Mediating expert knowledge: The use of pragmatic strategies in digital research digests

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ABSTRACT

Scientists are under increasing pressure to enhance public awareness of the societal implications of their research. This involves recontextualizing highly specialized knowledge into forms accessible to diverse audiences, varying in levels of expertise. While much research has focused on the reformulation of ideas for popularizing purposes, less emphasis has been placed on the pragmatic strategies involved in adapting expert knowledge for varied audiences in digital contexts. A pragmatic approach that leverages both verbal communication and digital tools could provide insights into these dissemination strategies. This study examines how digital research digests, which are concise versions of research articles, make scientific research accessible to non-experts. The study identifies two key sets of strategies: expert-oriented, which emphasize authority and credibility, and audience-oriented, which simplify complex ideas and relate them to everyday life. These strategies blend to form a unique narrative voice that balances authority with accessibility. The paper argues that effective digital dissemination should integrate both linguistic and pragmatic methods to successfully communicate complex information across different digital practices.

1. Introduction: The dissemination of scientific knowledge

The popularization of science, initially linked to advancements in printing technologies, has been actively promoted by institutions and scientific organizations since the mid-20th century, driven by a sense of responsibility to make scientific results accessible to both specialized and general audiences (Banks and Di Martino, 2019). The notion of a strict divide between the scientific community and the lay public has been challenged (Jones et al., 2015; Pilkington, 2018; Freddi, 2020), leading to the understanding that popular science is crafted for diverse audiences, including experts, with varying levels of background knowledge, needs, and expectations (Myers, 2003; Hyland, 2010). Thus, the reader "is no longer a passive observer but an active participant in the social discourse related to science and its consequences" (Pilkington, 2018: 14).

As a result, there are two prevailing discourses regarding science and its societal role. The "canonical view" posits the existence of two separate discourses: an authoritative discourse upheld by scientific institutions, and a public discourse that coexists but remains external to the former (Moirand, 2003; Motta-Roth and Scherer, 2016). In contrast, a "contemporary view", advocates a horizontal organization that connects scientific activity with the broader society. This perspective seeks not merely

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to explain science, but "sets out to explain the social meaning of such events" (Moirand, 2003: 198) striving for the democratization of access to scientific debates (Motta-Roth and Scherer, 2016).

The role that digital technology is playing in communication and the dissemination of knowledge has probably not yet been fully understood. The technological affordances associated with Web 2.0 and social media have significantly facilitated "the sharing of textual, visual, and/or audio information as well as different frameworks for interaction" (Garcés-Conejos Blivitch, 2014: 1). Scientific results, data, and methods, along with ongoing scientific challenges, are now accessible to anyone with an interest, fundamentally altering the traditional relationship between scientists and the general public. The dissemination of knowledge through digital platforms and media has recently attracted substantial research interest (i.e. Bondi et al., 2015; Bondi and Cacchiani, 2021; Facchinetti, 2021; Labinaz and Sbisà, 2021; Pontrandolfo and Piccioni, 2021; Schmied, 2021). These studies have explored a range of genres that have emerged due to technological advances and new technical affordances (i.e. blogs, social media, video abstracts, podcasts, websites), or have transitioned from offline to online media, acquiring new forms and even new communicative purposes in the process (i.e. feature articles, research digests, breaking news, etc.).

The popularization of scientific findings is closely linked to the concept of recontextualization, which essentially involves making necessary discursive changes to ensure that a text, originally created in a specific context, fits in another context, often to convey new meanings or serve a different communicative purpose (Bauman and Briggs, 1990; Linell, 1998; Calsamiglia and Van Dijk, 2004; Bezemer and Kress, 2008; Gotti, 2014; Bondi et al., 2015; Johansson, 2019; Carter-Thomas and Rowley-Jolivet, 2020). Recontextualization, as a discourse process, is closely related to the phenomenon of **g**eneric repurposing, which typically involves generic hybridization, as elements from both expert and popular discourse are combined (Luzón, 2023). This process of recontextualization entails making decisions on how to restructure arguments, redirect discourse purposes. and create new rhetorical connections (Hyland and Jiang, 2018). This complex task goes beyond merely simplifying the lexicogrammar and may even result in regenring the text, that is, in assigning a different genre to the text after recontextualization (English, 2011; Adami, 2014). In addition to these discursive phenomena associated with recontextualization, there are others, such as "repragmatisation" (Dynel, 2024), where a new pragmatic meaning is retrospectively attributed to a textual instance deviating from the original author's intent.

The writers' decisions are mainly triggered by the urge to bridge what is known as "knowledge asymmetries" (Ditlevsen and Kastberg, 2011; Gotti, 2014; Bondi et al., 2015; Engberg, 2016; Maier and Engberg, 2021), a concept widely used to cover phenomena ranging from geopolitics to communicative practices (Ditlevsen and Kastberg, 2011: 137), which refers to "the differences between individual knowledge in depth as well as in breadth" (Engberg, 2016: 37). These knowledge asymmetries generate "communicative efforts" (Maier and Engberg, 2021), which are taken to be the discursive intents made to overcome whatever knowledge asymmetry is in question, in search of a democratized access to science which facilitates citizens' understanding of complex knowledge (Lorés, 2023). Maier and Engberg (2021): 187 believe that the communication of knowledge is not present in the texts as such, but emerges "from constructive comprehension processes of the users when interacting with the text created for knowledge communication". For information to turn into knowledge, it needs to be subjected to these constructive comprehension processes, which rely both on the knowledge that the user has and also on the ability that communicators display to engage users in the communication process. Thus, two constructive comprehension processes (as part of the communicative efforts) take place at the same time: *comprehensibility enhancement* (of expert discourse), which has to do with strategies of simplification of form and content as well as accessibility, and *engagement enhancement* (with an audience not necessarily expert in the field), which involves both undialogized assertions and dialogic interactions with the audience (Maier and Engberg, 2021).

As mentioned above, within the wide landscape of digital scientific communication, two types of genres coexist: those that have migrated from their original offline territory to the online ecosystem, and those which are native to this ecosystem. Both native and non-native digital scientific genres take advantage of the technical affordances that the digital media offer (i.e. hyperlinking, multimodal assemblages, hypermodality) and provide content that stems from published research, usually the research article, which constitutes the "primary output" (Puschmann, 2015) from which they derive. Within these digital research genres, a distinction can be made between *digital research summary genres*, based on Luzón's (2023) "digital summary genres", which summarize and promote published research (i.e. graphical abstracts, visual abstracts, video abstracts, lay/author summaries, science podcasts), and those which I will here refer to as *digital research disseminating genres* (i.e. feature articles, research digests, online news), whose main purpose is to facilitate access to specialized knowledge to audiences who are not necessarily experts in the field. Apart from the diverse communicative purposes that both types of research genres seem to portray, a major distinction between these two types of digital genres lies in their authorship. Whereas *digital research summary genres* are written or produced by the author(s) of the research, *digital research disseminating genres* are mediated forms of expertise (Eriksson and Thornborrow, 2016: 1). That is, they are usually written by a science journalist or a scriptwriter who transfers specialized technical knowledge, generated by the scientist, to a general public who might hold various degrees of knowledge in the field. Their publication might be the result of efforts and interest on the part of public and private institutions and professional organizations to account for and give visibility to the scientific advances made and, on the whole, to facilitate access to knowledge in civic society. The affordances of digital platforms are leveraged, and usually further dissemination is ensured through the use of social media platforms, such as X (formerly Twitter), Instagram and, lately, also Tik Tok.

In this light, it seems to be relevant to explore how the "communicative efforts" made by these mediators are discursively instantiated in digital research disseminating genres to reach general audiences and bridge existent knowledge gaps. Thus, in the present study, I aim to identify and explore the pragmatic strategies and associated discursive resources used by

mediators in the process of recontextualizing expert knowledge for general or not-so-specialized audiences, for science dissemination purposes. Understanding that the social and communicative purpose of these texts is to bridge the knowledge asymmetries mentioned above, two research questions are here explored:

1. What pragmatic strategies do mediators use to communicate expert knowledge to and engage with general audiences?
2. What discursive and metadiscursive resources are associated with the deployment of the identified pragmatic strategies?

In the sections that follow, an overview will be given of the research digest as an object of study (Section 2), the corpus under study will be described and the methodological procedure followed will be explained (Section 3), results from the analysis undertaken will be discussed in Section 4, illustrated with examples from the corpus. Finally, Section 5 will offer conclusions and will suggest some avenues for further research.

2. The research digest as an object of study: Analytical perspectives

To identify the pragmatic strategies and the associated (meta)discursive resources used in the recontextualization of expert knowledge for digital dissemination purposes, I will here focus on a specific instance of digital research dissemination genre, the research digest, which, to my knowledge, has not been widely explored as an instance of digital scientific communication (see Lorés, 2023;2024). In the present study, the research digests published by the British Psychological Society (BPS) (https://www.bps.org.uk/collections/research-digest), the best well-known professional organization in the UK with an international projection in the discipline, have been selected as a basis of observation. The British Psychological Society has several publications (i.e. academic journals, network publications only for members, newsletters), among which, it also offers these texts, which are "digested" versions of the latest research papers published in academic journals in the field. Research digests are issued on weekdays and boast 70,000+ subscribers via email. Accessible through various channels including a weekly email digest and social media platforms like Facebook and X (formerly Twitter), they provide multiple avenues for staying updated.

Psychology's diverse subjects hold significant societal appeal, positioning it as a prime field for examining how specialized knowledge can be reshaped to enhance comprehension among broader audiences. This purpose is echoed on the BPS website, where the following statement is featured:

> "The aim of Research Digest is to provide engaging, accurate reports on the latest psychological research and studies that are timely, novel, thought-provoking and relevant to real life, and which make an important contribution to our expanding knowledge of the world."
> [https://www.bps.org.uk/publications, last accessed 16 June 2024]

Research digests published by the British Psychological Society exhibit a consistent organization of verbal and nonverbal elements, creating a template that has been followed in their publications and has evolved slightly over time.

The current template integrates various modes, combining static visual elements with a predominantly verbal component, and utilizing the interactive features available on electronic platforms (i.e. hyperlinks). The identified elements include:

- A picture at the top, on the right-hand side, relates either realistically or figuratively to the introduced research topic. This visual element helps readers contextualize the forthcoming content, acting as an engagement cue and serving as a forward-reference element for the subsequent text.
- At the top of the page, to the left of the picture, the following information is provided: the general topic or subdiscipline the digest addresses (e.g., cyberpsychology, education, children and families, etc.); the title, which is typically a variation or shorter version of the original research article's title; a brief descriptive sentence summarizing the study's findings; the date, and the name of the scriptwriter, which is hyperlinked to other research digests they have written.
- The body of text includes several hyperlinks to the direct source of the research, as well as to external sources that elaborate on, extend or complement the information provided.

One of the most notable recent changes to the layout of BPS research digests is the reduced level of interactivity. Previously, web-published research digests included the following elements at the end of the text:

- The scriptwriter's affiliation, indicating whether they were staff writers or freelancers, and links to their social profiles, typically Twitter.
- Social media options for the audience to disseminate and share the post, including platforms such as Twitter, Facebook, LinkdIn, Reddit and Pinterest.
- An evaluative section where interested readers could click to rate the content.

These three elements have been removed from all the posts, probably as a result of interactivity being redirected towards active social networks such as X (https://twitter.com/researchdigest), formerly Twitter, and Facebook (https://www.facebook.com/researchdigest).

In this study, the research digests published by the BPS are explored as examples of digital research dissemination genres, focusing on the pragmatic strategies employed by science journalists who write them and the associated discursive resources.

In line with Pascual (2024), pragmatic strategies are here understood as functional units of analysis that enable "to identify and uncover the context-sensitive intentions of interactants in a given communicative event […]". Defined as functional units, these strategies can manifest not only in single words but also in entire paragraphs. More importantly, they are realized through a variety of (meta)discursive resources. To operationalize the exploration of these resources, the model proposed by Hyland (2005, 2008) in terms of stance and engagement metadiscourse features has been adopted (and adapted). Hyland's model seeks to systematize the linguistic tools writers use to express their stance towards the material referenced in the text and to connect with their audience, specifically analyzing the resources used in "inter-subjective positioning" (Hyland 2005: 173).

While Hyland initially developed this model to examine how academic writers interact with their readers, in my view it is equally applicable to investigate mediated communication between science journalists and general audiences, as it pre-supposes an awareness of self and audience. The model defines *stance* as the writer's textual "voice" or acknowledged personality within a community. It encompasses a writer-oriented function that concerns how writers present themselves, express opinions, and make judgments. *Engagement*, on the other hand, focuses on a reader-oriented function, aiming to align with readers by acknowledging their presence, actively involving them in the discourse, and guiding them through interpretations (Hyland, 2008: 7).

According to the model, the metadiscursive features associated with the writer's **s**tance include attitude markers, which signal the writer's emotional or subjective stance rather than just factual certainty towards propositions in their writing; hedges, which indicate a writer's acknowledgment of differing viewpoints and a deliberate decision to not fully commit to a specific statement or claim; boosters, which serve to assert the writers' confidence in their assertions, aiming to suppress opposing perspectives and reinforce the certainty in what is being communicated, and self-mentions, which reflect the level of direct presence or visibility of the author within the text, highlighting their explicit involvement.

Engagement metadiscursive features comprise code glosses, which serve to offer additional information, ensuring that readers grasp the writer's intended meaning by rephrasing, explaining or elaborating on the content; directives, which guide readers by instructing them to take specific actions or encouraging particular interpretations; they therefore play a crucial role in managing how readers understand and process a text; reader-oriented pronouns, which serve as a tool for writers to acknowledge the presence of their audience within the text, meeting their desire for inclusion and actively involving them as contributors to the discussion; questions, which are perhaps the main strategy of dialogic engagement, inviting readers to participate actively and immerse themselves in the discourse as participants, and personal asides, which allow writers to directly engage readers, briefly interrupting the main argument to offer comments or insights, further enhancing the connection and interaction between the writer and the audience.

Hyland's stance and engagement model has been modified in three key ways to examine the pragmatic strategies science journalists use, particularly regarding metadiscursive resources, to convey specialized knowledge to general audiences.

These adaptations stem from the data-driven analysis carried out in the compiled corpus. Firstly, some variations in the categories included in the model have been implemented, mainly derived from the fact that the model is being applied to texts in which the writer is not the primary expert source, but a mediator. In this light, evidentials, a common type of metadiscursive resource (Hyland, 1998; Vande Kopple, 2002; Mur-Dueñas, 2011; among others) that is not considered in Hyland's stance and engagement model, were here included. Evidentials refer to the source of information and help guide readers' understanding by establishing the writer's authority on the subject and by shaping the interpretation of the information presented. They are highly effective tools that writers use to establish credibility, thus playing a significant role in mediating expert voices.

A second adaptation to the application of the stance and engagement approach involves a slight modification of the "self-mention" category. In this study, "self-mention" also encompasses references to expert sources of the disseminated scientific knowledge, in the understanding that the voice which is brought to the text lending credibility to this content is primarily that of the expert rather than the mediator. Following this adaptation, new labels have been used to account for the different agency. Thus, a distinction has been made between "expert-mention", including under this label the references to the expert voices originating the knowledge (i.e. scientists, scholars and researchers) and "mediator-mention", including here the scriptwriter's self-mentions, basically, first person singular pronouns. Related to the latter type of mentions (first person pronouns), first person plural pronouns of the exclusive type (*we* as author of the text) were never found, as research digests tend to be single-authored. Exclusive *we* was only recorded when referring to the authors of the research article digested. The use of the inclusive we in all its forms (*we, us, our, ours*) was identified and classified as an engagement marker indicating shared knowledge.

A third major adaptation, which represents a variation or rather an amplification on the original stance and engagement model, is the inclusion of elements specific to digital practices, such as the use of hyperlinks. Research into digital communication often requires innovative or revised methodological approaches (Georgakopolou and Spilioti, 2016; Kuteeva and Mauranen, 2018; Bondi and Cacchiani, 2021). The exploration of metadiscourse is no exception. In recent years, this analytical perspective has expanded to incorporate new realizations and functions to interpret digital objects of study (Georgakopolou and Spilioti, 2016; Consonni et al., 2020; Bondi and Cacchiani, 2021; D'Angelo et al., 2021; Lorés, 2024), extending beyond purely verbal elements. The advantageous functional flexibility that characterizes metadiscourse as an analytical perspective facilitates the inclusion of new tokens and categories that address communicative practices on digital platforms.

3. Corpus description and methodological procedure

The research questions outlined above were addressed in a corpus consisting of 20 research digests from the BPS webpage, posted between January 2021 and October 2021 and included in the SciDis Database, compiled by the InterGedi research group, (https://intergedi.unizar.es/). These texts were selected to ensure a variety of topics, subdisciplines and scriptwriters, resulting in a total of over 15,000 running words (see Appendix A).

The methodology followed consisted of two steps. Initially, a data-driven process was used to generate and design a taxonomy of pragmatic strategies that could be explored for stance and engagement markers. This involved a close reading of the corpus, allowing the data itself to inform the development of the taxonomy. The resulting taxonomy includes ten pragmatic strategies, organized into two main categories: writer-oriented and audience-oriented (see section 4 below). Although the exploration of the corpus resulted in a balanced organization of strategies, this balance was not intentional; the primary criterion was representativeness, which may have excluded other strategies not prominent in the data. Thus, the research began with manual coding and analysis to systematically uncover pragmatic strategies, collect relevant examples, and refine the taxonomy using corpus data.

A second round of coding permitted the identification of (meta)discursive features associated with the pragmatic strategies under study. For this, Hyland's (2005, 2008) model of stance and engagement in specialized written language was used, with the necessary adjustments as described in section 2. This second round of coding was technically facilitated by the use of NVivo software. NVivo Pro is a widely utilized quantitative and qualitative data analysis software designed for handling unstructured data and complex textual practices, including verbal, non-verbal, visual and audiovisual modes of expression.

In the present study, the tool enabled the formal labelling (colour-coding) of the pragmatic strategies manually identified which was followed by the subsequent identification of the metadiscursive markers included in that text. Metadiscursive elements were also determined using a close reading of the text. The software tool was used to draw quantitative data once the features identified were classified as stance or engagement markers. This coding procedure facilitated by the software provided insightful findings at both qualitative and quantitative levels, as detailed in the following sections.

4. Results and discussion

The combined exploration of pragmatic strategies and their associated stance and engagement (meta)discursive resources yielded insightful results which will be here discussed in turn.

4.1. Identifying pragmatic strategies

Stemming from the assumption that, as part of their mediating role, science journalists make communicative efforts to disseminate expert knowledge among general or not so expert audiences, the pragmatic strategies they use to bridge the knowledge asymmetries existent between the scientific community, as a primary source of research findings, and the digital research digests audience are likely to be a good starting point of exploration for such communicative efforts.

Attending to the identification of pragmatic strategies as functional units, and following the data-driven method described above, two major categories have been identified in the research digests under study, which contribute to the recontextualization of scientific discourse with the purpose of bridging knowledge asymmetries. These two categories include, on one hand, **expert-oriented** strategies, which enable the scriptwriter to align with the researchers' position and serve as a mediator of their voice. These expert-oriented strategies enhance credibility and lend authority to the scriptwriter's voice, despite them not being a scientist themselves.

On the other hand, **audience-oriented** strategies help readers grasp complex information and enable them to engage in a meaningful dialogue with experts. In this interaction, disciplinary knowledge is not a barrier but rather the very foundation of the exchange. These strategies enhance both comprehension and engagement.

The close reading of the corpus yielded a range of ten major types of pragmatic strategies, five of which were expert-oriented strategies and five others, audience-oriented. Table 1 below displays the strategies identified:

Table 1
Pragmatic strategies: Expert-oriented and audience-oriented strategies in digital research digests.

EXPERT-ORIENTED STRATEGIES	AUDIENCE-ORIENTED STRATEGIES
Build disciplinary knowledge	Establish a common territory of experience
Mark expertise	Facilitate understanding of technical knowledge
Confer credibility and authority to the scriptwriter's voice	Highlight relevance for readers' life
Emphasize the value of the experts' findings	Provide previous expert knowledge of the topic in a non-technical way
Identify the gap in knowledge that new research fills	Enhance direct interaction with the reader

As mentioned above, **expert-oriented strategies** allow the scriptwriter to mediate the researchers' voice by adopting their position. A description of the intent of each strategy is offered below:

1. **Build disciplinary knowledge**: the strategy is based on constructing the text mirroring the rhetorical structure of the research article from where it stems, providing methods, results, and conclusions, thus establishing rhetorical links with the authoritative text from which it derives.
2. **Mark expertise**: this strategy consists in bringing the experts' voices onto the text. To do so, direct and indirect quotations from the original research article are incorporated into the digital text.
3. **Confer credibility and authority to the scriptwriter's voice**: this strategy is carried out by quoting other sources, mainly using hyperlinks (i.e. links to publications such as other research digests, or outside sources) showing that what the scriptwriter says is based on evidence.
4. **Emphasize the value of the experts' findings**: this strategy consists of claiming novelty and originality for the findings reported, highlighting the value and significance of these findings mainly for the general public.
5. **Identify the gap in knowledge that the new research fills**: this strategy is fulfilled by pinpointing wrong assumptions or lack of knowledge and, consequently, indicating how the study presented is relevant for the advancement of the discipline.

The frequency of these significant expert-oriented strategies was quantified, yielding the results displayed in Table 2:

Table 2
Quantitative results of the use of expert-oriented pragmatic strategies. Normalization per 1000 words and raw numbers.

EXPERT-ORIENTED STRATEGIES	
1. Build disciplinary knowledge	8,02 ‰ (123)
2. Mark expertise	6,65 ‰ (102)
3. Confer credibility and authority to the scriptwriter's voice	5,28 ‰ (81)
4. Emphasize the value of the experts' findings	3,13 ‰ (48)
5. Identify the gap in knowledge that new research fills	2,67 ‰ (41)
Total	25,76 ‰ (395)

The frequency analysis reveals that the most prominent strategies are "building disciplinary knowledge" and "highlighting expertise", as well as "conferring credibility and authority to the scriptwriter's voice", all of which emphasize the notion of *authority*. In contrast, the least frequent strategies —"emphasizing the value of the expert's findings" and "identifying the gap in the knowledge"— are strategies borrowed from the rhetoric of academic interaction (Swales 1990, 2004; Swales and Feak, 2000). These strategies appear less prevalent in the discourse of digital knowledge dissemination and might have been transferred from the textual organization of the source text, specifically the research article from which the research digest originates.

Regarding **audience-oriented strategies**, aimed at engaging readers in understanding potentially complex (and, therefore, alienating) issues, the following were noted:

1. **Establish a common territory of experience**: this strategy helps establish a shared ground with the audience by referring to common, non-technical experience.
2 **Facilitate understanding of technical knowledge**: this is achieved by explaining technical content, providing examples and reformulating specialized concepts and terminology.
3 **Highlight relevance for readers' life**: here the strategy followed consists in applying findings to the readers' living context.
4. **Provide previous expert knowledge of the topic in a non-technical way**: this strategy is directed towards setting the scene and contextualizing the research which is then to be explained.
5. **Enhance direct interaction with the reader**: this pragmatic strategy consists in attracting the readers' attention through direct address.

The frequency of use of the most salient **audience-oriented strategies** is presented in Table 3 below.

Table 3
Quantitative results of the use of audience-oriented pragmatic strategies. Normalization per 1000 words and raw numbers.

AUDIENCE-ORIENTED STRATEGIES	
1. Establish a common territory of experience	4,04 ‰ (62)
2. Facilitate understanding of technical knowledge	3,20 ‰ (49)
3. Highlight relevance for readers' life	3,20 ‰ (49)
4. Provide expert knowledge of the topic in a non-technical way	3,13 ‰ (48)
5. Enhance direct interaction with the reader	2,22 ‰ (34)
Total	15,78 ‰ (242)

Based on the data, the percentages of use of the five strategies identified are quite similar. Although, "establish a common territory of experience" is used slightly more frequently than, for example, "enhance direct interaction with reader", there are no significant differences in their usage. This indicates that all five strategies are equally representative of the mediator's pragmatic tools for engaging their audience.

The interaction between expert-oriented and audience-oriented pragmatic strategies, as manifested through meta-discursive markers, is discussed in the following subsection.

4.2. Metadiscursive features instantiating pragmatic strategies: Stance and engagement

As detailed in the methodological section, pragmatic strategies were identified through their instantiation in terms of stance and engagement metadiscursive markers. Adapting Hyland's (2005, 2008) model, attitude markers, hedges, boosters, self-mentions, and evidentials were analyzed as stance indicators. Conversely, reader-oriented pronouns, questions, and personal asides were explored as markers of engagement with the reader. The codification of these discoursal indicators, reflecting both the projection of authorial voice and interaction with the reader, was conducted using NVivo, resulting in quantitative data that was subsequently interpreted qualitatively. Table 4 below presents the raw numbers and normalizations per 1000 words for the two categories of pragmatic strategies, as well as their associations with stance and engagement markers.

Table 4
Quantitative results of double coding (pragmatic strategies and stance/engagement markers). Normalization per 1000 words and raw numbers in brackets.

	EXPERT-ORIENTED STRATEGIES	AUDIENCE-ORIENTED STRATEGIES	TOTAL
ENGAGEMENT MARKERS	2.42 ‰ (37)	7.3 ‰ (114)	9.85 ‰ (151)
STANCE MARKERS	23.35 ‰ (358)	8.34 ‰ (128)	31.7 ‰ (486)
Total	25.76 ‰ (395)	15.78 ‰ (242)	41.54 ‰ (637)

The frequency analysis indicates that the metadiscursive features associated with expert-oriented pragmatic strategies seem more frequent than those linked with strategies aimed at engaging the audience. In terms of associated features, stance markers generally appear to be more prevalent, occurring three times more often than engagement markers. However, this broad overview becomes more nuanced when examining each type of strategy: as anticipated, stance markers are more frequently associated with expert-oriented strategies, while the use of engagement markers is linked mainly to audience-oriented strategies. However, a third insight from the quantitative study reveals that, whereas expert-oriented strategies are basically instantiated by means of stance markers (23.25 ‰ vs 2.42 ‰ engagement markers), audience-oriented strategies utilize a balanced combination of both engagement (8.34 ‰) and stance markers (7.3 ‰). Thus, there seems to be a strong connection between expert-oriented strategies and stance markers, which allow the scriptwriter to assume the authority and credibility of the expert, without resorting to technical language. Conversely, while engagement markers primarily support the goals of audience-oriented strategies, as expected, stance markers are also a primary resource used by mediators to establish a bond with the audience.

4.2.1. The interaction between expert-oriented pragmatic strategies and metadiscursive features

The combined analysis of expert-oriented pragmatic strategies and their associated metadiscursive realizations yielded interesting results. As indicated in Table 4, stance markers are the most frequent indicators of the expert voice. Table 5 below presents the occurrences of stance markers within each expert-oriented strategy. A more detailed examination reveals that the use of self-mentions and evidentials primarily contributes to the credibility of the mediator's voice:

Table 5
Quantitative results of the use of stance markers in expert-oriented pragmatic strategies. Normalization per 1000 words and raw numbers.

	Expert-mentions	Mediator-mentions	Evidentials	Hedges	Attitude markers	Boosters
1. Build disciplinary knowledge	4.6 ‰ (70)	0	0.8 ‰ (12)	1.4 ‰ (21)	0.8 ‰ (13)	0.4 ‰ (6)
2. Mark expertise	3.4 ‰ (52)	0	2.3 ‰ (35)	1 ‰ (15)	0.1 ‰ (2)	0.07 ‰ (1)
3. Confer credibility and authority to the scriptwriter's voice	0.7 ‰ (10)	0.07 ‰ (1)	2.3 ‰ (36)	0.3 ‰ (5)	0.3 ‰ (4)	0
04. Emphasize the value of the experts' findings	0.9 ‰ (14)	0	1.3 ‰ (20)	0.5 ‰ (8)	0.3 ‰ (4)	0
5. Identify the gap in knowledge that new research fills	0.7 ‰ (11)	0	0.7 ‰ (10)	0.4 ‰ (6)	0.07 ‰ (1)	0.07 ‰ (1)
TOTAL	10.3 ‰ (157)	0.07 ‰ (1)	7.4 ‰ (113)	3.6 ‰ (55)	1.6 ‰ (24)	0.5 ‰ (8)

Table 5 shows how expert-mentions and evidentials are the most salient stance markers used in expert-oriented strategies. As explained in Section 2, the study of self-mentions as metadiscursive indicators of the authorial (expert) voice was adapted to writer-mediated texts, where the personal voice of the mediator (the scientific journalist) recedes at certain stages and adopts the voice of the expert who generated the knowledge. As a result of the adaptations made, two different labels were used: expert-mentions (to refer to the scholars and researchers generating the scientific knowledge by proper name or by common terms like *the researchers, the team, the scientists*) and mediator-mentions (to refer to the author of the research digest). As observed on Table 5, it is the scientists' voice, not the journalists', that is prominent in research digests when presenting and discussing research.

Interestingly, the use of these expert-mentions is linked to specific strategies rather than others. They are primarily associated with two expert-oriented strategies: "Build disciplinary knowledge" (Example 1) and "Mark expertise" (Example 2).

Example 1 illustrates how referring to the RA authors portrays them not just as writers, but primarily as active research agents contributing to knowledge creation:

Example 1

But when **Oishi and Westgate** asked participants from nine different countries to describe their ideal lives by choosing from a list of features associated with a happy, meaningful or psychologically rich life, overall they chose elements from all three. (RD 15)

In Example 2, expertise is highlighted by directly quoting the scholars' voices in the text, emphasizing the value of their words.

Example 2

"None of the studies use a defined, representative sample, and very few include sufficient information to allow the calculation of a response rate," **the team writes.** (RD 1)

Other uses of expert-mentions contribute to strategies such as "Identify a gap" highlighting the value and significance of the contribution to be made:

Example 3

However, new research from Caitlin Halfpenny and Lucy James at Keele University gives us a window into how empathy shapes humour by taking a look at junior schoolchildren's use of jokes. (RD 11)

The use of evidentials as indicators of authorial stance was primarily associated with two pragmatic strategies: "Confer credibility and authority to the scriptwriter's voice" (Example 3) and "Mark expertise" (Example 4).

Evidentials typically appear as hyperlinks, leveraging the affordances of the digital media. In Example 4, the link to the original source (RA) from which the research is summarized serves to authenticate the subsequent content in the text as credible and reliable knowledge:

Example 4

In a new study in Psychological Science, Kevin A. Hoff and team look at the personality changes of teenagers as they move into adulthood. (RD 3)

Furthermore, the combination of evidentials and attitude markers, both classified as stance markers, serves to implement another expert-oriented strategy, "Emphasize the value of the experts' findings", by referring to the original research article as a textual source evaluated as "fantastic" (Example 5)

Example 5

This change is **fantastically illustrated** by a new preprint from Daphne Halt and team based in Boston, Massachusetts. (RD 12)

Finally, the function of "Identify gaps in the knowledge that new research fills" is also indicated strategically by means of both expert-mentions and evidentials. Other stance markers such as hedges, attitude markers and boosters, although displaying a less significant presence in the texts, also contribute to projecting credibility, mainly in combination with the more salient metadiscursive markers, as shown in example 6 above.

The close connection that can be perceived between expert-oriented strategies and stance markers, cannot, however be identified to the same extent when engagement markers are used to instantiate intents geared towards portraying expertise. Probably, the main reason for this is the scarce use of engagement features as compared to stance features in connection with expert-oriented strategies. In fact, among the various engagement markers explored, only code glosses can be taken to hold a certain degree of representation, as shown in Table 6:

Table 6
Quantitative results of the use of engagement markers in expert-oriented pragmatic strategies. Normalization per 1000 words and raw numbers.

	Code glosses	Personal asides	Appeals to shared knowledge (including inclusive *we*)	Reader pronouns	Questions	Directives
1. Build disciplinary knowledge	0.8 ‰ (12)	0.07 ‰ (1)	0	0	0.07 ‰ (1)	0
2. Mark expertise	0.3 ‰ (5)	0.07 ‰ (1)	0	0	0	0
3. Confer credibility and authority to the scriptwriter's voice	0.2 ‰ (3)	0.1 ‰ (2)	0.07 ‰ (1)	0	0	0
4. Emphasize the value of the experts' findings	0.07 ‰ (1)	0.07 ‰ (1)	0	0	0	0
5. Identify the gap in knowledge that new research fills	0.3 ‰ (4)	0	0.1 ‰ (2)	0.2 ‰ (3)	0	0
TOTAL	1.7 ‰ (25)	0.3 ‰ (5)	0.2 ‰ (3)	0.2 ‰ (3)	0.07 ‰ (1)	0.0 ‰ (0)

Code glosses, serving as metadiscursive markers that instantiate expert-oriented strategies, were identified in the corpus as the only salient engagement marker serving the purpose of projecting a trustable and credible voice, fulfilling diverse cognitive roles, such as exemplifying, explaining, or reformulating knowledge.

However, only in the case of the strategy "Build disciplinary knowledge" do code glosses play their part to engage readers by providing explanations and definitions of technical knowledge. Example 6 below illustrates this use:

> Example 6
>
> The first is hedonistic wellbeing, often called simply "happiness", which is characterised by plenty of positive emotions and general life satisfaction. The other is "eudaimonia" — feeling that your life has meaning and that you are realising your potential. (RD 15)

In the other four strategies, the values of all the markers, including code glosses, are too low to claim any significance. As a result, it can be argued that the strong correlation between expert-oriented strategies and stance markers, which contrasts with the weak interaction between these strategies and engagement markers, emerges as the primary discursive tool mediators employ in research digests to establish credibility and project an authoritative voice to be trusted by general audiences.

4.2.2. The interaction between audience-oriented pragmatic strategies and metadiscourse

The exploration of the connection between audience-oriented pragmatic strategies and their metadiscursive manifestations completed the understanding of how intentions are realized at the discursive level.

As with the examination of expert-oriented strategies, the combined analysis of pragmatic strategies and their associated metadiscursive realizations yields valuable insights. Table 7 below displays the occurrences of stance and engagement markers in audience-oriented strategies. As observed in Table 4, the percentage of stance and engagement marker usage yielded very comparable results. However, closer examination of the data reveals additional insights.

Table 7
Quantitative results of the use of stance markers in audience-oriented pragmatic strategies. Normalization per 1000 words and raw numbers.

	Expert-mentions	Mediator-mentions	Evidentials	Hedges	Attitude markers	Boosters
1. Establish a common territory of experience	0.07 ‰ (1)	0.3 ‰ (4)	0.3 ‰ (5)	0.2 ‰ (3)	0.3 ‰ (5)	0.07 ‰ (1)
2. Facilitate understanding of technical knowledge	0.2 ‰ (3)	0	0.4 ‰ (6)	0.1 ‰ (2)	0.1 ‰ (2)	0.07 ‰ (1)
3. Highlight relevance for readers' life	0.1 ‰ (2)	0	0.3 ‰ (4)	0.8 ‰ (13)	0.5 ‰ (8)	0.07 ‰ (1)
4. Provide expert knowledge of the topic in a non-technical way	0.1 ‰ (2)	0	1.1 ‰ (17)	0.4 ‰ (6)	0.1 ‰ (2)	0
5. Enhance direct interaction with the reader	0.07 ‰ (1)	0	0.2 ‰ (3)	0.1 ‰ (2)	0.07 ‰ (1)	0
TOTAL	0.6 ‰ (9)	0.3 ‰ (4)	2.3 ‰ (35)	1.7 ‰ (26)	1.2 ‰ (18)	0.2 ‰ (3)

Stance features as markers of audience-oriented strategies are primarily reflected as evidentials and hedges, as well as attitude markers. Evidentials, functioning as stance markers associated with audience-oriented strategies, typically manifest themselves as hyperlinks, similar to their use in expert-oriented strategies. They are primarily linked to the strategy "Provide expert knowledge of the topic in a non-technical way". This is achieved through hyperlinks to other digests or non-specialized sources, as shown in Example 7:

Example 7

In one experiment, they also found impacts on behaviour: participants in a version of the classic "dictator game" allocated significantly more money to recipients whose faces they saw in an image, compared with in an image of an image. (RD 16)

The term "Dictator game" is a hyperlink to an external page on "Psychological Wiki", a collaborative editing platform designed for both academic and practitioner psychologists. That platform aims to deliver "an up-to-date, authoritative statement of knowledge, theory, and practice in the whole field of psychology" (https://psychology.fandom.com/wiki/Psychology_Wiki, last accessed June 19, 2024). The hyperlink directs readers to a specific page on the platform that provides detailed information about the "dictator game" in psychology: https://psychology.fandom.com/wiki/Dictator_game. The page offers a comprehensive yet accessible description of the game, enhancing the audience's understanding with clear, plain language.

Other pragmatic strategies closely associated with the use of evidentials as stance markers are "Facilitate understanding of technical knowledge" and "Establish a common territory of experience". The latter is achieved, for instance, by hyperlinking to mass media content familiar to the audience, such as clips from films and TV series, which makes it highly engaging for the readers. Example 8 illustrates this use:

Example 8

So while it might be fun when a schlocky Bond villain falls from the top of the Golden Gate Bridge or Samuel L. Jackson gets eaten by a shark, there are scores of other examples that speak to people on a level that goes far beyond entertainment, and that may even help them understand their own grief. (RD 10)

Here the first hyperlink serves as an evidential to establish a shared experiential content by directing us to a clip from a James Bond film, while the second is a link to a film featuring Samuel L. Jackson. The key point is not the specific films, but their status as well-known popular culture references that the average audience is probably familiar with.

Hedges and attitude markers, while present in all the audience-oriented strategies, seem to be mainly linked to the strategy "Highlight relevance for readers' life". Several hedges (modal verbs *can, could and might*) are used by the mediator to describe situations of potential interest for the audience, as shown in the following example.

Example 9

Studying how training **can** educate teachers on the learning style myth **could** also help us understand how it spreads and why it sticks — and **might** help students get the most out of education at the same time. (RD 1)

Example 10 illustrates the use of attitude markers to underscore the social value of the findings reported.

Example 10

But, with couchsurfing being such a prevalent living situation, yet so different from sleeping rough, the psychological effects of this specific type of homelessness are **well worth investigating.** (RD 16)

Regarding engagement markers, although their frequency is similar to stance markers in the context of audience-oriented strategies, they are distinctly a type of metadiscursive device linked to audience engagement, rather than expert-oriented, as indicated above. Table 8 below shows the quantitative results for engagement markers in each audience-oriented strategy.

Table 8

Quantitative results of the use of engagement markers in audience-oriented pragmatic strategies. Normalization per 1000 words and raw numbers.

	Code glosses	Personal asides	Appeals to shared knowledge (including inclusive *we*)	Reader pronouns	Questions	Directives
1. Establish a common territory of experience	0.5 ‰ (7)	0.1 ‰ (2)	1.2 ‰ (18)	0.07 ‰ (1)	0	0
2. Facilitate understanding of technical knowledge	2 ‰ (32)	0	0.07 ‰ (1)	0	0	0
3. Highlight relevance for readers' life	0	0.07 ‰ (1)	0.2 ‰ (3)	0.6 ‰ (9)	0	0.07 ‰ (1)
4. Provide expert knowledge of the topic in a non-technical way	0.5 ‰ (7)	0.07 ‰ (1)	0.2 ‰ (3)	0.07 ‰ (1)	0	0
5. Enhance direct interaction with the reader	0.2 ‰ (3)	0	0.07 ‰ (1)	0.5 ‰ (7)	0.9 ‰ (14)	0.1 ‰ (2)
TOTAL	3.2 ‰ (49)	0.3 ‰ (4)	1.8 ‰ (26)	1.2 ‰ (18)	0.9 ‰ (14)	0.2 ‰ (3)

Although the percentage of engagement markers was much higher for substantiating audience-oriented strategies than for expert-oriented ones, in both contexts code glosses emerged as the most common metadiscursive indicators of rapport with the audience. They primarily supported one of the audience-oriented strategies identified: "Facilitate understanding of technical knowledge". By providing examples and explanations, code glosses enhance comprehension and foster audience engagement. Example 11 illustrates this use, showing how a technical concept (*Stop Distance Procedure*) is explained:

Example 11

The team collected data on the size of participants' personal spaces using the Stop Distance Procedure (SDP) — a task which measures the distance at which participants become uncomfortable with an approaching person, as well as where they become uncomfortable approaching the other party. (RD 12)

Whereas in expert-oriented pragmatic strategies, code glosses were barely the only engagement markers used, audience-oriented strategies, as expected, displayed a much wider range of markers. Thus, appeals to shared knowledge, closely linked to the use of reader pronouns as metadiscursive devices, were also found to be strongly associated with the audience-oriented pragmatic strategy of "Establish a common territory of experience", as illustrated in Example 12:

Example 12

People often think of drinking issues as binary — you either have one, and by extension are an alcoholic, or you don't have any issues with alcohol consumption. This kind of binary disease model belief, however, is a simplistic approach. (RD 10)

In this example, the use of the pronoun *you* gathers a general opinion rather than directly appealing to the reader, and it is combined with a reference to a common assumption: the binary view of drinking problems as a simple yes-or-no issue.

While reader pronouns were mostly linked to the strategies "Highlight relevance for readers's life" and "Enhance direct interaction with the reader", questions were exclusively associated with the latter, as shown in Example 13:

Example 13

Feeling happy and that your life has meaning are both associated with better health and relationships. But why should someone desire psychological richness? (RD 15)

Apart from the discursive role of interpellating the reader that these questions have, they also serve as signposts, conferring a question-answer structure to the text which clearly contributes to processing its content.

In all, the interaction between audience-oriented pragmatic strategies and metadiscourse highlights the crucial role of linguistic and discursive tools in engaging diverse audiences. The analysis reveals that the strategic use of stance and engagement markers effectively bridges the gap between complex knowledge and science comprehension, enhancing rapport and fostering understanding. By integrating familiar cultural references, by directly addressing the audience and establishing a dialogic relationship with them, these strategies ensure the readers' interest on otherwise alien technical knowledge.

5. Conclusions

In the evolving landscape of scientific communication, which has transitioned from traditional authoritative discourse to a more inclusive and interconnected model, this study has investigated how scientific knowledge is recontextualized across various contexts and audiences so that knowledge gaps and asymmetries are bridged and diverse audiences engaged effectively. For such purposes, the pragmatic strategies and metadiscursive resources utilized by mediators have been analyzed to shed light on how science is communicated and perceived in the digital age, emphasizing the role of mediators in shaping public discourse and knowledge dissemination.

The analysis of pragmatic strategies in digital research digests as mediated practices of science dissemination revealed distinct approaches used by mediators to bridge knowledge asymmetries between scientific experts and general audiences. Two main categories of pragmatic strategies emerged: expert-oriented and audience-oriented. Expert-oriented strategies aimed to uphold the scientific integrity and authority of the original research while making it accessible to a broader audience through methods such as building disciplinary knowledge, highlighting expertise, conferring credibility to the scriptwriter's voice, and emphasizing the research significance by illustrating its potential impact on the audience's daily life. Quantitative analysis indicated the prevalence of strategies emphasizing disciplinary knowledge and expertise, underlining their role in maintaining the credibility of the information being disseminated.

On the other hand, audience-oriented strategies were used to facilitate comprehension and engagement among audiences who are less familiar with technical language and complex concepts. The audience-oriented strategies identified included establishing common ground with readers, facilitating understanding of technical knowledge, and highlighting the relevance of these findings to everyday life. The quantitative analyses carried out showed a balanced use of these strategies, which suggests that mediators employ various approaches to foster reader understanding and interaction in an effective way.

The study also explored how these pragmatic strategies interacted with metadiscursive markers to reinforce the communicative intent of the digests. The interaction between expert-oriented pragmatic strategies and their associated metadiscursive features was examined, unveiling significant patterns and relationships. As expected, the connection between stance markers and expert-oriented strategies was strong, revealing that expert-mentions and evidentials play major roles in enhancing the credibility and authority of the scriptwriter's voice. Expert-mentions, instantiated by references to researchers by name or as a team, emphasize their active role in knowledge creation, thereby aligning the scriptwriter with the expertise and authority of the original research. Evidentials, typically implemented through hyperlinks to original sources, confer authenticity to the information presented in the digests, thus reinforcing the reliability and trustworthiness of the research

under scope. Expert-mentions are prominently used in strategies like "Build disciplinary knowledge" and "Mark expertise" to establish a direct connection with the researchers and their scholarly contributions. Similarly, evidentials are deployed in strategies such as "Mark expertise" and "Confer credibility to the scriptwriter's voice" where they serve to validate new research findings and underline their scientific significance.

The interaction between expert-oriented strategies and engagement markers is much less pronounced, with code glosses emerging as the only notable marker within expert-oriented strategies, in connection with the strategy "Build disciplinary knowledge". Code glosses fulfill functional roles such as exemplification and clarification to enhance reader comprehension of technical, expert knowledge and thus promote trust in such knowledge. Other engagement features like personal asides, appeals to shared knowledge, and reader pronouns play a much less relevant role in the projection of a credible and authoritative voice.

The exploration of the interaction between audience-oriented pragmatic strategies and their metadiscursive manifestations has also uncovered significant insights regarding their effective functional roles in digital research digests. The examination of metadiscursive markers within audience-oriented strategies showed that whereas the use of engagement markers is salient in this type of strategies, stance markers also play a key role and act as primary resources used by mediators to construct credible, trustworthy but also engaging voices. Thus, it can be argued that credibility and engagement are not simply two faces of the same coin: in fact, one may rely upon the other. Evidentials are primary stance features used to establish bonds with the audience by building a reliable voice. They are usually instantiated as hyperlinks to external sources or even popular cultural references, thus reinforcing credibility and facilitating deeper engagement by providing additional context. The use of evidentials is found in all the audience-oriented strategies identified, thus featuring as a common metadiscursive resource to appeal to expert voices. In contrast, other engagement markers like hedges and attitude markers, which are also frequently used types, are mainly associated with just one pragmatic strategy: "Highlight relevance for readers's life", thus showing a much narrower range of use.

As expected, the study identifies a higher proportion of engagement markers associated specifically with audience engagement. Code glosses play a pivotal role in explaining technical knowledge for diversified audiences and are thus intricately linked to one specific pragmatic strategy: "Facilitate understanding of technical knowledge". By offering examples and explanations code glosses clarify complex concepts, ensuring comprehensibility without compromising accuracy. The identification of the use of a wider range of engagement markers connected with audience-oriented strategies as compared to their use in expert-oriented strategies also reveals the primary role that these features play in fostering interaction with readers within science communication contexts.

In all, by strategically deploying stance and engagement markers, mediators facilitate the understanding of complex knowledge, bridge existent knowledge gaps and foster meaningful dialogues and interactions that encourage audience participation and engagement with scientific research findings.

Future research could delve deeper into the effectiveness of these pragmatic strategies across different digital platforms and investigate their impact on public perception and engagement with scientific knowledge. Additionally, exploring the nuanced roles of metadiscursive markers across different digital practices could shed light on how they contribute to both establishing credibility and fostering audience engagement. These insights would be invaluable for optimizing science communication practices in our interconnected world. Understanding these dynamics is crucial for effectively conveying scientific advancements to diversified audiences and promoting informed public discourse on complex issues.

CRediT authorship contribution statement

Rosa Lorés: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Rosa Lorés reports travel was provided by Spanish Ministry of Science and Innovation.

Data availability

Data will be made available on request.

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Appendix A

1. The "Learning Styles" Myth Is Still Prevalent Among Educators — And It Shows No Sign of Going Away

https://www.bps.org.uk/research-digest/learning-styles-myth-still-prevalent-among-educators-and-it-shows-no-sign-going

2. Study Suggests There Is Not A "Sensitive Period" For Developing Musical Skills

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3. Here's How Personality Changes In Young Adulthood Can Lead To Greater Career Satisfaction

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12. The Pandemic Has Left Us Wanting More Personal Space — Even In Virtual Reality

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13. We Think We've Changed More In The Past Than We Will Change In The Future — And Americans Seem Particularly Susceptible To This Illusion

https://www.bps.org.uk/research-digest/we-think-weve-changed-more-past-we-will-change-future

14. Domestic Violence Increased During Lockdown In The United States

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15. We've Neglected The Role Of "Psychological Richness" When Considering What Makes A Good Life, Study Argues

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16. Young Australians Who Couchsurf Experience High Levels Of Psychological Distress

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Transcultural Communication: Pragmalinguistic Aspects (Anubar, 2004)
Constructing Interpersonality: Multiple Perspectives on Written Academic Genres (Cambridge Scholars Publishing, 2010)
Abstracts in Academic Discourse: Variation and Change (Peter Lang, 2014)
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Interpersonality (Journal of English Academic Purposes, 2010*)*
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