Decoding Disciplinary Nuances: A Comparative Study of Move Structures, Verb Tense Patterns, and Lexical Density in Soft and Hard Science Abstracts

M Arinal Rahman[1*], Silvia Herlina[2], Piki Setri Pernantah[3], Yanti Karmila Nengsih[4], Wirdatul Aini[5]

[1]University of Szeged, Hungary
[2]UIN Antasari Banjarmasin, Indonesia
[3]Universitas Riau, Indonesia
[4]Universitas Sriwijaya, Indonesia
[5]Universitas Negeri Padang, Indonesia
*Corresponding author e-mail: rahman.muhammad.arinal@stud.u-szeged.hu

Abstract

Research article abstracts play a vital role in shaping initial impressions of scholarly work. This study investigates nuances in abstract writing across arts and humanities, social sciences, physics and astronomy, and chemistry. Using Bhatia's four-move and Hyland's five-move models, we analyze rhetorical move structures in 20 recent abstracts from top journals in each discipline. Verb tense preferences are examined through Tseng's approach, with a focus on the introduction move. Lexical density ratios are calculated following Halliday to assess complexity. Results reveal distinct move patterns between soft sciences (arts and humanities, social sciences) emphasizing logical flow, and hard sciences (physics and astronomy, chemistry) prioritizing conciseness. Verb tense analysis exposes tailored rhetorical strategies, with soft sciences exhibiting varied tenses and hard sciences consistently using present perfect tense to frame background. Lexical density is higher in soft science abstracts indicating more descriptive narratives, while hard science abstracts are more information-dense. These disciplinary nuances underscore the need for tailored guidelines and training in abstract writing. Findings contribute insights to enhance coherence, aligned with the conventions and epistemologies of diverse scientific communities.

Keywords: move structures; disciplinary differences; abstract writing; verb tense analysis

INTRODUCTION

Academic writing is a complex and nuanced skill that varies across disciplines. Even within the condensed space of a research article abstract, writers must carefully craft language to meet the expectations of their field. Abstracts serve a vital purpose in scientific communication as they

provide readers initial exposure to a study, shaping first impressions and influencing decisions on whether to further engage with the research (Hyland, 2000). Consequently, abstracts warrant careful construction to effectively introduce and represent scholarly work.

Variations in abstract writing across disciplines have been noted in areas including rhetorical moves (Samraj, 2002), verb tenses (Salager-Meyer, 1992), and lexical density (Halliday, 1987). However, few studies provide a comprehensive analysis examining move structures, verb tense patterns, and lexical density in tandem across fields. Additionally, prior comparative work on abstract writing tends to focus on broad disciplinary groupings, without nuanced investigation across subfields (Lorés, 2004).

While Swales and Feak (2007) perceive abstracts as part-genre, Bhatia (1993) and Lorés (2004) consider them an independent genre. This linguistic analysis explores variations in move structures influenced by culture and discipline. Additionally, the study investigates less-explored areas such as verb tense usage, inspired by Salager-Meyer (1992), and lexical density, building on research by Susoy (2023), Nasseri and Thompson (2021), and Hanafiah and Yusuf (2016).

The investigation focuses on arts and humanities, social sciences, physics and astronomy, and chemistry, aligning with Santos' (1996) and Swales and Feak's (2007) models. It assesses preferred verb tense within each move and explores lexical density for a nuanced understanding of academic vocabulary and language intensity.

This study aims to address these gaps through an in-depth analysis of move structures, verb tense preferences, and lexical density in abstracts across arts and humanities, social sciences, physics and astronomy, and chemistry. The goal is to unravel disciplinary nuances in abstract writing within these four domains. The investigation utilizes established frameworks on rhetorical moves, including Bhatia's (1993) four-move structure and Hyland's (2000) five-move model, providing continuity with seminal genre analysis scholarship. At the same time, it brings fresh perspective by delving into less-explored areas of verb tense and lexical density.

The study is grounded in a comparative analysis of recent research article abstracts from top-ranked journals in each discipline. A balanced dataset ensures representativeness across the four domains. The move structure analysis categorizes rhetorical patterns, providing insight into logical and narrative flow. Verb tense investigation focuses on the introduction move, elucidating preferences that shape initial framing. Finally, lexical density ratios are calculated and compared based on Halliday's (1987) approach, indicating linguistic complexity and conciseness.

METHODS
Data Collection
To create a robust foundation for investigation, I have intentionally selected 20 abstracts published in 2023 from top-ranked journals according to the Scimago Index. The selection process is finely tuned to maintain a balance between the soft and hard sciences. In the realm of soft science, I have curated abstracts from 5 journals in the social sciences top category and 5 journals in the arts and humanities top category. Similarly, for hard science, the focus is on physics and astronomy category and chemistry category, with 5 journals chosen from each category. Each of these journals contributes one article fostering a comprehensive exploration.

Data Analysis
This study employs two models, Bhatia's (1993) four-move and Hyland's (2000) five-move, to analyze research article abstracts across soft and hard sciences. While both models share common moves—purpose, method, results, and conclusion—Hyland's model includes an exclusive introduction move to establish context and motivate the research. The analysis categorizes moves as introduction, purpose, method, results/product, and conclusion for simplicity, with a specific focus on Hyland's introduction move. Verb tense usage in abstracts is examined across three categories—present, past, and future. The analysis follows Tseng's (2011) procedures, considering single and multiple sentences in the introduction move to evaluate predominant tenses. Instances with no explicit verb tense are also accounted for, ensuring a comprehensive assessment of tense

usage in abstracts. For the analysis of lexical density, a diverse set of abstracts is collected from both soft and hard sciences. Grammatical intricacy is assessed by examining sentence structures, while lexical density is calculated by determining the ratio of lexical items to running words (Halliday, 1987). This comparative analysis allows for insights into the conciseness and informativeness of abstracts within each category, considering both grammatical intricacy and disciplinary nuances. The iterative process ensures a refined understanding of the lexical density in research article abstracts.

FINDING AND DISCUSSIONS
Move Structure Soft Science and Hard Science
Soft and hard sciences exhibit contrasting move structures in research article abstracts. Soft sciences (Arts and Humanities, Social Sciences) follow a narrative flow with interconnected Introduction, Purpose, Results, and Conclusion moves. In contrast, hard sciences (Physics and Astronomy, Chemistry) emphasize a concise structure, highlighting Introduction, Results, and Conclusion moves. Refer to the table for a detailed overview of these patterns, emphasizing the importance of recognizing disciplinary variations for effective engagement in academic discourse.

Table 1. Distribution of Moves Across Soft Sciences Disciplines

Move	Arts and Humanities		Social Sciences		Total	
	N	%	N	%	N	%
Introduction	5	100	4	80	9	90
Purpose	4	80	3	60	7	70
Method	2	40	4	80	6	60
Results/Product	5	100	4	80	9	90
Conclusion	5	100	4	80	9	90

Table 2. Distribution of Moves Across Hard Sciences Disciplines

Move	Physics and Astronomy		Chemistry		Total	
	N	%	N	%	N	%
Introduction	5	100	5	100	10	100
Purpose	4	80	5	100	9	90
Method	2	40	3	60	5	50
Results/Product	5	100	5	100	10	100
Conclusion	5	100	5	100	10	100

Tables 1 and 2 dissect the move distribution in soft and hard science disciplines, providing insightful glimpses into the rhetorical intricacies of research article abstracts. In the soft sciences, Arts and Humanities adopt a conventional narrative flow, evenly distributing moves—Introduction, Purpose, Results/Product, and Conclusion. This aligns with humanities' rhetorical expectations (Swales, 1990). Social Sciences share similarities but spotlight the Purpose move, underlining the significance of articulating research objectives (Swales, 1990; Samraj, 2002). In hard sciences (Table 2), Physics and Astronomy and Chemistry consistently prioritize the Introduction, Results/Product, and Conclusion moves, reflecting the concise and information-focused style characteristic of these disciplines (Cargill & O'Connor, 2006). The Method move, while present, receives less emphasis, emphasizing a results-centric approach (Swales, 1990; Cargill & O'Connor, 2006). These findings underscore the influence of disciplinary norms on rhetorical structures, essential for scholars navigating nuanced scientific communication effectively.

Table 3. Move Structure in Research Articles Abstracts across the Four Disciplines

Disciplines	Abstract No.	Move Structure
Arts and Humanities	Abstract 1	I-P-M-R-C
	Abstract 2	I-R-C
	Abstract 3	I-P-M-R-C
	Abstract 4	I-P-R-C
	Abstract 5	I-P-M-R-C
Social Sciences	Abstract 6	I-P-M-R-C
	Abstract 7	I-R-C
	Abstract 8	I-P-M-R-C
	Abstract 9	I-P-M-R-C
	Abstract 10	I-P-M
Physics and Astronomy	Abstract 11	I-R-C
	Abstract 12	I-P-R-C
	Abstract 13	I-P-R-C
	Abstract 14	I-P-M-R-C
	Abstract 15	I-P-M-R-C
Chemistry	Abstract 16	I-P-M-R-C
	Abstract 17	I-P-R-C
	Abstract 18	I-P-M-R-C
	Abstract 19	I-P-R-C
	Abstract 20	I-P-M-R-C

I=introduction, P=purpose, M=method, R=results/product, C=conclusion

Table 3 unveils the move structures in research article abstracts across Arts and Humanities, Social Sciences, Physics and Astronomy, and Chemistry. Arts and Humanities adhere to a conventional sequence of Introduction, Purpose, Method, Results/Product, and Conclusion, aligning with humanities' logical progression (Swales, 1990). Social Sciences mirror this structure, emphasizing clarity in introducing problems, stating objectives, and presenting findings (Swales, 1990; Samraj, 2002). Physics and Astronomy deviate, favoring a concise Introduction, Results/Product, and Conclusion sequence, typical of the succinct style in physical sciences (Cargill & O'Connor, 2006). Chemistry echoes this structure, blending Introduction, Purpose, Results/Product, and Conclusion to meet the expectations of scientific writing in the discipline (Swales, 1990; Samraj, 2002). These variations underscore the nuanced communication norms within each scientific community, shaped by traditions, conventions, and audience expectations (Swales, 1990; Samraj, 2002; Cargill & O'Connor, 2006).

Verb Tense in Moves of Soft and Hard Sciences
The analysis of verb tense usage in the introduction move of abstracts from both soft and hard sciences reveals distinctive patterns reflective of each discipline's rhetorical strategies. The nuanced choices in verb tenses align with the epistemological characteristics of soft and hard sciences, illustrating their unique approaches to communicating research. To provide a comprehensive overview, a table summarizing the verb tense preferences in different moves of abstracts from both domains is presented below. This table aims to highlight the divergent use of tenses in the introduction, purpose, methods, results/product, and conclusion moves, emphasizing the nuanced language choices employed by researchers in each scientific discipline.

Table 4. Verb Tense Use in the Introduction Move across Disciplines

Feature	Abstract 1	Abstract 2	Abstract 3	Abstract 4	Abstract 5	Abstract 6	Abstract 7	Abstract 8	Abstract 9	Abstract 10
Tense in Introduction	has received (past)			has (present perfect)	refers (present)	use (present)	has emerged (present perfect)	are (present)	predict (present)	considers (present)
Tense in Purpose	Investigate (present)	Show (present)	Contribute (present)	Has (present)	Achieving (present continuous)	Test (present)	Examine (present)	Analyzes (present)	Highlights (present)	Obtained (past)
Tense in Methods	Draw (present)	Show (present)	Present, map (present)	Use, confirm (present)	Focus, employing, indicate (present)		Analyze (present)	Were, achieve (past)	Use, moved (past)	Propose, develop (present)
Tense in Results/Product	Identify, present, discuss (present)	Find, expose, contribute (present)	Identify, explain, depart (present)	Devised, confirms (past)	Find, remains (present)	Find, do not find (present)	Identify, find (present)	Find (present)	Did not affect (past)	Develops, illustrates (present)
Tense in Conclusion	Highlight, provide (present)	Contribute (present)	Emphasizes, add (present)	Offers (present)	Discuss (present)	Highlight (present)	Advances (present)	Discuss (present)	Conclude (present)	Highlight (present)
Feature	Abstract 11	Abstract 12	Abstract 13	Abstract 14	Abstract 15	Abstract 16	Abstract 17	Abstract 18	Abstract 19	Abstract 20
Tense in Introduction	play, expedite, have been (present perfect)	has (present perfect)	spread (present perfect)	is (present)	are (present)	introduces, is anticipated (present)		is (present)	have (present perfect)	have (present perfect)
Tense in Purpose	Reviewd (past)	Presents (present)	Survey (present)	Report, study (present)	Implement (present)	Review (present)	Reviewed, discussed (past)	Overcome (present)	Review (present)	Experimentally observe (present)
Tense in Methods	Summarize, discuss (present)	Present (present)	Explore, affect (present)	Measure, demonstrate (present)	Develop, realize (present)	Discuss, discussed, aims (present)	Review, have been (present perfect)	Leverage, optimize (present)	Discuss, focus (present)	Use, measure (present)
Tense in Results/Product	Discuss (present)	Highlight (present)	Survey (present)	Achieve, observe, discuss (present)	Realize, discuss (present)	Expands, provides, discusses (present)	Introduce, discussed (present)	Use, provide (present)	Focus, highlight (present)	Realize, discuss (present)
Tense in Conclusion	Address (present)	Discuss (present)	Survey (present)	Discuss (present)	Highlight (present)	Propose (present)	Believe (present)	Discuss (present)	Discuss (present)	Highlight (present)

The examination of verb tense use in the introduction move across soft and hard science abstracts unveils nuanced patterns reflective of each discipline's rhetorical strategies. Soft science abstracts (Abstracts 1-10) exhibit a diverse use of tenses, with a notable emphasis on present and present perfect tenses. The present tense creates immediacy, aligning with the dynamic nature of soft sciences (Swales, 1990). Present perfect tense signifies the ongoing relevance of prior research, showcasing the cumulative knowledge in these fields (Biber et al., 1999).

In contrast, hard science abstracts (Abstracts 11-20) consistently employ present perfect tense in the introduction, highlighting the established background and cumulative knowledge leading to current research. This aligns with the precision and objectivity expected in hard sciences, emphasizing the enduring relevance of prior work (Swales, 1990). The purpose move in both soft and hard science abstracts predominantly use the present tense to convey immediate study goals (Swales, 1990). Notably, soft science abstracts exhibit a more varied range of present-tense verbs, reflecting the multifaceted and exploratory nature of research in these domains. In the methods move, soft science abstracts employ a mix of present and past tenses, capturing both current practices and historical context. This nuanced use aligns with the context-dependent nature of research methodologies in soft sciences (Swales, 1990). In hard science abstracts, the prevalent use of present tense aligns with the expectation of clarity and precision in detailing quantitative research methods (Biber et al., 1999; Khairunnisa et al., 2022).

In the results/product move, both soft and hard science abstracts predominantly use the present tense, emphasizing the immediacy and current relevance of findings. Selective use of past tense in hard science abstracts contributes to a concise and factual presentation of outcomes (Swales, 1990; Sarte et al., 2021). In the conclusion move, both soft and hard science abstracts primarily employ the present tense, indicating the ongoing significance of study contributions. This consistent use reflects a forward-looking perspective, emphasizing implications and potential future directions (Biber et al., 1999; Anggraini et al., 2022). In conclusion, the nuanced verb tense patterns in soft and hard science abstracts align with each discipline's rhetorical and epistemological characteristics. Soft science abstracts showcase varied tenses, emphasizing ongoing and exploratory research, while hard science abstracts exhibit a consistent use of present perfect tense, highlighting cumulative and precise scientific inquiry.

Lexical Density of Soft and Hard Sciences

The examination of lexical density in research article abstracts across soft and hard sciences unveils notable distinctions. Soft sciences, such as Arts and Humanities and Social Sciences, demonstrate a higher lexical density, emphasizing a rich and nuanced vocabulary to convey their research succinctly. On the other hand, hard sciences, represented by Physics and Astronomy and Chemistry, exhibit a slightly lower lexical density, reflecting a focus on clarity and precision in presenting complex scientific information. The details of these findings are outlined in the accompanying table, providing valuable insights into the linguistic characteristics inherent in abstracts from diverse scientific disciplines.

Table 5. Lexical Density and Word Composition in Soft and Hard Science Research Articles

	Abstract No.	1	2	3	4	5	6	7	8	9	10
Soft science	Lexical Items	179	133	195	194	228	100	149	152	229	98
	Running Words	111	91	135	145	166	77	105	117	163	67
	Total Function Words	68	42	60	49	62	23	44	35	66	31
	Lexical Density	62%	68%	70%	75%	72,70 %	77%	70,70 %	77%	71,30 %	68,40 %

	Abstract No.	11	12	13	14	15	16	17	18	19	20
Hard Science	Lexical Items	184	90	132	151	219	287	202	147	129	159
	Running Words	127	72	107	118	181	222	151	112	92	130
	Total Function Words	57	18	25	33	38	65	51	35	37	29
	Lexical Density	69,50%	80%	80,50%	78,50%	82,30%	77,10%	74,60%	76,80%	71,50%	82,30%

The analysis of lexical density in soft and hard science abstracts reveals distinctive writing styles characteristic of each scientific domain (Halliday, 1987). In soft science abstracts (Abstracts 1-10), the lexical density ranges from 62% to 77%, suggesting a predominant use of descriptive language and a context-oriented narrative. The higher proportion of lexical items, reflecting specific information, is coupled with a substantial presence of function words, indicating an emphasis on conveying nuanced meaning and detailed descriptions. This aligns with the qualitative nature of soft sciences, where a comprehensive understanding of complex phenomena often necessitates a more elaborate and context-driven explanation (Myers, 1989; Sulaiman & Banseng, 2024).

Conversely, the hard science abstracts (Abstracts 11-20) exhibit a consistently higher lexical density, ranging from 71.5% to 82.3%. This suggests a more concise and information-packed writing style typical of quantitative and objective hard sciences. The elevated lexical density is primarily attributed to a more substantial proportion of content words, indicative of a focus on presenting precise and specific information. The reduced reliance on function words aligns with the expectation that hard science writing emphasizes clarity, brevity, and the transmission of quantitative findings (Halliday, 1987; Myers, 1989; Banseng et al., 2021).

The observed variations in lexical density between soft and hard science abstracts resonate with existing literature on linguistic features in scientific writing (Halliday, 1987; Myers, 1989; Handrianto et al., 2021). While soft sciences often require a more narrative and descriptive approach to capture the intricacies of social phenomena, hard sciences prioritize a more economical and information-dense style to communicate quantitative findings effectively. These findings contribute to a nuanced understanding of how linguistic features in scientific writing align with the epistemological and methodological characteristics of different scientific disciplines.

CONCLUSION AND IMPLICATION

The comprehensive analysis of research article abstracts across arts and humanities, social sciences, physics and astronomy, and chemistry sheds light on distinct move structures, verb tense preferences, and lexical density patterns within each discipline. The rhetorical strategies employed in crafting abstracts reveal nuanced communicative styles reflective of the unique characteristics of each scientific domain. In terms of move structures, soft sciences, represented by arts and humanities and social sciences, exhibit a narrative flow with interconnected introduction, purpose, results/product, and conclusion moves. This aligns with the humanities' logical progression and the emphasis on clarity in presenting research objectives and findings. In contrast, hard sciences, including physics and astronomy and chemistry, demonstrate a concise structure, prioritizing the introduction, results/product, and conclusion moves. This succinct style reflects the information-focused approach characteristic of these disciplines. Verb tense analysis reveals discipline-specific preferences. Soft science abstracts predominantly employ the present tense, emphasizing contemporaneity and ongoing discussions. In contrast, hard science abstracts consistently use the present perfect tense in the introduction, highlighting the established background and cumulative knowledge leading to current research. The nuanced use of verb tenses in each move aligns with the rhetorical conventions and epistemological expectations within each scientific

community. Lexical density analysis exposes distinctive writing styles between soft and hard sciences. Soft science abstracts demonstrate a higher lexical density, indicative of a more descriptive and context-oriented narrative. In contrast, hard science abstracts exhibit a consistently higher lexical density, reflecting a concise and information-packed writing style typical of quantitative and objective scientific writing.

The implications of this study are significant for enhancing scientific communication. First, recognizing the discipline-specific nuances in move structures, verb tense preferences, and lexical density underscores the need for tailored discipline-specific training in abstract writing. This awareness is crucial for researchers and students to effectively convey their research within the rhetorical conventions of their fields. Second, journal editors and reviewers can leverage these insights to offer targeted feedback, ensuring abstracts align with disciplinary norms, thereby improving overall clarity and coherence. Third, educators can benefit from these findings in designing pedagogical approaches that cater to the diverse needs of students engaged in scientific writing across disciplines. Lastly, the study emphasizes the potential for fostering effective interdisciplinary collaboration by bridging communication gaps, ensuring collaborative work is presented in a manner resonating with both soft and hard science audiences. In conclusion, this study contributes to a nuanced understanding of linguistic and rhetorical features in abstracts, promoting inclusivity in scientific communication.

REFERENCES

Anggraini, P. P., Apriliani, N. A., Supeni, I., & Handrianto, C. (2022). The use of the cocomelon youtube channel as a medium for introducing children's english vocabulary. *SAGA: Journal of English Language Teaching and Applied Linguistics, 3*(2), 81-90. https://doi.org/10.21460/saga.2022.32.137

Banseng, S., Sandai, R., Handrianto, C., & Rasool, S. (2021). Language of strata and expression in construction of sampi amongst iban community in malaysia. *International Journal of Education, Information Technology, and Others, 4*(3), 417-427. https://doi.org/10.5281/zenodo.5169017

Bhatia, V. K. (1993). *Analysing genre: Language use in professional settings*. London: Longman.

Biber, D., Johansson, S., Leech, G., Conrad, S., & Finegan, E. (1999). *Longman grammar of spoken and written English*. London: Longman.

Cargill, M., & O'Connor, P. (2006). Developing Chinese scientists' skills for publishing in English: Evaluating collaborating-colleague workshops based on genre analysis. *Journal of English for Academic Purposes*, *5*(3), 207-221.

Dos Santos, M. B. (1996). The textual organization of research paper abstracts in applied linguistics. *Text & Talk*, *16*(4), 481-500.

Halliday, M. A. (1987). Spoken and written modes of meaning. In *Comprehending oral and written language* (pp. 55-82). Brill.

Hanafiah, R., & Yusuf, M. (2016). Lexical density and grammatical intricacy in linguistic thesis abstract: A qualitative content analysis. *Proceedings of EEIC*, *1*(2), 43-46.

Handrianto, C., Jusoh, A. J., Nengsih, Y. K., Alfurqan, A., Muslim, M., & Tannoubi, A. (2021). Effective pedagogy in primary education: A review of current literatures. *Abjadia: International Journal of Education, 6*(2), 134-143. https://doi.org/10.18860/abj.v6i2.12978

Hyland, K. (2000). Disciplinary discourses: Social interaction in academic writing. London: Longman Pearson Education.

Khairunnisa, N., Rahman, M., & Handrianto, C. (2022). English digital literacy practices inside and outside class to develop students' speaking skills. *Pedagogy: Journal of English Language Teaching, 10*(1), 13-24. https://doi.org/10.32332/joelt.v10i1.3790

Lorés, R. (2004). On RA abstracts: from rhetorical structure to thematic organisation. *English for specific purposes*, *23*(3), 280-302.

Myers, G. (1989). The pragmatics of politeness in scientific articles. *Applied linguistics*, *10*(1), 1-35.

Nasseri, M., & Thompson, P. (2021). Lexical density and diversity in dissertation abstracts: Revisiting English L1 vs. L2 text differences. *Assessing Writing*, *47*, 100511.

Salager-Meyer, F. (1992). A text-type and move analysis study of verb tense and modality distribution in medical English abstracts. *English for specific purposes*, *11*(2), 93-113.

Samraj, B. (2002). Introductions in research articles: Variations across disciplines. *English for specific purposes*, *21*(1), 1-17.

Sarte, N. M. R., Santiago, B. T., Dagdag, J. D., & Handrianto, C. (2021). Welcome back: The return of college dropouts to school. *Jurnal Pendidikan dan Pemberdayaan Masyarakat (JPPM), 8*(2), 140-149. https://doi.org/10.36706/jppm.v8i2.15386

Sulaiman, M. F., & Banseng, S. (2024). Cooperative Model Approach to StudentsAchievement in Malay Essay Writing. *International Journal of Pedagogy and Learning Community (IJPLC)*, *1*(1), 49-56.

Susoy, Z. (2023). English L1 VS. L2 Differences in Dissertation Abstracts: Lexical Density, Lexical Diversity and Academic Vocabulary Use. *Acuity: Journal of English Language Pedagogy, Literature and Culture*, *8*(2), 198-210.

Swales, J. M., & Feak, C. B. (2010). From text to task: Putting research on abstracts to work. In *English for professional and academic purposes* (pp. 169-182). Brill.

Swales, J. M., & Swales, J. (1990). *Genre analysis: English in academic and research settings*. Cambridge university press.

Tseng, F. (2011). Analyses of move structure and verb tense of research article abstracts in applied linguistics. *International Journal of English Linguistics*, 1(2), 27.

Appendix 1

No.	Category	Name of Journal	Title of Article	Abstract
1	Arts and Humanities	Administrative Science Quarterly	Tedious Work: Developing Novel Outcomes with Digitization in the Arts and Sciences	Tedious work is pervasive in creative work, yet it has received little attention in the literature on creativity, including studies of science, innovation, and product development. Drawing from a comparative ethnography of two settings—systems biology and music production—we illuminate tedious work as an essential, previously under-investigated aspect of creative work that becomes increasingly prominent with digitization. Tedious work is repetitive, detail-oriented, and expertise-based, and we classify four types of it: fishing, administrating, polishing, and compiling. We develop a model of how tedious work emerges, why it becomes problematic, and what actors do to reduce its negative effects. Tedious work presents three risks to developing viable, novel outcomes—time drain, disengagement, and information overload—and we identify tactics that actors use to mitigate these risks and support individual creativity and the collective creative process. By unpacking the central notion of iteration and documenting the repercussions of creating novel outcomes with digitization, specifically the potential to amplify tedious work, we provide an important counterpoint to voices that hail digital technology's low cost and unlimited potential for iteration and refinement.
2	Arts and Humanities	Journal of Consumer Research	Origin versus Substance: Competing Determinants of Disruption in Duplication Technologies	Contemporary developments in material duplication promise product alternatives that are physically and sensorially indistinguishable from incumbent offerings. When fully realized, such duplicate offerings should obsolete the incumbents as a consequence of wider availability and lower monetary and social costs. Disruption will be impeded, however, if consumers favor incumbent products on the basis of non-material qualities. The authors show that the influence of such qualities depends on both the product category and characteristics of the consumer. In particular, when a creator is central to the product and when the consumer is inclined toward extraordinary beliefs, the influence of origin looms especially large. By contrasting origin and substance, the present research exposes dualistic thinking in consumers' product evaluations, enriches prior research on authenticity and extraordinary beliefs, and contributes to the stubborn problem of technology adoption.
3	Arts and Humanities	Human Relations	Navigating the twisted path of gaslighting: A manifestation of epistemic injustice for Palestinian women entrepreneurs	What exactly is gaslighting and how does it play out in the gendered context of women's entrepreneurship? We contribute to Stern's three-stage model of gaslighting by presenting a contextualised perspective through a 'twisted path' of gaslighting that maps out gaslighting interactions and consequences, reflecting how our findings coincide with, depart from and enrich this model; meanwhile identifying primary and subsequent (secondary and tertiary) gaslighting interactions. By examining gaslighting through the lens of epistemic injustice and testimonial injustice, we explain why some women entrepreneurs succumb to gaslighting, while others strategically employ testimonial smothering and infrapolitics as an empowered agential strategy rather than a disenfranchised consequence. Considering the lack of research on gaslighting in entrepreneurship, our geopolitical context emphasises the role of spatial position and identity within multiple systems of injustice, such as occupation and patriarchy, adding novel insights theorised and grounded in lived experiences. In doing so, we disrupt the influence of western feminism by embracing a postcolonial feminist perspective and promoting social justice through centring the voices of 40 internally displaced Palestinian women entrepreneurs. Policy implications underscore the need to raise awareness of gaslighting, facilitate its identification and promote preventive measures to hold gaslighters accountable.
4	Arts and Humanities	Behavior Research Methods	Procedure for extracting temporal structure embedded within	The idea that mental events unfold over time with an intrinsically paced regularity has a long history within experimental psychology, and it has gained traction from the actual measurement of brain rhythms evident in EEG signals recorded from the human brain and from direct recordings of action potentials and local field potentials within the nervous systems of nonhumans. The weak link in this idea, however, is the challenge of extracting signatures of

5			psychophysical data	this temporal structure from behavioral measures. Because there is nothing in the seamless stream of conscious awareness that belies rhythmic modulations in sensitivity or mental acuity, one must deploy inferential strategies for extracting evidence for the existence of temporal regularities in neural activity. We have devised a parametric procedure for analysis of temporal structure embedded in behaviorally measured data comprising durations. We confirm that this procedure, dubbed PATS, achieves comparable results to those obtained using spectral analysis, and that it outperforms conventional spectral analysis when analyzing human response time data containing just a few hundred data points per condition. PATS offers an efficient, sensitive means for bridging the gap between oscillations identified neurophysiologically and estimates of rhythmicity embedded within durations measured behaviorally.
5	Arts and Humanities	Journal of Business Ethics	Fostering Urban Inclusive Green Growth: Does Corporate Social Responsibility (CSR) Matter?	Urban inclusive green growth (UIGG) refers to the synergetic enhancement of the economy, the environment, and the society in a city. Achieving such enhancement requires addressing a series of problems in the development of urbanization, such as unemployment, lack of access to education, insufficient medical resources, inequity, and environmental pollution. As firms are critical to city development and urbanization, whether they practice corporate social responsibility (CSR) plays a crucial part in UIGG. In this study, we focus on Chinese cities as examples of UIGG and Chinese listed companies as CSR engagers, employing matched data on Chinese listed companies and cities to investigate how CSR affects UIGG. Specifically, the empirical results of a high-dimensional fixed effect model indicate that CSR significantly promotes UIGG. This finding remains valid after a set of robustness checks, including instrumental variable (IV) regression. CSR can promote UIGG by positively influencing enterprises' economic performance, innovation, and employment. To promote firms' substantive CSR actions, the government of Jiangsu Province, China, launched a pilot policy for CSR promotion by issuing an official guidance document, which can be considered a quasi-natural experiment to test the causality between CSR and UIGG. We find that the CSR pilot significantly promoted UIGG. The heterogeneity test results indicate that the influence of CSR on UIGG varies based on the audit company, the nature of the enterprise, and the structure of corporate leadership.
6	Social Sciences	Review of Economics and Statistics	The Impact of Short-Term Employment for Low-Income Youth: Experimental Evidence from the Philippines	We use a randomized field experiment to test the causal impact of short-term work experience on employment and school enrollment among disadvantaged, in-school youth in the Philippines. This experience leads to a 4.4 percentage point (79%) increase in employment eight to twelve months later. Although we find no aggregate increase in enrollment, we also do not find that the employment gains push youth out of school. Our results are most consistent with work experience serving as a signal of unobservable applicant quality, and these findings highlight the role of temporary work as a stepping stone to employment for low-income youth.
7	Social Sciences	Nature Climate Change	Community forest governance and synergies among carbon, biodiversity and livelihoods	Forest landscape restoration has emerged as a key strategy to sequester atmospheric carbon and conserve biodiversity while providing livelihood co-benefits for indigenous peoples and local communities. Using a dataset of 314 forest commons in human-dominated landscapes in 15 tropical countries in Africa, Asia and Latin America, we examine the relationships among carbon sequestered in above-ground woody biomass, tree species richness and forest livelihoods. We find five distinct clusters of forest commons, with co-benefits and trade-offs on multiple dimensions. The presence of a formal community management association and local participation in rule-making are consistent predictors of multiple positive outcomes. These findings, drawn from a range of contexts globally, suggest that empowered local forest governance may support multiple objectives of forest restoration. Our analysis advances understanding of institutional aspects of restoration while underscoring the importance of analysing the interconnections among multiple forest benefits to inform effective interventions for multifunctional tropical forests.

8	Social Sciences	Business and Society	Circular Economy and Business Models: Managing Efficiency in Waste Recycling Firms	Business orientation toward sustainable development goals and the circular economy are relevant research topics today in business theory and practice. The waste recycling sector is a key industry in the circular economy framework for promoting clean production and environmental sustainability. This study analyzes business performance in the recycling sector, focusing on efficiency indicators. The associations between firm efficiency and risk variables were also evaluated. The study goes through several methodological stages, including a Data Envelopment Analysis (DEA) multistage method and multivariate modeling: tobit regression, bootstrap models, and generalized method of moments (GMM). The main results indicate that the average efficiency of waste recycling firms is at a medium level. Large-sized firms achieve higher levels of efficiency than medium-sized and small firms, supporting the economies of scale hypothesis. The evidence also suggests that risk variables (rating score and Zscore) and capital structure are key determinants of firm efficiency in the waste recycling industry.
9	Social Sciences	Sociological Science	Does Schooling Affect Socioeconomic Inequalities in Educational Attainment? Evidence from a Natural Experiment in Germany	Critical theories of education and the dynamics of skill formation model predict that the education system reproduces socioeconomic inequalities in educational attainment. Previous empirical studies comparing changes in socioeconomic inequalities in academic performance over the summer to changes in these inequalities during the school year have argued, however, that schooling reduces inequalities in educational performance. The present study highlights the question of whether schooling affects socioeconomic inequalities in educational attainment by analyzing a natural experiment that induces exogenous variation in the length of schooling and allowed me to investigate the causal, long-term effects of the length of schooling on inequalities in educational attainment. Some German states moved the school start from spring to summer in 1966/1967 and introduced two short school years, each of which was three months shorter than a regular school year. I use variation in the short school years across cohorts and states to estimate the causal effects of the length of schooling on socioeconomic inequalities in educational attainment based on two German panel surveys. Less schooling due to the short school years did not affect inequalities in educational attainment. This finding runs counter to the results from the summer learning literature and to the predictions of the dynamics of skill formation model and critical theories of education. I conclude by discussing the implications of this finding for our understanding of socioeconomic inequalities in educational attainment.
10	Social Sciences	Journal of Applied Econometrics	Partial identification and inference for conditional distributions of treatment effects	This paper considers identification and inference for the distribution of treatment effects conditional on observable covariates. Since the conditional distribution of treatment effects is not point identified without strong assumptions, we obtain bounds on the conditional distribution of treatment effects by using the Makarov bounds. We also consider the case where the treatment is endogenous and propose two stochastic dominance assumptions to tighten the bounds. We develop a nonparametric framework to estimate the bounds and establish the asymptotic theory that is uniformly valid over the support of treatment effects. An empirical example illustrates the usefulness of the methods.
11	Physics and Astronomy	Reviews of Modern Physics	Kinematic variables and feature engineering for particle phenomenology	Kinematic variables play an important role in collider phenomenology, as they expedite discoveries of new particles by separating signal events from unwanted background events and allow for measurements of particle properties such as masses, couplings, and spins. For the past ten years, an enormous number of kinematic variables have been designed and proposed, primarily for the experiments at the CERN Large Hadron Collider, allowing for a drastic reduction of high-dimensional experimental data to lower-dimensional observables, from which one can readily extract underlying features of phase space and develop better-optimized data-analysis strategies. Recent developments in the area of phase-space kinematics are reviewd, and new kinematic variables with important phenomenological implications and physics applications are summarized. Recently proposed analysis methods and techniques specifically designed to leverage new kinematic variables are also reviewed. As machine learning is currently percolating through many fields of particle physics, including collider phenomenology, the interconnection and mutual complementarity of kinematic

(Decoding Disciplinary Nuances: A Comparative Study of Move Structures, Verb Tense Patterns, and Lexical Density in Soft and Hard Science Abstracts)

				variables and machine-learning techniques are discussed. Finally, the manner in which utilization of kinematic variables originally developed for colliders can be extended to other high-energy physics experiments, including neutrino experiments, is discussed.
12	Physics and Astronomy	Living Reviews in Relativity	Cosmology with the Laser Interferometer Space Antenna	The Laser Interferometer Space Antenna (LISA) has two scientific objectives of cosmological focus: to probe the expansion rate of the universe, and to understand stochastic gravitational-wave backgrounds and their implications for early universe and particle physics, from the MeV to the Planck scale. However, the range of potential cosmological applications of gravitational-wave observations extends well beyond these two objectives. This publication presents a summary of the state of the art in LISA cosmology, theory and methods, and identifies new opportunities to use gravitational-wave observations by LISA to probe the universe.
13	Physics and Astronomy	Nature Reviews Physics	Noncommuting conserved charges in quantum thermodynamics and beyond	Thermodynamic systems typically conserve quantities (known as charges) such as energy and particle number. The charges are often assumed implicitly to commute with each other. Yet quantum phenomena such as uncertainty relations rely on the failure of observables to commute. How do noncommuting charges affect thermodynamic phenomena? This question, upon arising at the intersection of quantum information theory and thermodynamics, spread recently across many-body physics. Noncommutation of charges has been found to invalidate derivations of the form of the thermal state, decrease entropy production, conflict with the eigenstate thermalization hypothesis and more. This Perspective surveys key results in, opportunities for and work adjacent to the quantum thermodynamics of noncommuting charges. Open problems include a conceptual puzzle: evidence suggests that noncommuting charges may hinder thermalization in some ways while enhancing thermalization in others.
14	Physics and Astronomy	Nature Physics	Magnetic trapping of ultracold molecules at high density	Trapping ultracold molecules in conservative traps is essential for multiple applications, including quantum-state-controlled chemistry, quantum simulations and quantum information processing. The study of molecular collisions, in particular, requires samples at high densities, which have been challenging to achieve so far with established cooling and trapping techniques. Here we report the magnetic trapping of molecules in the triplet ground state at high density and ultralow temperature. We measure the inelastic loss rates in a single-spin sample and spin mixtures of fermionic molecules and spin-stretched atom–molecule mixtures. We demonstrate the sympathetic cooling of molecules in the magnetic trap by the radio-frequency evaporation of co-trapped atoms and observe an increase in the molecules' phase-space density by a factor of 16. Magnetic trapping at these densities allows the study of both atom–molecule and molecule–molecule collisions in the ultracold regime in the absence of trapping light, which often leads to undesired photochemistry effects.
15	Physics and Astronomy	Physical Review X	Midcircuit Operations Using the omg Architecture in Neutral Atom Arrays	Midcircuit operations, such as qubit state measurement or reset, are central to many tasks in quantum information science, including quantum computing, entanglement generation, and metrology. For instance, in quantum error correction, the information gained from a measurement on a subset of qubits is used to influence the state of the remaining unmeasured qubits, rectifying inevitable errors that arise in a quantum circuit. Such partial projective operations pose a challenge for dense neutral atom arrays and trapped ions, where accidental exposure to resonant laser light during quantum state initialization and detection can spoil the state of untargeted qubits. In this work, we implement midcircuit operations in a 48-site array of neutral atoms, enabled by new methods for high-fidelity control of the omg (optical-metastable-ground-state qubit) architecture present in 171Yb. Here, the quantum information is encoded in either of the three qubit manifolds and can be shuttled between them. With state-sensitive shelving between the ground and metastable states, we realize a nondestructive state detection for 171Yb, incorporating global control and local feed-forward operations. Using new schemes for local addressing of the optical clock transition, we shelve a

18				subset of qubits to the metastable state, hiding them from projective operations performed on the qubits remaining in the ground state, demonstrating midcircuit measurement, spin reset, and motional reset in the form of ground-state cooling.
16	Chemistry	Chemical Reviews	Carbon–Carbon Bond Cleavage for Late-Stage Functionalization	Late-stage functionalization (LSF) introduces functional group or structural modification at the final stage of the synthesis of natural products, drugs, and complex compounds. It is anticipated that late-stage functionalization would improve drug discovery's effectiveness and efficiency and hasten the creation of various chemical libraries. Consequently, late-stage functionalization of natural products is a productive technique to produce natural product derivatives, which significantly impacts chemical biology and drug development. Carbon–carbon bonds make up the fundamental framework of organic molecules. Compared with the carbon–carbon bond construction, the carbon–carbon bond activation can directly enable molecular editing (deletion, insertion, or modification of atoms or groups of atoms) and provide a more efficient and accurate synthetic strategy. However, the efficient and selective activation of unstrained carbon–carbon bonds is still one of the most challenging projects in organic synthesis. This review encompasses the strategies employed in recent years for carbon–carbon bond cleavage by explicitly focusing on their applicability in late-stage functionalization. This review expands the current discourse on carbon–carbon bond cleavage in late-stage functionalization reactions by providing a comprehensive overview of the selective cleavage of various types of carbon–carbon bonds. This includes C–C(sp), C–C(sp2), and C–C(sp3) single bonds; carbon–carbon double bonds; and carbon–carbon triple bonds, with a focus on catalysis by transition metals or organocatalysts. Additionally, specific topics, such as ring-opening processes involving carbon–carbon bond cleavage in three-, four-, five-, and six-membered rings, are discussed, and exemplar applications of these techniques are showcased in the context of complex bioactive molecules or drug discovery. This review aims to shed light on recent advancements in the field and propose potential avenues for future research in the realm of late-stage carbon–carbon bond functionalization.
17	Chemistry	Chemical Society Reviews	Recent advances in point-of-care testing of COVID-19	Advances in microfluidic device miniaturization and system integration contribute to the development of portable, handheld, and smartphone-compatible devices. These advancements in diagnostics have the potential to revolutionize the approach to detect and respond to future pandemics. Accordingly, herein, recent advances in point-of-care testing (POCT) of coronavirus disease 2019 (COVID-19) using various microdevices, including lateral flow assay strips, vertical flow assay strips, microfluidic channels, and paper-based microfluidic devices, are reviewed. However, visual determination of the diagnostic results using only microdevices leads to many false-negative results due to the limited detection sensitivities of these devices. Several POCT systems comprising microdevices integrated with portable optical readers have been developed to address this issue. Since the outbreak of COVID-19, effective POCT strategies for COVID-19 based on optical detection methods have been established. They can be categorized into fluorescence, surface-enhanced Raman scattering, surface plasmon resonance spectroscopy, and wearable sensing. We introduced next-generation pandemic sensing methods incorporating artificial intelligence that can be used to meet global health needs in the future. Additionally, we have discussed appropriate responses of various testing devices to emerging infectious diseases and prospective preventive measures for the post-pandemic era. We believe that this review will be helpful for preparing for future infectious disease outbreaks.
18	Chemistry	Nature Materials	Task-adaptive physical reservoir computing	Reservoir computing is a neuromorphic architecture that may offer viable solutions to the growing energy costs of machine learning. In software-based machine learning, computing performance can be readily reconfigured to suit different computational tasks by tuning hyperparameters. This critical functionality is missing in 'physical' reservoir computing schemes that exploit nonlinear and history-dependent responses of physical systems for data processing.

(Decoding Disciplinary Nuances: A Comparative Study of Move Structures, Verb Tense Patterns, and Lexical Density in Soft and Hard Science Abstracts)

				Here we overcome this issue with a 'task-adaptive' approach to physical reservoir computing. By leveraging a thermodynamical phase space to reconfigure key reservoir properties, we optimize computational performance across a diverse task set. We use the spin-wave spectra of the chiral magnet Cu_2OSeO_3 that hosts skyrmion, conical and helical magnetic phases, providing on-demand access to different computational reservoir responses. The task-adaptive approach is applicable to a wide variety of physical systems, which we show in other chiral magnets via above (and near) room-temperature demonstrations in $Co_8.5Zn_8.5Mn_3$ (and FeGe).
19	Chemistry	Nature Reviews Chemistry	Room-temperature phosphorescent materials derived from natural resources	Room-temperature phosphorescent (RTP) materials have enormous potential in many different areas. Additionally, the conversion of natural resources to RTP materials has attracted considerable attention. Owing to their inherent luminescent properties, natural materials can be efficiently converted into sustainable RTP materials. However, to date, only a few reviews have focused on this area of endeavour. Motivated by this lack of coverage, in this Review, we address this shortcoming and introduce the types of natural resource available for the preparation of RTP materials. We mainly focus on the inherent advantages of natural resources for RTP materials, strategies for activating and enhancing the RTP properties of the natural resources as well as the potential applications of these RTP materials. In addition, we discuss future challenges and opportunities in this area of research.
20	Chemistry	Nature Chemistry	Direct observation of geometric-phase interference in dynamics around a conical intersection	Conical intersections are ubiquitous in chemistry and physics, often governing processes such as light harvesting, vision, photocatalysis and chemical reactivity. They act as funnels between electronic states of molecules, allowing rapid and efficient relaxation during chemical dynamics. In addition, when a reaction path encircles a conical intersection, the molecular wavefunction experiences a geometric phase, which can affect the outcome of the reaction through quantum-mechanical interference. Past experiments have measured indirect signatures of geometric phases in scattering patterns and spectroscopic observables, but there has been no direct observation of the underlying wavepacket interference. Here we experimentally observe geometric-phase interference in the dynamics of a wavepacket travelling around an engineered conical intersection in a programmable trapped-ion quantum simulator. To achieve this, we develop a technique to reconstruct the two-dimensional wavepacket densities of a trapped ion. Experiments agree with the theoretical model, demonstrating the ability of analogue quantum simulators—such as those realized using trapped ions—to accurately describe nuclear quantum effects.