

Markers of discourse structure in digital crowdfunding science proposals

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ENG Abstract: In a scientific context of growing interdependence at a global level, digital genres for public communication of science in the Internet are gaining scholarly attention. Yet, although these genres have been mainly examined through their rhetorical organisation and their main discourse features, research on the latter is to date limited. To fill this gap, this study focuses on the functions of linguistic markers of discourse structure in texts exemplars of science crowdfunding online. Overall results show that constructing a semantically coherent discourse is fundamental to achieve the main communicative purposes of this genre, namely to inform about science while requesting the public's donations for carrying out a project. Results also show that linguistic markers of discourse structure are widely used for establishing contrast among ideas and concepts, and by this means build the argument and persuade the reader that it is important to finance the project. They also help the construction of a coherent academic discourse in every rhetorical section (Overview, Lab Notes, Discussion), exhibiting variation across them according to their communicative functions.

Keywords: Crowdfunding discourse; digital genres; linguistic markers of discourse structure; persuasion strategies, Open Science.

ES Los marcadores de la estructura del discurso en proyectos de micromecenazgo digital sobre ciencia

Resumen: En un contexto científico de creciente interdependencia a nivel global, los géneros digitales para la comunicación pública de la ciencia en Internet están captando la atención académica. Sin embargo, aunque estos géneros han sido examinados principalmente a través de su organización retórica y sus principales características discursivas, la investigación sobre las últimas es hasta la fecha limitada. Para llenar este vacío, este estudio se centra en las funciones de los marcadores lingüísticos de la estructura del discurso en ejemplos de textos de crowdfunding científico en línea. Los resultados generales muestran que construir un discurso semánticamente coherente es fundamental para lograr los principales propósitos comunicativos de este género, es decir, informar sobre ciencia y al mismo tiempo solicitar donaciones del público para la realización de un proyecto. Los resultados también muestran que los marcadores lingüísticos de la estructura del discurso se utilizan principalmente para establecer contraste entre ideas y conceptos, y de esta manera construir el argumento y persuadir al lector de que es importante financiar una determinada investigación. También ayudan a la construcción de un discurso académico coherente en cada sección retórica (Resumen, Notas de laboratorio, Discusión), mostrando variaciones entre ellas según sus funciones comunicativas.

Palabras clave: Discurso del micromecenazgo; géneros digitales; marcadores lingüísticos de la estructura del discurso; estrategias de persuasión, Ciencia Abierta.

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1. Introduction

At present, researchers are increasingly using different digital genres that require making scientific contents accessible to lay publics and also engage them in various ways, either by prompting donation and/or by collaborating in scientific processes (Bondi et al. 2015; Luzón and Pérez-Llantada 2022). These web-mediated forms of communication are a response to the current Open Science agenda (Bonney et al. 2009; Follett & Strezov 2015), according to which scientific research should reach audiences beyond the expert scientific community. In this context, science crowdfunding practices draw upon the technological affordances of digital platforms that enable researchers to disseminate their work and raise donations from non-specialised audiences to fund their research. In this exploratory study I focus on science crowdfunding project proposals. These are web-based texts with which researchers can propose a scientific research project and raise funding for carrying it out. The fact of these proposals being online allows researchers to reach diversified audiences, capture their interest in the project, raise the audiences' awareness of the expected scientific and social impact of the project and by this means prompt donations. From a theoretical standpoint, crowdfunding project proposals have been defined as a hybrid genre because they adopt some of the rhetorical and linguistic conventions of the traditional research grant proposal but also exhibit distinct features of other online genres of science popularisation, such as blogs and citizen science projects (Mehlenbacher 2019; Pérez-Llantada 2021, 2023).

Several labels have been used to characterise linguistic markers of discourse, such as sentence connectives (Halliday & Hasan, 1976), discourse particles (Schorup 1985), pragmatic formatives (Fraser 1987) or discourse connectives (Blakemore 1987, 1992), among others. A well-established discourse category is that represented by the label 'discourse markers', as used by Schiffrin (1987), a category extensively investigated in the scholarly literature although the label has been differently and not always coherently used. Defined as sequentially dependent elements, which bracket units of talk used "to convey meaning and accomplish actions" (Schiffrin 1987, 31), discourse markers are normally characterised by two features: their 'semantic weakening' and their 'grammaticalisation' as discourse (rather than lexical) items.

Discourse studies in web-mediated genres have mainly examined their rhetorical organisation of the information and their main discourse pragmatic features (i.e., situational context, the relationship between members of the same discourse community, cultural references, politeness) (Hyland 2010, 2018). In particular, rhetorical and discourse features of crowdfunding projects have been studied and research has shown that, in these hybrid genres, first and second person pronouns used to establish interpersonal relationships coexist with modal verbs of possibility to build trust and noun phrases to provide information about the science being crowdfunded (Paulus & Roberts 2018; Hyland, 2018; Pérez-Llantada 2021). To contribute to this area of research, this paper engages in the analysis of not only discourse markers but also a series of linguistic items with different sort of functions and meanings in marking discourse structure, namely conjunctions (subordinators and coordinators), connecting adverbs and other connectors (e.g. prepositional phrases), non-connecting attitudinal/modal adverbs, interjections, markers of politeness, markers of (positive/negative) polarity and hesitation expressions. This study is novel in its analysis of them in this new digital genre going beyond the narrower concept of 'discourse marker' (Biber et al. 1999, 1086-1088) and widening the scope of analysis to all markers which play a fundamental role in managing and organising the discourse and are thus crucial for effective communication. The purpose is to understand how scientists connect their texts meaningfully and logically in order to communicate the results of his/her research effectively and accomplish the communicative intentions of the genre, to inform about science and to prompt donation. In this study I will identify the types of linguistic markers used in crowdfunding science discourse structure and will describe the role they play in the pragmatics of communication at a discourse level.

The research questions of this exploratory study are the following:

RQ1. What linguistic markers of discourse structure are used in crowdfunding project proposals in comparison with those found in other genres?

RQ2 What types of markers of discourse structure are used across the rhetorical sections of the proposals and what are their main discourse functions in each section?

2. Literature review

2.1. An overview of markers of discourse

It was at the end of the 70s when the term 'discourse markers' arose in a paper about the use of *well* (Labov & Fanshel 1977, 156) but it was not until the beginning of the next decade when discourse markers began to be studied (Levinson 1983; Zwicky 1985). But if there is a catalyst in the study of discourse markers, that was the seminal work of Schiffrin in 1987. Schiffrin conceived discourse as a process of social interaction and was her desire to unify quantitative and qualitative methods when studying the distribution of forms in discourse, attending to both language and interaction. For that, Schiffrin studied a series of unstructured interview conversations and focused on a group of markers (e.g., *because, but, now, or, so, then* and others) that did not easily fit into a linguistic class. Her reasoning was focused on the study of the ways in which discourse markers "add to discourse coherence" (Schiffrin 1987, 326), for what she classified them in a taxonomy that describes their relations with adjacent units, attending to markers across contexts, across languages and over time (Schiffrin 2001, 2006). Subsequent studies contributed to propose broader definitions and new classifications of discourse markers (Redeker 1991; Teufel 1998), revised their grammatical status (e.g., Fraser 1999) or focused on their constraints and implicatures by the context in which they appear (e.g., Blakemore

1992). As the studies followed one another and a debate about their nature and functions was established (the Prague School of Linguistics played a key role in it), what seemed to be clear is that discourse markers have important pragmatic and functional discursive roles, namely, they help the interpretation of utterances and reflect the interwoven interaction among participants in a discourse and a context. Experimental research has also shown that discourse markers are used in the recognition of rhetorical relations serving those rhetorical relations as an explanation for the construction of coherence in the discourse.

2.2. Different linguistic markers in academic and scientific discourse

Different linguistic markers of discourse have been studied from various perspectives according to their presence in academic written discourse or academic oral discourse, with special emphasis in the use of English and its pedagogic implications (e.g., Biber et al. 1999). Some authors have focused on these particles as a mark used by writers to project themselves into their discourse, signalling their attitude towards both content and audience, helping interaction and cohesion within texts (Hyland & Tse 2004). By contrast, metadiscourse markers are the label Hyland (2004, 2005) coined for the discourse markers that, along with other devices, writers use to organize their texts and guide readers (under the label of interactive markers), signal attitudes towards the information provided and engage the audience (what he called interactional markers) (Hyland 2010). In this way, discourse markers would serve to highlight the writer's stance towards the content or the readers providing coherence to a text and a "reader-friendly prose" (Hyland & Tse 2004, 157). It is worth highlighting that for certain authors professional communication in academic writing relies mainly on markers of discourse for expressing doubt and certainty (e.g., Hyland 2000, 2005; Hyland & Tse 2004; Stab, 2017), combining the use of what Hyland (2000) conceptualises as hedges (*might/perhaps/about/possibly*) with boosters (*in fact/definitely/it is clear that*), in an attempt to gain acceptance from the audience. Accordingly, the literature on academic writing confirms the use of both of them is necessary to produce a convincing argument (e.g., Cox & Hill 2011; Takimoto 2015; Hryniuk 2018). Although the knowledge shared by a discourse community can help the understanding of a research writing, it will be the writer's ability to anticipate ideas and values of the readers what will determine the election of certain markers and therefore the construction of a coherent academic discourse (Dontcheva-Navratilova 2007). Interestingly, markers for expressing causal relations (e.g., *because/since/although/while*) and contrastive relations (e.g., *in contrast/on the other hand/however/nevertheless*) have also been widely proved for the creation of cohesion in academic written discourse, as Povolná (2012) showed in her analysis of a corpus of fifteen Master's theses of Czech students of English. She observed that causal and contrastive relations were normally expressed overtly in novice academic writing, with *therefore, thus, but* and *however* as the most commonly used. Breeze (2019) studied the communication in online open peer reviews and noted that open access responses are, at the level of discourse pragmatics, different from traditional confidential responses in occluded peer reviews, with more markers to emphasize changes (e.g., *now/previously/this is now stated*) although a similar number of markers for textual organization (e.g., *therefore/further/furthermore*), which indicates a certain continuation between tradition and digitalization.

However, discourse strategies in academic written texts differ substantially from those in academic speech, in which engagement markers in online scientific videos (e.g., reader pronouns *you*, modals of obligation *must*, imperatives *look, click, meet*) (Luzón & Pérez-Llantada 2022) or reformulation markers (e.g., *that is to say/in other words/namely/I mean*) in audio-video recordings (Rowley-Jolivet & Carter-Thomas 2020) for communicating scientific research play an important role, serving also to mark rhetorical moves in discourse. In recent times, certain attempts of studying markers of discourse in scientific contexts have also been carried out from Asian universities, such as Rido's (2015) and her study of the use of markers of discourse in lectures of physics conveying the existence of what she called macro-discourse markers which functioned as rephrasers or topic shifters (e.g., *I mean, which means to say*) and micro-discourse markers (e.g., *so, now, so anyway, I mean*). However, and to the best of my knowledge, literature dealing with academic communication is still scarce when it comes to markers of discourse (and especially markers of discourse structure) in new digital genres such as the crowdfunding digital genre.

3. Methods

The design of this study was motivated by two traditions in Genre Studies, namely Rhetorical Genre Studies and English for Academic Purposes (Bazerman 1994; Miller 1984, Swales 1990, 2004). This corpus-based approach is entirely deductive; the linguistic constructs emerge directly from the analysis and interpretation of 50 Earth science-project proposals (323,384 words) from Experiment.com (see Annex 2). This is a web portal in English that allows scientists and researchers to raise funds for their projects at same time they share their proceedings and knowledge with a distributed audience. The template of the website operates through four different tabs or rhetorical sections (Overview, Methods, Lab Notes and Discussion), accompanied by a video presenting the project and the money goal to be raised during a specific period of time. Markers of discourse structure were extracted from each section. Table 1 shows the number of word types and word tokens of every section.

Table 1. Corpus overview

SECTION	WORD TYPES	% Total	WORD TOKENS	% Total
Overview (including Methods)	6,403	22.98%	56,771	17.55%
Labnotes	10,444	37.48%	126,416	39.09%
Discussion	11,013	39.54%	140,197	43.36%

Antconc 4.2.4 (Anthony, 2023) was used to retrieve the overall corpus statistics and to compute tokens, word frequency and concordances. Raw and normalized frequencies per 1,000 words were calculated to make the data comparable across rhetorical sections. The percentages of the total representativeness of each functional category in the whole corpus have been calculated according to the total number of markers of discourse structure analysed in this study (2,786 markers, which represents 0.86% of all words in the corpus). Percentages for types of markers in each rhetorical section were calculated considering the number of markers of discourse structure in each section separately (687 markers in the Overview section, 1,517 markers in the Lab Notes section and 582 markers in the Discussion section). Normalised occurrences per 1,000 words made the figures comparable across sections.

For the purposes of the current work, markers of discourse structure were identified through quantitative and context-sensitive analysis and classified into seven major categories (sequencing, explaining a cause, explaining effect, adding information, giving an example, contrast and alternatives, drawing conclusions) according to the taxonomy established in Cox & Hill (2011). This taxonomy was created to provide the required academic skills for English-speaking tertiary institutions and was designed specifically for students from countries where English is not the native language. Therefore, it has been understood that it is especially appropriate for an English-speaking platform with global audiences such as Experiment.com, in which scientists from different linguistic backgrounds use English as a language of communication for their research. Also, considering the importance of informal interaction with potential backers and the lay audiences in the crowdfunding digital genre two extra categories were added, namely marks of orality ('attention signals', 'response elicitors', 'response forms', 'hesitators') and polite-speech formulae, following Biber et al.'s (1999) taxonomy for linguistic markers other than discourse markers. Other existing taxonomies for classifying markers of discourse (e.g., Redeker 1990; Fraser 2004; Hyland 2010; Maschler & Schiffrin 2015) could have also served for this study, but Cox & Hill's and Biber et al.'s stand out for their simplicity and constitute a review of the previous ones, so they can be easily applied for both traditional (i.e. print) or digital academic discourses. Furthermore, the selected categories of markers were deemed appropriate since, put together, they cover both written and spoken discourse. At same time, this taxonomy was adapted considering only the most representative markers for each category (sequencing, explaining a cause, explaining an effect, adding information, giving an example, contrast and alternative, drawing conclusions). Therefore, those that, due to their low representation, do not provide a clear reading of their behaviour in the discourse, have not been included. Examples will be provided for each category of marker of discourse structure.

4. Results

4.1. Overall data

Table 2 shows the distribution of the main linguistic markers of discourse structure present in the analysed corpus according to Cox & Hill's (2011) and Biber et al.'s (1999) taxonomies.

Table 2. Categories of markers of discourse structure by frequency in the corpus

TIPOLOGY	MARKER OF DISCOURSE STRUCTURE	OVERVIEW			LABNOTES			DISCUSSION			TOTAL CORPUS	
		Raw freq.	Norm freq.	% total	Raw freq.	Norm. freq.	% total	Raw freq.	Norm. freq.	% total	Raw total	% total
Sequencing	First / Firstly / First of all	44	15.79	13.97%	109	39.12	13.24%	8	2.87	4.29%	322	11.55%
	Second / Secondly	15	5.38		29	10.4		2	0.71			
	After that	1	0.35		4	1.43		4	1.43			
	Then	28	10.05		39	13.99		11	3.94			
	Finally	8	2.87		20	7.17		0	0			
Explaining cause	That is / That is why	7	2.51	12.8%	9	3.23	11.5%	1	0.35	1.03%	267	9.58%
	Because	20	7.17		76	27.27		2	0.71			
	Since	31	11.12		50	17.94		1	0.35			
	Due to	30	10.76		38	13.63		2	0.71			
Explaining effect	So	68	24.4	13.82%	208	74.65	16.61%	136	48.81	24.74%	491	17.62%
	Therefore	11	3.94		9	3.23		0	0			
	Thus	11	3.94		19	6.81		4	1.43			
	As a result	5	1.79		14	5.02		4	1.43			
	Consequently	0	0		2	0.71		0	0			

TIPOLOGY	MARKER OF DISCOURSE STRUCTURE	OVERVIEW			LABNOTES			DISCUSSION			TOTAL CORPUS	
		Raw freq.	Norm freq.	% total	Raw freq.	Norm. freq.	% total	Raw freq.	Norm. freq.	% total	Raw total	% total
Adding information	And / And also	56	20.1	11.79%	81	29.07	7.44%	35	12.56	6.35%	231	8.29%
	Moreover	1	0.35		2	0.71		0	0			
	Furthermore	2	0.71		4	1.43		0	0			
	In addition / additionally	22	7.89		26	9.33		2	0.71			
Giving an example	For example / for instance /	7	2.51	9.17%	25	8.97	5.47%	3	1.07	3.6%	167	5.99%
	Such as	55	19.74		58	20.81		18	6.46			
	To illustrate this	1	0.35		0	0		0	0			
Contrast & alternatives	But	94	33.74	32.79%	183	65.68	29%	42	15.07	12.19%	736	26.41%
	However	32	11.48		50	17.94		2	0.71			
	or	91	32.66		187	67.12		27	9.69			
	although	8	2.87		20	7.17		0	0			
	while	0	0		0	0		0	0			
Drawing conclusions	In conclusion / To conclude	5	1.79	0.72%	5	1.79	0.32%	0	0	0	10	0.35%
	To sum / To sum up	0	0		0	0		0	0			
Marks of orality	Alright? / Ok? / huh?	0	0	0.87%	0	0	2.1%	3	1.07	4.33%	63	2.26%
	Yes / Yeah / Yep / no / ok	0	0		5	1.79		16	5.74			
	Oh / ah/ wow/ ouch/ Yipee!	3	1.07		3	1.07		4	1.43			
	You know / you see	1	0.35		3	1.07		1	0.35			
	Perhaps / maybe	2	0.71		21	7.53		1	0.35			
	Er... / Erm...	0	0		0	0		0	0			
Polite-speech formulae	Thanks/Thank you	16	5.74	4.07%	169	60.66	14.32%	233	83.63	43.47%	499	17.95%
	Sorry	0	0		4	1.43		6	2.15			
	Please	12	4.3		45	16.15		14	5.02			

Table 2 shows that, overall, the texts analysed are especially rich in markers that express contrast and alternatives (e.g., *but*, *however*) (26.41%), oppose and explain ideas and highlight concession/transition from one point to the next in a logical and clear manner. Markers for explaining effects (e.g., *so*, *therefore*, *thus*) occupy a relevant third position with 17.62% of the total amount, prompting the understanding of the scientific data (causes and consequences of the intended projects) among lay publics. On the one hand, markers for sequencing information (e.g., *first*, *after*, *then*) (11.55%), for adding information (e.g., *and*, *in addition*) (8.29%) and for providing examples (e.g., *for example*, *such as*) (almost 6%) have a very similar representation in the corpus since they all serve to explain organizational and methodological ideas to potential backers to make their matters understood and achieve clarity. Other markers typical of the oral discourse, such as polite formulas (e.g., *thank you*, *please*, *sorry*) account for 17.95% of the total of markers and proper marks of orality (e.g., interjections such as *oh!*, *wow!*, hesitators *er*, *ehm*, greetings such as *hi!* response elicitors as *ok?*, etc.) amount only 2.26%. These two latter categories comprise together more than 20% of all discourse markers in the corpus, indicating an important presence of colloquial features in this digital genre. Thus, markers for drawing conclusions (e.g., *to conclude*, *to sum up*) are particularly scarce, since these projects are prompting for donations to be executed and consequently, they are not able to present any concluding remarks yet. Put together, the data show that the discourse markers used in the different rhetorical sections serve in the creation of textual connectivity and cohesion, helping to construct arguments as part of a coherent crowdfunding discourse.

Noticeably, the markers *but* and *or* rank among the highest in the corpus. Normally used to introduce objections, their high proportion here seems to indicate that the crowdfunding genre is not based on categorical statements. Rather, it requires conscious work on the part of the reader to differentiate and evaluate facets, alternatives or points of view that may be conflicting within of a project proposal. On the other hand, markers of discourse structure for adding information are present along all the rhetorical sections, but especially in the Overview tab, where researchers present information in a cumulative manner and clarify methods. When these markers are used as utterance or turn-initial links in speech, researchers make sure that their potential audiences are well informed and they can link all pieces of information by data gathering.

Finally, it is worth highlighting that the absence of discourse markers for drawing conclusions in all sections is also an expected result, since these projects are prompting for donations to be executed and consequently, they are not able to present any concluding remarks yet. As also seen in Table 2, there are

observable differences across the rhetorical sections in relation to categories of markers of discourse structure.

4.2. Markers of discourse structure across rhetorical sections

Results indicate that not all sections of the proposals contain the same typology of markers in the same proportion. Variation across rhetorical sections responds to the different pragmatic and communicative intentions of each tab, helping discourse markers achieve textual cohesion and the construction of comprehensible and persuasive arguments that create a coherent final crowdfunding discourse.

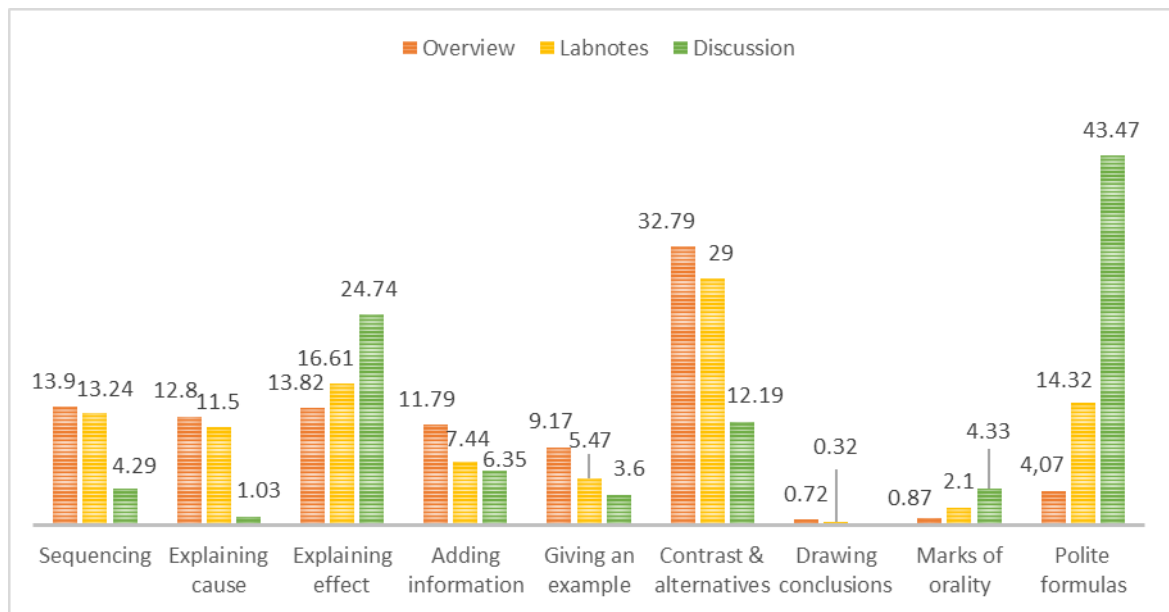


Fig. 1. Frequency of the representative markers of discourse structure by category in every rhetorical section (%)

4.2.1. Markers of discourse structure in Overview texts

As shown in Figure 1, the most frequent category of linguistic marker of discourse structure in the Overview texts is that used to indicate contrast and alternatives (32.79%), as the high presence of particles *but*, *or* and *however* (77.88%) indicates (Table 2). In this rhetorical section authors have to respond to questions such as *What is the context of this research?*, *What is the significance of this project?*, *What are the goals of this project?*. This means that they must provide most of the scientific data of their research here along with their budgetary objectives and the time needed to accomplish the planned actions. Furthermore, it has been proved that these markers are typical of the academic prose (Biber et al. 1999, 559), so their presence indicates that this rhetorical section present a more scientific discourse, similar to what could be found in the traditional grant proposal. At same time and more importantly, by introducing contrastive markers in this section the author can influence an idea that seems important to him/her, showing sometimes cons and pros of a fact and guiding the reading of a project. In other words, these guiding markers would help the construction of a logical scientific discourse adapted to lay audiences.

Markers for sequencing information (13.9%) and explaining effects (13.82%), at a discourse level, facilitate the understanding of the scientific content building a linear logic (e.g., *first*, *second*, *then*, *finally*), as the following examples extracted from different proposals related to the study of ecosystems show

- (1) **First**, this project looks to explain the combined effect the number of people and tornado energy have on tornado deaths and injuries.
- (2) **Second**, we will continue studying the AAS ecosystem.
- (3) **Then**, the foraminifera will be separated from the sediment by sieving.
- (4) **Finally**, this project encourages reflection on the benefits of employing geographical analysis in historical encounters with science

Additionally, they will facilitate signposting arguments and transmitting clearly the importance and consequences (e.g., *therefore*, *as a result*) the project will have for society. By this means, the balanced presence of the majority of markers of discourse structure typical of scientific language refers to the expository and explanatory nature of this section, in which a more formal language is used to transmit credibility. However, from the presence of contrast markers (32.79%) it is inferred that in this section the writer seeks validation and contrasted assessment of the information, making the reader aware of the pros and cons of the research to be funded and the relevance of supporting it. The fact that there is no virtual space for public discussion in this tab explains the absence of marks of orality, including polite formulas which are also typical of the spoken discourse (5%).

As also shown in Figure 2, causal types (e.g., *that is why*, *because*) make up 12.8% of all markers. They have a clear function of justification of the relevance of the projects, giving their own particular reasons of why to back them. Causative markers are particularly common in the Overview tab, for responding to questions such as *What is the significance of this project?*. This can be seen in example (5) for highlighting the importance of studying the internal structure of rock glaciers in San Juan mountains in Colorado.

- (5) This project will help understand the additional potential for decreasing water availability in some areas **due to** changing climate conditions.

Among all causative markers in the corpus, the use of *because* stands out (cf. Table 2), being a subordinator used to give reasons, both scientific and personal, justifying the proposal and stating the value of the present research.

If we turn to linguistic markers for adding information, they represent 11.9% of the total amount (see Figure 2). According to previous studies, readers process a text in a gradual manner, adding new information incrementally to a representation of the ongoing discourse (Sanders et al. 1993; Taboada, 2006). For example, in a project about the overuse of fertilizers in agriculture, which seeks the economically viability of growth of cereals in a healthy soil (6), researchers use the additive conjunction *and* as a resource to embed and coordinate different concepts and single cumulative ideas with the same syntactic role, in what Biber et al. (1999) called ‘the add-on strategy’.

(6) We [[love a challenge] **and** adventure] **and** now [we have all we handle]. Lower cost of production equals less financial risks. [**And** we are doing the right thing].

All these chunks of information (in square brackets in the example) form a “linear sequence of finite clause-like units, which follow in line without overlap or interruption” (Biber et al. 1999, 1068). This lineal sequence of ideas also helps to persuade the backer by linking all different data, concepts and explanations and therefore creating the impression of an informative abundance in order to help taking a decision when backing a project. Yet, when the cumulative information is accompanied by examples (9.17% of markers in this section are used to introduce them), it is usually more legible and understandable, especially if it is aimed at a non-specialist audience. Such markers foster the comprehension of the specialized information in the crowdfunding campaign as shown in example (7), about biodiversity in Jamaica.

(7) The type and relative abundances of pollen found in sediment cores provide information about changes in the vegetation community of the surrounding lake area over time. **For example**, an abrupt decline in tree pollen along with increases in pollen from crops and weeds may indicate agricultural land clearance.

This is also a common strategy in digital genres for science popularization such as scientific blogs, citizen science projects, research group websites and infomercials (Bucher 2019; Pérez-Llantada 2021, 2023; Luzón & Pérez-Llantada 2022). “Exemplification plays a key part in the interactive process between reader and text as the writer anticipates and responds to the reader’s possible need for clarification” (Hyland 2007, 278). It therefore can represent the writer’s self-perception of what the audience needs to know and it is a manner of persuade and guide the potential backers’ reading.

4.2.2. Markers of discourse structure in Lab Notes texts

In a similar manner to the Overview section, the Lab Notes section is abundant in markers for contrast and alternatives, amounting 29% of all markers in this tab (Fig. 2). This suggests that these texts are expository. Researchers share their scientific advances and updates with followers and potential backers, also making them aware of upcoming work despite these advances. In the Lab notes, contrast/concession markers build an argument that aims to explain and clarify concepts, giving reasons and creating a persuasive effect on the reader who can better understand the project. Example (8) shows the investigation of indoor air quality in Northeast Denver. Here, the research team shows an objective fact, the existence of two homes above normal background levels, to immediately provide a potential reason for this (introduced by *however*). Finally, the particle *but* emphasizes that these reasons are not an excuse, and reassures the initial idea, stressing the detected problem and making it double-clear for potential backers.

(8) Two homes were above typical background levels; **however**, this may have been due to a combination of poor ventilation and/or the presence of household products containing PERC, **but** again these two homes were well below the action level.

Markers typical of the spoken discourse in this section, such as polite formulas represent 14.32% of the markers found in this section, which together with marks of orality (2.1%) comprise 16.42%, a similar proportion to markers for explaining effects (16.61%), and not far from markers for sequencing information (13.24%) and explaining causes (11.5%). It must be noted that among this last types it is also possible to find some typical of conversational contexts, such as *so* (74.65%), which introduces clauses of result or decision.

(9) That tree really needs to come down because it’s a threat to both houses and the area likely needs to be clear to get some equipment back there. **So** we’ll build the composting system after the tree is removed.

Noticeably, the presence of the marker *because*, very common in the oral discourse, (27.27%), serves to give reasons, reinforcing the argument and clarifying to the reader the reason for the data presented, as example (10) illustrate, this last one about a project on the cork industry in Spain.

(10) In the case of Kyra’s project in Spain, she picked the cork oak not only **because** of its economic value for Spain (the cork industry in Spain is valued at 2 billion dollars), but also **because** it occupies a wide range of sites with varying precipitation.

The rhetorical effects of this argument seek to persuade the reader of the reliability of the project and the importance of reaching its aims for science and society. It also needs to be stressed here that markers to show gratitude (e.g., *thanks, thank you, many thanks*) are numerous in this section (60.66%), which seeks update but also compromise. Example (11) shows how the study of the floating seaweed of Sagasso Sea is shared casually with backers with expressions as it follows.

(11) Hi Sue - **thanks!** Thanks again and stay tuned for future updates which will eventually include my results!

The presence of orality markers in this rhetorical section might point to the hybrid nature of the discourse of crowdfunding science, as previously claimed (Mehlenbacher 2017; Pérez-Llantada 2021).

4.2.3. Markers of discourse structure in Discussion texts

The most frequent type of marker of discourse structure in the Discussion section is related to the spoken discourse typical of this tab, with formulas of politeness amounting to 43.47%. This is not an unexpected finding if we consider that the Discussion tab provides an interactive space for opinion sharing as the comment section of other digital genres such as Youtube videos (Cavaliere 2020) and citizen science projects' Talk page (Pérez-Llantada 2023). The markers *thanks/thank you* in the texts (83.63% in this rhetorical section) indicate that here the scientists and backers exchange tokens of gratitude that imply a personal assessment of each one's role within the project, namely, scientists value the ideas and the moral and economic support of the public and the public values the updating of the project's content and its social importance. More broadly, the presence of marks of gratitude in the corpus reveals one of the main discursive goals of the genre, namely obtaining funding to develop scientific research, for which gratitude acts as a compensatory means of payment. Example (12) shows the answer of the researcher of a project about paleontological field exploration in the South African Karoo to one of the comments by a potential backer

(12) You are right! **Thank you** Mayo for your comment. The crowdfunding enabled us to undertake the planned fossil collecting field trip. We found several important fossils including at least one new species (this fossil is still being prepared to expose it from the rock) and several volcanic ashes which are currently being dated at MIT.

Additionally, markers of orality (e.g. *er, ehm, yeah!*) rank highest in this section than in any other, since the discourse unfolds pauses or attention-signals, fostering familiarity and a closer relationship between backers and scientists. Example (13) shows a backer interacting with researchers in a project about the creation of devices for mapping caves in 3D.

(13) Hi all! **Yeah!** Project is now fully funded so I wish You success in lab trials!

Markers for explaining effects amount to almost 25% of all markers in the Discussion section. This result is especially motivated by the high presence of the marker *so* (48.81%), also observed in the Lab Notes section.

5. Discussion

This study aimed to understand the role of these markers of discourse structure in crowdfunding science proposals online, with a focus on the field of Earth Sciences, identify the types of markers used in these proposals as well as possible variation in their use across the different rhetorical sections of them. The study has sought to make two broad claims: that markers of discourse structure play important functions in crowdfunding writing, and that their presence in the different rhetorical sections of the analysed corpus reassures the hybridity of the crowdfunding genre.

In response to RQ1 -- "What linguistic markers of discourse structure are used in crowdfunding project proposals in comparison with those found in other genres?" -- results indicate that these proposals rely heavily in the use of linguistic markers for expressing contrast and alternatives, which helps researchers to present and support arguments in a scientific and rigorous manner showing the definition of scientific concepts, possible problems in the research process and different solutions to them. Causal and contrastive relations "rank among the most informative and complex semantic relations that can hold between segments of discourse" (Kortmann 1991, 162) and in academic written discourse are usually marked explicitly, presenting and supporting arguments (Povolná 2012). This points to the fact that this digital genre presents similar characteristics of the traditional academic grant proposal, often utilizing connectors and other metatextual signals as *consequently, however, firstly, finally* (Connor & Mauranen 1999). This is not an unexpected finding considering that the analysed texts seek to communicate academic research and objective scientific data to diversified audiences (Biber 2009; Luzón & Pérez-Llantada 2022).

In tracing functions of linguistic markers of discourse structure in the analysed corpus and despite the limitation of its size, one would argue that the discourse features establish through the use of linguistic markers in digital genres of science play an important role in "telling and selling" scientific research, allowing to reach its communicative purposes, i.e., to build credibility and trust in research with a view to persuasively enticing audiences to fund the projects.

This study is novel both in its analysis of the functions of linguistic markers of discourse structure in this new digital genre as in the role they play in achieving its communicative goals, namely to inform about science while requesting the public's donations for carrying out a project. Results showed how markers of discourse structure help to construct semantic meaning and build logical arguments when marking the different rhetorical sections and how the textual coherence of the texts enables scientists to share their expert knowledge with general audiences. The presence of the different categories of these markers in the texts is determined by their function in the rhetorical sections of Experiment.com, helping to create a coherent discourse in each one. By examining several examples in the different rhetorical sections of Experiment.com, this work derived characteristic properties of argumentative structures in relation to the functions of markers of discourse structure in crowdfunding proposals. Thus, linguistic markers for explaining causes, explaining effects and

giving examples, with their important presence in the corpus, help the argumentative structure of this genre. The use of these linguistic markers, as also Hyland (2007, 269) indicated, relates comprehension of the specialized information and supports the coherence of the discourse. As Bublitz (1988, 32) stated, “a text is not coherent in itself but is understood as coherent in an actual context”. On the other hand, the relatively high presence of markers typical of conversation and formulas for politeness suggests that the markers perform interpersonal functions in the discourse, as also observed for other digital genres (Hyland 2010; Luzón 2013; Mehlenbacher 2019; Pérez-Llantada 2023). In this case, the use of gratitude markers and markers for orality come to be one of the many colloquial features (e.g., use of deictics, intensifiers, person pronouns) that have also been present in other digital genres such as blogs, online comments and reviews in digital media (Pérez-Llantada 2021) and that make readers more easily persuaded to understand and accept scientific facts. Therefore, results show that the information being conveyed aims at clarity, which suggests that writers seek to make their texts comprehensible and accessible to lay publics (see also Mirović et al. 2019). This is a common communicative intention in this type of new digital genres, which perform different strategies and linguistic resources based on the simplification and condensation of specialized information to make scientific language accessible (Bondi et al. 2015). In addition, the use of gratitude markers has shown that an important emotional and evaluative burden on behalf of all counterparts is involved, contributing information relevant to assessing attitude of the crowdfunding texts, an aspect open to prospective research. Thus, the discursive markers of gratitude serve to estimate the benefit provided by the backer, both economically and morally, thus helping to establish interpersonal and proximity relationships with scientists and their audience.

Conversely, the scarcity of linguistic markers intended to draw conclusions is expected, since like the traditional genre of the grant proposal, results and conclusions will not be reached until the project is completed. Therefore, a similar presence can be also expected in terms of representation of the categories of linguistic markers in both digital and traditional genres, an aspect that still remains pending for future research. The study findings also suggest that the affordances of the digital medium (hypertextuality, modularity and interactivity) would minimize the need to use markers of discourse structure for giving examples or explaining a cause in high proportions since the different sections, pictures and headings in the Experiment website would simplify the writing efforts of the researchers. Before creating any project in the web platform, researchers have access to guidelines on language use and to a section for guiding their writing process through frequently asked questions (FAQ) (<https://experiment.com/faq>). Therefore, the rhetorical digital structure of the crowdfunding genre may influence the choice of markers of discourse structure in general, helping to build texts that communicate clearly and effectively.

Regarding RQ2, -- “What types of markers of discourse structure are used across the rhetorical sections of the proposals and what are their main discourse functions in each section?” -- results have shown that the fact that the Overview and Lab Notes sections present a very similar and balanced representativeness of all types of markers of discourse structure, with slight differences, indicate they accomplish analogous communicative and pragmatic functions. Both sections are especially rich in markers to express contrast and alternatives, serving to provide identification of new information or to appreciate the scientific value of the proposals. This high presence converges with the idea stated by Taboada (2006) that these two types play an important role in expressing cohesion and coherence relations in academic written discourse. Thus, the potential backer “attempts to interpret the text as discourse by relating it to his/her background knowledge and previous experience in similar types of discourse” (Povolná 2012). The studies on linguistic markers used in academic prose indicate that markers for causality and contrast are frequent because they are related to the communicative purpose of specialized discourse, namely convincing of the importance of the research results (e. g. *that is, however, but*) (Connor & Mauranen 1999). Among those relations, causal and contrastive are some of the most informative and semantically complex (Kortmann 1991, 160–164) and they tend to be marked explicitly in academic written discourse (Biber et al. 1999, 880). This means that the use of discourse markers for indicating causes and marking contrast would help these two rhetorical sections to present and support arguments in order to arrive at an interpretation intended by the author of a project proposal, making research credible and accessible to non-experts. Noticeably, in the Lab Notes section, with an important presence of markers typical of the oral discourse i.e. formulas of politeness (e.g., *thank you*), markers for explaining causes (e.g., *because*) or for referring to effects (e.g., *so*), scientists seek to persuade the reader of the reliability of the project in a more entertaining manner, similar to the functions blogs develop. Thus, it can also be asserted that the fact that linguistic markers for organizing sequential information (e.g., *first, second, after, finally*) and markers for explaining causes (e.g., *that is why, because, due to*) are abundant in this section, constitutes an effective way to fulfil two communicative goals in this genre. First, informing clearly about the project and second, explaining why it is important to back it, persuading the public to donate money (Mehlenbacher 2019).

Scientists seek to write projects that are both comprehensible and persuasive, and for that they need to understand the rhetorical organization of the texts, as well as the argument preferences of their potential backers, a distributed audience of people with different sociocultural backgrounds. In order to make science accessible to them, scientists must comprehend the importance of linguistic markers of discourse structure when presenting specialized content to lay publics and the creation of a coherent discourse. Providing the readers with information and contrasting ideas while alternatives are offered contribute to communicative effectiveness in the Overview and Lab Notes sections, structuring the means by which a writer is able to relate a scientific text to a given interactive crowdfunding context. Although similar, these two sections differ in their use of marks of orality, the Lab Notes discourse being halfway between that of the other two rhetorical sections.

From the findings, it also seems clear that the role of markers of discourse structure in the Discussion Tab have shed light on the changes that the crowdfunding genre is bringing to scientific communication through the use of marks typical of conversation (e.g., greetings, polite-speech formulas). This contributes to the idea of the crowdfunding genre as a participatory genre, in which both the launcher and the backer can exchange ideas on science or express moral support. The use of these markers helps to establish familiarity and closeness with the backer, contributing to persuade for donation.

6. Conclusions

The salient communicative purposes and functions of markers for discourse structure traced in the corpus lay bare the importance of sharing scientific knowledge to society, making science accessible to diversified audiences and allowing citizens to take part in the scientific debate. Results have illustrated how digital environments allow researchers to communicate with the lay public and to make research outcomes credible and accessible and, at the same time, persuading the audiences to trigger donation.

To inform future pedagogical practice on this genre, it would be necessary to scale-up the present study using a larger corpus and conduct a qualitative ethnographic method. Thus, it would be possible to collect data about the reasons behind the scientist's use of linguistic markers for discourse structure when writing their crowdfunding proposals. This would yield robust generalizations of the process of writing for public dissemination of scientific results among non-expert audiences and how scientists create a coherent discourse aligned with the values underpinned in the Open Science agenda. Raising scientists' awareness of the importance of counting on the linguistic and rhetorical conventions necessary to communicate science effectively online is vital and should therefore be learnt.

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Appendix 1

Crowdfunding proposals in Experiment.com referenced in this article as indented examples

[1] Tornadoes, Casualties, and Climate Change (2016) By Tyler Fricker

<https://experiment.com/projects/is-climate-change-depleting-an-untapped-water-resource>

[2] The Arlington Archosaur Site: a unique Cretaceous ecosystem and urban fossil dig (2016) By Christopher Noto and Stephanie Drumheller-Horton

<https://experiment.com/projects/the-arlington-archosaur-site-a-unique-cretaceous-ecosystem-and-urban-fossil-dig>

[3] Recent climate change and foraminifera populations on Greenland's continental shelf (2015) By Laura Larocca and Kimberly Meehan

<https://experiment.com/projects/recent-climate-change-and-foraminifera-populations-on-greenland-s-continental-shelf/discussion>

[4] Cityscapes and Earth Debates: Fashioning the Geosphere in Nineteenth-Century Ireland (2017) By Tanya O'Sullivan

<https://experiment.com/projects/cityscapes-and-earth-debates-fashioning-the-geosphere-in-nineteenth-century-ireland>

[5] 10,000 years of climate and environmental changes in Jamaica, a biodiverse tropical island (2017) By Mario Williams and Jacquelyn Gill

<https://experiment.com/projects/10-000-years-of-climate-and-environmental-changes-in-jamaica-a-biodiverse-tropical-island/methods>

[6] No but seriously now, how much fertilizer do we really need? (2016) By Buz Kloot and Carl Coleman

<https://experiment.com/projects/no-but-seriously-now-how-much-fertilizer-do-we-really-need>

[7] How has Viking knitting evolved up to the 17th century? (2015) By Alex Todorovic-Jones and Kyra Prats

<https://experiment.com/projects/how-susceptible-are-oaks-to-climate-change-and-drought>

[8] Investigating Indoor Air Quality in Northeast Denver (2015) By Ashley M. Collier, George Ware, PG Iwasaki, LaShonn Billingsley, Debbi Main, Raj Pandya, and Brian Fauver

<https://experiment.com/projects/investigating-indoor-air-quality-in-northeast-denver>

[9] Filling the Knowledge Gap: Seismic Hazards at Cherry Point (2015) By Research Now and Donna Gerardi Riordan

<https://experiment.com/projects/filling-the-knowledge-gap-seismic-hazards-at-cherry-point-wa/methods>

[10] Is climate change depleting an untapped water resource? (2016) By Raquel Granados Aguilar, PhD, Taylor Rowley, Rodrigo Rodríguez, Maximilian Witek, Cameron Ramsey, and Dennis Mmasa

<https://experiment.com/projects/is-climate-change-depleting-an-untapped-water-resource>

[11] Fauna of the Floating Islands: a study of the floating seaweed, Sargassum (2015) By Martin

<https://experiment.com/projects/fauna-of-the-floating-islands-a-study-of-the-floating-seaweed-sargassum>

[12] Palaeontological field exploration in the South African Karoo (2019) By Bruce S. Rubidge

<https://experiment.com/projects/palaeontological-field-exploration-in-the-south-african-karoo>

[13] You can take it with you! Building robust devices for 3D mapping caves (2016) By Myre, Hafferman, and Schuchardt

<https://experiment.com/projects/you-can-take-it-with-you-robust-devices-for-3d-mapping-caves>

Appendix 2

Projects in the corpus analysed

Title	Researcher	N. of words (tokens)
Can immersive telepresence systems more effectively educate inland and coastal communities about the hydrosphere?	James Neilan, Laura Kubiak, and Charles Cross	3,056
What is the rate a new regenerative agricultural method sequesters carbon in the soil?	Scott E Strough	1,411
Palaeontological field exploration in the South African Karoo	Bruce S. Rubidge	2,767
Faunal diversity in the Mesozoic formations of Northwestern Colorado	Tyler Bridges et al	4,497
Crowdsourcing hydrocarbon pollution monitoring in shale areas using passive sampling	Gunnar Schade	3,362
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