

# Augmenting Meaning: A Comparative Analysis of Circumstantiation in Academic Abstracts Across Three Disciplines

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## Abstract

Within academic and scientific contexts, the genre of research article abstracts holds considerable importance, as these abstracts play a crucial role in influencing readers' decisions regarding the selection of articles. The current study aimed to formulate a clear view of the use of circumstances in research article abstracts across three disciplines: economics, engineering (electrical and electronic) and medicine (general and internal). The study analyzed a corpus of 360 research article abstracts (RAAs), comprising a total of 80,028 words, from twelve highly ranked open access academic journals within the three disciplines published within 2018–2019. To answer the research questions, computational linguistics analysis methods of text mining via the annotation and tagging of the circumstances used in these RAAs were employed using the Systemic Functional Linguistics software UAM CorpusTool. The analysis administered the SFL system for circumstances.

Upon employing the nonparametric Kruskal Wallis test, the findings revealed a statistically significant variance in the employment of circumstances in RAAs ( $\chi^2(2) = 124.24$ ,  $df:2$ ,  $p < .001$ ) between the fields of economics and medicine and between the fields of engineering and medicine. The findings of the current study analysis may present a clearer account of the contemporary approach to crafting an academic abstract, which may serve as a valuable resource for prospective authors within these specific disciplines and contribute to the knowledge base of scholars engaged in the realm of academic writing.

**Keywords:** Research Article Abstracts, Systemic Functional Linguistics, Circumstances, Text Mining, UAM CorpusTool

## 1. Introduction

### *1.1 Introduce the Problem*

Authors engage in the production and publication of research papers with the primary goal of scrutinizing existing information within their specialized field, seeking to expand upon it for a more comprehensive understanding and to contribute to the advancement of knowledge on the subject. Research articles, as products of this collective effort within a particular field, serve as valuable resources to be shared among practitioners. Recognizing the inherently social nature of scientific endeavors, Pigliucci (2018) emphasizes the dynamic interplay of methods, subject matters, social customs, and institutional roles shaping scientific communities. Scientific discourse adheres to established rules, utilizes verified methods, addresses specific subjects, and follows agreed-upon customs. Abstracts, being the initial point of contact between research articles and their audience, hold significant importance in influencing readers' decisions to engage further with the text. Holtz (2011) underscores the growing relevance of abstracts in the face of the increasing volume of scientific publications. Considering the pivotal role abstracts play in readers' selection of research articles and the internal conventions of specialized discourse, this study aims to offer a socio-semiotic descriptive analysis of linguistic representations in the abstracts of three disciplines—economics, engineering, and medicine. Employing Halliday's systemic functional linguistics (SFL) framework, the study utilizes text mining and corpus linguistics tools to investigate the employment of circumstances in 360 research article abstracts across the three disciplines. The objective is to unveil discipline-specific linguistic characteristics within these fields.

### *1.2 Significance of the Study*

Several studies have examined the composition of academic rhetoric, including its subgenres and the variations imposed by the different disciplinary backgrounds. However, research on research article abstracts has primarily concentrated on the processes employed, the participants involved, and the patterns in which these elements are presented. Consequently, there exists a notable dearth of studies focusing on the utilization of circumstances to contextualize the reported actions, revealing a significant gap in the existing knowledge. A comprehensive understanding of these elements can substantially enhance writing instruction, thereby aiding educators in teaching students how to construct clear and compelling prose. Ultimately, such research has the potential to bridge the divide between theoretical frameworks and practical application, fostering a deeper appreciation for the art and science of writing.

Hence, the goal of this study was to systematically analyze the use of circumstances, both qualitatively and quantitatively, to provide a descriptive account of these RAAs of the three chosen disciplines. In order to do so, the authentic usage of language in highly ranked scientific journal publications over a corpus of 360 RAAs in the fields of economics, engineering and medicine was examined. The analysis followed the SFL theoretical framework as described by Halliday (2014) utilizing O'Donnell's (2008) UAM CorpusTool Version 6.2 multiple-layer annotation software to analyze and annotate each text on its

different layers, and SPSS to statistically test the significance of these differences.

Understanding how these disciplines situate their processes within the frame of circumstance aides future authors within these fields as they construe their intended meanings within the desired contexts. The initial objective of this analysis is finding out whether variances between disciplines exist or not. If variances do exist, then the descriptive analysis shall reveal them and the quantitative analysis shall explore their statistical significance.

### *1.3 Literature Review*

Research articles as a subgenre of academic writing have received some attention in studies examining experiential meanings through the analysis of transitivity (Hui, 2013; Choura, 2018; Hao, 2022; Zheng, 2021). Despite significant attention given to analyzing processes and participant roles in research articles, fewer studies have thoroughly examined the role of circumstances framing these processes. This gap is only recently starting to be addressed.

Several recent studies have begun to focus on the importance of circumstances in academic discourse. For instance, Marr and Martin (2021) emphasized the pedagogical benefits of teaching circumstantial meanings to multilingual students, finding that this can improve their comprehension of complex academic materials and their ability to generate academic texts. Similarly, Anjarwati et al. (2021) conducted a gender-based analysis of 10 article introductions, revealing that female authors tended to use more manner circumstances, while male authors favored location and cause circumstances.

Other studies have extended this focus to diverse academic contexts. Scott (2022) examined 5 doctoral research proposal presentations in health sciences, showing that circumstances of time, place, and manner were frequently used to frame research as feasible and significant. In contrast, Ayaawan and Antia (2023) compared methodology sections of 60 research articles from African and Western journals, highlighting a tendency for African journals to downplay author presence while Western journals emphasized collaborative circumstances, such as accompaniment and location.

Additional studies have analyzed abstracts, revealing notable patterns in the use of circumstances. For example, Jaiyeoba and Onipede (2023) found that circumstances of time and place were common in 100 public administration project abstracts, while Lin et al. (2024) observed a high frequency of location circumstances in 30 science abstracts, suggesting a field-specific style.

However, despite these findings, there is still much to explore in terms of the lexico-grammatical makeup of research article abstracts, particularly concerning the employment of circumstances and their variation across academic disciplines. To the knowledge of this paper, no study has yet examined the specific usage of circumstances in research article abstracts across different fields. Therefore, this paper addresses this gap by investigating the use of circumstances in abstracts, aiming to provide insights into disciplinary variations in academic writing and how these contribute to the effective communication of research.

### *1.4 Research Hypothesis*

The objective of the study was to find significant differences between the academic research abstract writing of three disciplines in the use of circumstances. Such differences were detected by following the SFL analysis system of circumstance as introduced by Halliday through the quantitative analysis of the lexico-grammatical features. The null ( $H_0$ ) and the alternative ( $H_a$ ) hypotheses are thus formulated as follows:

$H_a$ : The quantitative analysis of the lexico-grammatical features of circumstance discloses statistically significant differences between research article abstracts across the academic disciplines of economics, electrical and electronic engineering, and general and internal medicine.

$H_0$ : The quantitative analysis of the lexico-grammatical features of circumstance discloses no statistically significant differences between research article abstracts across the academic disciplines of economics, electrical and electronic engineering, and general and internal medicine.

## **2. Method**

An interpretivist cross-sectional mixed-method research design was adopted, employing a grounded theory strategy where exploratory data coding and analysis was performed in a bottom-up inductive research approach. Authentic RAAs were observed and analyzed inductively to spot the lexico-grammatical patterns presented as circumstances of processes in the RAAs of the disciplines of medicine, economy, and engineering.

The goal of this approach is to construct meaning from the obtained data by locating and recognizing patterns and associations between these patterns as it is a “bottom-up” approach that examines data to find patterns, resemblances, and regularities to reach conclusions or to generate theory (Lodico et al., 2010). Following this approach method was done in two parts; first, the datasets were examined, and the used features and resources annotated, then the analyses outcomes for patterns and similarities or differences were observed to construct a conclusion.

To carry out the analysis, UAM CorpusTools software, an SFL annotation software developed by O'Donnell, was employed to analyze RAAs linguistic semiotics to facilitate the linguistic annotation of written corpora by specifying multiple layers of analysis and annotating each text at that layer.

### *2.1 Data Source and Collection Criteria: Building the Corpus*

To carry out the analysis, a total of 360 RAAs published within the years of 2018 and 2019 were selected from twelve journals in three different disciplines: medicine, economics, and engineering. The three chosen fields, according to the Biglan model (1973), are considered applied academic disciplines. The Biglan model categorized academic disciplines per three sets of attributes: hard vs. soft (in terms of the observance of a common set of paradigms), pure vs. applied (according to their application orientation), and life vs. nonlife (as per their involvement of organic living systems). So, medicine is classified as a hard, applied, life

discipline, engineering is a hard, applied, nonlife discipline, while economics is a soft, applied, nonlife discipline.

Thirty RAAs were selected from each journal, totaling to 120 RAAs per discipline. The rationale behind this selection was to avoid journal-specific criteria that may affect sought results. The number of journals in each of the disciplines are presented in Table 1, and the number of the open access one in each quartile. Table 2 provides a full list of the journals selected in each discipline and the total number of words in the selected abstracts. The total data corpus word count per disciplines and in total is presented in Table 3.

The selected journals are classified by the Web of Science (WOS), a research platform produced by Clarivate Analytics that was initially created by the Institute for Scientific Information (ISI), which provides indexing of major international journals and proceedings. Based on a quartile ranking of each journal in each of its subject category classifying the rank a journal occupies based on its impact factor distribution for its subject category. The selected journals are classified Q1 and Q2 which denotes that they occupy top (25%) and middle-high (between top 50% and top 25%) positions within their fields. The Impact Factor (IF) distribution is based on a calculation of the average number of weighted citations received by a journal in a year by the documents published in the selected journal in the three previous years. As there is only one open-source journal that is classified by WOS as Q1 in the discipline of electrical and electronic engineering and two in economics, three electrical and electronic engineering journals and two economics journals will be Q2. All four journals selected from the field of medicine will be Q1.

Table 1. Numbers of Journals and Open-Access Journals of Chosen Disciplines in WOS

Discipline	Total number of Journals	Number of Open Access Journals				
		Total	Q1	Q2	Q3	Q4
Economics	363	19	2	5	3	9
Electrical and electronic engineering	266	19	1	4	9	5
General and internal medicine	160	47	7	14	15	11

Table 2. Targeted Disciplines, Journals and Word Count of the Chosen Article Abstracts Per Journal

Discipline	Journal	Total number of words Per Journal	Total number of words per discipline	Total number of words in Corpus
Economics	Technological and Economic Development of Economy	5220	18755	80028
	Theoretical Economics	3528		
	Journal of Business Economics and Management	5388		
	Quantitative Economics	4619		
Electrical and electronic engineering	IEEE Access	5638	20451	
	IEEE Photonics Journal	4222		
	Journal of Modern Power Systems and Clean Energy	5095		
	High Voltage	5496		
General and internal medicine	PLoS Medicine	13955	40822	
	BMC Medicine	9306		
	Journal of The Formosan Medical Association	7240		
	Journal of Cachexia Sarcopenia and Muscle	10321		

The selection of journals with a considered high-ranking was motivated by the researcher's attempt to ensure that all RAAs are well-perceived by the audience of the discipline, and the articles' selection within each journal was the most recent twenty-five publications at the time of writing. In addition, the selected journals are open access journals published under a Creative Commons license, which permits researchers to execute text mining without contacting the authors or publishers to seek permission to do so, while requiring attribution to the authors and publishers. All CC-licensed material, according to Creative Commons, "allow for text and data mining by granting express permission to privately reproduce, extract, and reuse the contents of a licensed database and create adapted databases", and, in the case of publicly sharing the results, requires attribution to the rights holder. Thus, the titles of RAAs, names of RA authors and the publishing journals were included during the collection of the corpus.

## 2.2 Data Analysis Tools

The research employed two different software to answer the research questions and address the proposed hypotheses; UAM CorpusTool to carry out the feature annotation and tagging and SPSS software for statistical computing.

Using the UAM application, tokens of circumstances were tagged and annotated to highlight

the type/token ratio as one of the indicative linguistic features of the experiential metafunction corresponding to the field of discourse. Then, the exported statistical figures were compared across the three disciplines by employing a Kruskal-Wallis test, which is the nonparametric equivalent of the parametric one-way analysis of variance (ANOVA) test, to establish whether a statistical difference between the usage of linguistic features exists or not using the SPSS. These accounted for the quantitative analysis of this study.

### 3. Results

As a part of the experiential meanings of the text, the transitivity system examines the processes employed, the participants involved, and the circumstances that frame these processes. Using circumstances enhances the texts' experiential density as it provides more specificity to the given information. To identify any variances, the use of circumstances across the three examined disciplines are examined and compared.

#### 3.1 Circumstances in Economics RAAs

The dataset of the RAAs written in the field of economic included 1380 as reported in the table 下方 showing that different instances of circumstances appeared in the texts. The most dominant circumstance type used was manner (0.50%) followed by location (19.26%). However, when looking at the subtypes, location of place (0.79%) was the most dominant circumstance, followed by the circumstance of reason (0.78%) as the second most frequent type in the dataset. While the least used circumstance types were default Contingency (0.02%) and distance Extent (0.03%). This shows that the texts are concerned with situating events in time and space in addition to indicating how these actions and events took place. The following present examples of circumstances use in the texts examined.

- (1) We obtain rich measurements of risk preferences for 2939 subjects **across 30 countries** [Circumstance: Extent: Distance].
- (2) The dispersion of individual returns to experience, **often** [Circumstance: Extent: Frequency] referred to as heterogeneity of income profiles (HIP)
- (3) depending on the state of the economy **at the point of exit** [Circumstance: Location: place].
- (4) Players need favors **at random times** [Circumstance: Location: Time]
- (5) **Through the hybrid method and evaluation results** [Circumstance: Manner: Means], the central and local governments of Taiwan could continuously improve and strengthen their DPR system.



Table 1. Semantic Subtypes of Circumstances found in Economics RAAs

Semantic type	N	%	Semantic subtype	Probe question	N	%
Extent	55	3.97%	Distance	how far?	5	0.36%
			Duration	how long?	33	2.38%
			Frequency	how often?	17	1.23%
Location	267	19.26%	Place	where?	148	10.68%
			Time	when?	119	8.59%
Manner	346	24.96%	Means	how?	97	7.00%
			Quality	how?	87	6.28%
			Comparison	how? what like?	64	4.62%
			Degree	how much?	98	7.07%
Cause	232	16.74%	Reason	why?	147	10.61%
			Purpose	what for?	68	4.91%
			Behalf	who for?	17	1.23%
Contingency	89	6.42%	Condition	why?	60	4.33%
			Default		4	0.29%
			Concession		25	1.80%
Accompaniment	186	13.42%	Comitative	who or what with?	132	9.52%
			Additive	who or what else?	54	3.90%
Role	66	4.76%	Guise	what as?	29	2.09%
		0.00%	Product	what into?	37	2.67%
Matter	93	6.71%	Matter	what about?	93	6.71%
Angle	52	3.75%	Angle	according to whom?	52	3.75%
<b>Total</b>	<b>1386</b>	<b>100%</b>			<b>1386</b>	<b>100%</b>

### 3.2 Circumstances in Engineering RAAs

The dataset of the RAAs written in the field of engineering included 1410 different instances of circumstances as reported in the table below showing that different instances of circumstances appeared in the texts (Table 5). The most dominant circumstance type used was manner (31.21%) followed by location (25.11%). However, when looking at the subtypes, location of place (17.59%) was the most dominant circumstance, followed by the circumstance of means (12.84%) as the second most frequent type in the dataset. While the least used circumstance types were frequency Extent (2.27%), Angle (0.57%), and behalf Cause (0.28%), and the absence of default Contingency and distance Extent circumstances was noted.

Table 5. Semantic Subtypes of Circumstances found in Engineering RAAs

Semantic type	N	%	Semantic subtype	Probe question	N	%
Extent	32	2.27%	Distance	how far?	0	0.00%
		0.00%	Duration	how long?	21	1.49%
		0.00%	Frequency	how often?	11	0.78%
Location	354	25.11%	Place	where?	248	17.59%
		0.00%	Time	when?	106	7.52%
Manner	440	31.21%	Means	how?	181	12.84%
		0.00%	Quality	how?	124	8.79%
		0.00%	Comparison	how? what like?	42	2.98%
		0.00%	Degree	how much?	93	6.60%
Cause	271	19.22%	Reason	why?	159	11.28%
		0.00%	Purpose	what for?	108	7.66%
		0.00%	Behalf	who for?	4	0.28%
Contingency	57	4.04%	Condition	why?	30	2.13%
		0.00%	Default		0	0.00%
		0.00%	Concession		27	1.91%
Accompaniment	87	6.17%	Comitative	who or what with?	29	2.06%
		0.00%	Additive	who or what else?	58	4.11%
Role	93	6.60%	Guise	what as?	37	2.62%
		0.00%	Product	what into?	56	3.97%
Matter	68	4.82%	Matter	what about?	68	4.82%
Angle	8	0.57%	Angle	according to whom?	8	0.57%
<b>Total</b>	<b>1410</b>	<b>100.00%</b>			<b>1410</b>	<b>100.00%</b>

### 3.3 Circumstances in Medical RAAs

The dataset of the RAAs written in the field of medicine included 1380 instances of circumstances (Table 6). The most dominant circumstance type used was manner (3.47%) followed by location (2.41%). However, when looking at the subtypes, location of place (1.33%) was the most dominant circumstance, followed by the circumstance of reason (0.48%) as the second most frequent type in the dataset. While the least used circumstance types were Condition Contingency (0.17%), Frequency Extent (0.17%) and distance Angle (0.10%). This shows that the texts are concerned with situating events in time and space in addition to indicating how these actions and events took place.

Table 6. Semantic Subtypes of Circumstances found in Medical RAAs

Semantic type	N	%	Semantic subtype	Probe question	N	%
Extent	217	8.08%	Distance	how far?	1	0.04%
			Duration	how long?	181	6.74%
			Frequency	how often?	35	1.30%
Location	492	18.32%	Place	where?	272	10.13%
			Time	when?	220	8.19%
Manner	709	26.40%	Means	how?	214	7.97%
			Quality	how?	162	6.03%
			Comparison	how? what like?	144	5.36%
			Degree	how much?	189	7.04%
Cause	423	15.75%	Reason	why?	99	3.69%
			Purpose	what for?	226	8.41%
			Behalf	who for?	98	3.65%
Contingency	86	3.20%	Condition	why?	35	1.30%
			Default		0	0.00%
			Concession		51	1.90%
Accompaniment	471	17.54%	Comitative	who or what with?	403	15.00%
			Additive	who or what else?	68	2.53%
Role	132	4.91%	Guise	what as?	74	2.76%
			Product	what into?	58	2.16%
Matter	135	5.03%	Matter	what about?	135	5.03%
Angle	21	0.78%	Angle	according to whom?	21	0.78%
<b>Total</b>	<b>2686</b>	<b>100.00%</b>			<b>2686</b>	<b>100.00%</b>

### 3.4 Circumstances across the three Disciplines

To understand the difference between the disciplines in their realizations, the results of the analyses of the three datasets were compared and statistically examined to reveal if the difference is statistically significant. By comparing the results of the analysis of circumstances used the RAAs of the three different disciplines, RAAs in the field of Medicine employed the highest frequency of instances (13.13%) and had the highest frequency of use in circumstances of manner, location, cause, accompaniment, extent, matter and role. It is followed by RAAs in economics (7.39%) which had the highest frequency of use in circumstance of contingency and angle. RAAs in engineering had the least frequency of circumstances (6.89%) among the three fields.

Table 7 displays that circumstances of manner were employed more than other types of circumstances in all disciplines (medicine = 3.47%, engineering = 2.15%, economics = 1.84%). The second most frequently used type was location (medicine = 2.41 %, engineering = 1.73%, economics = 1.42%). The least used type of circumstance was angle, which was used most in RAAs in the field of economics (0.28%), followed by medicine (0.10%), then engineering

(0.04%).

Table 7. Frequency of the circumstance types used in the three disciplines

Semantic type	Semantic subtype	Economics		Engineering		Medicine	
		N	%	N	%	N	%
Extent	Distance	5	0.03%	0	0.00%	1	0.00%
	Duration	33	0.18%	21	0.10%	181	0.89%
	Frequency	17	0.09%	11	0.05%	35	0.17%
Location	Place	148	0.79%	248	1.21%	272	1.33%
	Time	119	0.63%	106	0.52%	220	1.08%
Manner	Means	97	0.52%	181	0.89%	214	1.05%
	Quality	87	0.46%	124	0.61%	162	0.79%
	Comparison	64	0.34%	42	0.21%	144	0.70%
Cause	Degree	98	0.52%	93	0.45%	189	0.92%
	Reason	147	0.78%	159	0.78%	99	0.48%
	Purpose	68	0.36%	108	0.53%	226	1.11%
Contingency	Behalf	17	0.09%	4	0.02%	98	0.48%
	Condition	60	0.32%	30	0.15%	35	0.17%
	Default	4	0.02%	0	0.00%	0	0.00%
Accompaniment	Concession	25	0.13%	27	0.13%	51	0.25%
	Comitative	132	0.70%	29	0.14%	403	1.97%
	Additive	54	0.29%	58	0.28%	68	0.33%
Role	Guise	29	0.15%	37	0.18%	74	0.36%
	Product	37	0.20%	56	0.27%	58	0.28%
Matter	Matter	93	0.50%	68	0.33%	135	0.66%
Angle	Angle	52	0.28%	8	0.04%	21	0.10%
<b>Total</b>		<b>1386</b>	<b>7.39%</b>	<b>1410</b>	<b>6.89%</b>	<b>2686</b>	<b>13.13%</b>

To find if the difference was statistically significant or not, first the normality of the data was checked based on the Shapiro-Wilk test ( $\alpha=0.05$ ), which returned a p-value of 0.000006118, concluding that the data was not normally distributed. Thus, the non-parametric equivalent of the ANOVA test was used, and the Kruskal-Wallis H test indicated that there is a significant difference in the total use of different circumstance types between the different disciplines,  $\chi^2(2) = 124.24$ ,  $p < .001$ , with a mean rank score of 129.71 for Economics, 145.41 for Engineering, 266.38 for Medicine (Table 8). The Post-hoc Dunn's test using a Bonferroni corrected alpha of 0.017 indicated that the mean ranks of the following pairs are significantly different: Economics-Medicine, and Engineering-Medicine. The p-value equals 0, ( $P(\chi \leq 124.2357) = 1$ ), which indicates that the chance of type I error (rejecting a correct  $H_0$ ) is small: 0 (0%). Since the p-value  $< \alpha$  (Figure 1),  $H_0$  is rejected and the alternative hypothesis that there is a significant difference between the use of circumstance types in RAAs across the

three disciplines is accepted. The test statistic H equals 124.2357, which is not in the 95% region of acceptance: [0, 5.9915]. The observed effect size  $\eta^2$  is large, 0.34 which indicates that the magnitude of the difference between the average is large. Also, the test power is found strong 0.9838, which is required to avoid the probability of rejecting a false negative (a Type II error).

Table 8. Kruskal Wallis Test of circumstance types' usage in the three disciplines

Pair	Mean Rank difference	Z	SE	Critical value	p-value	p-value/2
$x_1-x_2$	-15.7	1.17	13.4187	32.1231	0.242	0.121
$x_1-x_3$	-136.6625	10.1845	13.4187	32.1231	0	0
$x_2-x_3$	-120.9625	9.0145	13.4187	32.1231	0	0



Figure 1.  $\chi^2$  distribution of circumstance types used in the three disciplines

Box plots shown further illustrate the differences between the use of circumstance types are shown in Figure 2. The lower and upper quartiles of their use in RAAs in Economics and engineering are comparatively close, but the lower quartile of those in the field of medicine clearly exceed both other disciplines.

The histogram in Figure 3 presents the distribution of circumstance types frequencies in Table 7. The x-axis of the histogram represents the disciplines as the variable and the y-axis represents the count of instances of circumstance type, and the vertical bar represents the number of individual texts with that score. As the variable is quantitative and not categorical, the present gaps reflect the fact that there were no frequency scores in the data set. The shape of the distribution of instances is unimodal as it has one distinct peak and is shown to be positively skewed with its peak toward the lower end of its range and a relatively long positive tail.

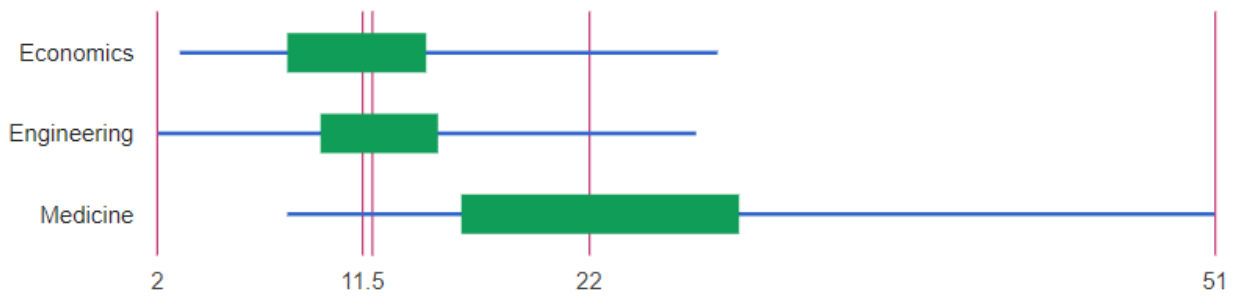


Figure 2. Boxplots of the circumstance types' usage in the three disciplines

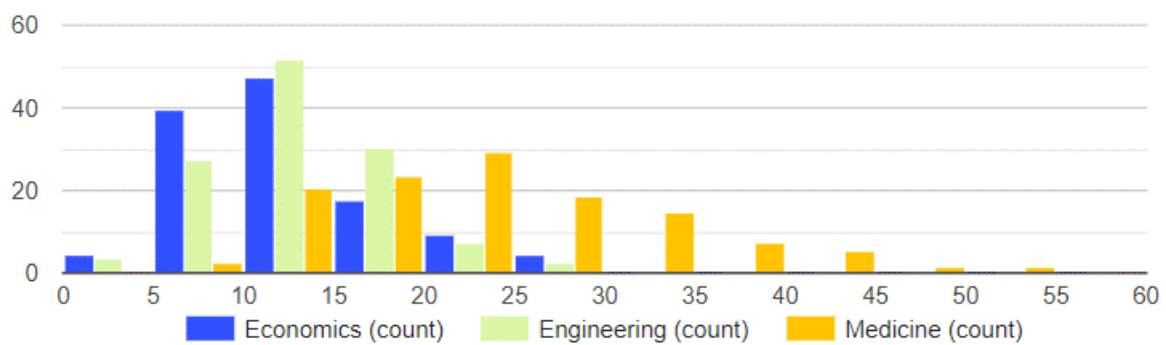


Figure 3. Histogram of circumstance types' usage in the three disciplines.

#### 4. Conclusion

This study provides a comprehensive analysis of the use of circumstances in research article abstracts across the disciplines of economics, engineering, and medicine. By employing the Systemic Functional Linguistics framework and utilizing computational tools for text mining, the research revealed significant differences in the way these disciplines employ circumstantial elements to frame processes within their abstracts. Medicine abstracts exhibited the highest frequency of circumstances, emphasizing the importance of situating research processes within specific contexts, particularly through the use of manner and location circumstances. In contrast, economics and engineering abstracts demonstrated a more selective use of circumstantial elements, focusing on specific types such as contingency and angle.

The findings underscore the discipline-specific linguistic strategies that shape how information is presented in research article abstracts. This analysis not only enhances our understanding of the rhetorical structures within academic writing but also provides valuable insights for authors in these fields, guiding them in crafting more effective and contextually appropriate abstracts. Future research could expand this investigation to other disciplines or explore the impact of these rhetorical choices on the reception and citation of academic works.

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