The thematic structure in research article abstracts: Variations across disciplines
Hmoud S. Alotaibi*

Abstract: This study has investigated the thematic structure of RA abstracts published in business administration, applied linguistics, accounting, physics, chemistry, and computer science disciplines from the perspectives of topical, textual, and interpersonal themes. The results showed that the unmarked topical themes were the most prevalent types in the RA abstracts, while the interpersonal themes were the least frequent. Concerning the textual themes, the results revealed some disciplinary variations. For example, the computer science abstracts relied heavily on conjunctive adjuncts while applied linguistics abstracts made a sort of balance between the conjunctions and conjunctive adjuncts. Additionally, the results showed that the adversative type was the most commonly used in all disciplines except in computer science where the temporal type was the most frequent element, and the accounting abstracts have had both adversative and additive types with the same frequency.

Keywords: thematic structure; topical themes; textual themes; interpersonal themes; RA abstract

1. Introduction
The genre of the RA abstract has attracted the attention of the researchers especially after Swales (1990) seminal work on the genre of the RA introduction. Researchers have examined the rhetorical structure of the RA abstract by focusing on one discipline (e.g. Lores, 2004; Santos, 1996), a range of disciplines (e.g. Dahl, 2004; Hyland, 2000; Melander et al., 1997; Pho, 2008) and across languages (e.g. Martin-Martin, 2003; Van Bonn & Swales, 2007). The traditional move structure of the RA abstract that these studies have revealed is the introduction, purpose, method, results, and conclusion. The purpose, method, and results moves are found to be obligatory while the

ABOUT THE AUTHOR
Dr. Hmoud S. Alotaibi holds a PhD in Applied Linguistics, and works now as a head and associate professor of English at Shaqra University, Saudi Arabia. His research interests are genre analysis, academic wiring, and English for academic purposes. He published a number of research articles and a book entitled: The Structure of the Research Article in Linguistics. (Email: halrwais@su.edu.sa)

PUBLIC INTEREST STATEMENT
When it comes to writing, it is important to be cognizant of subtle nuances that shape the writing style and language. This paper demonstrates how authors from different academic disciplines write abstracts of their research articles. The abstract is seen as a roadmap of the whole article; and within a limited number of words, writers should address the significance of their papers, highlight the methodology, and report their findings. Each sentence or clause begins with a theme, and it is interesting to focus on that part to see how authors shape the beginning of their sentences. In this paper, the readers will be introduced to different types of themes and their subtypes.
introduction and conclusion moves are optional. More importantly, researchers (e.g. Dahl, 2004; Hyland, 2000; Melander et al., 1997; Pho, 2008) have discerned disciplinary variations across the abstracts. For example, Hyland (2000) showed that the introduction move appeared to be more important in soft disciplines compared to hard disciplines, where the latter give more importance to the method move. In addition, the results move in soft disciplines take the form of argument while it focuses on reporting research findings in hard disciplines. Furthermore, soft disciplines exhibited more use of personal pronouns than hard fields.

Recently, researchers have moved away from examining the move structure of the RA abstract for specific investigations such as the use of metadiscourse (Alotaibi, 2015; El-Dakhs, 2018; Liu & Huang, 2017), metadiscursive nouns (Jiang & Hyland, 2016), phrasal complexity (Ansarifar et al., 2018), complex noun phrases (Ruan, 2018), and multi-word expressions (Omidian et al., 2018). Lores (2004) has examined the thematic progression in the RA abstract by focusing on linguistics. Hence, more studies are needed to clarify the genre of the RA abstract across disciplines. The present study fills this gap by investigating the thematic structure of the RA abstract in a range of disciplines, three of soft disciplines and three of hard ones, by focusing on the textual, interpersonal, and topical themes. The purpose of the study is to tease out disciplinary variations in RA abstract in light of thematic choices.

2. Thematic structure in academic writing
In the Systemic Functional Linguistics (SFL) theory, the thematic structure of a clause consists of two parts: Theme and Rheme. The “clause has meaning as a message, a quantum of information;” thus, “the Theme is the point of departure for the message. It is the element the speaker selects for ‘grounding’ what he is going on to say” (Halliday, 2014, p. 83). Rheme, therefore, is the remainder of the clause or message. So, in the sentence, the author is submitting his manuscript, the author is the theme and is submitting his manuscript is the rheme. More specifically, the subject the author is a topical theme. The topical theme is the ideational component that occupies the first position, and can be a participant, a process, or a circumstance. Furthermore, the theme in the previous sentence is unmarked because it functioned as a subject. Theme would be considered marked if it does not function as a subject. For example, in the sentence, in my city, people love to travel, the prepositional phrase in my city is a marked theme. According to Halliday (2014) and Wei (2016), Marked Themes are classified into five types: spatial, temporal, manner, cause, and contingency.

Topical themes can be preceded by textual or interpersonal themes. Textual themes are elements that connect the discourse and help organize the text. Textual themes include conjunctions (and, but, or) and conjunctive adjuncts (however, therefore, as a result). The Interpersonal themes highlight the speaker’s stance with expressions such as it seems that, perhaps, and certainly.

Lores (2004) examined the rhetorical organization and thematic progression to analyze abstracts from linguistics RAs. The thematic progression model was introduced by Danes (1974) and consists of three types (a) linear theme, (b) constant theme, and (c) multiple theme or split rheme. She found a clear relationship between the thematic progression and the rhetorical structure. For example, in the abstracts that followed the IMRD structure, the linear patterns appeared to be common in the results and discussion sections. Yet, in the abstracts that employed the CARS model, the linear patterns were employed in Move 1 (establishing a territory) while Move 2 (establishing a niche) and Move 3 (occupying the niche) displayed the constant thematic pattern.

Ebrahimi (2016) examined the theme types and patterns employed in 120 RA abstracts from the disciplines of applied linguistics, economics, agriculture and applied physics. The study found some similarities and differences. For example, the unmarked topical themes were employed the most across the disciplines, yet the marked topical themes appeared to be more favored in soft disciplines compared to hard disciplines. Furthermore, the textual themes were employed more than interpersonal themes in all sets of abstracts.
The employment of thematic choice in RAs is under studied. Most of the studies that examined thematic structure have focused on student essays. For example, Wei (2016) found that Chinese college students employed fewer topical themes and significantly more interpersonal themes compared to their American counterparts. Additionally, Chinese college students used significantly more textual themes in the form of conjunctive adjuncts but used fewer conjunctions. Chang and Lee (2019) examined textual and interpersonal themes in essays of college students and essays of professional writers. The authors found that essays of students employed significantly more textual themes while essays of professionals showed a more balanced textual and interpersonal theme use. North (2005) also examined essays written by students to discern whether disciplinary background plays any role. The author found that students from an arts background received higher grades than those from a science background. Also, the author found that students of arts background used significantly more textual and interpersonal themes than their counterparts of science background. North commented on two extracts, one by a student of arts background and the other by a student of science background by showing that “[i]n the ‘arts’ extract, the student uses both textual themes to make explicit the structure of the argument and interpersonal themes to indicate her degree of commitment to the views she presents, while the ‘science’ extract, although dealing with similarly complex ideas, offers a series of bald assertions” (North, 2005, p. 441). This interpretation might be the reason why students of arts background received higher marks in their essays compared to the science students.

3. Methodology

The study analyzed the use of topical, textual, and interpersonal themes employed by professional writers in a range of disciplines. The corpus consisted of 180 RA abstracts in the fields of business administration, applied linguistics, accounting, physics, chemistry, and computer science. Experts in each field were requested to suggest a journal and thus 30 RA abstracts were taken from the most recent issue of the following journals: Journal of Small Business Management, Journal of English for Academic Purposes, The Accounting Review, Journal of Applied Physics, The Journal of Organic Chemistry, and the International Journal of Computer Vision. The selected journals were data-based and the texts were published in 2019.

The study examined the thematic structure of the texts by considering the T-unit as the basic analysis unit. The T-unit is an independent clause with other dependent clauses around it (Fries, 1995). The T-unit consists of a theme and a rheme. The present study examined the topical theme in each T-unit, and any textual or interpersonal themes preceding it. The analysis was performed by the researcher and verified by an expert in applied linguistics and writing studies. The excerpt in (1) highlights the way the analysis was conducted. The brackets indicate the T-unit and the abbreviation in parentheses at the end shows the text where the example was taken from.

(1) [We (Topical: Unmarked) investigate the problem of automatically determining what type of shoe left an impression found at a crime scene.] [This recognition problem (Topical: Unmarked) is made difficult by the variability in types of crime scene evidence (ranging from traces of dust or oil on hard surfaces to impressions made in soil) and the lack of comprehensive databases of shoe outsole tread patterns.] [We (Topical: Unmarked) find that mid-level features extracted by pre-trained convolutional neural nets are surprisingly effective descriptors for this specialized domains.] [However, (Textual: Adversative) the choice of similarity measure for matching exemplars to a query image (Topical: Unmarked) is essential to good performance.] [For matching multi-channel deep features, (Topical: Marked: Manner) we propose the use of multi-channel normalized cross-correlation and analyze its effectiveness.] [Our proposed metric (Topical: Unmarked) significantly improves performance in matching crime scene shoeprints to laboratory test impressions.] [We (Topical: Unmarked) also show its effectiveness in other cross-domain image retrieval problems: matching facade images to segmentation labels and aerial photos to map images.] [Finally, (Textual: Temporal) we (Topical: Unmarked) introduce a discriminatively trained variant and fine-tune our system through our proposed metric, obtaining state-of-the-art performance.] (CS 3)
4. Results

Table 1 presents an overview of the data by showing the total number of words in RA abstracts, the average number of words per abstract, the total number of T-units, and the average number of words per T-unit.

From these results, it can be seen that abstracts of computer sciences RAs were the longest with an average of 196.6 words per RA. They are followed by physics abstracts with an average of 180.6 then applied linguistics abstracts with an average of 178.5. With a huge gap, the accounting abstracts came in the fourth position with an average of 136.6 then chemistry abstracts of an average of 127.7 and finally business administration texts with an average of 108.23.

Hence, unsurprisingly, the use of T-units came in the same order with computer science abstracts being the highest with an average of 9.3 and business administration texts were the least with an average of 4.7 per RA. Concerning the average number of words per T-unit, however, there were some variations. Applied linguistics abstracts had an average of 24.9 followed by physics papers with an average of 23.18. Then business administration papers followed with an average of 22.7, and similarly accounting texts with an average of 22.15. Finally, both computer sciences and chemistry papers had the least average number of words per T-unit with 21.8 and 21.5, respectively.

The first part of investigation covered the use of topical, textual, and interpersonal themes in all sets of abstracts. As shown in Table 2, all groups of writers in the examined disciplines used topical themes significantly more than textual and interpersonal types. Applied linguistics and physics abstracts used topical themes the most, while textual themes appeared to be the most in business administration abstracts, and finally accounting papers employed interpersonal themes the most. It appears that business administration abstracts used topical themes the least in favor of textual themes, and similarly accounting papers used a less percentage of topical themes in favor of interpersonal themes. Other than these disciplinary variations, it is evident that interpersonal themes are quite low in the RA abstracts which may indicate the desire of authors to avoid expressing their stance and attitude in this part-genre.

The topical themes were further examined to indicate theme markedness. Table 3 shows that all sets of abstracts have used unmarked themes noticeably more than marked themes. Concerning marked themes, business administration abstracts used them the most with a percentage of 25.2% while accounting abstracts used marked themes the least with a percentage of 13.5%. On the other hand, the unmarked themes were employed the most in accounting abstracts with a percentage of 86.5% while business administration used them the least with a percentage of 74.8%. Similar to the finding regarding the use of textual themes in business administration abstracts, it appears here that...
the writers of this discipline have shortened the gap between marked and unmarked themes to create a balance. A similar gap can also be noticed in computer science and physics abstracts.

Further examination of marked themes types has revealed interesting similarities and differences in the examined abstracts. As shown in Table 4, the manner type was the most frequently used in all disciplines except in chemistry abstracts where the spatial was the most employed type. The spatial type was the second type in frequency in accounting and physics abstracts. In applied linguistics abstracts, however, the temporal type was the second in frequency and the cause type was in business administration and computer science abstracts. Overall, the manner type was the most used in abstracts followed by the spatial type, and then the cause type.

As indicated above, the manner theme was the most predominant type in the entire examined abstracts except in chemistry texts. Drawing on the manner type, the authors have highlighted their research methodology (Ex. 2 & 3) and compared their study with previous studies (Ex. 4 & 5).

(2) Based on our qualitative cross-case analysis, we identify startup-specific context factors that inhibit routinizing (BA 2).
(3) Depending on the electron-donor substitution, they feature an intramolecular charge-transfer (ICT) character in the excited state. (Chem 3).
(4) While encoders have been studied rigorously, relatively few studies address the decoder side. (CS 10).
| Disciplines            | Temporal | Spatial | Manner | Cause | Contingency | Total |
|------------------------|----------|---------|--------|-------|-------------|-------|
| Business administration| 0%       | 2.8%    | 86.1%  | 8.3%  | 2.8%        | 36    |
| Applied linguistics    | 12.5%    | 10%     | 57.5%  | 10%   | 10%         | 40    |
| Accounting             | 0%       | 12%     | 76%    | 8%    | 4%          | 25    |
| Physics                | 10.7%    | 26.8%   | 53.6%  | 7.1%  | 1.8%        | 56    |
| Chemistry              | 6.5%     | 45.1%   | 38.7%  | 3.2%  | 6.5%        | 31    |
| Computer science       | 4.5%     | 14.9%   | 50.7%  | 22.4% | 7.5%        | 67    |
| Total                  | 6.3%     | 18.4%   | 58.4%  | 11.4% | 5.5%        | 100%  |
(5) Adopting a functional linguistic approach (e.g. Veel’s (1997) framework of text taxonomy), analyses showed that explanation is the most common text type in the three chemistry textbooks, and the five subtypes of explanations represented in the textbooks are causal (40%), factorial (24%), sequential (15%), consequential (13%) and theoretical (8%). (EAP 5)

The second most common marked type was the spatial expression. In Ex. (6), the authors used that thematic structure to refer to an experiment conducted by the researchers, while in Ex. (7), the authors used the prepositional phrase to refer to their study, and the authors in Ex. (8) used the spatial element to refer to their study by using the adverb here.

(6) The absorption of the EUV radiation in the cold peripheral gas has been eliminated in another experiment by means of irradiating the target with a wide defocused laser beam that resulted in an increase of the EUV output by an order of magnitude. In that experiment, the conversion efficiency at $\lambda = 11.2$ nm amounted to 3.9%. (PHY 2)

(7) In this study, two carbazole-dithienylethene-$\text{BF}_2\text{bdk}$ triads CDB1 and CDB2, suspending carbazole and $\text{BF}_2\text{bdk}$ moieties on both sides of dithienylethene unit, have been developed. (Chem 2).

(8) Here, our hydrogen bond and structural access to Brønsted acid/imine complexes was used to analyze BINOL-derived chiral disulfonimide (DSI)/imine complexes. (Chem 6).

Concerning textual themes, the results in Table 5 show that the conjunctive adjuncts were used more than conjunctions in all sets of abstracts. Interestingly, when examining the gap between the use of conjunctions and conjunctive adjuncts, certain variations were revealed. The gap was very narrow in applied linguistics abstracts with only 12% difference, yet the gap was wide in computer sciences abstracts with a difference of 83.6%. This may indicate that applied linguistics abstracts made a sort of equilibrium between the conjunctions and conjunctive adjuncts while computer science abstracts have relied heavily on conjunctive adjuncts.

The use of conjunctive adjuncts was further examined, and the results are presented in Table 6. The results showed that the adversative type was the most frequently used in all groups except in computer science where the temporal type was the most employed, and in accounting both adversative and additive had the same frequency. The additive type was the second in frequency in business administration and applied linguistics abstracts. In chemistry abstracts, both additive and causal types had very similar frequency. The accounting abstracts also have shown the use of summative type which was low in frequency in the rest of abstracts.
| Disciplines            | Additive | Temporal | Adversative | Causal | Comparative | Summative | Others | Total |
|------------------------|----------|----------|-------------|--------|-------------|-----------|--------|-------|
| Business administration| 6        | 3        | 7           | 1      | 3           | 2         | 1      | 23    |
|                        | 26.1%    | 13%      | 30.4%       | 4.4%   | 13%         | 8.7%      | 4.4%   | 100% |
| Applied linguistics    | 3        | 2        | 6           | 1      | 0           | 0         | 2      | 14    |
|                        | 21.4%    | 14.3%    | 42.9%       | 7.1%   | 0%          | 0%        | 14.3%  | 100% |
| Accounting             | 6        | 1        | 6           | 1      | 2           | 4         | 0      | 20    |
|                        | 30%      | 5%       | 30%         | 5%     | 10%         | 20%       | 0%     | 100% |
| Physics                | 1        | 4        | 12          | 3      | 0           | 0         | 1      | 21    |
|                        | 4.8%     | 19%      | 57.1%       | 14.3%  | 0%          | 0%        | 4.8%   | 100% |
| Chemistry              | 5        | 1        | 8           | 6      | 1           | 0         | 0      | 21    |
|                        | 23.8%    | 4.8%     | 38.1%       | 28.5%  | 4.8%        | 0%        | 0%     | 100% |
| Computer science       | 8        | 19       | 13          | 2      | 1           | 0         | 2      | 45    |
|                        | 17.9%    | 42.2%    | 28.9%       | 4.4%   | 2.2%        | 0%        | 4.4%   | 100% |
| Total                  | 29       | 30       | 52          | 14     | 7           | 6         | 6      | 144   |
|                        | 20.1%    | 20.9%    | 36.1%       | 9.7%   | 4.8%        | 4.2%      | 4.2%   | 100% |
As indicated above, the adversative adjuncts were the most common used elements in all groups of abstracts with exception to computer science texts. In Ex. (9), the authors used two adversative types (whereas and however) in the process of discussing their findings.

(9) In these simulations, the hole contact and absorber are assumed to be ideal, whereas we vary the partial specific contact resistances in the electron contact by orders of magnitude by adjusting the electron and hole mobilities, their densities (through variations of the donor doping density), and the contact thickness. The simulations confirm the finding of the model that, when the contact fraction cannot be adjusted—as is the case with full-area contacts—combined passivation and conductivity are necessary and sufficient for optimal solar cell performance, and they imply selectivity. However, the reciprocal is not true … (PHY 23).

The second most prevalent textual adjunct was the temporal element, and it was the first used category in computer science abstracts. In the Excerpt (10), the authors organized the text textually by using temporal adjuncts: first, second, and finally twice. The abstracts also showed the employment of the conjunction and as well as the additive element additionally.

(10) This has three benefits. First, the network learns a representation of shape beyond that of a single viewpoint, as the silhouette forces it to respect the visual hull, and the depth image forces it to predict concavities (which don’t appear on the visual hull). Second, as the network learns about 3D using the proxy tasks of predicting depth and silhouette images, it is not limited by the resolution of the 3D representation. Finally, using a view-dependent representation (e.g. additionally encoding the viewpoint with the input image) improves the network’s generalisability to unseen objects. Additionally, the network is able to handle the input views in a flexible manner. First, it can ingest a different number of views during training and testing, and it is shown that the reconstruction performance improves as additional views are added at test-time. Second, the additional views do not need to be photometrically consistent. The network is trained and evaluated on two synthetic datasets — a realistic sculpture dataset (SketchFab), and ShapeNet. The design of the network is validated by comparing to state of the art methods for a set of tasks. It is shown that (i) passing the input viewpoint (i.e. using a view-dependent representation) improves the network’s generalisability at test time. (ii) Predicting depth/silhouette images allows for higher quality predictions in 2D, as the network is not limited by the chosen latent 3D representation. (iii) On both datasets the method of combining views in a global manner performs better than a local method. Finally, we show that the trained network generalizes to real images, and probe how the network has encoded the latent 3D shape. (CS 2).

5. Discussion
The present study has investigated the thematic structure in RA abstracts of the following disciplines: business administration, applied linguistics, accounting, physics, chemistry, and computer science. The results have revealed certain similarities and differences between the examined disciplines. First, the examination of the use of the topical, textual, and interpersonal themes has revealed that all sets of abstracts have relied heavily on topical themes to begin their independent clauses. This result is in line with that from Wei’s (2016) study, which indicated that topical themes were more predominant in English essays written by native speakers of English and by Chinese students. These results suggest that topical themes are obligatory in writing compared to the textual and interpersonal themes that are optional as shown by Halliday (2014).

Second, the use of textual themes showed a clear similarity in all groups of abstracts. Business administration abstracts, however, gave more preference to using textual themes, and this slight increase gave a sort of balance in this discipline between the topical and textual themes. Third, the use of interpersonal themes was very low in all groups. This finding is in line with Ebrahimi (2016) who argued that the absence of interpersonal themes might be attributed to “the argumentative nature and impersonal tone of the RA abstract genre” where “[t]here is hardly room for attitudinal
expression in this kind of academic writing.” (p. 108). Alternatively, Wei (2016) found in student essays an “overuse of interpersonal Themes” and this “may make their essays more colloquial” (p. 58). In addition, Chang and Lee (2019) and North (2005) reported the evident presence of interpersonal themes in essays written by students. In this study, however, accounting abstracts used interpersonal themes the most followed by applied linguistics abstracts. Here, we may conclude that in the examined corpus, the soft discipline abstracts showed more preference of using interpersonal themes compared to hard disciplines.

Fourth, the examination of theme markedness has shown that all groups of abstracts used the unmarked themes more than marked themes. This result is in line with the findings in Ebrahimi (2016) who interpreted this result as an indication “that in most of the analyzed clauses, the Topical Theme occupied both Thematic and grammatical subject position. This compliance of Theme and grammatical subject may indicate the structural simplicity of the analyzed RA abstracts” (p. 107). The overuse of unmarked themes over marked ones was also found in student essays in Wei’s (2016) study, whether in essays written by native speakers or nonnative speakers of English. Thus, it can be concluded that unmarked themes is predominant in academic writing regardless of its specific genre. Yet, the results in the present study have shown that three disciplines, namely business administration, physics, and computer science featured the use of topical themes which ultimately shortened the gap between the use of marked and unmarked themes and consequently shorted the gap between these two types of themes.

Fifth, the use of marked types has discerned certain similarities and differences between the abstract groups. The manner type was the most dominant in all abstracts except chemistry where the spatial type was used the most. These results are not in line with those in Ebrahimi (2016) where topical adjuncts appeared the most in applied linguistics abstracts and the least in physics abstracts. In addition, the overuse of manner adjuncts in this study are not consistent with those by Wei (2016) in student essays where temporal and spatial elements were the most predominant, followed by contingency in English essays written by Chinese students.

Sixth, the examination of textual themes has shown that conjunctive adjuncts were used more than conjunctions in all groups of abstracts. The results showed that applied linguistics abstracts made a sort of balance between the conjunctions and conjunctive adjuncts while computer science abstracts relied heavily on conjunctive adjuncts. This finding is not consistent with what found in student essays written by native speakers of English as reported in Wei (2016), and partially in Chang and Lee (2019), where there was an overuse of conjunctions over conjunctive adjuncts. These results may suggest that academic writers may not find conjunctions are the appropriate cohesive devices in this highly condensed and short section, i.e. RA abstract, compared to student essays.

Finally, the results concerning the use of conjunctive adjuncts have shown that the adversative type was the most frequently used in all groups except in computer science where the temporal type was the most employed, and in accounting both adversative and additive had the same frequency. This overuse of adversative types in RA abstracts was not found in EFL essays in Chang and Lee (2019) and in Wei (2016) where additive and temporal elements were the most predominant elements. This variation can be attributed to the fact that writers of RA abstracts “are more into helping readers to make text connection through focus on the steps of the arguments presented in the RA abstracts” (Ebrahimi, 2016, p. 108).

In sum, the investigation of topical, textual, and interpersonal themes in RA abstracts of a range of disciplines from hard and soft disciplines has shown that it is not a matter of soft vs. hard disciplines as there an evident overlap and each discipline may have its own thematic features. Firstly, the topical themes and specifically the unmarked themes is predominant in academic writing in general whether RAs or student essays. Secondly, the use of interpersonal themes is more often in student essays, as reported in previous studies, compared to RAs. Thirdly, two of soft
disciplines in this study out of three have used more cases of interpersonal themes, which may indicate that in the RA abstract, the soft disciplines appear to employ interpersonal themes more than hard disciplines. Fourthly, the manner type of marked themes was the most employed in the present study while it was not the case in student essays where temporal and spatial types were the predominant elements. Fifthly, the use of conjunctive adjuncts seems to be more preferable than conjunctions in RAs compared to student essays. Finally, the adversative type as a textual element seems to be more common in RA abstracts and this was not the case in student essays where additive and temporal elements were the most common.

6. Conclusion
The study has highlighted the thematic structures in RAs from a range of soft and hard disciplines by focusing on the abstract section. With comparison between the results of this study and those in previous works, the study has addressed some concluding remarks concerning the employment of topical, textual, and interpersonal themes in RA abstracts. Chiefly, the study has shown that the use of interpersonal themes marks a clear distinction between RA abstracts and student essays. In addition, the study has addressed the specific types of marked themes as well as textual themes that appear to be prevalent in RA abstracts and those that seem to be preferable in student essays.

It should be noted, however, that these results might not be generalized for a number of reasons. First, the texts were drawn from one journal of each discipline. Hence, by exploring a range of journals, we may have a better understanding of thematic structures in the RA abstract. Second, the analysis has been restricted to the RA abstract. Thus, by extending the analysis to other sections of RA is of importance to gain a better understanding of thematic structures in the RA genre as a whole. Despite these limitations, the study should contribute to the genre theory and enhance researchers’ understanding of disciplinary variations. Additionally, the study should provide researchers with insights regarding the construction of RA abstract and the subtle nuances it encompasses.

Funding
The author has not received any financial support for this work.

Author details
Hmoud S. Alotaibi
E-mail: halwiwais@su.edu.sa
Department of English, Shaqra University, Saudi Arabia.

Citation information
Cite this article as: The thematic structure in research article abstracts: Variations across disciplines, Hmoud S. Alotaibi, Cogent Arts & Humanities (2020), 7:1756146.

References
Alotaibi, H. (2015). Metadiscourse in Arabic and English Research Article Abstracts. World Journal of English Language, 5(2), 1–8. https://doi.org/10.5430/wjel.v5n2p1
Ansarifar, A., Shahriri, H., & Pishghadam, R. (2018). Phrasal complexity in academic writing: A comparison of abstracts written by graduate students and expert writers in applied linguistics. Journal of English for Academic Purposes, 31(58-71), 2018. https://doi.org/10.1016/j.jeap.2017.12.008
Chang, P., & Lee, M. (2019). Exploring textual and interpersonal Themes in the expository essays of college students of different linguistic backgrounds. English for Specific Purposes, 54, 75–90. https://doi.org/10.1016/j.esp.2019.01.002
Dahl, T. (2004). Some characteristics of argumentative abstracts. Akademisk Prosa, 2, 49–67. Department of Romance Studies, University of Bergen.
Danes, F. (1974). Functional sentence perspective and the organization of the text. In F. Danes (Ed.), Papers on functional sentence perspective (pp. 106–128). Publishing House of the Czechoslovak Academy of Sciences.
Ebromhi, S. (2016). Theme types and patterns in research article abstracts: A cross disciplinary study. International Journal of English Language & Translation Studies, 4(3), 104–115. Retrieved from www.eltsjournal.org
El-Dakhs, D. A. S. (2018). Why are abstracts in PhD theses and research articles different? A genre-specific perspective. Journal of English for Academic Purposes, 36(6), 48–60. https://doi.org/10.1016/j.jeap.2018.09.005
Fries, P. H. (1995). A personal view of theme. In M. Ghadessy (Ed.), Thematic development in English texts (pp. 1–19). Pinter.
Halliday, M. A. K. (2012). An introduction to functional grammar Revised by C. M. I. M. Matthiessen. (4th ed.). Routledge.
Hyland, K. (2000). Disciplinary discourses: Social interactions in academic writing. University of Michigan Press.
Jiang, F. K., & Hyland, K. (2016). Nouns and academic interactions: A neglected feature of metadiscourse. Applied Linguistics, 39(4), 508-531. https://doi.org/10.1093/applin/amw023
Liu, P., & Huang, X. (2017). A study of interactional metadiscourse in English abstracts of Chinese economics research articles. Higher Education Studies, 7(3), 25–41. https://doi.org/10.5539/hest.v7n3p25
Lores, R. (2004). On RA abstracts: From rhetorical structure to thematic organization. English for Specific Purposes, 23(3), 280–302. https://doi.org/10.1016/j.esp.2003.06.001
Martin-Martin, P. (2003). A genre analysis of English and Spanish research paper abstracts in experimental social sciences. *English for Specific Purposes*, 22(1), 25–43. https://doi.org/10.1016/S0889-4906(01)0053-3

Melander, B., Swales, J. M., & Fredrickson, K. M. (1997). Journal abstracts from three academic fields in the United States and Sweden: National or disciplinary proclivities?. In A Duszak (Ed.), *Culture and style of academic discourse* (pp. 251–272). Mouton de Gruyter.

North, S. (2003). Disciplinary variation in the use of theme in undergraduate essays. *Applied Linguistics*, 26(3), 431–452. https://doi.org/10.1093/applin/ami023

Omidian, T., Shahriari, H., & Siyanova-Chanturia, A. (2018). A cross-disciplinary investigation of multi-word expressions in the moves of research article abstracts. *Journal of English for Academic Purposes*, 36, 1–14. https://doi.org/10.1016/j.jeap.2018.08.002

Pho, P. D. (2008). Research article abstracts in applied linguistics and educational technology: A study of linguistic realizations of rhetorical structure and authorial stance. *Discourse Studies*, 10(2), 231–250. https://doi.org/10.1177/14614456070787010

Ruan, Z. (2018). Structural compression in academic writing: An English-Chinese comparison study of complex noun phrases in research article abstracts. *Journal of English for Academic Purposes*, 36, 37–47. https://doi.org/10.1016/j.jeap.2018.09.001

Santos, M. B. D. (1996). The textual organization of research paper abstracts in applied linguistics. *Text*, 16(4), 481–499. http://dx.doi.org/10.1515/text.1996.16.4.481

Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge University Press.

Van Bonn, S., & Swales, J. M. (2007). English and French journal abstracts in the language sciences: Three exploratory studies. *Journal of English for Academic Purposes*, 6(2), 93–108. https://doi.org/10.1016/j.jeap.2007.04.001

Wei, J. (2016). Thematic choice in Chinese college students’ English essays. *English for Specific Purposes*, 41, 50–67. https://doi.org/10.1016/j.esp.2015.09.003

© 2020 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:
Share — copy and redistribute the material in any medium or format.
Adapt — remix, transform, and build upon the material for any purpose, even commercially.
The licensor cannot revoke these freedoms as long as you follow the license terms.
Under the following terms:
Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.
You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
No additional restrictions
You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.