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Science Popularization: Interdiscursivity among Science, Pedagogy, and Journalism / *Popularização da ciência: a interdiscursividade entre ciência, pedagogia e jornalismo*

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ABSTRACT
Scientific discourse produced by and for specialists reaches, by means of science popularization (SP), the public sphere of the media, envolving displacements in time, space, and discourse. This hybridization between science and journalism generates scientific journalism, which aims at popularizing science and making it comprehensible, thus performing a pedagogical function. We consider this process as discourse recontextualization from the scientific to the journalistic spheres, mediated by a pedagogic discourse. We argue, in this paper, that SP news texts and scientific articles are members of the same genre system that makes scientific discourse relatively visible to the general public. Firstly, we identify our theoretical framework, the concept we adopt for SP, genre system and recontextualization. Secondly, we explore interdiscursivity in one exemplar of the SP news genre, highlighting the existing relations between science, journalism, and pedagogy in this genre.
KEYWORDS: Science Popularization; Recontextualization; Discourse Genre; Dialogism; Intertextuality/Interdiscursivity

RESUMO
O discurso científico produzido por e para especialistas chega, por meio da popularização da ciência (PC), à esfera pública da mídia, passando por deslocamentos no tempo, no espaço social e no discurso. Essa hibridização entre ciência e jornalismo gera o discurso do jornalismo científico, que busca tornar conhecido o desconhecido ou compreensível o hermético como um ato pedagógico. Consideramos esse processo como recontextualização do discurso da esfera científica na esfera jornalística, mediada pelo discurso pedagógico. Argumentamos, neste trabalho, que a notícia de PC e o artigo científico são membros de um mesmo sistema de gêneros que tornam público o discurso da ciência. Primeiramente, identificamos nosso quadro teórico de referência e as concepções de PC, sistema de gêneros e recontextualização. Em seguida, exploramos a interdiscursividade em um exemplar do gênero notícia de PC, ressaltando as relações existentes entre ciência, jornalismo e pedagogia nesse gênero.
PALAVRAS-CHAVE: Popularização da ciência; Recontextualização; Gênero discursivo; Dialogismo; Interdiscursividade

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Introduction

The social conditions of production and appropriation of scientific discourse in Brazilian society have been the focus of surveys conducted in the last decade by the Ministry of Science and Technology (MST). The surveys from 2006[1] and 2010[2] (the results from the 2014 study have not been published yet) focused on the interest, level of information, attitudes, views and knowledge about science and technology from, respectively, 2,004 and 2,016 respondents across Brazil, from different social classes, aged 16 or over.

The results of the 2006 survey indicated that scientific knowledge is poorly spread or not spread at all among the population, because at the time a) 85% said they did not understand texts on science; b) 81% believed that scientific knowledge is not widely disseminated because it is not well explained in schools; c) 73% reported having little or no knowledge about science. Overall, these results demonstrate that, despite the restricted access to scientific knowledge, the Brazilian population has interest in science and technology (rather than politics and fashion, for example) and that the population's interest in science has a direct relationship with science education. Among the 2,004 interviewees, 16% said they had no interest in science and technology events, but 34% believed that the current level of development of science and technology in the country is not greater because the population has a low educational level.

The 2010 survey replicates the earlier one in order to update the governmental discourse, arguing that

> [...] in four years, there was an improvement in the relationship of the population with science, since the percentage of people that are very interested in science in 2010 raised from 41% to 65%. Despite this increase, the survey shows that only 15% of those approached were able to name a major scientific institution in Brazil and few could name a famous scientist, which indicates that the history of science in Brazil is not being adequately told at school and in the media [...] (MOTTA-ROTH, 2011b, pp.15-16).[3]

[1] Available at: http://www.mct.gov.br/upd_blob/0013/13511.pdf. Acessed on Jun. 25, 2015.
[2] Available at: http://www.mct.gov.br/upd_blob/0214/214770.pdf. Acessed on Jun. 25, 2015.
[3] In the original: "[...] em quatro anos, houve um avanço na relação da população com a ciência, já que o percentual de pessoas muito interessadas em ciência passou, em 2010, de 41% para 65%. Apesar desse avanço, outro resultado da pesquisa indica que somente 15% das pessoas abordadas foram capazes de citar uma instituição científica importante no Brasil e poucos puderam indicar o nome de um cientista famoso,

Our interest in these surveys and the popularization of science discourse in Brazilian society generated two umbrella projects, entitled *Critical genre analysis with emphasis on articles of science popularization* and *Critical analysis of discourse genres in social practices of science popularization* (MOTTA-ROTH, 2007; 2010a).[4] These research projects were collaboratively carried out in the Special Interest Group REWRITE (SIG-REWRITE), at the Federal University at Santa Maria, by a team of senior and junior researchers (undergraduate, masters and doctorate students) who explored different genres of science popularization (SP) such as didactic reportages, language textbooks, infomercials and SP news.[5]

Specifically in this article, we will take as reference the results of these two umbrella projects to argue that the constitutive discourse of these SP news texts is characterized by interdiscursivity between discourses from scientific, pedagogic and media spheres. As in previous analysis of SP news texts, we seek to investigate the textualization of propositional content, interpersonal relationships and information organization, to examine: 1) the interdiscursivity among the discourses of science, journalism and pedagogy associated with the recontextualization of scientific discourse in the mass media for a non-specialist audience; and 2) the presence/absence of linguistic exponents of such interdiscursivity. We emphasize that language is a polysemic term and, depending on which aspect is under consideration, different definitions will apply:

a) as a social semiotic system, a meaning making potential socially constructed and shared in a given context of culture (HALLIDAY, 1989, p.4);

b) as social practice if we consider the power that language in use (discourse) has to construct our experience. Thus the social semiotic system stands in dialectical relation with social life (FAIRCLOUGH, 1992): when in use, this social semiotics constitutes human experience.

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o que significa que a história da ciência no Brasil não está sendo adequadamente contada na escola e nos meios de comunicação [...]".

[4] In the original: *Análise crítica de gêneros com foco em artigos de popularização da ciência* and *Análise crítica de gêneros discursivos em práticas sociais de popularização da ciência*. PQ/CNPQ Research Projects n. 301962/2007-3 and n. 301793/2010-7, respectively.

[5] See, for example, Arnt & Socolosky (2010); Moreira & Motta-Roth (2008); Motta-Roth et al. (2008); Motta-Roth (2009; 2010b; 2011b; 2013); Motta-Roth & Lovato (2009; 2011); Motta-Roth & Marcuzzo (2010); Motta-Roth & Scherer (2012); Scherer & Motta-Roth (2014), for more information on SP genre studies by SIG-REWRITE.

We take into consideration the corpora explored in two umbrella projects, comprising 30 SP news texts in Portuguese and 60 in English, published online in the following journals: *Ciência Hoje*, *Galileu*, *BBC News*, *Scientific American*, *Nature* and *ABC Science*. We were able to find linguistic exponents of the relationship between three discourses: an assertive discourse that projects authority to interpret the phenomena of the world (science), a didactic discourse that explains scientific concepts (pedagogy) and a third type of discourse that celebrates scientific discoveries (media) to the broader society consuming media texts.

Taking SP as recontextualization involves referring back to Bernstein's (1996) discussion on the appropriation of theoretical discourses by the recontextualizing field of school (Education).

> For Bernstein (Ibid, p.90), any recontextualization involves the transfer of texts from a "primary context" of discourse production to a "secondary context" of discourse reproduction by means of an intermediate context, considered to be "recontextualizing," which relocates the discourse. The SP process also involves recontextualization and also assumes that circulation of texts between the primary and secondary contexts results in shifts in the original intellectual field and relocation of the original discourse in new contexts (p.91) (MOTTA-ROTH, 2009, p.181).[6]

From this perspective, we assign a recontextualizing role to the media (instead of the school), as it mobilizes, in newspapers, magazines, television news and other media, explanatory and exemplifying resources commonly associated with pedagogical discourse. In this dynamics, the media context is constituted as a space between the primary context of production of scientific research and non-specialist contexts of wider society. The relationship between these (primary, secondary and recontextualizing) contexts is established by texts (intertextuality) and discourses (interdiscursivity).

The discussion proposed here is organized into two moments. First, we identify our theoretical framework, focusing on our conceptions of SP, discourse genres, and the

[6] In the original: "Para Bernstein (Idem, p.90), qualquer recontextualização implica a transferência de textos de um "contexto primário" de produção do discurso para um "contexto secundário" de reprodução do discurso por meio de um contexto intermediário, chamado de "recontextualizador" que faz a realocação do discurso. O processo de PC também envolve recontextualização e também pressupõe que a circulação de textos entre os contextos primário e secundário resulte em deslocamentos do campo intelectual original e na realocação do discurso original em novos contextos" (p.91).

recontextualization of science discourse in the media. Then we discuss results from the umbrella projects, illustrating the debate with the analysis of an exemplar of the SP news genre, to demonstrate how science, pedagogy, and media discourses intersect in this genre.

1 Theoretical Framework

1.1 Critical Genre Analysis

The theoretical framework of Critical Genre Analysis (CGA) interrelates assumptions of three theoretical approaches: Systemic Functional Linguistics of M. A. K. Halliday and his collaborators from the Sydney School; Social Rhetoric, especially C. Bazerman's studies; and N. Fairclough's Critical Discourse Analysis (CDA). CGA is also influenced by the sociohistorical perspective of M. M. Bakhtin's Dialogic Analysis and Sociocultural Theory of L. S. Vygotsky, common references shared by the three aforementioned theoretical perspectives. This interdisciplinary base, originally advocated by J. L. Meurer (2002), assumes the inextricability between text and context in a social semiotic perspective.

The conception of language in use (or discourse, for Fairclough) as a social practice presupposes that language holds a dialectical relationship with the social structure: we act in language according to rules and resources previously established and at the same time transformed by our action in discourse (FAIRCLOUGH, 1992, p.64). These assumptions, which emphasize the constitutive relations between text, discursive practice and social practice (FAIRCLOUGH, 1992), relate to Bakhtin's notion that language can only be examined in the act of discourse production.

We can view language as a stratified system in communicative plans along a continuum: from the phoneme and the grapheme, smaller concrete units of meaning, going through lexicogrammar, speech acts, texts in a given register and genre, reaching discourse, the most abstract end of the continuum.

Figure 1 is a visual analogy of the stratification of the communicative plans as text in relation to interaction (processes of text production and interpretation) and to the social context as a whole (social conditions of text production and interpretation). It represents

the phonological or graphological instantiation of lexicon and grammar, of register and genre, and discourse – particular views constituted by language in use (FAIRCLOUGH, 2003). Each concentric circle includes the smaller circles and so on (MARTIN, 1992, p.496), in increasingly broader units. The context consists of communicative plans from phonology to discourse, in a specific genre associated to a recurrent and institutionalized communicative situation in the culture of a social group (HALLIDAY, 1978, p.145), as a bundle of meanings articulated in stages and oriented to the purpose of carrying out social practices (MARTIN, 2002, p.269).

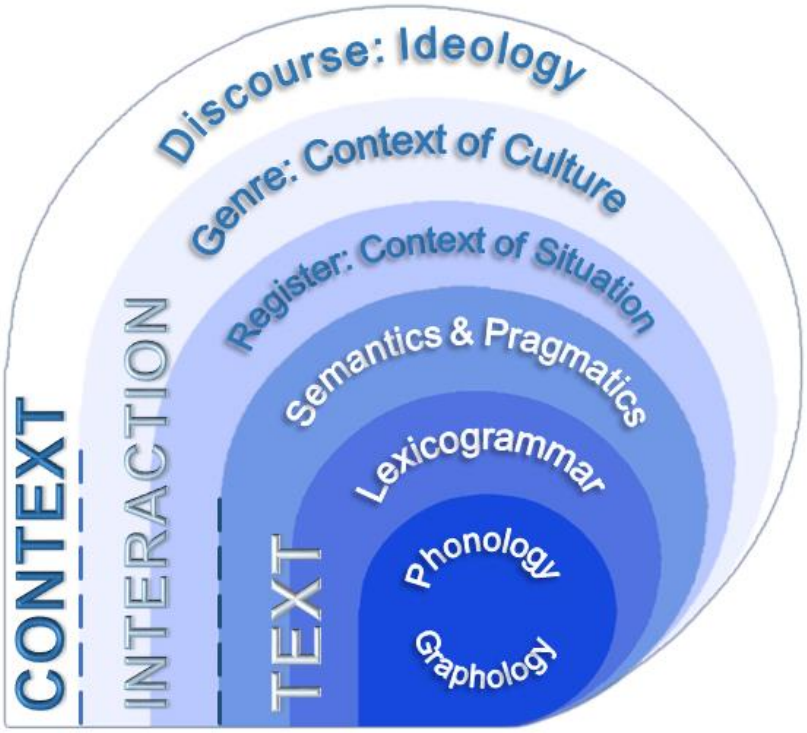

Fig.1 – Articulation of the conceptions of discourse as text, interaction, and context (FAIRCLOUGH, 1989, p.25) and of language as social semiotic (MARTIN, 1992, p.496) (MOTTA-ROTH, 2008, p.355).

CGA establishes relationships between the three-dimensional model of CDA, proposed by Fairclough (2003), and the model of concentric circles adapted from Systemic Functional Linguistics. Text as inscribed on Fairclough's model is equivalent to graphology and lexicogrammar; interaction corresponds to register and genre; and context is the broadest plan of social practices, corresponding to discourse. Genre, a constitutive element of culture, mediates between a given situation and the broader context of the social cutout in question.

According to Bakhtin (1986a, p.63), "language enters life through concrete utterances (which manifest language) and life enters language through concrete utterances as well." The semiotic dimension of a situation of interaction constitutes the text lexicogrammar, corresponding to a register from a specific genre. This genre, in turn, structures institutions.

Based on this conception of language, we try to examine intersubjective relations established discursively in the social and discursive process of SP, through critical analysis of discourse genres that constitute this process, considering its sociohistorical universe and the human activities constituted by them.

Therefore, Bakhtin's Dialogic Discourse Analysis (1986a; 1986b) contributes to our debate on the intertextual and dialogical character of SP utterances, because it stresses the relations between a text and other texts, previously and subsequently produced, and the genres situated in different spheres of social activities. This sociohistorical perspective guides our analysis as it explores two dimensions of the utterance:

a. the *dialogical dimension* – "dialogic relations" between texts, meaning relations between utterances (BAKHTIN, 1986b, pp.106; 117), the interaction between discourses, between interlocutors (FIORIN, 2009, p.166) such as reader and author, this author and other authors that precede or follow him/her, this reader and other authors and readers in other discursive events. For Bakhtin (1986a, p.92), the "expression of an utterance always *responds* to a greater or lesser degree, it expresses the speaker's attitude toward others' utterances and not just his attitude toward the object of his utterance"; and

b. the *intertextual dimension* – ability of a text to evoke other texts existing in the culture, as a chain of texts (BAKHTIN, 1986b, pp.105; 106), as a mosaic of quotations (KRISTEVA, 1967 cited by FIORIN, 2009, p.163). In this "meeting of two texts – of the ready-made and the reactive text being created" there is also the "meeting of two subjects and two authors" (BAKHTIN, 1986b, p.107).

CDA also emphasizes the importance of intertextuality[7] and examines the ways in which texts are produced, consumed, distributed and mediated by the relations with these other texts, genres, and discourses:

[7] Overall, Fairclough (1992, p.84) refers to intertextuality as the property texts have of being explicit or implicitly constituted by fragments of other texts. As Fairclough, we use the term intertextuality as reference to the explicit relations between textual materialities, and the term interdiscursivity to refer to the implicit relations between discourses or spheres of social activity.

> Discourse analysis should focus upon structuring or 'articulatory' processes in the construction of texts, and in the longer-term constitution of 'orders of discourse' (that is, total configurations of discursive practices in particular institutions, or indeed in a whole society). On the level of texts, I see these processes in terms of 'intertextuality' […]: texts are constructed through other texts being articulated in particular ways, ways which depend upon and change with social circumstances. On the level of orders of discourse, relationships among and boundaries between discourse practices in an institution or the wider society are progressively shifted in ways which accord with directions of social change. (FAIRCLOUGH, 1992, p.9).

Any genre is produced and transformed in a process that is mediated by the relations they with other genres (BERKENKOTTER, 2001) and especially the SP news genre has intertextuality as striking feature, as we now discuss.

1.2 Science Popularization as Intertextual Space

Overall, SP can be seen as evidence of the relations between the strict sphere of scientific activity (universities, research centers, etc.) and the other parts of society. SP is essential for the survival of knowledge areas, since each of these areas depends on the support for research provided by society as a whole (MYERS, 1990, p.145). However, this perspective is not consensual among scientists or journalists. The reference literature (MYERS, 1990; HILGARTNER, 1990; BEACCO et al., 2002; MOIRAND, 2003) brings at least two views on SP: a "canonical view" and a "contemporary view" of SP.

The "canonical view" of SP implies that there are two separate discourses on science: a discourse of authority, an expert discourse, within scientific institutions and a public discourse external to them (MYERS, 2003, p.266.). This has been, as Hilgartner (1990, p.519) claims, the culturally dominant view, where there is a strong division between the pure, genuine scientific discourse and the popularization discourse, which simplifies and distorts the scientific discourse so that it reaches society at large. This simplification of scientific discourse in SP, seen as distortion, positions journalists as outsiders, strangers to the scientific culture. At the same time, it positions SP consumers, the general public, as "lay," non-specialists who often misunderstand what they read (HILGARTNER, 1990, p.519).

Such division would be at service of scientific institutions only as a means of maintaining power in the social structure. This vertical knowledge organization

(MORAIS; NEVES, 2007), in which science is superior to journalism and the remaining of society, ensures a view of science as truth, respected by the totality of society as an indisputable cultural asset. The rupture between the discourse of science and the SP would also imply a break between genres from journalism and those from science. In this sense, a SP news text would be considered too distant from or even dissociated from a scientific article. However, to Myers (2003, p.266), SP is an order of discourse, a field in which social practices and discourses compete with each other, arranged in a system of genres. Like Myers, we oppose ourselves to this duality, seeking an understanding of the SP process more aligned to the "contemporary view" of SP.

The "contemporary view" of SP sees popularization as mobilization of debates around science and democratization of access to this debate, suggesting a horizontal organization between spheres of scientific activity and the rest of society in which journalism plays the role of a recontextualizing field (MOIRAND, 2003; BEACCO et al., 2002). On this regard, the scientific article as well as the SP article participate in the same social semiotic system in the scientific field (OLIVEIRA, 2005, p.222). Both are interrelated through complex intertextual networks of reference to the same scientific facts, but with specific realizations of meaning in different discourse genres.

In the "canonical view," SP texts are distortions of scientific discourse while non-specialist readers are seen as unable to consume "pure and genuine" science. On the other hand, in the "contemporary view," the discussion revolves around the access to scientific genres, which were restricted to the academic and scientific sphere because they impose barriers to the non-specialist reader. These barriers do not occur only due to the specific knowledge assumed in the reading of the text, but also because of the formal register of language typically used in these contexts (OLIVEIRA; PAGANO, 2006, p.627). Thus, scientific and SP genres have particular characteristics associated to their contexts of production, circulation and consumption (FAIRCLOUGH, 1992), but can be seen as part of the same system of scientific publication.

In this horizontal organization of knowledge (MORAIS; NEVES, 2007), the ideological formation of science is object of negotiation between different social actors (BEACCO et al., 2002), and science appears as a cultural asset to be shared. Concurrence between discourses from different spheres of activity is evident in the interdiscursivity established between journalistic and scientific genres.

We adopt a concept of SP aligned with the "contemporary view" because we understand that in the social semiotic system of science, SP genres play a constitutive role, since they can expand (or fluidize) the boundaries between science and society in general. However, we try to discuss to what extent SP, on the one hand, effectively ensures democratized access to scientific knowledge and, on the other hand, enables the continuity of science to the extent that its financing depends on the support from society.

Under this perspective we define SP as a recontextualization process of scientific discourse in the mass media (MOTTA-ROTH, 2009), which results from a flow between the media, the pedagogy and the science spheres of activity, through the establishment of (explicit or implicit) relations between genres that constitute them (MOTTA-ROTH, 2010b; 2011a; MOTTA-ROTH; SCHERER, 2012). This definition presupposes the idea that the critical analysis of genres such as SP news, should involve a close examination of interdiscursivity.

2 Recontextualization and Interdiscursivity in the SP News Genre

2.1 Recontextualization and System of Genres

SP understood as a recontextualization process of scientific discourse in the mass media involves the transfer of texts from a primary context (science) to a secondary context (the mass media) (MOTTA-ROTH, 2009, based on BERNSTEIN, 1974; 1996).

Therefore, understanding SP as recontextualization involves acknowledging the constitutive role of the relations between different contexts, texts and discourses involved in this process. These relations configure, for example, science as a sphere of social activity, organized by a system of genres. Based on Devitt (1991), Bazerman (1994) and Bhatia (2004, p.54), Motta-Roth (2010b, pp.158-159) defines the system of scientific genres as the

> interaction of all discursive events that make [the scientific community] or that are connected to it: activities in the research lab, in the departmental collegiate, in the researchers' offices, in the graduate program, in publishing houses that publish books from researchers, in bookstores that sell them, libraries that buy them, etc. [These interactions, in turn,] constitute the interaction of subjects in the various

> activities [that] social group and mobilize the participation of all parties [researchers, colleagues, students, department heads, book publishers, librarians, journalists, readers, etc.] in the process of knowledge production.[8]

Considering the functioning of the scientific sphere through the interaction between different genres (a research project, a scientific book, a book review, an advising session, a department meeting, memo, etc.), intertextuality and interdiscursivity between texts and discourses from science, pedagogy and the media can be described as links that configure the system of SP genres. This system, in turn, is understood as part of the broader system of scientific genres (MOTTA-ROTH, 2010b; MOTTA-ROTH; SCHERER, 2012).

Nevertheless, identifying and interpreting the links in the system of genres of science can appear as challenges to a discourse analyst. Dialogism between genres in this system, especially in the case of interdiscursivity, can be so fluid (so implicit) that their recognition (and subsequent instantiation in the interaction) will depend on the reader/speaker's familiarity (also the discourse analyst's familiarity) with the discourses mobilized in the exemplars of these genres. As Fairclough (1992, p.34) emphasizes, based on studies by M. M. Bakhtin, J. Authier-Revuz and J. Kristeva,

> Given the constitutive heterogeneity of discourse, particular pans of a text will often be ambivalent, raising questions for the interpreter about which DFs are most relevant to their interpretation, and, as Pêcheux observes in one of his last papers (1988), giving discourse analysis the character of an interpretative rather than a straightforwardly descriptive discipline. (FAIRCLOUGH, 1992, p.34).

Considering the dialogic nature of discourse, we assume the aforementioned interpretative character of CDA (FAIRCLOUGH, 1992) and more broadly of Applied Linguistics (MOITA-LOPES, 1994, 2006), to demonstrate the entanglement among the discourses of science, pedagogy and the media in one exemplar of the SP news genre.

[8] In the original: "interação de todos os eventos discursivos que conformam [a comunidade científica] ou que estão ligados a ela: as atividades no laboratório de pesquisa, no colegiado departamental, nos escritórios dos pesquisadores, no programa de pós-graduação, nas editoras que publicam os livros dos pesquisadores, nas livrarias que os vendem, nas bibliotecas que os compram, etc. [Essas interações, por sua vez,] constituem a interação dos sujeitos nas várias atividades [nesse] grupo social e mobilizam a participação de todas as partes [pesquisadores, colegas, estudantes, chefes de departamento, editores de livros, bibliotecários, jornalistas, leitores, etc.] no processo de produção de conhecimento."

2.2 Interdiscursivity in SP News

In previous analyses (MOTTA-ROTH, 2009a), we have found that a modality of knowledge production is the publication of a scientific paper in specialized journals and the subsequent recontextualization (BERNSTEIN, 1996) of that information on media genres such as SP news, focus of this work. In this genre,

> a research (its methodology, core results and the significance of its results to society) is reported in an accessible language to non-specialists. The news is a combination of headline, [lead] and the main event of the story – in this case, the development of a new research, its context, previous events and relevance of its results for the non-specialized reader's life (MOTTA-ROTH, 2010b, p.161, based on MOREIRA; MOTTA-ROTH, 2008, p.4).[9]

Among the results of the umbrella projects reported here, we emphasize the relation between the schematic representation of the SP news rhetorical organization and the interdiscursive relations between journalism, pedagogy and science, identified in this genre. In short, we can describe this rhetorical organization in terms of six relatively sequential moves (performed by steps, as proposed by SWALES, 1990, pp.140-148) which:

> 1) capture the reader's attention by means of a supporting line after the title; 2) present the researchers or allude to the original scientific paper; 3) present what is already known or unknown about the subject; 4) briefly describe the study methodology; 5) explain the innovation brought by the results of the new research being popularized; and 6) evaluate the search results and their implications for society, for the reader's life, etc. (MOTTA-ROTH; LOVATO, 2009).[10]

The organization of information in SP News may include, in addition to these rhetorical moves, recursive elements throughout the text. These elements appear in the

[9] In the original: "uma pesquisa (sua metodologia, seus resultados centrais e o significado desses resultados para a sociedade) é reportada em uma linguagem acessível a não especialistas. A notícia é uma combinação entre a manchete, [a linha de apoio] e o relato do evento principal – nesse caso, a realização de uma nova pesquisa, seu contexto, os eventos prévios e a relevância da pesquisa para a vida do leitor não especialista."
[10] In the original: "1) captam a atenção do leitor por meio de uma linha de apoio logo após o título; 2) apresentam os pesquisadores ou aludem ao artigo científico original; 3) apresentam o que já se sabe ou ainda se desconhece sobre o assunto; 4) descrevem sucintamente a metodologia do estudo; 5) explicam a inovação trazida pelos resultados da nova pesquisa popularizada; e 6) avaliam os resultados da pesquisa e suas implicações para a sociedade, para a vida do leitor, etc."

form of: quotes and reports of voices from experts who are included with the purpose of interpreting and commenting on the research being popularized; expansion and reduction (apposition and gloss) and metaphors to explain scientific principles and concepts; and stress on social/local perspective to emphasize the social relevance or locate the research in time and space.[11]

With regard to interdiscursivity, we identify, among the rhetorical moves described above, linguistic elements associated with different spheres of activity. The term "element" is used here in reference to Fairclough (1992, p.124), who considers the combination of different genres, style and discourses in the constitution of "orders of discourse." Identifying the implications of elements from different discourses in texts is to seek traces (cues) of the processes of text production and interpretation (p.198).

Our analysis of interdiscursivity "traces" in the SP news texts from our corpora indicates the combination of the three discourses mentioned above, through the following aspects:

- *Scientific discourse*: emphasis on the news plausibility, by mobilizing *technical terms*, using *mitigation strategies* typically associated to scientific discourse, which is characterized by *hypotheses*, as relativisms or provisional "truths" subjected to falsification, as opposed to journalism, which is characterized by assertive rhetoric (NASCIMENTO, 2011) in the form of categorical assertions (FAIRCLOUGH, 2003). In our view, scientific discourse is also performed by sentences in the interrogative mood about observable phenomena in the world;
- *Journalistic discourse*: emphasis on *spectacularity*, characterized by *celebration*, *assertiveness*, *fact* confirmation (as opposed to scientific hypotheses) to be exposed with "objectivity" especially attained by the *invoking of voices from social actors* that legitimize the news as they signal that the account is not just a one-sided view from the journalist (NASCIMENTO, 2011). Also the strategy of *conversationalization* functions as an approximation to the target audience through the interpellation of the reader referred

[11] This short description of SP news rhetorical organization is a result of the various analyses of the umbrella projects, which involved continuous elaboration and re-elaboration of the schematic representation of the genre rhetorical organization by project participants, under the project coordinator's guidance, between 2007 and 2014. Among the versions produced, we highlight the one initially described in Prates, Scherer and Motta-Roth (2008), and subsequently edited in Motta-Roth (2009) and Motta-Roth and Lovato (2009) in order to signal the intertextuality and interdiscursivity in moves that repeart throughout the text.

to by the pronoun "you": "Your belly's very own body clock," "Your stomach may truly have a mind of its own." (MOTTA-ROTH, 2009; MARCUZZO, 2011);

- *Pedagogic discourse*: transference of new/scientific information to the scope of the learner, using *rhetorical strategies* to provide "*scaffolding*" so that scientific knowledge is recontextualized *to a non-specialized audience*. This rhetoric is marked by the *explanation of concepts and principles*, through *discursive strategies* like *apposition* and *gloss* to explain technical terms from the science world in everyday language (MOTTA-ROTH, 2009; GERHARDT, 2011) or to identify voices of experts as members of the scientific community, by presenting credentials that enhance their authority to speak about the subject (MARCUZZO, 2011).

The identification and interpretation of these elements (see Appendix) point out that the process of recontextualization selects elements of social events based on criteria (FAIRCLOUGH, 2003, pp.139-40) that, in the case of the news text analyzed, correspond to three general principles:

1. Organizational Principle: the journalist arranges the elements selected from social events in a rhetorical organization, in which the headline in the title brings firstly an assertive statement to capture the reader's attention ("Your belly's very own body clock"), but later in the text this statement is mitigated by the observation that there is no clear knowledge on how that happens ("Food availability can shift sleep patterns, though Researchers are not sure how"). Alternatively, the arrangement may place the daily life discourse as prior scaffolding to the technical discourse following it, as in Example 1, retrieved from the text analyzed in section 2.3:

Example 1

> *It's been known for a long time that* nocturnal creatures such as *mice and bats flip their sleep schedules if food is only available during the day*. [...] In a paper published today in Science[1], a team led by Clifford Saper from Harvard Medical School in Boston, Massachusetts suggests they have found *the region of the brain responsible for the sleep-rhythm adjustment* […] *This region sits close to the area of the brain that manages ordinary circadian responses to light and dark.* (COURTLAND, 2008).

3. Addition Principle: information from specific passages considered unfamiliar to the readership (by being hermetic, considering the case of scientific principles and concepts, or unknown in the case of credentials associated to representatives of science) is expanded through apposition, gloss, exemplification, and identification (GERHARDT, 2011). The

addition principle can be observed in Example 2, an excerpt retrieved from the text analyzed in section 2.3:

Example 2

> the region of the brain responsible for the sleep-rhythm *adjustment — a clump of cells known as the dorsomedial hypothalamic nucleus (DMH)"* […] *'food anticipation' — factors like body temperature and increased movement that signal metabolic changes in advance of a meal* (COURTLAND, 2008).

4. Presence Principle: reference to things, people, places, etc. are excluded or included, emphasized or de-emphasized by discursive strategies such as **quoting** and **reporting** discourses from others; reference to credentials associated to the person whose words are quoted or reported: "'I think this paper's going to have a very short half-life,' says Ralph Mistleberger, who studies circadian rhythms at Simon Fraser University in Burnaby, British Columbia" (COURTLAND, 2008). By emphasizing almost exclusively voices from science, the journalist emphasizes the scientific point of view in what we call "effect of monologism" (MOTTA-ROTH; LOVATO, 2011) – the exclusion of voices from other sectors of society make the dialogic space to be reduced to a position only, becoming impossible to debate about the research and its relation with society (LOVATO, 2014; SCHERER, 2013). This effect of monologism ends up revealing a process aligned to the canonical and undemocratic view of SP.

Details about the analyses of SP news associated with each of these principles can be found in the collection of dissertations and theses associated with the umbrella projects and referred throughout this report. Although each work points to one of these principles (because they consist of parts of a broader research on the genre), we stress the fact that what places the SP news genre in the genre system of science is the inter-relation between those principles. The complex relations established among science, journalism and society (through pedagogy) are responsible for supporting the system:

> SP news and scientific articles do not exist separately, but rather are part of the same genre system that produces and maintains science as [this genre system] recontextualizes the scientific object through the principle of dialogism and through the intertextual power of popularization. [...] The recontextualization of a scientific article reporting a new research in a SP news text creates "a new link in the historical chain of verbal communication" [BAKHTIN, 1986b, p.106] through dialogic and intertextual relations. The discursive flow between

> science, media and society does not manifest itself linearly, as a continuum, but it is multidirectional: science informs the media while the media informs the audience. The audience, in turn, consumes the mediatization and, through an emergent process (SAWYER, 2003), in which macro-phenomena emerge from the actions of several engaged individuals, this audience determines the media agenda as well as influences the routes of science (MOTTA-ROTH, 2007b, p.3) (MOTTA-ROTH, 2010b, p 165;. 170).[12]

In this line of thought, we argue that analyzing SP genres demands approaching interdiscursivity issues (considering the interweaving among different genres that compose the genre system of science and the contact points among different discourse spheres involved in the SP social process) as a constitutive trait of these genres.

As a possibility to approach issues of interdiscursivity in SP genres, we present in section 2.3 an analysis of interdiscursivity in one of the exemplars of SP news from our corpus.

2.3 Analysis of Interdiscursivity in an Exemplar of SP News

We illustrate the interdiscursivity in SP news with an analysis of an exemplar of this genre published in *Nature News*,[13] an international online magazine on SP (Tables 1 and 2). This publication, founded in 1869, is nowadays part of the *Nature Publishing Group*, incorporated in the 90s to the German conglomerate *Georg von Holtzbrinck GmbH Publishing Group* – whose concern is "to cover the largest possible share of the global publishing market with the best services" (GERHARDT, 2011, p.82). In relation to other publications analyzed the umbrella projects, *Nature* seems to be more scientifically oriented due to a "broader coverage regarding subjects" (e.g. mathematics, medicine, archeology, anthropology) and it includes experts when referring to the

[12] In the original: "notícias de PC e o artigo científico não existem separadamente, mas integram um mesmo sistema de gêneros que produz e mantém a ciência ao recontextualizar seu objeto pelo princípio do dialogismo e pela capacidade intertextual da popularização. [...] A recontextualização de um artigo científico que relata uma nova pesquisa em uma notícia de PC cria "um novo elo na cadeia histórica da comunicação verbal" [BAKHTIN, 1992b, p.332] por meio de relações dialógicas e intertextuais. O fluxo discursivo entre ciência, mídia e sociedade não se manifesta de forma linear, como um contínuo, mas é pluridirecional: a ciência informa a mídia, esta informa o público, este, por sua vez, consome a midiatização e, por um processo de emergência (SAWYER, 2003) em que fenômenos macrossociais emergem das ações de vários indivíduos participativos, determina a agenda da mídia, assim como influencia os caminhos da ciência (MOTTA-ROTH, 2007b, p.3)."

[13] Available at http://www.nature.com/news/2008/080522/full/news.2008.848.html. Accessed on Jun. 25, 2015.

magazine's target audience (GERHARDT, 2011; SCHERER, 2013). In addition, biodatas of journalists signing the news reveal that they have degrees in the field of the study being reported. For example, the author of the text analyzed in this work, Rachel Courtland, reports in her professional page[14] that she holds an undergraduate degree and a graduate degree in Physics and in science communication. This orientation towards scientific discourse is also confirmed by the indication of a list of references at the end of the text, according to scientific conventions (this feature is not present in other texts from our corpora), as shown in the analysis.

To guide the reading of the analysis, we present in Table 1 the set of elements of interdiscursivity involved in SP news analogously to the representation of its rhetorical organization in six moves (MOTTA-ROTH, 2009). The code is composed of numbers and letters (e.g. 1b) corresponding respectively to the rhetorical moves associated with each discourse and to the aspect of the study in focus (e.g. *1. Celebration/Spectacularization of information with emphasis on (b) results of the popularized research*) or to the discursive resource used to didactize scientific information (e.g. *3. Explanation of principles and concepts through (b) exemplification*).

In the first column of Table 2, we present the exemplar in question marked with three different colors: blue, green and orange. These colors correspond to the three discourses signalled in Table 1 and their corresponding linguistic elements of interdiscursivity. In the second column, we offer comments to justify our interpretation, referring to the various analyses of the SP news genre carried out by the research teams of our umbrella projects.

Pedagogy Discourse, Science Discourse, Journalism Discourse
1. Celebration/Spectacularization of (a) new research, (b) results, (c) consequences or effects 2. Synthesizing research details: (a) publication, (b) objectives, (c) results, (d) participants/place, (e) research method 3. Explaining principles and concepts through apposition/gloss by means of (a) metaphor, (b) exemplification, (c) explanation, etc. of everyday world 4. Contrasting (a) old and (b) new knowledge 5. Explicating (a) INNOVATION, (b) relevance or (c) applicability of research results, (d) observations about the results 6. Mobilizing the voices of science/Silencing non-hegemonic voices

Table 1 – Elements associated to interdiscursivity in SP news.

[14] Available at https://www.linkedin.com/pub/rachel-courtland/1a/6b9/b1a. Accessed on Jun. 25, 2015.

SP news text from Nature	Notes
(1)(b) Your belly's very own body clock (1)(b) Food availability can shift sleep patterns, (4) though researchers aren't sure how.  Rachel Courtland (4) Does the body make sure we're awake when it's time to eat? (2) (c)Your stomach may truly have a mind of its own. A tiny area of the brain may switch sleep schedules to match up with mealtimes. (4) It's been known for a long time that nocturnal creatures such as mice and bats flip their sleep schedules if food is only available during the day. (5a) but finding the parts of the brain responsible for the switch has proved difficult. (2) In a paper (a) published today in Science [1], (d) a team led by Clifford Saper from Harvard Medical School in Boston, Massachusetts suggests (5a) they have found the region of the brain responsible for the sleep-rhythm adjustment (3) — a clump of cells known as the dorsomedial hypothalamic nucleus (DMH). This region sits close to the area of the brain that manages ordinary circadian responses to light and dark. (2c) The study shows that mice lacking a particular gene that acts in the DMH do not adjust to changes in feeding schedule. Reinstating the gene restored the behaviour. (5d) But some researchers in the field have serious concerns about the work. (6) "On the face of it, it's almost the final nail in saying DMH is the pacemaker, but under the surface there are people who strongly disagree," says neuroscientist Masashi Yanagisawa of University of Texas Southwestern Medical Center in Dallas, who was not involved in the work. (5d) This study's results conflict with other research indicating that the DMH may have no special role and that food-related circadian rhythms persist even after the DMH has been disabled. The brain region responsible for food-related rhythms may well continue to be elusive. Waking up hungry (2b) To investigate the role of the DMH, Saper and his colleagues looked at mice that lacked a particular clock gene called Bmal1. They observed that mice without this gene slept intermittently and seemed to follow no regular schedule, (3c) a sign that their circadian clock no longer functioned. (2b) To test the ability of the mice to switch their sleep schedules to match up with mealtimes, the researchers (2e) stopped offering food	• (Journalism) Interpellation (Your) – journalistic character of appealing to the audience (MOTTA-ROTH, 2009). • (Science) Concession/uncertainty (though... aren't sure) – provisional character of science (NASCIMENTO, 2011). • (Science) Question – scientific character/ problematization of phenomena. • (Pedagogy) Textualization/wording of everyday language (tiny area of the brain) replacing technical terms such as: type X of (brain) cells, or cerebral cortex, the dorsomedial hypothalamic nucleus (DMH), etc. (GERHARDT, 2011). • (Pedagogy) Explanation of scientific principles and concepts in terms associated to everyday life. • (Science) Contrast between old and new knowledge (LOVATO, 2011; 2014). • (Journalism) Contrast helps to present the research results as innovation, novelty – spectacularization (MOTTA-ROTH, 2010). • (Science) Reference to the article in which the research was originally published to specialists and identification of

overnight and restricted meals to a short 4-hour window during the day. (2c) Ordinary mice were able to switch their sleep schedules almost immediately to match, but the Bmal1 -deficient mice could not. (2e) Injecting a virus containing the gene into the DMH seemed to restore the mice's ability to switch their sleep schedule to match the new feeding schedule. (5b; 6) "Potentially it has substantial benefit for people," says Saper, who anticipates that (5b) more work in the area will help produce medication that can rapidly alter sleep schedules in humans. (5c) Such drugs could benefit people adjusting to jet lag, a process that often takes days. (4b) The results (4a) build on previous work by Yanagisawa that show oscillations in the DMH only when feeding conditions are restricted, (3c) suggesting that a period of fasting followed by an unusual mealtime might allow the DMH to overpower the main circadian clock and rejig sleep schedules [2] . Sweet anticipation But implicating DMH as the food clock depends on measuring 'food anticipation' — factors like body temperature and increased movement that signal metabolic changes in advance of a meal. Some groups who have deactivated the DMH by creating a lesion have seen no change in this behavior, indicating that other parts of the brain may be responsible[3]. At this week's Society for Research on Biological Rhythms conference in Florida, other researchers reported that Bmal1 -deficient mice still maintain food-entrained rhythms. (6) "I think this paper's going to have a very short half-life," says Ralph Mistleberger, who studies circadian rhythms at Simon Fraser University in Burnaby, British Columbia. Mistleberger notes that Bmal1 -deficient mice are not particularly healthy, and that the extent of the study's food restrictions may stress the mice so much as to skew the results. (4b) So while researchers are making headway, (4a) 80 years after food anticipatory behavior was first observed, in rats, finding the brain region responsible may continue to prove elusive. (3c) Although the DMH may have some role, (6) Mistleberger says, the mechanism is more likely to be a brain-wide network phenomenon or perhaps "a completely NOVEL clock, one that doesn't rely on the same set of clock genes, or at least NOT IN THE SAME WAY." References Fuller, P.M., Lu, J. & Saper, C.B. Science 320, 1074-1077 (2008). Mieda, M. et al. Proc. Natl. Acad. Sci. USA 32, 12150-12155 (2006). Landry, G.J. et al. J. Biol. Rhythms 22, 467-478 (2007).	authors by their credentials (MARCUZZO, 2011; LOVATO, 2011). • (Pedagogy) Apposition/gloss to identify the research authors' affiliation/credentials and to explain scientific terms (GERHARDT, 2011). • (Science) Low degree of Modalization – provisional "truth," science as the field of hypotheses and relativism (NASCIMENTO, 2011). • (Science) Specialized terms in the field of study (GERHARDT, 2011). • (Journalism) Assertiviness – information is presented as factual – search for objectivity/credibility (NASCIMENTO, 2011). • (Journalism) Quoting and Reporting – Little or none representation of voices from other social sectors besides science – little or none distancing/strong alignment to the scientist's disourse – "effect of monologism" (MARCUZZO, 2011; LOVATO, 2014; SCHERER, 2013). • (Science) Indication of "References" according to academic writing conventions.

Table 2 – Traces of elements associated to the interdiscursivity in SP news.

Conclusion

Meaning production involves the perception of relations between text, social practice and institutional structure, connections between individual and social experiences, sociohistorical conditions of production, distribution and consumption of texts in society (VOLOCHINOV, 1995 [1929]; FAIRCLOUGH, 1989). Textualization of human experience mobilizes lexicogrammar, register, genre and discourse as metaphors of social practice (HALLIDAY, 1978; VOLOCHINOV, 1995 [1929]). Especially by involving recontextualization, the SP news genre positions the Bakhtinian dialogic principle in the center of the discussion on this genre and the relations between science and society.

Our analysis aimed to expose the functioning of interdiscursivity among the discourses of science, journalism and pedagogy in the constitution of the SP news genre as part of the genre system of science. We addressed the results of analyses developed by projects carried out by SIG-REWRITE/UFSM between 2007 and 2014 to identify "traces" of elements of different discourses that SP incorporates. Data from our analysis emphasize the social process of SP as the recontextualization of science discourse in contemporary electronic media in a continuous flux between genres and spheres (MOTTA-ROTH, 2010b). This system, comprising SP genres and academic genres, (re)creates and maintains science as a tightly controlled and hierarchical system. Differently from what a democratic view of SP presupposes, the interdiscursivity identified in the SP news genre reveals a canonical view of SP by suggesting that society in general consumes and honors scientific capital, instead of having an interfering voice in the debate and in the social implications of science.

REFERENCES

ARNT, J. T.; SOCOLOSKY, T. O gênero discursivo notícia de popularização da ciência no livro didático. *Expressão* (UFSM), v. 14, p.87-96, 2010.

BAKHTIN, M. M. The Problem of Speech Genres In: *Speech Genres and Other Late Essays*. Editado por Caryl Emerson e Michael Holquist. Trans. Vern W. McGee. Austin: University of Texas Press, 1986a, pp.60-102. [1952-1953].

_____. The Problem of the Text in Linguistics, Philology and the Human Sciences: An Experiment in Philosophical Analysis. In: *Speech Genres and Other Late Essays*. Editado

por Caryl Emerson e Michael Holquist. Trans. Vern W. McGee. Austin: University of Texas Press, 1986b, pp.103-131.

_____. Os gêneros do discurso In: BAKHTIN, M. M. *Estética da criação verbal.* Trad. Maria Ermantina Galvão Gomes Pereira. São Paulo: Martins Fontes, 1992a, p.277-326. [1952-1953]

_____. O problema do texto. In: BAKHTIN, M. M. *Estética da criação verbal.* Trad. Maria Ermantina Galvão Gomes Pereira. São Paulo: Martins Fontes, 1992b, p.327-358. [1959-1961]

_____ (VOLOCHINOV, V. N.). *Marxismo e filosofia da linguagem*: problemas fundamentais do método sociológico na ciência da linguagem. Trad. Michel Lahud e Yara Frateschi Vieira. 7.ed. São Paulo: HUCITEC, 1995. [1929]

BAZERMAN, C. Systems of Genre and the Enactment of Social Intentions. In: FREEDMAN, A.; MEDWAY, P. (Eds.). *Genre and the New Rhetoric*. London: Taylor & Francis, 1994, pp.79-101.

BEACCO, J-C.; CLAUDEL, C.; DOURY, M.; PETIT, G.; REBOUL-TOURÉ, S. Science in Media and Social Discourse: New Channels of Communication, New Linguistic Forms. *Discourse Studies*, v. 4, n. 3, pp.277- 300, 2002.

BERKENKOTTER, C. Genre Systems at Work: DSM-IV and Rhetorical Recontextualization in Psychotherapy Paperwork. *Written Communication*, v. 18, pp.326-349, 2001.

BERNSTEIN, B. *Class, Codes and Control*, v. 1: Theoretical Studies towards a Sociology of Language. 2. ed. London: Routledge & Kegan Paul, 1974.

_____. *A estruturação do discurso pedagógico:* classe, códigos e controle. Petrópolis: Vozes, 1996.

BHATIA, V. *Worlds of Written Discourse:* A Genre-Based View. London/New York: Continuum, 2004.

COURTLAND, R. Your belly's very own body clock. *Nature News*, 2008. Disponível em: [http://www.nature.com/news/2008/080522/full/news.2008.848.html]. Acesso em: 25 jun 2015.

DEVITT, A. J. Intertextuality in Tax Accounting: Generic, Referential, and Functional. In: BAZERMAN, C.; PARADIS, J. (Eds.). *Textual Dynamics of the Professions*: Historical and Contemporary Studies of Writing in Professional Communities. Madison, WI: The University of Wisconsin Press, 1991, pp.336-357.

FAIRCLOUGH, N. *Language and Power*. London: Longman, 1989.

_____. *Discourse and Social Change.* Cambridge: Polity Press, 1992.

_____. *Discurso e mudança social*. Trad. Isabel Magalhães (Coord.). Brasília: Editora UnB, 2001. [1992]

_____. *Analysing Discourse*: Textual Analysis for Social Research. London/New York: Routledge, 2003.

FIORIN, J. L. Interdiscursividade e intertextualidade. In: BRAIT, B. (Org.). *Bakhtin*: outros conceitos-chave. São Paulo: Contexto, 2009, p.161-193.

GERHARDT, L. B. *A didatização do discurso da ciência na mídia eletrônica*. 2011. 167f. Tese. (Doutorado em Estudos Linguísticos). Universidade Federal de Santa Maria, Santa Maria.

HALLIDAY, M. A. K. *Language as Social Semiotic:* The Social Interpretation of Language and Meaning. London: Edward Arnold, 1978.

_____. Part A. In: HALLIDAY, M.A.K.; HASAN, R. *Language, Context, and Text:* Aspects of Language in a Social-Semiotic Perspective. Oxford: Oxford University Press, 1989, pp.3-49.

HILGARTNER, S. The Dominant View of Popularization: Conceptual Problems, Political Uses. *Social Studies of Science*, v. 20, n. 3, pp.519-139, 1990.

LOVATO, C. dos S. *Análise de gênero:* investigação da organização retórica de notícias de popularização da ciência na revista Ciência Hoje online. 2011. 102f. Dissertação. (Mestrado em Estudos Linguísticos). Universidade Federal de Santa Maria, Santa Maria.

_____. dos S. *A homogeneidade discursiva em notícias de popularização da ciência nas revistas Ciência Hoje online e Galileu*. 2014. 193f. Tese. (Doutorado em Estudos Linguísticos). Universidade Federal de Santa Maria, Santa Maria.

MARCUZZO, P. *Ciência em debate? Uma análise das vozes em notícias de popularização científica.* 2011. 173f. Tese. (Doutorado em Estudos Linguísticos). Universidade Federal de Santa Maria, Santa Maria.

MARTIN, J. R. *English Text:* System and Structure. Philadelphia/Amsterdam: John Benjamins, 1992.

_____. A Universe of Meaning – How Many Practices? In: JOHNS, A. (Ed.) *Genre in the Classroom:* Multiple Perspectives. Mahwah, NJ: Lawrence Erlbaum, 2002, p.269-278.

MEURER, J. L. Uma dimensão crítica do estudo de gêneros textuais. In: MEURER, J.L.; MOTTA-ROTH, D. (Orgs.). *Gêneros textuais e práticas discursivas:* subsídios para o ensino da linguagem. Bauru: EDUSC, 2002, p.17-29.

MOIRAND, S. Communicative and Cognitive Dimensions on Science in the French Media. *Discourse Studies*, v. 5, n. 2, pp.175-206, 2003.

MOITA LOPES, L. P. Pesquisa interpretativista em Linguística Aplicada: a linguagem como condição e solução. *D.E.L.T.A*, v. 10, n. 2, p.329-338, 1994.

_____. Uma lingüística aplicada mestiça e ideológica: interrogando o campo como lingüista aplicado. In: MOITA LOPES, L. P. (Org.). *Por uma linguística aplicada indisciplinar*. São Paulo: Parábola, 2006. p.13-44.

MORAIS, A. M.; NEVES, I. A teoria de Basil Bernstein: alguns aspectos fundamentais. *Práxis Educativa*, Ponta Grossa, v. 2, n. 2, p.115-130, 2007.

MOREIRA, T. M.; MOTTA-ROTH, D. Popularização da ciência: uma visão panorâmica do Diário de Santa Maria. In: *VIII Encontro do Círculo de Estudos Linguísticos do Sul/CELSUL*, 2008, Porto Alegre. *Anais...* Porto Alegre: UFRGS/CELSUL, 2008, p.1-12.

MOTTA-ROTH, D. *Análise crítica de gêneros com foco em artigos de popularização da ciência*. Santa Maria: Universidade Federal de Santa Maria, 2007. Projeto de Produtividade em Pesquisa PQ/CNPq (nº 301962/2007- 3).

_____. Análise crítica de gêneros: contribuições para o ensino e a pesquisa de linguagem. *D.E.L.T.A.*, v. 24, n. 2, p.341-383, 2008.

_____. Popularização da ciência como prática social e discursiva. In: MOTTA-ROTH, D.; GIERING, M. E. (Orgs.). *Discursos de popularização da ciência. Hipers@beres - Volume I.* Santa Maria, RS: PPGL Editores, 2009, p.131-195.

_____. Análise crítica de gêneros discursivos em práticas sociais de popularização da ciência. Santa Maria: Universidade Federal de Santa Maria, 2010a. Projeto de Produtividade em Pesquisa PQ/CNPq (nº 301793/2010-7).

_____. Sistemas de gêneros e recontextualização da ciência na mídia eletrônica. *Gragoatá* (UFF), v. 28, p.153-174, 2010b.

_____. *E-Mediatization of Science:* Inter/Hipertextuality, Genre Systems and Scientific Literacy. Mesa Redonda "Gênero Textual/Letramento, Ciência e Tecnologia", In: *VI SIGET – Simpósio Internacional de Gêneros Textuais*, 2011a, Natal. *Anais do VI SIGET*. Natal: UFRN, 2011.

_____. Letramento científico: sentidos e valores. *Notas de Pesquisa* (UFSM), v. 1, n. 0, p.12-25, 2011b. Disponível em: [http://cascavel.ufsm.br/ revistas/ojs-2.2.2/index.php/nope/article/view/3983/2352]. Acesso em: 23 jun. 2015.

_____. Análise crítica de gêneros com foco em notícias de popularização da ciência. In: SEIXAS, L.; PINHEIRO, N. F. (Orgs.). *Gêneros*: um diálogo entre Comunicação e Linguística Aplicada. Florianópolis, SC: Insular, 2013, p.121-146.

_____; LOVATO, C. dos S. Organização retórica do gênero notícia de popularização da ciência: um estudo comparativo entre português e inglês. *Linguagem em (Dis)Curso* (UNISUL), v. 9, n. 2, maio/ago, p.233-271, 2009.

_____; LOVATO, C. O poder hegemônico da ciência no discurso de popularização científica. *Calidoscópio* (UNISINOS), v. 9, p.251-268, 2011.

_____; MARCUZZO, P. Ciência na mídia: análise crítica de gênero de notícias de popularização científica. *Revista Brasileira de Linguística Aplicada* (UFMG/ALAB), v. 10, p.511-538, 2010.

_____; MARCUZZO, P.; NASCIMENTO, F. S.; SCHERER, A. Polifonia em notícias de popularização da ciência sob a ótica sistêmico-funcional. In: *4 Congresso da ALSFAL-Associação de Lingüística Sistêmico-Funcional da América Latina*, 2008, Florianópolis, SC. *Anais do Congresso/Actas/Proceedings*, v. 1. Florianópolis, SC: ALSFAL/PPGI-CCE-UFSC, 2008, p.133-146.

_____; SCHERER, A. Expansão e contração dialógica na mídia: intertextualidade entre ciência, educação e jornalismo. *D.E.L.T.A.* v. 28, p.639-672, 2012.

MYERS, G. *Writing Biology:* Texts in The Social Construction of Scientific Knowledge. Madison: University of Wisconsin Press, 1990.

_____. Discourse Studies of Scientific Popularization: Questioning the Boundaries. *Discourse Studies*, v. 5, n. 2, pp.265-279, 2003.

NASCIMENTO, F. S. '*GM crops may be harmful to the environment*': graus de autoridade e assertividade em notícias de popularização da ciência. 2011. 114f. Dissertação. (Mestrado em Estudos Linguísticos). Universidade Federal de Santa Maria, Santa Maria.

OLIVEIRA, J. M. de. *As vozes da ciência:* a representação do discurso nos gêneros artigo acadêmico e de divulgação científica. 2005. 250f. Tese. (Doutorado em Linguística). Universidade Federal de Minas Gerais, Belo Horizonte.

_____; PAGANO, A. The Research Article and the Science Popularization Article: A Probabilistic Functional Grammar Perspective on Direct Discourse Representation. *Discouse & Society*, v. 8, n. 5, pp.627-646, 2006.

PRATES, N. D.; SCHERER, A. S.; MOTTA-ROTH, D. Organização retórica e uso de aposto em artigos de popularização da ciência. In: *56º Seminário do Grupo de Estudos Linguísticos/GEL*, 2008. *Anais...* São José do Rio Preto: UNIP, 2008.

SCHERER, A. S. *Engajamento e efeito de monologismo no gênero notícia de popularização científica.* 2013. 167f. Dissertação. (Mestrado em Estudos Linguísticos). Universidade Federal de Santa Maria, Santa Maria.

_____; MOTTA-ROTH, D. Discurso, intertextualidade e ciência na mídia de massa: o caso da popularização científica. *Cenários: Revista de Estudos da Linguagem* (UNIRITTER), v. 2, p.50-68, 2014.

SWALES, J. M. *Genre Analysis:* English in Academic and Research Settings. Cambridge: Cambridge University Press, 1990.

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