thought to have been, the model since they were published in a very high ranking journal. In addition, the context of publication ranking of the Saudi scholars' RA abstracts and, thereby, different audiences may have affected the findings. Therefore, future studies may look at and investigate

thematic progression patterns in medical RA abstracts written by native speakers of different languages. That is to say, a researcher may investigate how academic native speakers of Arabic write their abstracts in Arabic; likewise, how Chinese, Spanish write in their own languages.

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Acknowledgments

The authors are indebted to the two anonymous reviewers for their insightful and helpful comments. The authors also wish to express their gratitude to both the Deanship of Scientific Research at King Saud University and the Research Centre at the Faculty of Arts for funding the present study. They also thank RSSU at King Saud University for their technical support.

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